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Safe Travel for Virginia's Non-Motorized Road Users: A Comprehensive Review of Pedestrian and Bicycle Laws in Virginia and the United States

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Supplementary Notes

Abstract

This study involved conducting a comprehensive review of Virginia's laws regarding the status, rights, and responsibilities of pedestrians and other non-motorized users of Virginia's transportation network and comparing them with the status, rights, and responsibilities of motorists.

The analysis of Virginia's pedestrian-related statutes and their comparison with those of other states and the *Uniform Vehicle Code* revealed a number of areas where the *Code of Virginia* is unclear as to the rights and responsibilities of pedestrians and motorists. For example, pedestrians are directed to use crosswalks and intersections only "wherever possible," which is a vague standard. The Code also contains several pedestrian-related provisions where the language is ambiguous, and there are also provisions in the Code that potentially conflict with one another. In addition, the Code is silent in a number of areas that could increase pedestrian safety, such as a due care requirement, a requirement that pedestrians obey the directions of law enforcement officers, and a requirement that pedestrians yield the right of way to emergency vehicles.

Bicycles were used as a proxy for "other non-motorized users" because Virginia laws governing bicyclists frequently govern individuals using electric personal assistive mobility devices, electric power-assisted bicycles, roller skates, skateboards, or mopeds (e.g., §§ 46.2-800, 46.2-904, and 46.2-905 of the *Code of Virginia*). However, Virginia's bicycle laws were updated relatively recently by the General Assembly and were found to be generally clear and in harmony with those in the majority of other states.

FINAL REPORT

SAFE TRAVEL FOR VIRGINIA'S NON-MOTORIZED ROAD USERS: A COMPREHENSIVE REVIEW OF PEDESTRIAN AND BICYCLE LAWS IN VIRGINIA AND THE UNITED STATES

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PREFACE

This report was commissioned by Virginia's Secretary of Transportation, Pierce R. Homer, and the Commonwealth Transportation Board. The research was funded in part by a State Planning and Research grant coordinated by the Northern Virginia District of the Virginia Department of Transportation (VDOT). Additional financial support was provided by the Virginia Transportation Research Council (VTRC). The study was guided by a steering committee representing a wide variety of public agencies and public interest groups who offered valuable insight into current pedestrian- and bicycle-related problems that might be alleviated by amendments to the *Code of Virginia*. The members of the steering committee were:

Keith Martin, VDOT, Chairman
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LIST OF ACRONYMS AND ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
ANOVA	Analysis of variance
CPI	Consumer Price Index
FARS	Fatality Accident Reporting System
FHWA	Federal Highway Administration
NHTSA	National Highway Traffic Safety Administration
the Code	Code of Virginia
UVC	Uniform Vehicle Code
VDOT	Virginia Department of Transportation
VTRC	Virginia Transportation Research Council

EXECUTIVE SUMMARY

Introduction

Traffic safety has changed considerably since Virginia enacted its first statutory codification of the "rules of the road" in 1926.[1] In particular, as automobiles become larger and faster, and with ever increasing congestion on the roadways, it is becoming increasingly important to ensure that legislation related to the safety of pedestrians and other non-motorized road users continues to offer as much protection to pedestrians and bicyclists as possible. Although pedestrian fatalities nationwide have been decreasing over time, there is evidence to indicate that this might be associated with decreased walking activity rather than improvements in safety.[2] In order to protect these vulnerable road users, legislation related to pedestrians and bicyclists must be periodically reviewed and amended in order to keep pace with demographic and technological changes in society. However, much of the language concerning pedestrian safety in the *Code of Virginia* (hereinafter referred to as "the Code") today was written for the first "Rules of the Road" provisions enacted in 1926,[3] during a time when pedestrian and motorist interactions were very different than they are today.

This report analyzes Virginia's pedestrian- and bicycle-related statutes and contrasts them with pedestrian- and bicycle-related legislation from the other 49 states and the District of Columbia in order to identify ambiguities and conflicts in the Code and to suggest areas where Virginia's pedestrian and bicycle laws need improvement. In order to provide a more comprehensive support structure for legislative changes, Virginia crash data were analyzed and surveys of pedestrian and bicycle safety education policies were sent to all 50 states and the District of Columbia. Many studies analyzing pedestrian and bicycle safety have pointed out that improvements related to pedestrians and bicyclists have traditionally focused on the "three E's": engineering, enforcement, and education.[4] Although the focus of this report (legislation) mainly falls into the enforcement category (and to a lesser extent into the education category), it is important to note that all three are necessary to improve pedestrian and bicyclist safety. Indeed, "a comprehensive approach is most effective in creating safer walking environments."[5]

Purpose, Scope, and Methods

In a memorandum to Commissioner of Transportation David S. Ekern, Virginia Secretary of Transportation Pierce R. Homer requested a review of Virginia's laws affecting pedestrians and other non-motorized road users:

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[1] Act of Mar. 25, 1926, ch. 474, 1926 Va. Acts 763, 789.
[2] CHARLES V. ZEGEER ET AL., NCHRP REPORT 500: GUIDANCE FOR IMPLEMENTATION OF THE AASHTO STRATEGIC HIGHWAY SAFETY PLAN II-3 (Transportation Research Board 2004).
[3] Act of Mar. 25, 1926, ch. 474, 1926 Va. Acts 763, 789.
[4] *See, e.g.,* BRYAN E. PORTER ET AL., THE VIRGINIA STRATEGIC PLAN FOR PEDESTRIAN SAFETY (2005-2010) 19 (Old Dominion University, George Mason University 2005); ZEGEER ET AL., *supra* note 2, at II-1.
[5] ZEGEER ET AL., *supra* note 2, at II-1.

> The purpose of this memorandum is to request that the Department of Transportation conduct a comprehensive review of Virginia's laws regarding the status, rights and responsibilities of pedestrians and other non-motorized users of the transportation network as compared to the status, rights and responsibilities of motor vehicles. In the event the review suggests a need for statutory changes, whether for clarification or modification of current law, the Department should develop a legislative proposal for consideration during the 2008 session.[6]

This study reviewed accommodations for pedestrians and other non-motorized users of Virginia's roads through a comprehensive analysis of Virginia laws relating to the rights and duties of non-motorized users. Bicyclists were chosen as a proxy for all other (non-pedestrian) non-motorized users because Virginia's laws governing bicyclists frequently govern individuals using electric personal assistive mobility devices, electric power-assisted bicycles, roller skates, skateboards, and mopeds.[7] The following tasks were performed to fulfill the purpose of the study:

1. a literature review of reports on pedestrian and bicyclist safety, including those published by the Virginia Transportation Research Council (VTRC) and the National Highway Traffic Safety Administration (NHTSA), and journal articles focusing on pedestrian and bicycle safety education, comprehension, and behavior

2. an analysis of available Virginia pedestrian and bicycle crash data at macroscopic and microscopic levels

3. an analysis of statutes in the Code related to pedestrians and bicyclists

4. a comparison of the pedestrian- and bicycle-related legislation in Virginia and that in the other 49 states, the District of Columbia, and the model legislation in the Uniform Vehicle Code (UVC) (for the purposes of this report, "state" includes the District of Columbia)

5. surveys of the pedestrian and bicycle coordinators in each state and the offices of the superintendent of education in each state regarding pedestrian and bicycle safety education policies to determine how such education is carried out to both public school children and the general public.

Literature Review

The two most recent studies conducted by the VTRC on pedestrian safety[8] concluded that the Code was unclear with respect to a number of areas concerning pedestrian safety. The

[6] Memorandum from Pierce R. Homer, Virginia Secretary of Transportation, to David S. Ekern, Sr., Virginia Commissioner of Transportation (Apr. 9, 2007) (on file with the Virginia Transportation Research Council).
[7] *See*, *e.g.*, VA. CODE ANN. § 46.2-800 (2007); VA. CODE ANN. § 46.2-904 (2007); VA. CODE ANN. § 46.2-905 (2007).
[8] CHARLES B. STOKE & ANDREA M. SULLIVAN, SAFE WALKING IN THE COMMONWEALTH: AN ANALYSIS OF THE ISSUES AND PROPOSED CLARIFICATIONS TO THE CODE OF VIRGINIA (Va. Transp. Research Council 1995); CHARLES B. STOKE & VERONICA M. KELLY, THE PEDESTRIAN IN THE TRANSPORTATION SYSTEM: LEGISLATION FOR IMPROVED TRAFFIC SAFETY (Va. Transp. Research Council 1990).

studies made similar recommendations: (1) the definitions of six words used in the Code should be added in order to provide the pedestrian statutes with greater clarity;[9] (2) when pedestrians must yield to vehicles should be made clear; (3) a provision that prohibited pedestrians from "carelessly and maliciously interfer[ing] with the orderly passage of vehicles"[10] should be removed; (4) the places for pedestrians to walk and appropriate behavior for pedestrians in particular situations (e.g., when walking on the roadway) should be clearly designated; and (5) an explicit requirement for drivers to use due care should be added. Only one of these recommendations was enacted.[11]

In the most recent VTRC study on Virginia's bicycle safety laws,[12] the researcher made a number of recommendations to improve safety for bicyclists and clarify the rights and responsibilities of both bicyclists and motorists. Most of the recommendations were enacted in the fifth and sixth years after the study was completed. Among other things, the definition of the word "bicycle" was changed to include children's bicycles (thus bringing children within the reach of the Commonwealth's child bicycle helmet law),[13] a provision governing when passengers are permitted to ride on bicycles was added,[14] and the prohibition on riders riding two abreast was amended to include a prohibition on riders riding *more* than two abreast.[15]

A study that evaluated pedestrian- and bicycle-related legislation nationwide demonstrated that the Code frequently offered less protection to pedestrians and bicyclists than did the majority of other states. NHTSA published a guide that compared the statutes of the 50 states with those in the UVC and that demonstrated that Virginia lacked a number of protections present in the majority of other states, such as a provision requiring drivers to use due care and a provision specifically defining where pedestrians must walk in the absence of a sidewalk.[16] Similarly, a 1985 article in the George Mason University Law Review identified a number of ambiguities and conflicts in the Code that needed to be amended, particularly with regard to what are now §§ 46.2-923 and 46.2-924.[17]

Studies that evaluated the behavior and comprehension of right-of-way rules of pedestrians identified two key problems that need to be considered when an attempt is made to improve pedestrian safety. First, a number of studies have noted that pedestrians and drivers often misunderstand their rights and responsibilities. For example, many people believe that a pedestrian's right of way depends on whether the pedestrian is using a marked or an unmarked

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[9] The authors of both studies recommended adding definitions of the words "marked crosswalk," "unmarked crosswalk," "pedestrian," "sidewalk," "traffic control device," and "traffic control signal." STOKE & SULLIVAN, *supra* note 8, at 30; STOKE & KELLY, *supra* note 8, at 11.
[10] VA. CODE ANN. § 46.2-923 (2007).
[11] The definition of "sidewalk" was added in 2003. Act of Mar. 16, 2003, ch. 29, 2003 Va. Acts 30, 33.
[12] BARBARA SCHEIB, BICYCLE LAWS: A SURVEY AND COMPARISON OF REGULATIONS IN VIRGINIA AND THE NATION (Va. Transp. Research Council 1998).
[13] Act of Mar. 16, 2003, ch. 29, 2003 Va. Acts 30, 31.
[14] *Id*. at 35.
[15] Act of Apr. 15, 2004, ch. 947, 2004 Va. Acts 1849, 1851.
[16] NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., U.S. DEP'T OF TRANSP., RESOURCE GUIDE ON LAWS RELATED TO PEDESTRIAN AND BICYCLE SAFETY (2002).
[17] Alaine K. Belongia, Comment, *Rights, Liabilities, and Duties of Pedestrians and Motorists in Virginia*, 8 GEO. MASON U. L. REV. 177 (1985).

crosswalk[18] or that pedestrians have the right of way over vehicles at all times—even when they are crossing without a crosswalk, an intersection, or a signal present.[19] Second, pedestrians who cross unsafely (e.g., who cross without a signal or who jaywalk) perceive the risk of harm (i.e., from a traffic accident or a ticket) to be small compared with the inconvenience of using a safer crossing route.[20] One way to motivate pedestrians to choose the safer route would be to increase the risk of a negative consequence for pedestrians who cross unsafely by greater enforcement of pedestrian-related laws.[21]

Crash Data Analysis

An analysis of Virginia crash data for the most recent 7 years that data were available (1999 through 2005) did not reveal specific increasing or decreasing trends in the raw numbers of pedestrian and bicyclist fatalities, although the number of injured pedestrians in Virginia decreased slightly. The raw numbers are often of interest in traffic safety research because they are readily understandable and transparent to both the general public and safety experts. However, the raw numbers do not take into account any factors that might have been changed over time and that would have influenced pedestrian and bicycle traffic crashes, such as demographic changes and changes in the number of pedestrians and bicyclists. To account for demographic changes over time, fatality and injury rates per million population were calculated and analyzed. A decreasing trend in the pedestrian and bicyclist injury rates per million population was found.

An examination of long-term trends over 26 years (1980 through 2005) in Virginia and nearby states revealed that Virginia had fewer pedestrian-involved fatal crashes than Maryland and North Carolina and more than West Virginia, Tennessee, Kentucky, and the District of Columbia, although Maryland's and North Carolina's numbers had decreased to near Virginia's in recent years. The long-term trends in the rate of fatal pedestrian crashes per million population showed that Virginia's rate was lower than the rates of Maryland and the District of Columbia and similar to those of West Virginia, Tennessee, Kentucky, and North Carolina.

Because a number of bills have been introduced in the Virginia General Assembly in recent years to change the requirement that drivers *yield* to pedestrians in crosswalks to a requirement that drivers *stop* for pedestrians in crosswalks (or to authorize localities to make this change),[22] an analysis of pedestrian-involved fatal crashes for other states that had enacted this law change was conducted. A before-after analysis using the pedestrian-involved fatal crash data from states that had changed their crosswalk laws from requiring drivers to yield to pedestrians in crosswalks to requiring them to stop for pedestrians in crosswalks revealed a statistically

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[18] Julie Hatfield et al., *Misunderstanding of right-of-way rules at various pedestrian crossing types: Observational study and survey*, 39 ACCIDENT ANALYSIS & PREVENTION 833, 841 (2007).
[19] Kristie Martinez & Bryan Porter, *The likelihood of becoming a pedestrian fatality and driver's knowledge of pedestrian rights and responsibilities in the Commonwealth of Virginia*, 7 TRANSP. RES. PART F 43, 53 (2004).
[20] PORTER ET AL., *supra* note 4, at 28.
[21] *Id*.
[22] *See, e.g.,* H.B. 2945, 2007 Gen. Assem., Reg. Sess. (Va. 2007); H.B. 2863, 2006 Gen. Assem., Reg. Sess. (Va. 2006); S.B. 233, 2006 Gen. Assem., Reg. Sess. (Va. 2006); H.B. 539, 2004 Gen. Assem., Reg. Sess. (Va. 2004); H.B. 1613, 2003 Gen. Assem., Reg. Sess. (Va. 2003).

significant decrease in two of the studied states.[23] However, the decrease is thought to be ascribed to long-term decreasing trends in the data. Time-series analysis confirmed the existence of the decreasing trends, and time-series and cross-sectional analyses concluded that the law changes from yield to stop were not statistically associated with a reduction in the number or the rate (per million population) of the pedestrian-involved fatal crashes in any of the studied states.

In Virginia, the analysis revealed that the greatest number of pedestrian crash fatalities occurred when the pedestrian was crossing mid-block (not at a crosswalk) and identified adults and senior citizens trying to cross roads mid-block or on uninterrupted stretches of major roads as the most serious pedestrian traffic safety problem.[24] This situation accounted for more than two-thirds of the pedestrian fatalities in the two sample years: 2001 and 2006. This is notable because when crossing in the absence of a crosswalk or intersection, pedestrians are not protected by a statutorily determined right of way.

Other commonly identified situations in Virginia where pedestrians were struck and killed involved pedestrians walking or lying in the roadway, walking or sitting on the roadside, and crossing in a crosswalk. Adults outnumbered senior citizens in non-intersection, in-roadway crashes, but both groups were equally numbered in terms of fatalities occurring when the pedestrian was in the crosswalk. Children were killed most often in the roadway, not at an intersection. Pedestrians struck while crossing in a crosswalk were killed while crossing against the signal and when confronted by a left-turning vehicle.

Pedestrian and Bicycle Education Surveys

The results of the two pedestrian and bicycle education surveys sent to the pedestrian and bicycle coordinators in each state and to the offices of the superintendent of education in each state revealed that there is a variety of approaches to pedestrian and bicycle safety education. Respondents indicated that in each state, different state agencies take part in educating both school children and the general public about pedestrian and bicycle safety, most notably the departments of transportation, education, highway safety, motor vehicles, and health. The responses to both surveys indicated that most states target children in elementary and intermediate schools. A small number of respondents to the survey sent to the pedestrian and bicycle coordinators indicated that their states target other vulnerable populations, such as the elderly and immigrant populations. Although a large number of respondents to both surveys relies on a combination of Federal Highway Administration recommendations, state-funded research efforts, and cooperation among different state agencies when designing and implementing bicycle and pedestrian action plans, a small but notable number also uses information made available on the Internet by various pedestrian and bicycle advocacy organizations (such as the Pedestrian and Bicycle Information Center at http://www.pedbikeinfo.org) and action plans developed by other states and the federal government.

[23] The crash data analysis is discussed in the full report.

[24] Adults were defined as individuals 20 through 64 years old, and senior citizens were defined as individuals age 65 and older.

Analyses of the Code of Virginia, the Codes of Other States, and the Uniform Vehicle Code

The analysis of the Code and the comparison of the Code to the codes of other states and the UVC revealed a number of areas where the Code was confusing and a number of issues regarding which the majority of states had legislated but where Virginia was silent. In addition, the analysis revealed a few provisions in the Code that either overlapped or were in conflict with other provisions. These are detailed in the full report.

Recommendations for Possible Changes to the Pedestrian- and Bicycle-Related Statutes in the Code of Virginia

The review of the codes of other states showed that the language used in the UVC could be used to clarify some of Virginia's more ambiguous provisions.

1. *The addition (or amendment) to the Code of five definitions would clarify Virginia's pedestrian-related statutes.* Definitions of the words "traffic," "pedestrian," and "traffic-control device" would aid in the interpretation of a number of Virginia statutes. The definition of the word "crosswalk" could be written to differentiate between "marked" and "unmarked" crosswalks to clarify the situations where drivers must yield to pedestrians. The definition of the term "shared-use path" suggests that shared-use paths are paths primarily for the use of bicyclists, rather than paths that are intended to be *shared*. These definitions should be included (or amended) in the Code in order to provide for a more uniform interpretation of Virginia's pedestrian- and bicycle-related laws.

2. *Section 46.2-826 of the Code, which requires drivers to stop before entering a public highway or sidewalk from a private road, does not afford ample protection to pedestrians on sidewalks.* It is not clear why drivers must yield the right of way to pedestrians on sidewalks when the driver is approaching from a private road or driveway but not when the driver is turning onto a private road or driveway. The sidewalk is the domain of the pedestrian, and drivers should be required to yield to pedestrians on sidewalks at all times.

3. *Virginia is the only state that does not expressly require pedestrians to obey red, amber, and green vehicular traffic signals when crossing in the absence of a pedestrian control signal.* This is potentially dangerous, as pedestrians can legally cross in front of oncoming traffic that has a green light (provided that the oncoming traffic is not close enough for the pedestrian to be considered "in disregard" of it[25]). Further, this causes a conflict with Virginia Supreme Court decisions that refused to grant pedestrians the right of way when they are crossing against a red light.[26] In situations where there are no pedestrian control signals to guide pedestrians' crossing

[25] VA. CODE ANN. § 46.2-924(B) (2007).
[26] *See, e.g.,* Floyd v. Nunn, 232 S.E. 2d 813, 217 Va. 834 (1977); Sanders v. Newsome, 19 S.E.2d 883, 179 Va. 582 (1942).

behavior, pedestrians should be required to obey red, amber, and green vehicular traffic signals.

4. *Section 46.2-834 of the Code requires only* drivers *to obey the direction of law enforcement officers directing traffic.* It would offer more protection to pedestrians and bicyclists to require that pedestrians and bicyclists, in addition to drivers, obey the directions of law enforcement officers who are directing traffic.

5. *Although § 46.2-858 of the Code prohibits drivers from passing another vehicle while a pedestrian is passing or about to pass in front of that vehicle, the prohibition is included in a provision entitled "Passing at a railroad grade crossing,"*[27] *not in a provision in the designated pedestrian section of the Code (i.e., Article 16 of Title 46.2)*. Forty-six other states also prohibit this behavior but include the prohibition in the sections of their codes regulating the rights and responsibilities of pedestrians. Although the title does not have the force of law,[28] it should still provide an accurate description of the behavior that the statute is designed to cover. Including this prohibition in the pedestrian section of the Code would provide better notice to pedestrians and drivers that passing a vehicle stopped to allow a pedestrian to cross is illegal.

6. *Section 46.2-923 of the Code is vague and does not clearly define the expected behavior of pedestrians crossing the street.* The prohibition on pedestrians "carelessly or maliciously interfer[ing] with the orderly passage of vehicles" is confusing because it relies on the pedestrians' mental state, rather than on their behavior. No other state regulates pedestrian behavior in this way—the majority prohibits pedestrians from running out in front of vehicles that are so close that the pedestrian constitutes an immediate hazard or so close that it is impossible for the driver to yield. The Code should follow the example of other states, which would provide a clearer enumeration of the duties of pedestrians. Further, this statute requires that pedestrians use marked crosswalks or intersections "wherever possible," which is a vague standard that does not clearly identify when pedestrians must use a crosswalk or intersection and when they may choose to cross between intersections. The Code should explicitly state when pedestrians must use crosswalks and intersections and when they are permitted to cross mid-block.

7. *Parts of § 46.2-924 of the Code are ambiguous and are inconsistent with other sections of the Code.* With respect to when pedestrians have the right of way over vehicles, this provision provides that pedestrians have the right of way at all times over vehicles making turns, even if the pedestrian is crossing unlawfully, which conflicts with the pedestrians' right of way in the right-turn-on-red provision (§ 46.2-835) where drivers must yield only to pedestrians who are crossing lawfully. Pedestrians should be granted the right of way over turning vehicles only when crossing *lawfully*. In addition, Virginia should follow the 33 states that clearly specify that drivers must yield to pedestrians in crosswalks *and* must slow down or

[27] VA. CODE ANN. § 46.2-858 (2007).
[28] Good v. Commonwealth, 155 Va. 996, 1000, 154 S.E. 477, 478 (1930).

stop if necessary, which provides a clearer enumeration of what is expected of drivers by the term "yield" (8 more states require drivers to come to a complete stop). Finally, the prohibition on pedestrians entering or crossing intersections in disregard of approaching traffic should be removed, as it overlaps in content with §§ 46.2-923 and 46.2-926 and would be subsumed within the proposed changes to § 46.2-923.

8. *Pedestrian control signals are no longer limited to the words "Walk" and "Don't Walk."* The Code would be clearer if this provision in § 46.2-925[29] were updated to include symbols (e.g., a red outline of a hand indicating "Don't Walk") and words used on pedestrian control signals. The Code should accurately reflect the technologies currently in use in pedestrian control signals.

9. *Section 46.2-926 of the Code prohibits pedestrians from stepping out from where they cannot be seen, which potentially conflicts with the requirement in § 46.2-923 that pedestrians use crosswalks or intersections "wherever possible."* In situations where vehicles are parked along a street or where there are low-hanging trees near a crosswalk, a pedestrian may be forced either to step out from where he or she cannot be seen (e.g., from between a row of parked vehicles) or to cross away from the crosswalk. The recommended change to § 46.2-923 would encompass this behavior and render this section superfluous—pedestrians would be prohibited from suddenly stepping out in front of traffic that is so close that it constitutes an immediate hazard. This would thus cover the situation of a pedestrian stepping out from where he or she cannot be seen when there is closely approaching traffic. This change would not prohibit this behavior entirely, however, and would allow pedestrians to step out from where they cannot be seen as long as they do not create a hazard in doing so (e.g., when the road is free from traffic).

10. *The provision in § 46.2-927 of the Code governing pedestrians' right of way when boarding or alighting from buses is confusing.*[30] It is not clear whether this provision, which gives pedestrians who are boarding or alighting from buses the right of way over vehicles, exempts them from the requirement to cross in a crosswalk. This should be indicated in the statute, either by expressly granting pedestrians boarding or alighting from buses the right to cross away from a crosswalk or intersection or by requiring them to move to a crosswalk or intersection to cross the street, notwithstanding their right of way over vehicles.

11. *Section 46.2-928 of the Code does not clearly explain where pedestrians must walk in the absence of sidewalks.* In the absence of sidewalks, pedestrians *may* use the shoulder when walking on the roadway, but they are not required to do so. The Code should require this, as the shoulder is not a travel lane and requiring pedestrians to use the shoulder in the absence of sidewalks (when there is a shoulder present) would minimize pedestrian and vehicle interactions. Further, when using the roadway, pedestrians are required to keep to the extreme left, regardless of whether or not they are walking along a one-way or a two-way road, rather than to "walk facing traffic."

[29] VA. CODE ANN. § 46.2-925 (2007).
[30] VA. CODE ANN. § 46.2-927 (2007).

On a one-way road, keeping to the extreme left does not provide the pedestrian with the advantage of being able to see oncoming vehicles and potentially puts him or her in the faster travel lane. The Code should follow the UVC and provide that "*if on a two-way roadway*, [pedestrians] shall walk only on the left side of the roadway" (emphasis added).[31]

12. *A number of provisions regarding drivers and pedestrians in the codes of other states and the UVC are not present in the Code, and their inclusion in the Code would offer greater protection to pedestrians.* The Code should include a statutory duty for drivers to use due care not to collide with a pedestrian, a requirement that pedestrians yield to authorized emergency vehicles, a prohibition on intoxicated pedestrians walking on the roadway itself, and a requirement that pedestrians obey bridge and railroad gate signals.

13. *It is not clear that adult tricycles fall under the ambit of any of the definitions in the Code.* The definitions of "bicycle," "electric power-assisted bicycle," "moped," and "vehicle" do not encompass adult tricycles (or adult recumbent tricycles), where the wheels are not in tandem. The Code should add a definition for "human powered vehicle" or amend the definition of bicycle in order to bring adult tricycles within the reach of the Code's bicycle-related provisions.

14. *Section 46.2-904 of the Code would be clearer if a definition for "official traffic control device" were added.* It is not immediately apparent in the statute that the signs posted by localities that prohibit bicyclists from riding on sidewalks are the same "official traffic control devices" that riders must obey. The Code should include a definition that specifies that traffic-control devices include signs as well as signals designed to control the flow of traffic.

15. *A provision making parents responsible for the bicycle violations of their children could aid in enforcement of bicycle-related provisions in the Code.* Because enforcement of helmet laws is difficult when the only person a law enforcement officer can ticket is a young child,[32] the Code should follow the 31 other states that hold parents responsible for children's bicycle violations.

16. *The responses to the survey sent to the pedestrian and bicycle coordinators nationwide indicated that the majority of responding states target school age pedestrians and bicyclists but do not target other vulnerable road users, such as the elderly and immigrant populations.* Elderly pedestrians are more likely to die from a pedestrian-related crash than any other age group.[33] Immigrant populations are also especially at risk in pedestrian crashes;[34] Hispanic pedestrians are hospitalized at a

[31] UNIFORM VEHICLE CODE § 11-506(c).
[32] NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., BICYCLE HELMET USE LAWS: LESSONS LEARNED FROM SELECTED SITES 23–24 (2004).
[33] National Highway Traffic Safety Administration, Traffic Safety Facts 2005 Data, http://www-nrd.nhtsa.dot.gov/pdf/nrd-30/NCSA/TSF2005/810624.pdf (last visited July 6, 2007).
[34] NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., U.S. DEP'T OF TRANSP., UNIFORM GUIDELINES FOR STATE HIGHWAY SAFETY PROGRAMS 4 (2006).

rate of 8 per 100,000 people, which is more than double the rate of non-Hispanic whites.[35] Virginia should ensure that these vulnerable populations are targeted when designing and implementing pedestrian and bicycle outreach and education plans.

[35] Michael Chandler, *Without a Car, Suburbanites Tread in Peril*, WASH. POST, July 16, 2007, at B1.

FINAL REPORT

SAFE TRAVEL FOR VIRGINIA'S NON-MOTORIZED ROAD USERS: A COMPREHENSIVE REVIEW OF PEDESTRIAN AND BICYCLE LAWS IN VIRGINIA AND THE UNITED STATES

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INTRODUCTION

Improving accommodations for bicyclists and pedestrians has been an important priority for Virginia for a number of years. Since 1978, the Virginia Transportation Research Council (VTRC) has conducted 12 studies evaluating different aspects of pedestrian and bicycle safety. Although at least one of these studies found that Virginia's rate of pedestrian fatalities and injuries was lower than the national average, this did not take into account external factors that may increase or decrease an individual state's fatality/injury rate and, as such, does not necessarily indicate that Virginia's pedestrian and bicycle laws offer as much protection for its citizens as they possibly can.[36] In addition, at least in the most recent 7 years for which data are available, although Virginia has consistently ranked in the top quarter of the nation for the rate of pedestrian fatalities and injuries per 100,000 population, the Commonwealth has never placed above 15th.[37] In the words of one study: "Improvement is possible."[38]

As Virginia's population continues to increase,[39] it is important to ensure that Virginia's statutes affecting pedestrians and bicyclists keep pace with the reasonable expectations of the growing population. In the past VTRC studies, several provisions of the *Code of Virginia* (hereinafter referred to as "the Code") that were either ambiguous or that potentially did not offer enough protection to pedestrians and bicyclists were identified, as well as several important provisions that were present in the codes of other states but were absent from the Code.

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[36] STOKE & SULLIVAN, *supra* note 8, at 13.
[37] Appendix A contains a table of state rankings by pedestrian fatalities per 100,000 population from 1999 through 2005.
[38] PORTER ET AL., *supra* note 4, at 15.
[39] Virginia's annual growth rate since 2000 has been 1.2 percent per year. Welden Cooper Center for Public Service, *Virginia Population Estimates 2006*, Jan. 22, 2007, http://www3.ccps.virginia.edu/demographics/estimates/2006/0-main.html (last visited July 29, 2007).

Although most of the recommendations made in the VTRC studies with respect to bicycle-related legislation were enacted, almost none of the recommended reforms to pedestrian safety laws was adopted.

In addition to revising statutes, an important aspect of pedestrian and bicycle safety is the public's awareness of the laws concerning pedestrians and bicyclists and their interaction with motorists. Education is a key component of adopting new pedestrian- and bicycle-related legislation, as it is important to inform the public of any changes in pedestrian and bicycle laws.

Virginia has also prepared a Strategic Highway Safety Plan to address ways to improve highway safety for all users of Virginia's roads.[40] The plan notes: "Although much progress has been made, we must adopt a multi-perspective approach to make further gains in transportation safety in Virginia."[41] Specifically, because "pedestrians and bicyclists are the most vulnerable users in our transportation system and need particular attention and accommodation,"[42] there are specific strategies to achieving the plan's goals with respect to pedestrians and bicyclists enumerated in the plan. Amending Virginia's pedestrian- and bicycle-related legislation can help achieve three of the enumerated goals. First, strategy PB-4 suggests informing drivers of their responsibilities and of "[t]he current state law regarding bicycle, pedestrian, and vehicle interaction."[43] If Virginia's pedestrian- and bicycle-related laws are vague or unclear, it will be difficult to inform drivers of their responsibilities with respect to pedestrians and bicyclists. Second, strategy PB-5 seeks to "[l]ink socio-economic, crash, highway inventory and traffic information to better understand the causes of non-motorized crashes."[44] Many studies seeking to determine the causes of non-motorized crashes use behavioral science, education, and enforcement data to evaluate potential causes. In order for these studies to be as successful as possible, it is important to ensure that pedestrian- and bicycle-related legislation is understandable and can be consistently applied, which is difficult to do when such legislation is vague and confusing. Finally, strategy PB-14 states that it is necessary to "[e]nforce and/or modify existing pedestrian, cycling and helmet laws."[45] This report identifies a number of areas, such as when crossing between intersections or when walking on the roadway, where Virginia's pedestrian- and bicycle-related laws are ambiguous. When laws are ambiguous, it is difficult for law enforcement officers to enforce them and for judges to interpret them.

PURPOSE AND SCOPE

This report was prepared at the request of the Commonwealth Transportation Board and the Virginia Secretary of Transportation. The project's goal was to identify areas that can enhance legislative protections for pedestrians and bicyclists and to clarify any ambiguous portions of the Code. The more ambiguity in the pedestrian- and bicycle-related statutes in the

[40] Va.'s Surface Transp. Safety Executive Comm., Commonwealth of Virginia's Strategic Highway Safety Plan, at i (2006), *available at* http://www.virginiadot.org/info/resources/Strat_Hway_Safety_Plan_FREPT.pdf.
[41] *Id*. at 1.
[42] *Id*. at 5.
[43] *Id*. at 27.
[44] *Id*.
[45] *Id*. at 28.

Code, the more difficult it is for both motorized and non-motorized users of the road to understand their rights and responsibilities, for law enforcement officers to enforce the law, and for judges to interpret the meaning of the law.

In order to accomplish this goal, the statutes of other states and the Uniform Vehicle Code (UVC) relating to pedestrian and bicycle safety were compared with the statutes in the Code; available Virginia crash data were analyzed in an attempt to identify patterns and areas where increased protection is needed and to obtain additional insights into the causes of pedestrian and bicycle accidents; and pedestrian and bicycle education surveys were sent to the pedestrian and bicycle coordinators and to the offices of the superintendent of education in all 50 states and the District of Columbia.

RESEARCH METHODS

The researchers conducted the following tasks to fulfill the purpose of the study:

1. *Literature review of studies on pedestrian and bicycle safety.* This review focused on VTRC studies on pedestrian and bicycle safety and included articles from academic journals and reports published by government agencies on pedestrian- and bicycle-related legislation and safety in general.

2. *Analysis of available Virginia crash data.* Virginia crash data were examined at two levels: macroscopic and microscopic. The macroscopic analysis used aggregate statistics to extract overall tendencies of pedestrian- and bicycle-related traffic crashes; the microscopic analysis used individual accident records to obtain insights about these accidents that the macroscopic analysis was likely to fail to unveil.

3. *Analysis of the pedestrian- and bicycle-related statutes in the Code.* Statutes that govern the behavior of pedestrians and bicyclists both in general and in their interactions with motorists, as well as the sections that govern motorists' behavior in situations where a motorist interacts with a pedestrian or bicyclist, were evaluated for ambiguous language and for any provisions that appear to conflict with other sections of the Code.

4. *Review of the codes of the remaining states and the model UVC.* These codes were examined to identify any areas of significant legal variance between Virginia and the other 49 states and the District of Columbia (for the purposes of this report, "state" includes the District of Columbia). Virginia's position with respect to such areas was evaluated to pinpoint any provisions in the Code that differ greatly from the provisions in the majority of other states and the UVC and to detect those issues where Virginia is silent but where the majority of states have legislated.

5. *Surveys regarding pedestrian and bicycle education in the public schools and public outreach education policies of all 50 states and the District of Columbia.* Two

surveys were sent to all 50 states and the District of Columbia: one to the superintendent of the department of education that asked about pedestrian and bicycle education policies in public schools, and one to the pedestrian and bicycle education coordinators that asked about public outreach in general. The surveys were provided via an Internet survey program and distributed via email. The introductory letter sent to the pedestrian and bicycle coordinator and the superintendent of the department of education in each state are provided in Appendices B and E. The surveys are provided in Appendices C and F.

RESULTS AND DISCUSSION

Literature Review

Studies on Pedestrian and Bicycle Safety by the Virginia Transportation Research Council

Over the past 30 years, the VTRC has prepared 12 reports concerning various aspects of pedestrian and bicycle safety, including several that analyzed and suggested revisions to Virginia's pedestrian- and bicycle-related laws. The two most recent pedestrian studies were completed in 1990 and 1995, respectively.

In 1990, Stoke and Kelly analyzed crash data, reviewed the pedestrian-related statutes in the Code, and suggested several changes to the Code.[46] In their crash data analysis, Stoke and Kelly found that most pedestrian deaths and injuries involved people "old enough to be able to understand changes in the law and modify their behavior;" that there was "a need to clearly define and regulate the actions of [people] who are crossing or using the roadway;" and that there was "a need for the regulation of motor vehicle speed and pedestrian crossing locations and maneuvers. They also supported the addition of a requirement for both drivers and pedestrians to use due care when they encounter each other.[47]

Stoke and Kelly found that the major provisions relating to pedestrian safety in the Code involved a requirement for pedestrians to use crosswalks whenever possible, to obey pedestrian signals, and to use the roadway only when necessary and for drivers to yield the right of way to pedestrians in crosswalks. They proposed extensive revisions to the Code, among other things recommending the addition of definitions of six terms[48] and "a provision requiring pedestrians to obey traffic control devices"[49] and clarification of the language relating to pedestrians' behavior in unmarked crosswalks and in the absence of a crosswalk.[50]

[46] STOKE & KELLY, *supra* note 8.
[47] *Id*. at 16.
[48] The authors proposed adding the definitions of "marked crosswalk," "unmarked crosswalk," "pedestrian," "sidewalk," "traffic control device," and "traffic control signal." *Id*. at 11.
[49] *Id*. at 13.
[50] *Id*. at 12.

In 1995, Stoke and Sullivan reviewed the literature on pedestrian safety; compared the pedestrian statutes in the Code with those of the UVC and 12 other jurisdictions, i.e., the six surrounding states and six states that the National Highway and Traffic Safety Administration (NHTSA) considered to be especially conscious of pedestrian safety;[51] analyzed pedestrian crash data from 1990 through 1994; and conducted a survey regarding public school educational programs nationwide.[52]

Stoke and Sullivan found several areas in the Code that were ambiguous. They recommended clarifying when pedestrians must yield to vehicles; removing the "carelessly and maliciously interfere with the orderly passage of vehicles" provision; clearly designating places for pedestrians to walk and appropriate behavior for pedestrians in particular situations (e.g., when walking on the roadway); and adding an explicit requirement to use due care.[53]

Despite the similar findings of both studies, only one of the recommended changes to the Code from either study was adopted. In 2003, the definition of "sidewalk" was added to the Code, although this change appeared in an act amending Virginia's bicycle laws, so it is not clear that the change was related to pedestrian safety.[54]

In contrast, the most recent VTRC study on Virginia's bicycle safety laws, by Scheib in 1998,[55] made a number of recommendations that were adopted by the General Assembly.[56] Most of the recommendations to improve safety for bicyclists and clarify the rights and responsibilities of bicyclists and motorists were enacted in the fifth and sixth years after the study was completed. Among other things, the study led to the amendment of the definition of "bicycle" to include children's bicycles (thus bringing children within the reach of the Commonwealth's child bicycle helmet law), the addition of a provision governing passengers riding on bicycles, a provision allowing riders to use their right arm for signaling, and an amendment that changed the prohibition on riders riding two abreast to a prohibition on riders riding *more* than two abreast. In addition, the requirement that bicyclists ride near the right edge of the road was modified to require riders to ride near the right edge only when traveling at less then the normal speed of traffic. These changes brought the Code substantially in line with the UVC. One provision recommended by Scheib but not enacted was a provision imposing liability on parents or guardians for infractions by minor bicyclists.

Pedestrian- and Bicycle-Related Legislation

Only one other resource that involved a comprehensive analysis of pedestrian- and bicycle-related legislation was found. NHTSA produced an interactive guide, available on CD-

[51] The border jurisdictions were the District of Columbia, Kentucky, Maryland, North Carolina, Tennessee, and West Virginia. The states that the National Highway Traffic Safety Administration considered to be especially conscious of pedestrian safety were California, Florida, Massachusetts, Montana, Oregon, and Washington. STOKE & SULLIVAN, *supra* note 8, at 6–8.
[52] STOKE & SULLIVAN, *supra* note 8.
[53] *Id*. at 29–30.
[54] Act of Mar. 16, 2003, ch. 29, 2003 Va. Acts 30, 33 (adding the definition of the word "sidewalk" to the Motor Vehicle Code and amending a number of bicycle related provisions).
[55] SCHEIB, *supra* note 12.
[56] Act of Apr. 15, 2004, ch. 947, 2004 Va. Acts 1849; Act of Mar. 16, 2003, ch. 29, 2003 Va. Acts 30.

ROM or as a downloadable file, that compared the model UVC to the pedestrian and bicycle laws in all 50 states.[57] Designed to be an "easily accessed database of current and proposed laws that may affect pedestrian and bicycle safety," the guide evaluated state laws (as of 1999) and assessed the "safety relevance of each key provision."[58] The guide also included 42 laws implemented in various jurisdictions that the authors considered to be "innovative."[59] Virginia made the list with a provision that offered greater protection to students riding school buses:

> All school buses transporting pupils to and from all public, private, or parochial schools or in connection with such schools, operating on any highway in the Commonwealth which has two or more roadways separated by a physical barrier or barriers or an unpaved area, or which have five or more lanes the center lane of which is a flush median marked for use by turning traffic only, shall be routed so that no pupil shall be picked up or discharged at any point which will require any pupil to cross such highway as described in this section, in order for such pupil to reach such bus or to return to his residence. Any violation of this section shall constitute a Class 1 misdemeanor.[60]

The authors felt that, despite the need for local school bus routing because of the variation in conditions that can exist, "[t]his provision covers one of the few "universal" principles. Crossing roadways of the type described should be avoided in virtually all cases. Even if signals are available to assist a crossing and the bus discharges the student at the signal, risk is elevated."[61]

In addition, the authors of the guide included "model legislation, based on research into crash causation, that is designed to have a positive effect on pedestrian or bicycle safety. It provides the user with sample legislation for seven laws and ordinances that can be implemented to improve specific aspects of pedestrian or bicycle safety."[62]

In an article for the George Mason University Law Review, Belongia collected the cases that considered the "effect of a pedestrian's failure to comply with the Virginia statutes that prescribe where he should cross streets and highways and when he has the right-of-way."[63] Through an interpretation of Virginia case law and the Code, she summarized the general common law duties of pedestrians. In addition to those duties enumerated in the Code, she noted that the Virginia Supreme Court had identified a general duty to exercise reasonable care on the part of both the driver and the pedestrian[64] and a duty for the pedestrian to look before crossing a street.[65] If the pedestrian looks but fails to observe vehicles in dangerous proximity, he or she may be found negligent as a matter of law, although a pedestrian is not required to look continuously for approaching traffic.[66] Although the rights and duties of motorists and

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[57] NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., U.S. DEP'T OF TRANSP., RESOURCE GUIDE ON LAWS RELATED TO PEDESTRIAN AND BICYCLE SAFETY (2002).
[58] *Id*.
[59] *Id*.
[60] This was the provision in effect at the time that the guide was published. VA. CODE ANN. § 46.2-918 (2007) is functionally identical—the word "parochial" has since been replaced by "religious."
[61] NAT'L HIGHWAY TRAFFIC SAFETY ADMIN. U.S. DEP'T OF TRANSP., RESOURCE GUIDE ON LAWS RELATED TO PEDESTRIAN AND BICYCLE SAFETY (2002).
[62] *Id*.
[63] Belongia, *supra* note 17, at 177.
[64] *Id*. at 177–80.
[65] *Id*. at 180.
[66] *Id*.

pedestrians "are equal and their duties are mutual and reciprocal" in the absence of a statutorily enumerated right of way, pedestrians still must exercise a greater degree of care when crossing in the absence of an intersection than they do when crossing at an intersection.[67]

Belongia also pointed out that the language in § 46.1-230 (now § 46.2-923) of the Code was ambiguous when applied to factual situations,[68] since there were multiple interpretations of when a pedestrian may escape being found negligent as a matter of law. This was problematic, she argued, since there exists a lack of mutuality of risk between a motorist, who is less likely to be injured by the accident, and a pedestrian, who is much more likely to suffer an injury. Because of this concern, Belongia argued that "[a] motorist should be held to a greater and more constant degree of care than is required of a pedestrian,"[69] and "[b]ecause the risk involved is largely one-sided, the jury should be allowed maximum freedom to render a verdict in the pedestrian's favor."[70] The lack of mutuality of risk also supported liberal judicial construction of "[t]he Virginia statutes pertaining to pedestrian duties and the rights-of way between pedestrians and motorists" in order to "afford the pedestrian protection commensurate with his vulnerability."[71] She concluded by noting that ambiguities in § 46.1-230 (now § 46.2-923) and § 46.1-231 (now § 46.2-924) needed to be clarified, particularly with respect to pedestrians' rights of way over turning vehicles at intersections.[72]

Pedestrian and Driver Comprehension and Behavior

Pedestrian crashes may at times be the result of drivers and/or pedestrians failing to observe traffic rules and afford each other the proper right of way.[73] Hatfield et al. noted that "[i]nadequate knowledge of relevant rules and responsibilities has been identified as a possible reason for failure to observe them, and so as a possible reason for vehicle-pedestrian crashes"[74] after conducting a study of pedestrian misunderstanding of right-of-way rules in Australia. The authors observed more than 2,800 pedestrians crossing at signal-controlled intersections and surveyed more than 500 of them, assigning each to the role of either "pedestrian" or "driver" when answering survey questions.[75] They found that both pedestrians and drivers were often confused about who had the right of way.[76] The pedestrians' observed attention to traffic gradually increased from crossing on a "Walk" signal to crossing during a flashing "Don't Walk" signal to crossing on a "Don't Walk" signal.[77] In Australia, as in Virginia, a pedestrian has the

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[67] *Id*. at 181.
[68] *Id*. at 187–89, quoting VA. CODE ANN. § 46.1-230 (1980), which provided that:

> When crossing highways or streets, pedestrians shall not carelessly or maliciously interfere with the orderly passage of vehicles. They shall cross wherever possible only at intersections or marked crosswalks. Where any intersections of highways or streets contain no marked crosswalks pedestrians shall not be guilty of negligence as a matter of law for crossing at any such intersection or between intersections when crossing by the most direct route.

[69] *Id*. at 188.
[70] *Id*. at 189.
[71] *Id*. at 194.
[72] *Id*. at 194–95.
[73] Hatfield et al., *supra* note 18, at 834.
[74] *Id*.
[75] *Id*. at 833.
[76] *Id*. at 838.
[77] *Id*. at 841.

same right of way at a marked crossing as at an unmarked crossing;[78] however, the percentage of people in the study who believed that the pedestrian would have the right of way at an unmarked crossing was much less than the percentage who believed that the pedestrian had the right of way at the marked crossing.[79] This potentially may explain one study that found that at uncontrolled locations (no traffic control device present) on high-volume multi-lane roads, pedestrian crashes were higher in marked crosswalks than in unmarked crosswalks.[80] If pedestrians do not believe that they have the same right of way in an unmarked crosswalk as in a marked crosswalk, they may be more cautious when crossing at an unmarked crosswalk.[81] The authors also cautioned, however, against assuming that this "false sense of security" explains the increase in crashes at marked crosswalks versus unmarked crosswalks, noting a complementary study that found that there was a slight increase in pedestrian scanning behavior (before stepping into the street) after marked crosswalks were installed.[82] Despite this finding, they recognized that "measures of 'pedestrian awareness' and 'pedestrians' expectation that motorists will stop for them' cannot be collected by field observation alone."[83] The study noted that "contrary to the expectations of many pedestrians," the installation of "a marked crosswalk without other more substantial crossing facilities [e.g., signs warning of pedestrians crossing] does not cause most motorists to stop and yield to pedestrians."[84]

Hatfield et al. also suggested that "[traffic control] signals may be regarded as a somewhat more legitimate form of pedestrian crossing than zebra crossings [striped crosswalks painted on the pavement]."[85] Based on these findings that indicated that motorists and pedestrians often misunderstood right-of-way rules, the authors recommended education campaigns and also recommended marking *all* areas intended to be crossings.[86]

Martinez and Porter sought to determine "what Virginians actually knew about pedestrian law" so that "appropriate changes—be they education, engineering, police enforcement, legislative, etc.—could be implemented in the future to help decrease the number of pedestrian injuries and fatalities."[87] In order to develop an understanding of pedestrians' knowledge of their rights and responsibilities, they completed a random telephone questionnaire of 1,096 licensed Virginia drivers.[88] They found that respondents correctly knew the proper driver behavior at a mid-block crosswalk and that a driver is not allowed to stop in a crosswalk at a red light.[89] In addition, drivers were "more apt to give pedestrians the right of way when such a right was not mandated by Virginia statute": 76.7 percent reported "always or almost always yielding to a pedestrian who is crossing the road in front of them even when the pedestrian is not in a

[78] VA. CODE ANN. § 46.2-924(A) (2007).
[79] Hatfield, *supra* note 18, at 841.
[80] Charles V. Zegeer et al., *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations: Analysis of Pedestrian Crashes in 30 Cities*, 1773 Transp. Res. Rec. 56, 59–60 (2001).
[81] *Id*.
[82] *Id*. at 61.
[83] *Id*. at 61–62.
[84] *Id*. at 60.
[85] Hatfield, *supra* note 18, at 842.
[86] *Id*.
[87] Martinez & Porter, *supra* note 19, at 45.
[88] *Id*. at 51.
[89] *Id*. at 53.

crosswalk or at an intersection."[90] More than 55 percent "thought Virginia law stated that pedestrians have right of way even when not crossing in a crosswalk or at an intersection."[91]

Other studies noted that a major challenge to increasing pedestrian safety is posed by the inconvenience of engaging in safe walking when compared with the very low risk that any one unsafe crossing will result in harm to the pedestrian.[92] Although one obvious solution to this problem is to increase the cost of unsafe crossing practices by enforcing and ticketing pedestrians, Porter et al. also found that there is not "much political support for deploying effective interventions for pedestrians" since the public and lawmakers seem to share "a belief that pedestrians are the protected class and not as much at-fault for their injuries and deaths."[93]

Bicycle Helmet Use and Safety

A substantial portion of the literature on bicycle safety is devoted to helmet use. Among the questions raised are whether helmets are effective in preventing injury, whether helmet use encourages riskier behavior, whether mandatory helmet use provisions are effective, and whether such provisions discourage potential bicyclists from riding at all.

The literature is generally in agreement that a properly fitted and secured bicycle helmet can reduce head injuries.[94] However, whether this translates into a reduction in severe brain injury or an actual reduction in overall injury is less clear. For example, a response to one of the more recent studies argued that head injury is not a good proxy for severe brain injury since most patients with head injuries are not hospitalized.[95] In fact, since brain injury by angular acceleration can occur without impact to the head, it is possible for the additional weight of helmets to increase the risk of that type of trauma.[96] In addition, some studies have suggested that helmet wearing increases the incidence of risky bicycling behavior—a phenomenon known as risk compensation.[97]

Another issue addressed in the debate over bicycle helmets is the effect of mandatory use laws. Although these laws tend to increase the percentage of bicycle riders wearing helmets,[98] this may be partially due to a decrease in the number of people riding bicycles because of the helmet legislation.[99] In addition, helmet use tends to decrease over time back to pre-legislation levels, particularly in mid- and low-income areas.[100]

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[90] *Id*.
[91] *Id*.
[92] *See* Brenda Lobb, *Trespassing on the Tracks: A Review of Railway Pedestrian Safety Research*, 37 J. SAFETY RES. 359, 359 (2006); PORTER ET AL., *supra* note 4, at 28.
[93] PORTER ET AL., *supra* note 4, at 28.
[94] *See, e.g.,* Thompson et al., *Helmets for Preventing Head and Facial Injury in Bicyclists*, 4 COCHRANE DATABASE OF SYSTEMATIC REVIEWS (1999).
[95] W.J. Curlow, *Bicycle Helmets and Brain Injury*, 39 ACCIDENT ANALYSIS AND PREVENTION 433, 433 (2007).
[96] *Id.* at 434.
[97] *See, e.g.,* Gregory B. Rodgers, *Bicyclist Risks and Helmet Usage Patterns: An Analysis of Compensatory Behavior in a Risky Recreational Activity*, 17 MANAGERIAL AND DECISION ECON. 493 (1996).
[98] D.L. Robinson, *Head Injuries and Bicycle Helmet Laws*, 28 ACCIDENT ANALYSIS AND PREVENTION 463 (1996).
[99] *Id.*
[100] *See, e.g.,* A.K. Macpherson et al., *Economic Disparity in Bicycle Helmet Use by Children Six Years After the Introduction of Legislation*, 12 INJURY PREVENTION 231 (2006).

Mandatory use of bike paths and lanes is also addressed in much of the literature on bicycle safety. Although there are good safety arguments for segregating bicycle and motor vehicle traffic,[101] at least one study has indicated that bicyclists are less safe when driving on dedicated bike lanes adjacent to roadways.[102] Among the reasons cited are that these laws discourage cyclists and motorists from following the rules of the road for drivers of vehicles and that motorists tend to give cyclists less clearance when bicycle lanes are present.[103] In addition, some bicycle advocacy groups have adamantly opposed such provisions;[104] currently, mandatory bike path use laws appear in only a minority of states.

Education

Education is a crucial part of implementing new pedestrian- and bicycle-related legislation, as the public must be made aware of any changes in the law. The Federal Highway Administration (FHWA) has taken a multi-faceted approach to its public outreach program, using television and radio media, creating a CD-ROM to teach school children about pedestrian safety, and developing a university level course addressing non-motorized transportation issues.[105] Based on feedback from focus groups showing that drivers are most affected by the thought of striking a child, that they want messages to appeal to them emotionally, and that they want to see an actual crash and its aftermath in any video materials, FHWA researchers created dramatizations for its television ads designed to "focus on the meaning of pedestrian signals and the importance of pedestrians making themselves visible at night."[106]

In order to be effective, education and outreach efforts need to be targeted to vulnerable populations, such as older pedestrians, young children, and immigrant populations.[107] Studies have shown that a large number of educational programs are directed at young children.[108] In addition, a FHWA report found that factors associated with higher crash rates included neighborhoods with a higher percentage of single parents and neighborhoods with more than 30 percent of housing stock constructed before 1980.[109] The authors of the study believed that the increase in crash rates in these situations was because "single parents with children are likely to have less ability, given the other demands on their time, to extensively monitor their children"

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[101] B.L. BOWMAN, R.L. VECELLIO & D.W. HAYNES, A SYNTHESIS OF EXISTING BICYCLIST AND PEDESTRIAN RELATED LAWS AND ENFORCEMENT PROGRAMS (Fed. Highway Admin. 1993).
[102] John Franklin, *Two Decades of the Redway Cycle Paths in Milton Keynes*, 40 TRAFFIC ENGINEERING AND CONTROL 393 (1999).
[103] Bicycle Transportation Institute, Engineering and Planning: Bike Lanes, http://www.bicycledriving.com/ bikelanes.htm (last visited July 31, 2007).
[104] *See, e.g.,* Bicycle Transportation Institute, Engineering and Planning: Bike Lanes, http://www.bicycledriving.com/ bikelanes.htm (last visited July 31, 2007); Bicycling Life, Bike Lanes vs. Wide Outside Lanes, http://www. bicyclinglife.com/EffectiveAdvocacy/blvswol.htm (last visited July 31, 2007).
[105] Tamara Redmon & Leverson Boodlal, *Life in the Crosswalk*, 66 PUBLIC ROADS 32, 23–37 (2003).
[106] *Id*. at 33.
[107] NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., U.S. DEP'T OF TRANSP., UNIFORM GUIDELINES FOR STATE HIGHWAY SAFETY PROGRAMS (2006).
[108] B.J. CAMPBELL ET AL., A REVIEW OF PEDESTRIAN SAFETY RESEARCH IN THE UNITED STATES AND ABROAD 115–19 (Fed. Highway Admin. 2004); Olivier Duperrex et al., *Safety Education of Pedestrians for Injury Prevention: A Systematic Review of Randomized Controlled Trials*, 324 BMJ 1129 (2002).
[109] PATRICK MC MAHON ET AL., AN ANALYSIS OF FACTORS CONTRIBUTING TO "WALKING ALONG ROADWAY" CRASHES: RESEARCH STUDY AND GUIDELINES FOR SIDEWALKS AND WALKWAYS 10–12 (Fed. Highway Admin. 2002), *available at* http://www.walkinginfo.org/pdf/rd/SidewalkReport.pdf.

and that "newer neighborhoods are more likely to contain amenities such as better designed roads, large yards, and nearby parks."[110] Factors identified in another study that were associated with lower crash rates included lower levels of unemployment and neighborhoods with a higher percentage of family households.[111] The authors believed that employment rates were correlated with pedestrian crash rates because individuals have less time to walk in the street and were more financially able to own a car.[112] Because family members "indicate the presence of groups of people who can rely on each other for a variety of different resources," the "possibility that another family member will have a vehicle and provide transportation reduces the need for family members to walk as a form of transportation."[113] In addition, elderly pedestrians are also especially vulnerable. "In 2005, the fatality rate for pedestrians (age 70+) was 2.88 per 100,000 population—higher than for any other age group."[114]

Studies by Hatfield et al.[115]and Martinez and Porter[116] found that there are situations where pedestrians may be confused about when they have the legal right of way. Improving pedestrians' knowledge of pedestrian safety legislation is a component of improving pedestrian safety in general. In particular, Martinez and Porter noted that education efforts in general had focused on teaching young children and on reaching the public with mass media.[117]

Crash Data Analysis

Overview

In order to identify areas where amendment of the Code might offer pedestrians and bicyclists in Virginia added protection, Virginia crash data were analyzed at both macroscopic and microscopic levels. The macroscopic analysis looked at overall tendencies of pedestrian and bicycle crashes in Virginia and in a comparison to other states. The microscopic analysis used individual accident records to obtain insights about these accidents that the macroscopic analysis was likely to fail to unveil.

Over the past 4 years, a number of bills have been introduced in the Virginia General Assembly to change the requirement that drivers *yield* to pedestrians in crosswalks to a requirement that drivers *stop* for pedestrians in crosswalks (or to authorize localities to make this change).[118] Despite this persistence, none of the bills was successful at changing Virginia's crosswalk law. In preparation for this report, the researchers met with a steering committee that expressed an interest in trying again to amend Virginia's crosswalk laws to require drivers to

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[110] *Id*. at 10–12.
[111] *Id*. at 12–13.
[112] *Id*. at 12.
[113] *Id*.
[114] National Highway Traffic Safety Administration, Traffic Safety Facts 2005 Data, http://www-nrd.nhtsa.dot.gov/pdf/nrd-30/NCSA/TSF2005/810624.pdf (last visited July 6, 2007).
[115] Hatfield et al., *supra* note 18.
[116] Martinez & Porter, *supra* note 19.
[117] Martinez & Porter, *supra* note 19, at 44.
[118] *See, e.g.,* H.B. 2945, 2007 Gen. Assem., Reg. Sess. (Va. 2007); H.B. 2863, 2006 Gen. Assem., Reg. Sess. (Va. 2006); S.B. 233, 2006 Gen. Assem., Reg. Sess. (Va. 2006); H.B. 539, 2004 Gen. Assem., Reg. Sess. (Va. 2004); H.B. 1613, 2003 Gen. Assem., Reg. Sess. (Va. 2003).

stop for pedestrians. In response, the researchers decided to analyze crash data from four states (Washington, Georgia, Minnesota, and Oregon) that had changed their crosswalk laws to require drivers to stop. Currently, eight states have changed their laws to require drivers to stop; however, two of them made the change too recently for enough data to be collected for analysis, and two made the change too long ago for any results to be linked to contemporary circumstances in Virginia. The jurisdictions that made the change are indicated in Appendix H.

After Washington changed its crosswalk law in 1990 to require drivers to stop for pedestrians in crosswalks, Britt et al. arranged for the Seattle Police Department to conduct a series of targeted enforcement campaigns and determined if enforcement increased driver compliance with the new law.[119] The researchers were "unable to demonstrate that law enforcement efforts directed at motorist violators of crosswalk laws significantly or consistently increase[d] drivers' willingness to stop for pedestrians."[120] Despite the fact that this study did not analyze driver compliance with crosswalk laws before the law change, it is important to note that after the law change, 81 of every 100 cars "failed to stop for a pedestrian in the near-side lanes of the marked sentinel locations."[121] No other studies that attempted to assess the effectiveness of a change in crosswalk law from yield to stop were identified.

The time constraints of this study made a more thorough analysis of the effectiveness of the law change impossible because of the difficulty in obtaining adequate exposure measure and pedestrian injury crash data in a short time frame. The final results of the analysis of pedestrian-involved fatal crashes did not show a statistically significant difference in the number or rate of pedestrian-involved fatal crashes before and after the law changes in any of the studied states. The analysis did not, however, evaluate crashes involving pedestrian injuries; it is possible that an analysis of injury crashes would reveal a significant difference after the law change.

Macroscopic Analysis

Annual Trends of Pedestrians and Bicyclists in Traffic Crashes in Virginia

In the macroscopic analysis, a visual comparison and a regression model of trends in the numbers of pedestrians and bicyclists in traffic fatalities and injuries, their rates per million population, and their percentages in total traffic fatalities and injuries in Virginia were employed. Empirical data used for this analysis included annual numbers of pedestrian and bicyclist fatalities and injuries in traffic crashes,[122] percentages of pedestrians and bicyclists among all traffic fatalities and injuries,[123] and annual population estimates in Virginia.[124] The data were for the 7 years from 1999 through 2005, the only years for which such crash data were available from the website of the Virginia Department of Motor Vehicles.

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[119] John W. Britt et al., *Law Enforcement, Pedestrian Safety, and Driver Compliance with Crosswalk Laws: Evaluation of a Four-Year Campaign in Seattle*, 1485 TRANSP. RES. REC. 160 (1995).
[120] *Id*. at 166.
[121] *Id*. at 164.
[122] Virginia Department of Motor Vehicles, 2000-2006 Virginia Crash Facts, http://www.dmv.state.va.us/webdoc/citizen/drivers/crash_facts.asp (last visited July 18, 2007).
[123] *Id*.
[124] U.S. Census Bureau, 1980-2005 Population Estimates, http://www.census.gov/popest/estimates.php (last visited July 18, 2007).

A regression model used to account for a linear trend can be written as follows:

$$Y_t = \beta_0 + \beta_1 \times Time1998_t + \nu_t$$

where

Y_t = a dependent time-series variable such as the number of pedestrians in traffic fatalities, its rate per million population, and its percentage in total traffic fatalities

t = year (t = 1999,…,2005)

β_0 and β_1 = regression coefficients to be estimated

$Time1998_t$ = a sequential time variable based on 1998 calculated by $t - 1998$
($Time1998_{t=1999} = 1, Time1998_{t=2000} = 2, \ldots, Time1998_{t=2005} = 7$)

ν_t = a serially correlated error; $\nu_t = \varepsilon_t - \varphi_1 \nu_{t-1} - \cdots - \varphi_m \nu_{t-m}$ where $\nu_t, \ldots, \nu_{t-m}$ are $m + 1$ serially correlated errors; ε_t is a normal independent error term; and $\varphi_1, \ldots, \varphi_m$ are m autoregressive coefficients.

Annual Trends of Pedestrian-Involved Fatal Crashes in Virginia and Other U.S. States

To discover changes in pedestrian-involved fatal crashes over time and differences across states, an initial visual inspection of trends over the 26-year period was conducted. From 1980 through 2005, the number and rate per million population of pedestrian-involved fatal crashes on roads with speed limits of 35 mph or lower were compared for Virginia over time and between Virginia and five surrounding states (Maryland, West Virginia, Tennessee, Kentucky, and North Carolina) and the District of Columbia.

Pedestrian-involved fatal traffic crashes that occurred on roads with speed limits of 35 mph or lower were extracted from the national fatal crash database: the Fatality Analysis Reporting System (FARS).[125] It is important to note that in all of the extracted fatal crashes, pedestrians were involved but were not necessarily the ones fatally injured. Separating the crashes by type of fatality (i.e., driver or pedestrian) was impossible given the time constraints of the study. In 2005, however, pedestrians were killed in 99.7 percent of pedestrian-involved fatal crashes according to the FARS database, suggesting that pedestrians were killed in almost all of these crashes on roads with speed limits of 35 mph or lower.

"Stop" versus "Yield" in Pedestrian Laws

The fatal crashes extracted from FARS for 26 years (1980 through 2005) were used to analyze the effect of the change in pedestrian laws from requiring drivers to yield to pedestrians

[125] Nat'l Highway Traffic Safety Admin., U.S. Dept. of Transp., 1981-2006 Fatality Analysis Reporting System, http://www-fars.nhtsa.dot.gov/main.cfm (last visited July 18, 2007).

in crosswalks (when traveling on roads with speed limits of 35 mph or lower) to requiring drivers to stop for pedestrians in crosswalks. In Virginia, drivers are required to yield to pedestrians crossing at intersections on roads with speed limits of 35 mph or lower. For this analysis, three sets of pedestrian-involved fatal crash data were prepared: (1) including impaired drivers, (2) excluding impaired drivers, and (3) including impaired drivers and having occurred only at intersections.

Annual population estimates for the same 26-year period (1980 through 2005) were obtained from the U.S. Census Bureau[126] and were used as a control variable (or exposure measure). A pedestrian-involved fatal crash rate was calculated by dividing the number of such crashes by a population estimate, resulting in a fatal crash rate per million population.

At meetings with a steering committee, committee members expressed a strong interest in amending Virginia's crosswalk laws to require drivers to stop for pedestrians in crosswalks. Four states, Washington, Georgia, Minnesota, and Oregon, changed their pedestrian laws to require drivers to stop for pedestrians in crosswalks in 1990, 1995, 1996, and 2003, respectively.[127] Hawaii and the District of Columbia were excluded from this analysis because their law changes occurred in 2005, which was too recent to provide enough data for a comparison.[128] Maryland and Nebraska were not included because they changed their crosswalk laws in 1982 and 1979, respectively, which was too far in the past for an analysis.[129]

To examine the statistical association between changes in pedestrian laws and changes in pedestrian-involved fatal crashes, three statistical approaches were employed: a before-after analysis, a time-series analysis, and a cross-sectional analysis. For the before-after analysis, pedestrian-involved fatal crash data before and after the law change were compared. For the time-series analysis, a regression model appropriately treating properties of time-series data was employed. For the cross-sectional analysis, data from a group of states that had enacted the law change were contrasted with those from the remaining states without the change. These three approaches were applied to each of the aforementioned three datasets of pedestrian-involved fatal crashes, and they are described below.

Before-After Analysis. Four states (Washington, Georgia, Minnesota, and Oregon) that were included in this analysis introduced a "stop" requirement into their pedestrian laws in 1990, 1995, 1996, and 2003, respectively. Numbers of pedestrian crashes and crash rates were compared before and after the law changes in these four states. The "before" and "after" time periods were 5 years each for each state except Oregon. Oregon's after period was only 2 years because Oregon changed its law in 2003; thus, Oregon's results were interpreted with caution. Data for the year of the law change were excluded from the analysis to remove any transitional effect that may have occurred during that year.

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[126] Britt et al., *supra* note 119, at 164.
[127] Act of June 10, 2003, ch. 278 § 1, 2003 Or. Laws 1099, 1100; Act of Mar. 18, 1996, ch. 333, 1996 Minn. Laws 234, 234; Act of Apr. 7, 1995, No. 229 § 3, 1995 Ga. Laws 232, 233; Act of Mar. 28, 1990, ch. 241, 1990 Wash. Sess. Laws 1306, 1309.
[128] Act of May 25, 2005, No. 73 § 3, 2005 Haw. Sess. Laws 160, 160; 51 D.C. Reg. 10533 (Mar. 16, 2005).
[129] Act of June 1, 1982, ch. 721, 1982 Md. Laws 3775, 3775–76; Act of May 8, 1979, No. 395, 1979 Neb. Laws 1134, 1134.

Normality of the number and rate of the pedestrian-involved fatal crashes was first examined using four statistical tests (i.e., Shapiro-Wilk, Kolmogorov-Smirnov, Cramer-von Mises, and Anderson-Darling tests). Parametric tests (i.e., *t*-test with equal and unequal variances) and non-parametric tests (i.e., Wilcoxon rank sum, median scores, Van de Waerden, and Savage scores tests) were performed to determine if any difference in the number or rate between the before and after periods was statistically significant. All tests were based on the assumption that the data to be tested were statistically independent (thus uncorrelated), which may have been violated because the data used for this analysis were time-series data. Moreover, this analysis could not account for decreasing trends found in the fatal crash data.

Time-Series Analysis. Three states (Washington, Georgia, and Minnesota) included in this analysis introduced a stop requirement into their pedestrian laws during the 1990s (1990, 1995, and 1996, respectively) and maintained the requirement for at least 10 years until 2005, which provided a long enough time period after the law change for this analysis. Because Oregon changed its law in 2003, it was not included in this analysis. This analysis using 26 years of data from 1980 through 2005 determined whether each of the three states had a statistically significant change in the number or rate of pedestrian-involved fatal crashes before and after the law change while correcting for correlations and previously existing trends over time.

Demographic and economic factors are generally believed to influence people's transportation-related activities; thus, they are likely to be influential in a fluctuation of traffic crashes over time. For example, Hermans et al.[130] used four economic variables including percentage of inflation to predict Belgian traffic accidents. To control for demographic and economic variations over time, an annual population estimate at the state level[131] and a consumer price index (CPI) were compiled for the same 26-year period as that used for the crash data. CPI is widely used as an economic indicator and a major indicator measuring the efficacy of government economic policy.[132] It was used here as a proxy for the collective effect of U.S. economic activities in each year. These demographic and economic data were merged into the crash dataset to form a final database for time-series analysis.

In addition, to account for a collective effect of improvement in pedestrian-related traffic safety, a sequential time variable was included as a control factor, and it is a linear trend variable. However, population, CPI, and the sequential time variable turned out to be highly correlated, indicating that they should be included in the model one at a time. Inclusion of any of these three factors in the regression model successfully removed decreasing trends from the pedestrian-involved fatal crash data.

A linear regression model was employed for this analysis. Prior to the development of the regression models, the number and rate of pedestrian-involved fatal crashes were examined for normality by using four statistical tests (Shapiro-Wilk, Kolmogorov-Smirnov, Cramer-von

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[130] Elke Hermans et al., *Frequency and Severity of Belgian Road Traffic Accidents Studied by State-Space Methods*, 9 J. OF TRANSP. & STATISTICS, 63–76 (2006).
[131] U.S. Census Bureau, 1980-2005 Population Estimates, http://www.census.gov/popest/estimates.php (last visited July 18, 2007).
[132] *Id*.

Mises, and Anderson-Darling tests). Normality is not a strictly required condition for a linear regression model. However, it is a convenient condition for performing statistical tests, and a significant departure from a normal distribution is likely to affect estimates of standard errors of coefficients of the model, producing biased estimates of the errors. This may affect a statistical confidence of the coefficients substantially; thus, it may invalidate some statistical conclusions related to such coefficient parameters.

Because time-series data were used to develop a regression model, error terms of the model should be examined for a serial correlation. In the presence of a serial correlation, the correlated errors were treated by adding autoregressive error components; thus, the model is called an autoregressive error model. However, it is possible that the autoregressive error components fail to remove all serial correlations. If remaining correlations are high, model results should be interpreted with caution, especially regarding statistical significance of coefficients. There were some cases with statistically significant correlations in remaining residuals, but the correlations did not affect the conclusions of this study.

Four time-series regression models were developed for each of the three states (Georgia, Minnesota, and Washington) that changed their laws in the 1990s based on the three datasets; thus, a total of 36 (4 models × 3 states × 3 datasets) final models were developed. The specifications used were as follows:

Model 1: $Y_t = \beta_0 + \beta_1 \times STOP_t + \nu_t$

Model 2: $Y_t = \beta_0 + \beta_1 \times STOP_t + \beta_2 \times Time1980_t + \nu_t$

Model 3: $Y_t = \beta_0 + \beta_1 \times STOP_t + \beta_2 \times CPI1967_t + +\nu_t$

Model 4: $Y_t = \beta_0 + \beta_1 \times STOP_t + \beta_2 \times Population_t + \nu_t$

where

t = year (t = 1980,…,2005)

Y_t = the number of pedestrian-involved fatal crashes in year t

$STOP_t$ = an indicator equaling 1 if a stop requirement is present in a pedestrian law in year t and 0 otherwise

$Time1980_t$ = a sequential time variable based on 1980 ($Time1980_{t=1980} = 1$, $Time1980_{t=1981} = 2, \cdots,$ $Time1980_{t=2005} = 26$)

$CPI1967_t$ = a CPI of year t based on 1967 with 100 base value ($CPI1967_{1967} = 100$)

$Population_t$ = a population estimate of year t (on July 1)

β_0, β_1, and β_2 = regression coefficients to be estimated

ν_t = a serially correlated error; $\nu_t = \varepsilon_t - \varphi_1 \nu_{t-1} - \cdots - \varphi_m \nu_{t-m}$ where $\nu_t, \ldots, \nu_{t-m}$ are $m + 1$ serially correlated errors, ε_t is a normal independent error term, and $\varphi_1, \ldots, \varphi_m$ are m autoregressive coefficients.

For developing the time-series models, the Yule-Walker method was used for parameter estimation, the Durbin-Watson test was used for detecting serial correlations in regression

residuals, the Jarque-Bera test was used for examining normality of regression residuals, the Portmanteau Q-test and the Engle Lagrange multiplier test were used for examining constant variance (specifically, ARCH disturbance), and a backward elimination method with a cut-off significance level of 0.1 was used for selecting an appropriate order of autoregressive error terms to enter into the model.

In addition to the two demographic and economic factors that the study took into account, however, there are many other potentially influential factors (e.g., weather conditions; public policies in health, safety, and education; and changes of distributions of vulnerable walking groups) that the study did not take into account. It is not feasible to account for all such factors in practice because of a lack of available data. At a minimum, this analysis included population as a factor to account for the demographic changes of an individual state and CPI as a factor to account for the collective economic activities of the United States.

Cross-Sectional Analysis. A total of 49 states (consisting of the 6 states with a stop requirement and the 43 states without such a requirement) was included in this analysis. A cross-sectional analysis using 2004 and 2005 data was performed to detect and measure a difference between the 6 states (Nebraska, Maryland, Washington, Georgia, Minnesota, and Oregon) that changed their laws before 2004 from a requirement that drivers yield to pedestrians in crosswalks to a requirement that drivers stop for pedestrians in crosswalks (1979, 1982, 1990, 1995, 1996, and 2003, respectively) and the 43 states that require drivers to yield for pedestrians in crosswalks. Hawaii and the District of Columbia were excluded from this analysis because they made such a change in 2005.

To perform a statistical test for a difference in the number and rate of pedestrian-involved fatal crashes in 2004 and 2005, a normality check was first performed by four statistical tests (Shapiro-Wilk, Kolmogorov-Smirnov, Cramer-von Mises, and Anderson-Darling tests). For normal data, a parametric one-way analysis of variance (ANOVA) was used for comparing the two groups of states in the number and rate of such crashes. Equal variance was tested using Bartlett's test, and when unequal variance was found, Welch's variance-weighted ANOVA was employed. For non-normal data, a nonparametric one-way ANOVA was used with four statistical tests (i.e., Wilcoxon rank sum, median scores, Van der Waerden, and Savage scores tests). This analysis was expected to determine whether there is a difference in the number and/or rate of pedestrian-involved fatal crashes on roads with speed limits of 35 mph or lower between the 6 states with a stop requirement and the 43 states with a yield requirement in their pedestrian laws.

Microscopic Analysis

Pedestrian Fatal Crashes in Virginia

To ensure that any changes in legislation were at least neutral in terms of pedestrian safety, an analysis of the Virginia FR-300 fatal crash reports (accident report forms filled out by the investigating officer at the scene of a crash) was conducted. This analysis focused on behaviors that led to fatal pedestrian traffic crashes or circumstances in which the crashes occurred.

Interestingly, even though the fatalities studied had much in common in terms of driver and pedestrian actions, they often involved unusual behaviors or circumstances. For example, several fatal crashes occurred when a person was lying in the roadway. In one case, two persons were fighting in the roadway when they were struck. In another case, three pedestrians pushing their disabled vehicles through an intersection and over to the side were struck simultaneously. More than one crash resulted in multiple pedestrian fatalities. Several crashes involved drivers who were struck by their own vehicle after they got out of the vehicle. There were also quite a few secondary crashes, where persons near a previous crash site were struck by passersby or out-of-control, crash-involved vehicles. A number of fatalities were the result of rear-end crashes in which the vehicle striking the pedestrian was hit from behind and pushed ahead. Several crashes involved "Good Samaritans" who had stopped to assist people or animals in the roadway or persons stranded on the shoulder and were subsequently struck and killed. At least one of the fatal crashes was deemed by the investigating officer to involve a driver intentionally striking a pedestrian.

The 2001 and 2006 fatal crash reports were selected to provide a snapshot of current crashes involving pedestrian fatalities and to determine if the characteristics of such crashes had changed over time. Only these 2 years of data were examined because of the time constraints of the study. Detailed fatality information is provided in Appendices I and J. Since no measures of pedestrian exposure were available for the specific 2001 and 2006 crash locations, it was impossible to construct pedestrian fatal crash rates.

From a careful reading of the 2001 and 2006 FR-300s, five common fatal pedestrian crash scenarios were developed:

1. *Pedestrian struck in the roadway, away from intersections and crosswalks.* This scenario covered cases where pedestrian fatal crashes occurred mid-block or on an unbroken stretch of highway. This was, by far, the most common type of pedestrian fatality.

2. *Pedestrian struck on the roadside.* Persons walking just off of the roadway were struck by out-of-control vehicles or by impaired, distracted, or speeding drivers.

3. *Pedestrians struck on sidewalks.* These crashes involved a vehicle traveling in the roadway mounting the curb and striking a pedestrian. None of the crashes in this category involved vehicles striking pedestrians on the sidewalk as the vehicle pulled out of a driveway.

4. *Pedestrians struck in crosswalks at intersections.* This scenario involved pedestrians struck while crossing against the traffic signal or when drivers were turning left at a green light. Although there are other potential situations where pedestrians might be struck in crosswalks at intersections (e.g., when drivers are turning right at a red light, etc.), this type of crash was not recorded in Virginia in 2001 or 2006.

5. *Pedestrians struck at intersections but not in the crosswalk.* These crashes often occurred at the far side of the intersection or as pedestrians crossed the median and stepped into the other side of the roadway.

For pedestrians struck away from intersections or on the roadside, the roadway type (i.e., secondary, primary/arterial, interstate, or city street) was noted. In addition, the age of the pedestrian (children aged 12 and under, teenagers aged 13 to 19, adults aged 20 to 64, and senior citizens aged 65 and older) was noted for all pedestrians killed. These age groups were chosen to determine whether legislation should be proposed to target any one age group based on fatal-crash involvement.

Results and Discussion

Macroscopic Analysis

Annual Trends of Pedestrians and Bicyclists in Traffic Crashes in Virginia. Trends of pedestrians and bicyclists involved in traffic crashes in Virginia from 1999 through 2005 are shown in Figures 1 through 6. The raw numbers of pedestrian and bicyclist fatalities (Figure 1) and bicyclist injuries (Figure 2) do not appear to show any noticeable increasing or decreasing trend over time although the number of injured pedestrians (Figure 2) appears to be decreasing slightly. This observation was confirmed by the results of a regression model, which found a statistically significant decrease in the number of pedestrian injuries but no statistically significant decrease in the number of pedestrian fatalities, bicyclist fatalities, or bicyclist injuries.

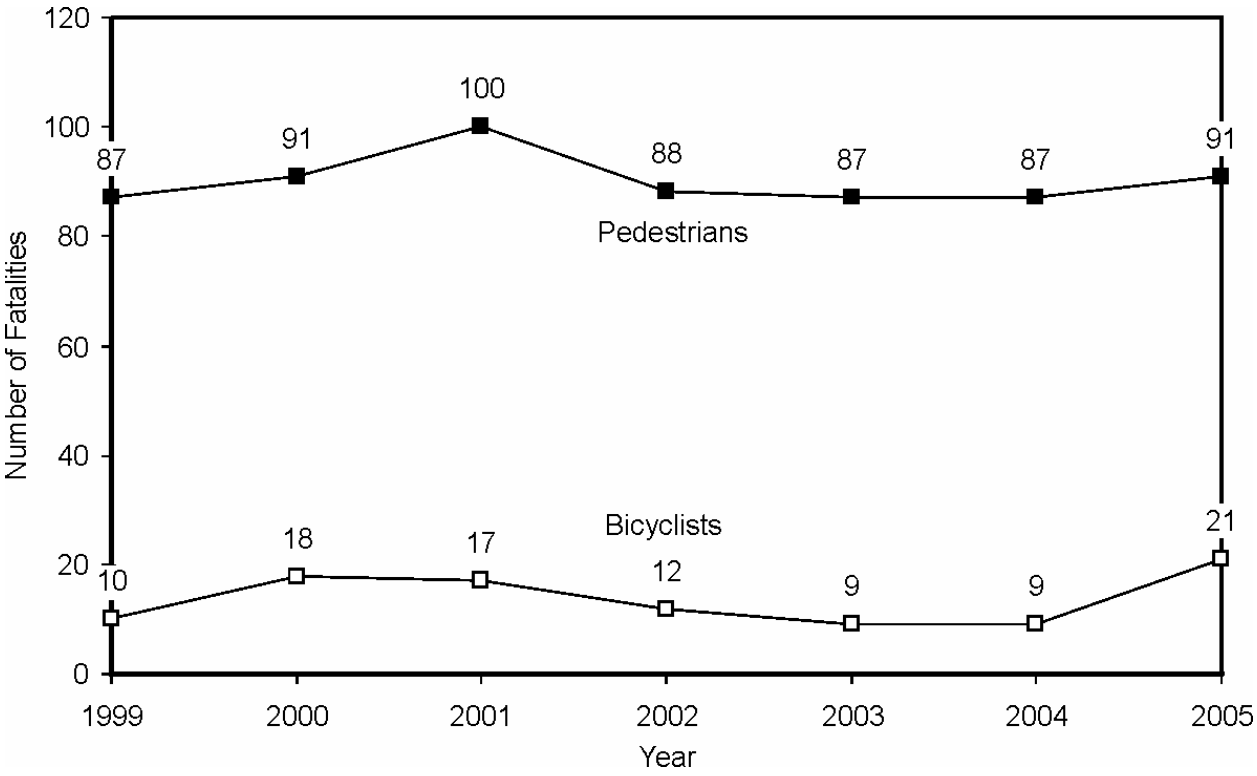

Figure 1. Fatalities of pedestrians and bicyclists in Virginia from 1999 through 2005.

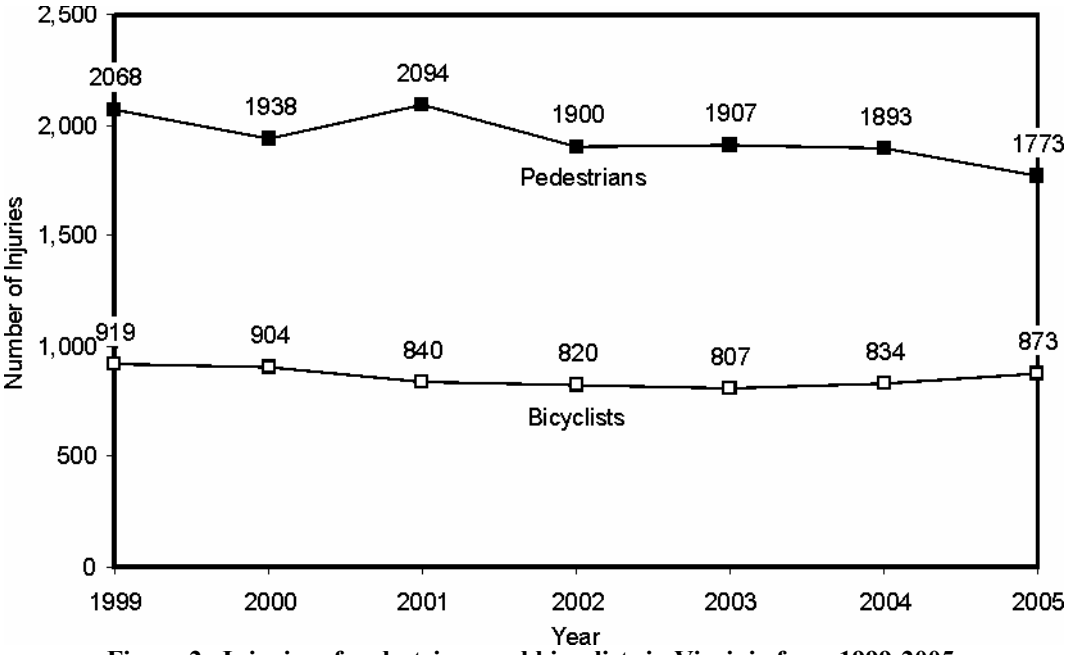

Figure 2. Injuries of pedestrians and bicyclists in Virginia from 1999-2005.

The raw numbers in the figures do not reflect any factors that might have been changed over time and that would have influenced pedestrian and bicycle traffic crashes, such as weather conditions, demographic changes, changes in the number of pedestrians and bicyclists, economic conditions, traffic volumes, driver behaviors, and so on. It is impossible to collect and control for all such factors.

However, for this analysis, the population estimate of Virginia, which is one of the most frequently adopted exposure measures in traffic safety, was taken into account. Figures 3 and 4

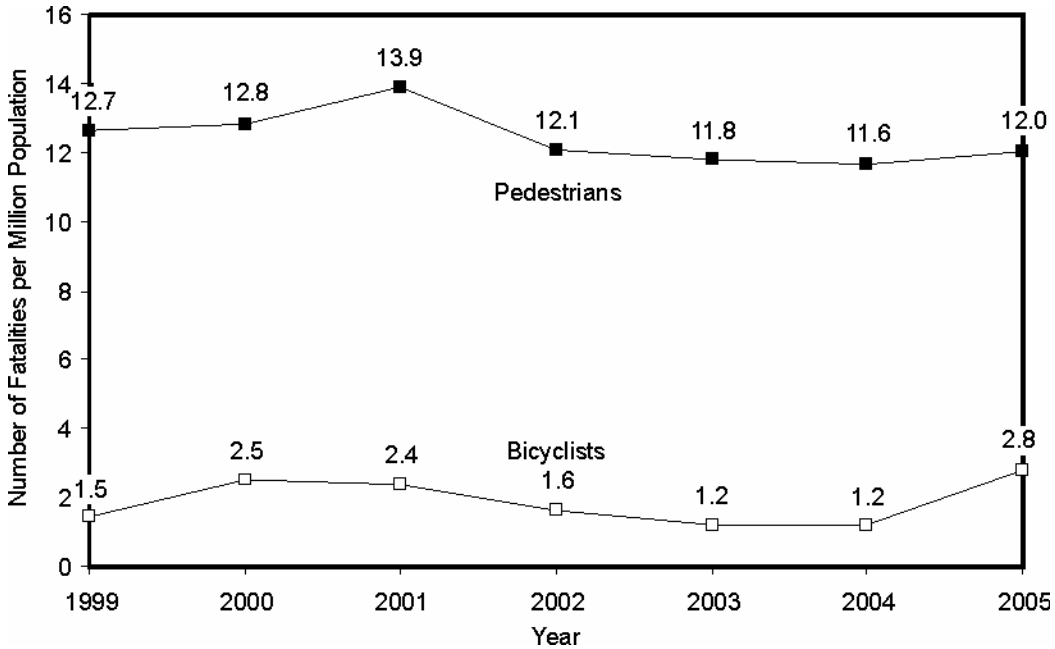

Figure 3. Fatality rates of pedestrians and bicyclists in Virginia from 1999 through 2005.

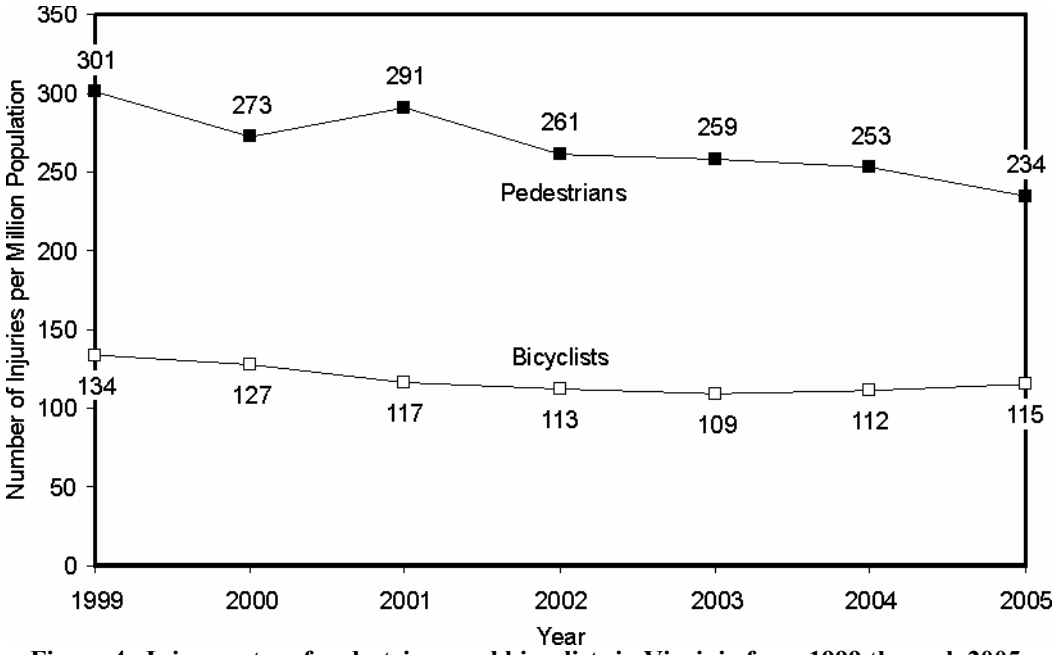

Figure 4. Injury rates of pedestrians and bicyclists in Virginia from 1999 through 2005.

show fatality and injury rates of pedestrians and bicyclists in traffic crashes per million Virginia residents. The annual trends appear to be similar to those for the raw numbers in Figures 1 and 2. The pedestrian and bicyclist injury rates (Figure 4) appear to have decreased slightly. Both decreases in pedestrian injury rates and bicyclist injury rates were statistically confirmed by the results of regression models.

Percentages of pedestrians and bicyclists among all victims in traffic crashes were also examined and are presented in Figures 5 and 6. No specific trends stand out, and percentages of injuries of pedestrians and/or bicyclists seem stable across time.

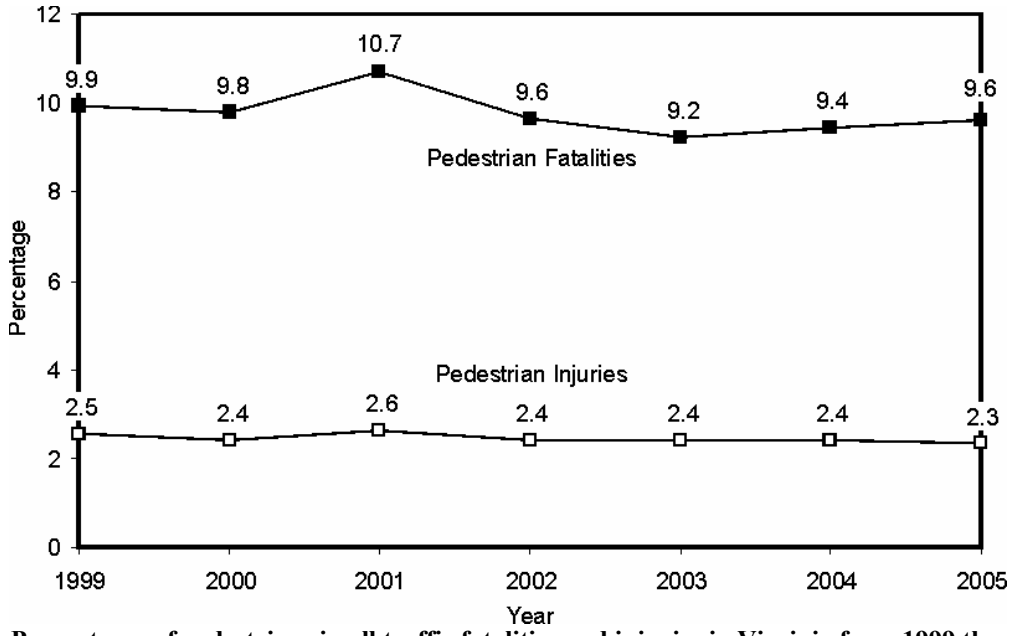

Figure 5. Percentages of pedestrians in all traffic fatalities and injuries in Virginia from 1999 through 2005.

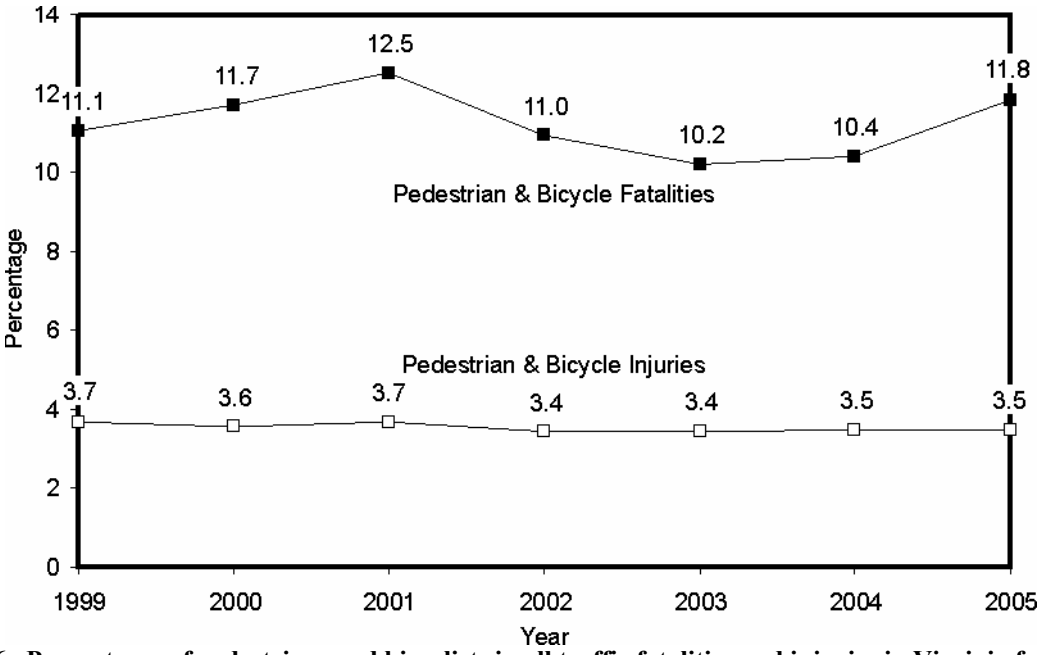

Figure 6. Percentages of pedestrians and bicyclists in all traffic fatalities and injuries in Virginia from 1999 through 2005.

In summary, an examination of annual trends of pedestrians and bicyclists involved in traffic crashes revealed no statistically significant changes in the number and rate of pedestrian and bicyclist fatalities in Virginia from 1999 through 2005. However, statistically significant decreasing trends were found in the number of injured pedestrians and in the rates of injured pedestrians and injured bicyclists.

Annual Trends of Pedestrian-Involved Fatal Crashes in Virginia and Surrounding States. The raw number and rate per million population of pedestrian-involved fatal crashes on roads with speed limits of 35 mph or lower in Virginia for the 26 years from 1980 through 2005 are shown in Figure 7; crashes involving impaired drivers were excluded. Both the number and the rate of fatal crashes demonstrated an overall decreasing trend over the 26-year period. A similar overall decrease in the number of fatal crashes was also found in other states, although the rate of the decrease differed across states, as shown in Figure 8. Decreasing trends in several states, including Virginia, have slowed down or plateaued in recent years (e.g., 1999 through 2005).

The number and rate of fatal crashes were compared between Virginia and the surrounding five states (Maryland, West Virginia, Tennessee, Kentucky, and North Carolina) and the District of Columbia and are shown in Figures 9 and 10. An overall decreasing trend over the 26 years was found in all the states, although the decreasing slopes varied. In terms of the number of fatal crashes in Figure 9, Virginia had more crashes than the three western states (West Virginia, Kentucky, and Tennessee) and the District of Columbia whereas it had fewer crashes than North Carolina and Maryland. However, North Carolina and Maryland appear to have made a significant improvement over the past 20 years. After accounting for population (i.e., fatal crash rate per million population), Virginia's rate fell below the rates of the District of Columbia and Maryland and was similar to those of the other four states in Figure 10.

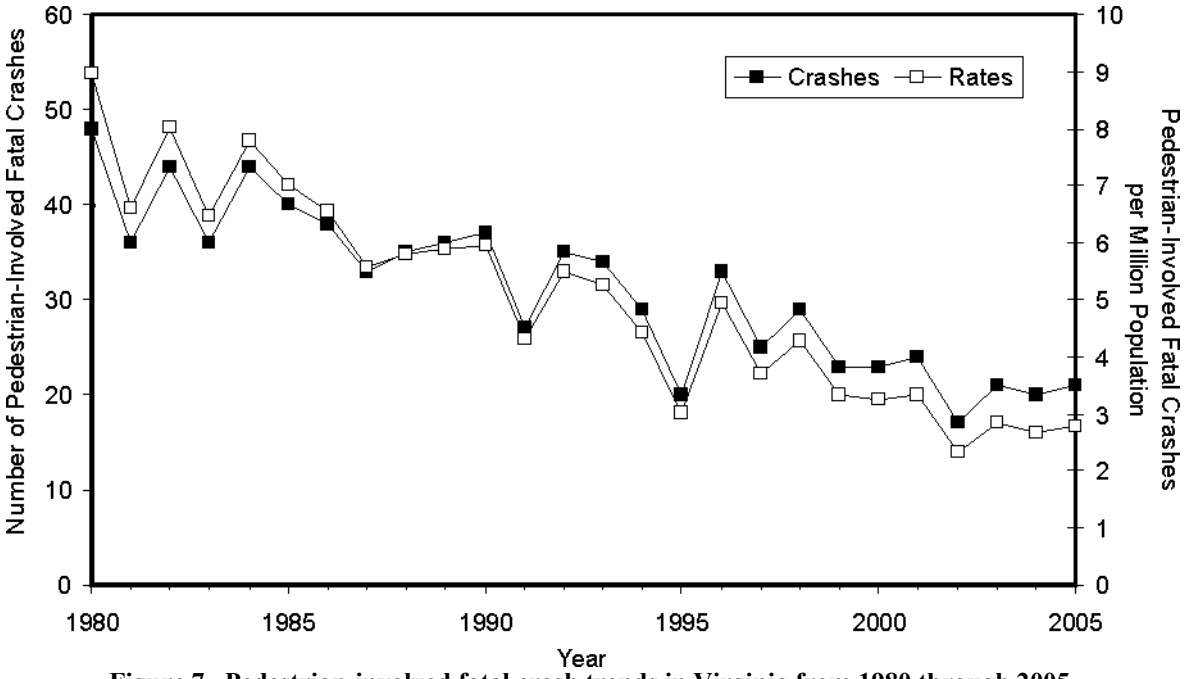

Figure 7. Pedestrian-involved fatal crash trends in Virginia from 1980 through 2005.

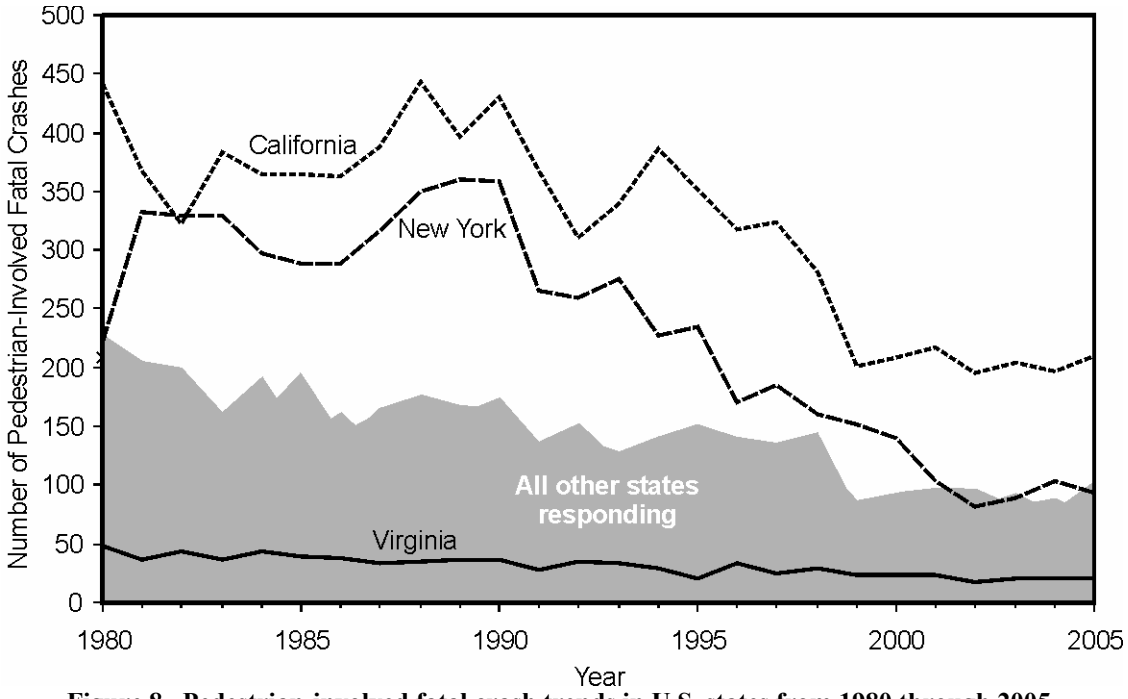

Figure 8. Pedestrian-involved fatal crash trends in U.S. states from 1980 through 2005.

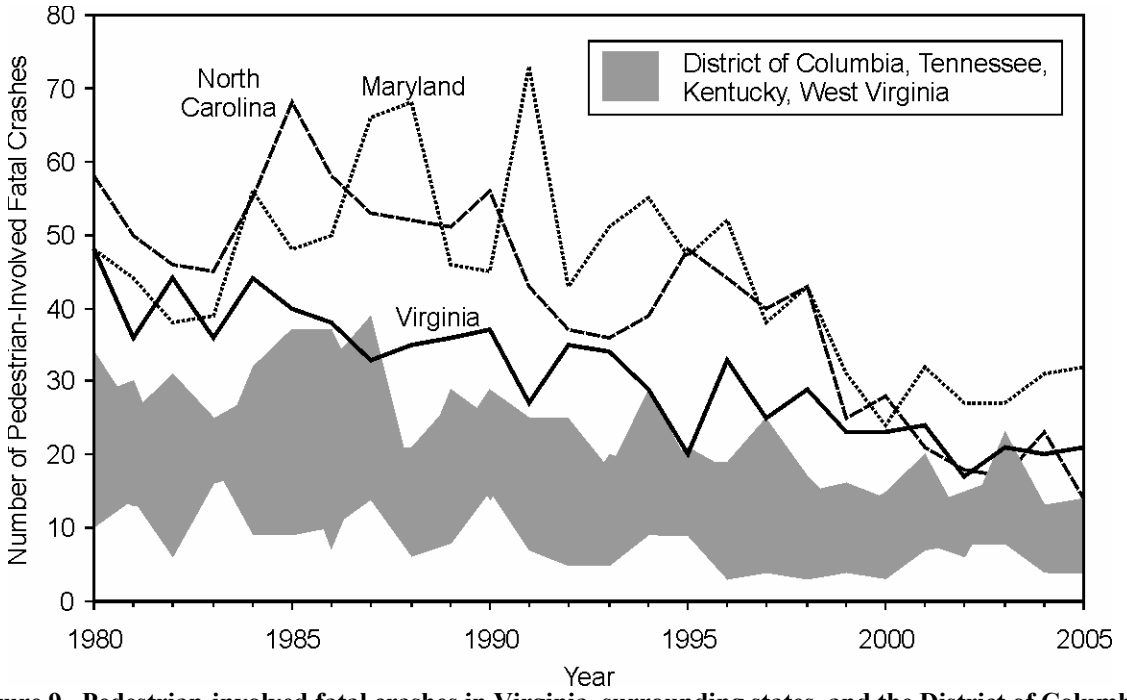

Figure 9. Pedestrian-involved fatal crashes in Virginia, surrounding states, and the District of Columbia from 1980 through 2005.

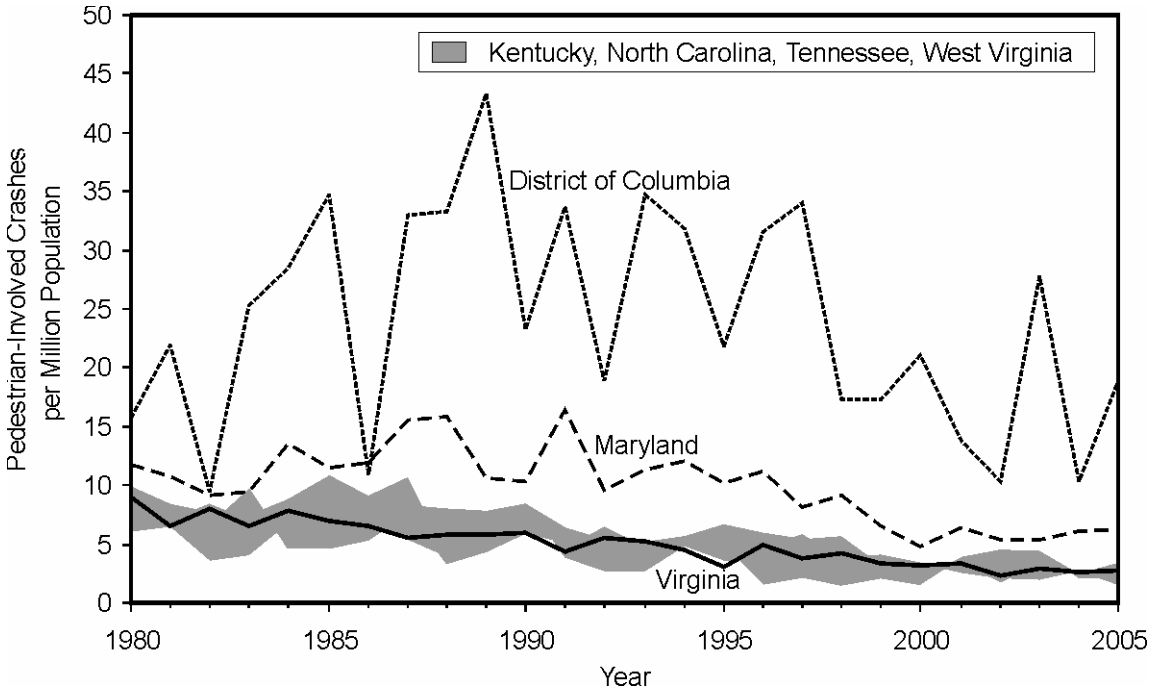

Figure 10. Pedestrian-involved fatal crash rates in Virginia, surrounding states, and the District of Columbia from 1980 through 2005.

In summary, in terms of the raw number of pedestrian-involved fatal crashes, Virginia had fewer fatal crashes on average than Maryland and North Carolina and more than West Virginia, Tennessee, Kentucky, and the District of Columbia. In terms of the fatal crash rate per million population, Virginia's rate was lower than the rates of the District of Columbia and Maryland and similar to the rates of the other four states.

"Stop" Versus "Yield" in Pedestrian Laws. A comparison between states with stop vs. yield requirements in pedestrian laws was performed to determine if there was a safety effect of such a law change in other states, using pedestrian-involved fatal crashes extracted from the FARS national database. Unfortunately, since there is no national repository of injury crash population data, it was impossible to perform a similar analysis using pedestrian injury crashes within the time constraints of this study.

Three datasets of the pedestrian-involved fatal crashes that occurred on roads with speed limits of 35 mph or lower were used for this analysis and were separated into three categories: (1) including impaired drivers, (2) excluding impaired drivers, and (3) including impaired drivers and having occurred only at intersections. The number and rate of pedestrian-involved fatal crashes per million population ashes were compared to those of four states (Washington, Georgia, Minnesota, and Oregon) that had changed their pedestrian laws between 1990 and 2003 by changing the requirement that drivers yield to pedestrians in crosswalks to a requirement that drivers stop for pedestrians in crosswalks. Although all the analyses were performed for each of the three datasets, only the results of the analyses using the second dataset (excluding crashes involving impaired drivers) are presented here. However, the conclusions regarding the effects of the law changes drawn from the analyses using the three datasets were virtually identical.

The number and rate of the pedestrian-involved fatal crashes excluding impaired drivers are presented for the period 1980 through 2005 in Figures 11 and 12. In Figure 11, the raw

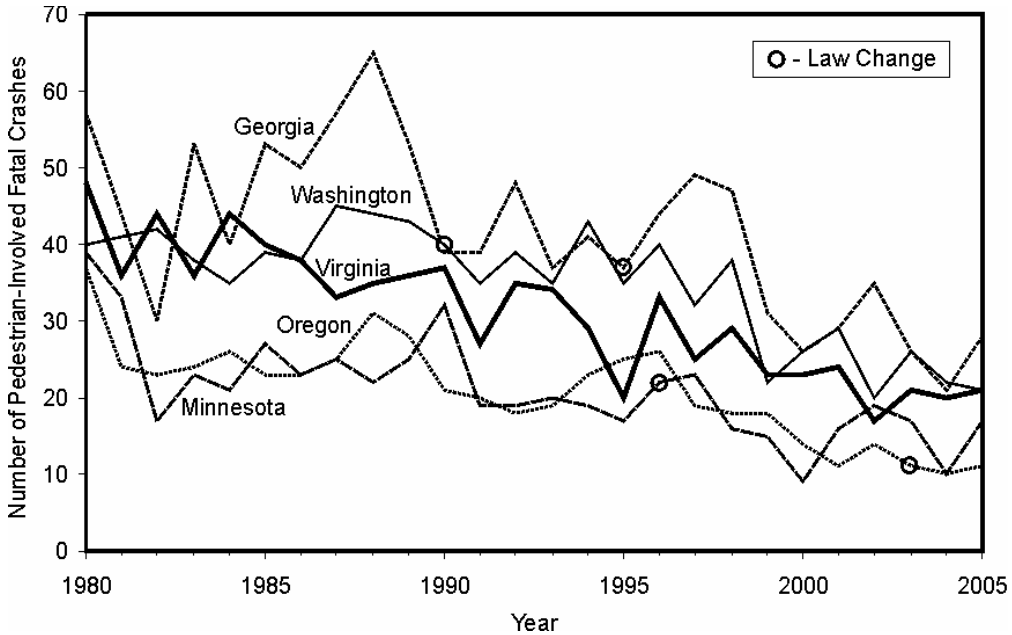

Figure 11. Pedestrian-involved fatal crashes from 1980 through 2005 in Virginia and four states with a "stop" requirement.

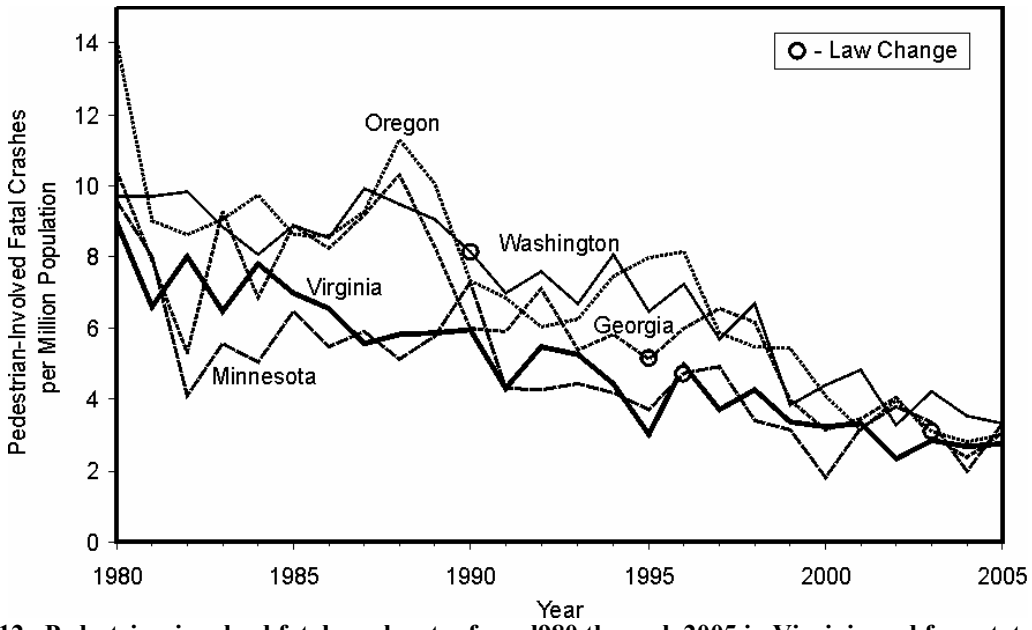

Figure 12. Pedestrian-involved fatal crash rates from l980 through 2005 in Virginia and four states with a "stop" requirement.

number of crashes in Virginia is consistently near the middle of the graph over time in comparison with that of the four states having a stop requirement in their laws. In terms of the raw number of pedestrian-involved fatal crashes, Virginia had fewer crashes than Georgia, slightly fewer crashes than Washington, and more crashes than Minnesota and Oregon. In terms of the rate per million population in Figure 12, the trends for Virginia are quite close to those for Minnesota. The decreases in fatalities in recent years have brought the other states' fatal crash figures closer to Virginia's.

Before-After Analysis. The change in the number and rate of the pedestrian-involved fatal crashes before and after the law were compared in four states (Washington, Georgia, Minnesota, and Oregon). As seen in Tables 1 and 2, in all four states there were considerable declines in terms of a percentage change in both in the number and rate, ranging from 3 to 30 percent. However, Washington was the only state for which the decline after the law change was statistically significant, and its fatal crash rate was reduced by 22 percent (see Table 2). It should be noted that this reduction does not mean that the law change caused the reduction; it means only that the law change was statistically associated with the reduction. However, the researchers hypothesized that the reduction in Washington's fatal crash rate was likely due to a continuation of previous decreasing trends, which is seen in Figure 12, and thus not likely to be related to the law change. Once the previous trends were removed from the data, the researchers hypothesized that the reduction was likely to disappear, which was confirmed by the results of a time-series analysis. It should be noted that as described previously, only the results of the analyses using pedestrian-involved fatal crash data on roads with speed limits of 35 mph or lower excluding crashes involving impaired drivers are presented here and in the following two subsections.

Table 1. Before-After Comparison of Pedestrian-Involved Fatal Crashes

State	Change of Law	Analysis Period		Average Fatal Crash Count		Change (After – Before)
		Before	After	Before	After	
Washington	1990	1985-1989	1991-1995	41.8	37.4	–4.4 (–11%)[§]
Georgia	1995	1990-1994	1996-2000	40.8	39.4	–1.4 (–3%)[§]
Minnesota	1996	1991-1995	1997-2001	18.5	15.8	–2.7 (–15%)[§]
Oregon[†]	2003	1998-2003	2004-2005	15.0	10.5	–4.5 (–30%)[§]

[†] The "after" period is 2 years.
[§] A change is not statistically significant at the 0.1 significance level.

Table 2. Before-After Comparison of Pedestrian-Involved Fatal Crash Rate per Million Population

State	Change of Law	Analysis Period		Average Fatal Crash Rate		Change (After – Before)
		Before	After	Before	After	
Washington	1990	1985-1989	1991-1995	9.17	7.15	–2.0 (–22%)[*]
Georgia	1995	1990-1994	1996-2000	6.03	5.17	–0.9 (–14%)[§]
Minnesota	1996	1991-1995	1997-2001	4.16	3.29	–0.9 (–21%)[§]
Oregon[†]	2003	1998-2003	2004-2005	15.0	10.5	–4.5 (–30%)[§]

[†] The "after" period is 2 years.
[*] A change is statistically significant at the 0.05 significance level.
[§] A change is not statistically significant at the 0.1 significance level.

Time-Series Analysis. For three of the states (Washington, Georgia, and Minnesota), a time-series analysis using 26 years of data (1980 through 2005) was employed to correct for existing decreasing trends and potential bias because of a correlation of data over time. Oregon was not included in this analysis because of its short after period. The following four models were estimated for each of the three states:

$$\text{Model 1: } Y_t = \beta_0 + \beta_1 \times STOP_t + \nu_t$$
$$\text{Model 2: } Y_t = \beta_0 + \beta_1 \times STOP_t + \beta_2 \times Time1980_t + \nu_t$$
$$\text{Model 3: } Y_t = \beta_0 + \beta_1 \times STOP_t + \beta_2 \times CPI1967_t + +\nu_t$$
$$\text{Model 4: } Y_t = \beta_0 + \beta_1 \times STOP_t + \beta_2 \times Population_t + \nu_t$$

where

t = year (t = 1980,…,2005)
Y_t = the number of pedestrian-involved fatal crashes in year t
$STOP_t$ = an indicator equaling 1 if a stop requirement is present in a pedestrian law in year t and 0 otherwise
$Time1980_t$ = a sequential time variable based on 1980 ($Time1980_{t=1980} = 1$, $Time1980_{t=1981} = 2, \cdots,$ $Time1980_{t=2005} = 26$)
$CPI1967_t$ = a CPI of year t based on 1967 with 100 base value ($CPI1967_{1967} = 100$)
$Population_t$ = a population estimate of year t (on July 1)
β_0, β_1, and β_2 = regression coefficients to be estimated

ν_t = a serially correlated error; $\nu_t = \varepsilon_t - \varphi_1 \nu_{t-1} - \cdots - \varphi_m \nu_{t-m}$ where $\nu_t, \ldots, \nu_{t-m}$ are $m + 1$ serially correlated errors, ε_t is a normal independent error term, and $\varphi_1, \ldots, \varphi_m$ are m autoregressive coefficients.

The estimated models are presented in Tables 3, 4, and 5 for Washington, Georgia, and Minnesota, respectively. All regression coefficients were statistically significant at the 0.01 level, and all autoregressive coefficients were statistically significant for most at the 0.05 level and for some at the 0.1 level. All four models initially included the law change variable (i.e., *STOP*). The variable was removed from Models 2, 3, and 4 because its coefficient estimate was not statistically significant.

Model 1 suggests that the law change was statistically associated with a reduction in pedestrian-involved fatal crashes in all three states when a decreasing trend was not taken into account. However, Models 2, 3, and 4 indicate that the statistical association between the law change and the reduction disappeared when the trend was accounted for by one of the three variables, i.e., *TIME*1980, *CPI*1967, and *Population*. It should be noted that a high order autoregressive term (e.g., lag 8 in Model 1 for Washington) was included in an effort to remove any remaining serial correlations among residuals, and despite such an effort, residuals of Models 2 and 3 for Georgia and Model 1 for Minnesota still contain autocorrelations, but they did not affect the findings.

Table 3. Time-Series Models of Pedestrian-Involved Fatal Crashes (Washington)

Model	Estimates	R^2_{Total}
Model 1	$\hat{Y}_t = 42.9 - 12.8 \times STOP_t + 0.570 e_2 - 0.325 e_8$	0.75
Model 2	$\hat{Y}_t = 45.1 - 0.789 \times TIME1980_t - 0.455 e_2$	0.70
Model 3	$\hat{Y}_t = 59.6 - 0.0598 \times CPI1967_t - 0.467 e_2$	0.70
Model 4	$\hat{Y}_t = 79.8 - 0.00000877 \times Population_t + 0.445 e_2$	0.71

Table 4. Time-Series Models of Pedestrian-Involved Fatal Crashes (Georgia)

Model	Estimates	R^2_{Total}
Model 1	$\hat{Y}_t = 48.2 - 14.5 \times STOP_t - 0.395 e_6$	0.50
Model 2	$\hat{Y}_t = 54.7 - 0.975 \times TIME1980_t$	0.43
Model 3	$\hat{Y}_t = 73.5 - 0.0763 \times CPI1967_t$	0.45
Model 4	$\hat{Y}_t = 91.6 - 0.00000713 \times Population_t + 0.376 e_9$	0.62

Table 5. Time-Series Models of Pedestrian-Involved Fatal Crashes (Minnesota)

Model	Estimates	R^2_{Total}
Model 1	$\hat{Y}_t = 23.8 - 7.41 \times STOP_t$	0.31
Model 2	$\hat{Y}_t = 29.3 - 0.615 \times TIME1980_t$	0.50
Model 3	$\hat{Y}_t = 41.0 - 0.0477 \times CPI1967_t$	0.51
Model 4	$\hat{Y}_t = 81.4 - 0.000013 \times Population_t$	0.48

Based on these results, the law changes in the three states were not statistically associated with a reduction in the number of pedestrian-involved fatal crashes. This finding is statistically valid yet not definitive since the models do not include influential factors such as the total number of pedestrians using crosswalks in each state or the total volume of motor vehicle traffic in each state.

Cross-Sectional Analysis. Last, a comparison was made between the six states with laws requiring drivers to stop for pedestrians in crosswalks (Nebraska, Maryland, Washington, Georgia, Minnesota, and Oregon) and the 43 states that require the driver to yield. Hawaii and the District of Columbia were excluded from this analysis because their laws changed in 2005. The six states requiring drivers to stop seemed to have a smaller number and rate of pedestrian-involved fatal crashes on average than did the 43 states requiring drivers to yield, as indicated in Tables 6 and 7. However, none of the observed differences was statistically significant, meaning that the differences in the number and the rate between "stop" and "yield" states occurred purely by chance.

In summary, the law changes do not appear to be statistically associated with a reduction in the number or rate of pedestrian-involved fatal crashes that occurred on roads with speed limits of 35 mph or lower. Although the results (Tables 1 through 7) were from analyses using pedestrian-involved fatal crash data for roads with speed limits of 35 mph or lower excluding crashes involving impaired drivers, the finding holds true for the cases including impaired drivers, excluding impaired drivers, and including impaired drivers and only intersection crashes.

Table 6. Cross-Sectional Comparison of Pedestrian-Involved Fatal Crashes

Year	Average Fatal Crash Count		Difference ("Stop" States – "Yield" States)
	"Stop" States[†]	"Yield" States[‡]	
2004	16.2	24.4	–8.2 (–34%)[§]
2005	19.2	25.1	–5.9 (–24%)[§]

[†] Nebraska, Maryland, Washington, Georgia, Minnesota, and Oregon.
[‡] Forty-three states excluding the six "stop" states, Hawaii, and the District of Columbia.
[§] A difference is not statistically significant.

Table 7. Cross-Sectional Comparison of Pedestrian-Involved Fatal Crash Rate per Million Population

Year	Average Fatal Crash Rate		Difference ("Stop" States – "Yield" States)
	"Stop" States[†]	"Yield" States[‡]	
2004	2.99	3.47	–0.48 (–14%)[§]
2005	3.65	3.51	+0.14 (+4%)[§]

[†] Nebraska, Maryland, Washington, Georgia, Minnesota, and Oregon.
[‡] Forty-three states excluding the six "stop" states, Hawaii, and the District of Columbia.
[§] A difference is not statistically significant.

Summary of Macroscopic Analysis. Recent annual trends (1999–2005) in pedestrian and bicyclist fatalities and injuries in Virginia revealed statistically significant decreasing trends in the number of pedestrian injuries and the rate of pedestrian and bicyclist injuries. In an examination of the long-term trends (1980–2005) of the pedestrian-involved fatal crashes that occurred on roads with speed limits of 35 mph or lower, the number and rate (per million population) of these fatal crashes have been declining in Virginia over time. Similar declines were found for the surrounding states and in the District of Columbia.

Comparisons of the pedestrian-involved fatal crash data between Virginia and the surrounding states revealed the following: (1) in terms of the raw number of fatal crashes, Virginia had fewer than Maryland and North Carolina and more than West Virginia, Tennessee, Kentucky, and the District of Columbia; (2) North Carolina and Maryland appeared to have made significant improvements over the past 20 years, and their numbers have become close to Virginia's in recent years; and (3) in terms of the rate of such fatal crashes (per million population), Virginia's rates were lower than those of Maryland and the District of Columbia and were similar to those of the other four states.

The three analyses of "stop" versus "yield" states indicated that the law changes from yield to stop were not statistically associated with a reduction in the number or rate (per million population) of pedestrian-involved fatal crashes; there were reductions in the number and rate of such crashes after the law changes, but they were not statistically significant after accounting for previously decreasing trends. The numbers and rates of pedestrian-involved fatal crashes in states with stop laws versus those in the 43 states with yield laws were not statistically different.

Microscopic Analysis

Pedestrian Fatal Crashes in Virginia. As seen in Table 8, more than 60 percent of the pedestrian fatalities occurring in 2001 and 2006 involved pedestrians struck in the roadway away from intersections. More than 50 percent of these crashes occurred on primary/arterial highways (Table 9). Very little change with regard to roadway type occurred between 2001 and 2006, except that fewer crashes occurred on the interstate system in 2006. The reader should note, however, that there were relatively few pedestrian crashes in either year and such small numbers would be expected to vary from year to year because of chance factors alone.

There were 100 pedestrian crashes in 2001 and 83 in 2006. There were 3 crashes in each year that were not included in Tables 8 through 10. In 2001, the circumstances of 2 of these crashes were unknown and the third was not a pedestrian crash. (The vehicle involved ran off the road and struck a house, killing one of the occupants inside.) In 2006, the circumstances of all 3 crashes were unknown.

The second most common type of fatal pedestrian crashes involved the pedestrian being struck while walking or sitting on the side of the road (11% to 14% of the crashes). Although most of these crashes occur on primary and interstate highways, they are still relatively rare compared to in-roadway, non-intersection crashes. Crosswalk, intersection (non-crosswalk), and sidewalk crashes are also rare.

Table 8. Pedestrian Crash Scenarios, 2001 and 2006

Scenario	2001		2006	
	No.	%	No.	%
Pedestrian struck in roadway not at crosswalk or intersection	67	69.1	50	62.5
Pedestrian struck in roadway at intersection in crosswalk	6	6.2	12	15.0
Pedestrian struck in roadway at intersection not in crosswalk	8	8.2	7	8.8
Pedestrian struck on sidewalk	2	2.1	2	2.5
Pedestrian struck on roadside	14	14.4	9	11.3
Total	97	100.0	80	100.0

Table 9. Pedestrian Crash Scenarios by Roadway Type, 2001 and 2006

Scenario	Roadway Type	2001		2006	
		No.	%	No.	%
Pedestrian struck in roadway not at crosswalk or intersection	Secondary	7	10.4	9	18.0
	Primary/Arterial	35	52.2	28	56.0
	Interstate	12	17.9	2	4.0
	City street	13	19.4	11	22.0
	Subtotal	67	100.0	50	100.0
Pedestrian struck in roadway at intersection in crosswalk	Against light	2	33.3	6	50.0
	With light	0	0	0	0
	Unknown	2	33.3	4	33.3
	Left-turning vehicle	2	33.3	2	16.7
	Subtotal	6	100.0	12	100.0
Pedestrian struck in roadway at intersection not in crosswalk	Against light	2	25.0	1	14.3
	With light	0	0	0	0
	Unknown	6	75.0	5	71.4
	Left-turning vehicle	0	0.0	1	14.3
	Subtotal	8	100.0	7	100.0
Pedestrian struck on sidewalk	Subtotal	2	100.0	2	100.0
Pedestrian struck on roadside	Secondary	3	21.4	2	22.2
	Primary/Arterial	5	35.7	2	22.2
	Interstate	4	28.6	4	44.4
	City street	2	14.3	1	11.1
	Subtotal	14	100.0	9	100.0
Total		97		80	

Table 10. Fatally Injured Pedestrians by Age, 2001 and 2006

Scenario	Year	Adults		Children		Teenagers		Senior Citizens		Total
		No.	%	No.	%	No.	%	No.	%	
Pedestrian struck in roadway not at crosswalk or intersection	2001	46	69	6	9	2	3	13	19	67
	2006	37	74	4	8	1	2	8	16	50
Pedestrian struck in roadway at intersection in crosswalk	2001	3	50	0	0	0	0	3	50	6
	2006	5	42	0	0	1	8	6	50	12
Pedestrian struck in roadway at intersection not in crosswalk	2001	6	60	0	0	1	10	3	30	10
	2006	5	71	0	0	0	0	2	29	7
Pedestrian struck on sidewalk	2001	0	0	1	50	1	50	0	0	2
	2006	2	100	0	0	0	0	0	0	2
Pedestrian struck on roadside	2001	9	64	0	0	2	14	3	21	14
	2006	7	78	0	0	1	11	1	11	9
Total	2001	64	65	7	7	6	6	22	22	99
	2006	56	70	4	5	3	4	17	21	80

In terms of age of fatally injured pedestrians, adults (i.e., 20 to 64 years old) made up the largest group (65% in 2001 and 70% in 2006), followed by senior citizens (i.e., age 65 or older) (22% and 21%, respectively). Eleven children (i.e., age 12 and under) and nine teenagers (i.e., 13 to 19 years old) were fatally injured, accounting for 13 percent of all pedestrian fatalities in 2001 and 9 percent in 2006. Adults far outnumbered senior citizens in non-intersection, in-roadway crashes but were about equally numbered in terms of in-crosswalk fatalities. All but one of the children were killed in non-intersection, in-roadway crashes.

Summary of Microscopic Analysis. The microscopic analysis identified adults (20 through 64 years old) and senior citizens (age 65 or older) attempting to cross roads between intersections or on uninterrupted stretches of highways as the most serious pedestrian traffic safety problem, accounting for two-thirds of all pedestrian fatalities. Interestingly, it is while crossing between intersections mid-block where pedestrians must share the right of way with vehicles[133] and are not protected by a statutorily determined right of way.[134] Most of the pedestrian fatalities between intersections occurred on primary and arterial roads where roadways are designed to move vehicles at a reasonably high speed between activity centers.

Being struck while on the roadside or shoulder where pedestrians have the right of way accounted for 11 percent of the 2001 pedestrian fatalities and 14 percent of the 2006 pedestrian fatalities and was the next most serious problem, especially among adults. Only 6 fatal crashes in 2001 and 12 fatal crashes in 2006 involved a pedestrian being struck in a crosswalk, and these crashes were distributed equally between adults and senior citizens.

Analysis of the Code of Virginia

Virginia's pedestrian- and bicycle-related statutes were reviewed alongside the pedestrian- and bicycle-related legislation of all 50 states, the District of Columbia, and the UVC. Areas where language appeared to be ambiguous were identified, along with areas where Virginia appeared to offer less protection for pedestrians than did other states or the UVC or where provisions within the Code appeared to be in conflict. To aid in this analysis, the researchers reviewed VTRC studies on pedestrian- and bicycle-related legislation, attended meetings with stakeholders from different localities and state agencies across the Commonwealth, and examined Virginia Supreme Court cases and Virginia Attorney General Opinions concerning pedestrian and bicycle safety. Because the UVC is followed either exactly or substantially in many states and because of its jurisdiction-neutral status as model legislation, the language of the UVC was used most often to provide an example or to illustrate problems within the Code. The analysis resulted in a number of legal issues that were identified across the 51 jurisdictions reviewed. A spreadsheet consisting of each state's position on these legal issues is provided in Appendix H.

Analysis of the Code: Pedestrians

§ 46.2-100. Definitions.

The definitions of the following pedestrian-related words and terms are provided in the Code.

[133] Brown v. Arthur, 202 Va. 624, 629, 119 S.E.2d 315, 318 (1961).
[134] VA. CODE ANN. § 46.2-923 (2007) requires pedestrians to cross at intersections or marked crosswalks wherever possible. VA. CODE ANN. § 46.2-924 (2007) gives pedestrians the right of way when crossing at crosswalks or at intersections on a road where the speed limit is 35 mph or less.

"Crosswalk."

> "Crosswalk" means that part of a roadway at an intersection included within the connections of the lateral lines of the sidewalks on opposite sides of the highway measured from the curbs or, in the absence of curbs, from the edges of the traversable roadway; or any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other markings on the surface.

At several places in the Code, the two types of crosswalks enumerated in this definition are distinguished from each other. For example, § 46.2-923 requires pedestrians to cross "wherever possible, only at intersections or marked crosswalks."[135] The Code, however, does not explicitly distinguish between marked and unmarked crosswalks. Further, the first part of the definition, which would seem to define an "unmarked crosswalk," differs from what is stated in § 46.2-924(A)(2). The latter defines when drivers are expected to yield to pedestrians as: "[a]t any regular pedestrian crossing included in the prolongation of the lateral boundary lines of the adjacent sidewalk at the end of a block,"[136] although the two provisions are similar enough to suggest that they are intended to cover the same type of crossing. It is not clear why "crosswalk" is defined this way if the situation where drivers must yield to pedestrians defines a "pedestrian crossing" differently. These two provisions should be made consistent with each other by either adjusting the definition of "crosswalk" to match what is stated in § 46.924(A)(2) or by adjusting what is stated in § 46.2-924(A)(2) to match the definition of "crosswalk."

Although most states include marked and unmarked crosswalks together into one definition, Wisconsin took an alternative approach, where "marked" and "unmarked" crosswalks are defined separately:

> "Crosswalk" means either of the following, except where signs have been erected by local authorities indicating no crossing:
>
> (a) Marked crosswalk. Any portion of a highway clearly indicated for pedestrian crossing by signs, lines or other markings on the surface; or
>
> (b) Unmarked crosswalk. In the absence of signs, lines or markings, that part of a roadway, at an intersection, which is included within the transverse lines which would be formed on such roadway by connecting the corresponding lateral lines of the sidewalks on opposite sides of such roadway or, in the absence of a corresponding sidewalk on one side of the roadway, that part of such roadway which is included within the extension of the lateral lines of the existing sidewalk across such roadway at right angles to the center line thereof, except in no case does an unmarked crosswalk include any part of the intersection and in no case is there an unmarked crosswalk across a street at an intersection of such street with an alley.[137]

This approach is clearer because it defines the area of the roadway where pedestrians should cross when no markings or signals are in place, although, in Virginia, it would be prudent to include the prolongation of the lateral lines of a shared-use path as well within the definition, since there are a number of areas where shared-use paths are in place instead of sidewalks. In

[135] VA. CODE ANN. § 46.2-923 (2007).
[136] VA. CODE ANN. § 46.2-924(A)(2) (2007).
[137] WIS. STAT. § 340.01(10) (2006).

residential areas or in areas where it is too costly to install a new signal or marked crosswalk, it is crucial that pedestrians know where they should cross. In Virginia, pedestrians are expected to use *marked* crosswalks or intersections "wherever possible,"[138] but in the absence of marked crosswalks or intersections, it is unclear where they should cross.

"Shared-use Path."

> "Shared-use path" means a bikeway that is physically separated from motorized vehicular traffic by an open space or barrier and is located either within the highway right-of-way or within a separate right-of-way. Shared-use paths may also be used by pedestrians, skaters, users of wheel chairs or wheel chair conveyances, joggers, and other nonmotorized users.

This definition was added as part of an act to amend Virginia's bicycle laws in 2003.[139] However, discussions with Virginia Department of Transportation (VDOT) officials from Northern Virginia indicated that this definition seems to suggest that shared-use paths are primarily for bicycles; in reality, they are intended to be shared. In fact, more and more shared-use paths are being developed for use by all non-motorized road users, not just by bicyclists. Rather than phrase the definition as a "bikeway," the uses of a shared-use path would be more appropriately described by a more neutral term such as "trailway," "pathway," or "facility." In addition, the deletion of the word "also" and the addition of the word "bicyclists" would more accurately convey the message that shared-use paths are for the benefit of *all* non-motorized users.

Several definitions of pedestrian-related words and terms are provided in the codes of other states and in the UVC but are absent from the Code of Virginia.

"Pedestrian."

Forty-five other states and the UVC define "pedestrian," although the definitions vary with regard to whether or not people in wheelchairs are included in the definition. The UVC defines pedestrian as "any person afoot,"[140] and a little more than one-half of the states that define "pedestrian" use the same or equivalent language. The remaining states that define "pedestrian" include individuals in wheelchairs in the definition.

The Attorney General of Virginia issued an opinion evaluating which persons are considered to be pedestrians in Virginia that interprets the word "pedestrian" to include persons other than just persons on foot:

> While it is true that a pedestrian is ordinarily understood to be one who travels on foot, nevertheless the mere circumstance that he or she has attached to his or her feet roller skates, or ice skates, or walks on stilts, or uses crutches, or is without feet and propels himself or herself along by means of a chair or by some other mechanical device, does not clothe him or her, in a broad and general sense, with any other character than that of a pedestrian.[141]

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[138] VA. CODE ANN. § 46.2-923 (2007).
[139] Act of Mar. 16, 2003, ch. 29, 2003 Va. Acts 30, 33.
[140] UNIFORM VEHICLE CODE § 1-168 (Nat'l Comm. on Unif. Traffic Laws and Ordinances 2000).
[141] 1987–1988 Va. Op. Att'y Gen. 450, 452 (1988).

The attorney general pointed out that "the dangers presented by the use of motor vehicles are often greater to those using crutches or a wheelchair than they are to those traveling on foot."[142] Adding a definition of "pedestrian" that includes individuals using wheelchairs or other personal assistive mobility devices will clarify the Code and provide greater protection to such individuals.

It is important to note that of the states that did define "pedestrian," no state distinguished between the traditional "pedestrian," i.e., a person walking to get from point A to point B, and a person driving a vehicle who, after pulling over on the side of the road, steps out of the vehicle to change a tire, offer assistance, etc. In all states that define "pedestrian," both individuals would be considered "pedestrians."

"Traffic."

Forty-three states and the UVC define "traffic" to include pedestrians. This is significant because "traffic" is not a term that lends itself to a straightforward interpretation. For example, the term "moving traffic" in § 46.2-833 of the Code could be interpreted to refer only to motor vehicles or to motor vehicles, pedestrians, bicyclists, skateboarders, etc. Black's Law Dictionary defines traffic as "[t]he passing to and fro of people, animals, vehicles, and vessels along a transportation route."[143] However, § 46.2-935 of the Code distinguishes pedestrians from "traffic," thus implying that pedestrians were not intended to be considered traffic.[144]

"Traffic Control Signal" or "Traffic Control Device."

The overwhelming majority (46) of states and the UVC define one or both of these terms. Definitions of "traffic control device" often are preceded by the word "official" and encompass signs, signals, markings, and devices installed for the purpose of regulating, warning, or guiding traffic,[145] whereas definitions of "traffic control signal" typically refer only to devices such as stoplights.[146] Neither term is defined in the Code, and adding at least a definition of "official traffic control device" would add clarity to the sections of the Code regulating traffic.

Section 46.2-904 permits localities to prohibit bicycles from being ridden on designated sidewalks and crosswalks. The localities must conspicuously post signs warning of any enacted prohibitions. The statute further commands bicyclists not to ride on a sidewalk or crosswalk where prohibited by "official traffic control devices."[147] A definition of "official traffic control device" that includes "signs" within the definition would make it clear that the devices referred to in this provision are the same conspicuously posted signs mentioned earlier in the statute.

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[142] *Id*. at 451.
[143] BLACK'S LAW DICTIONARY 1502 (7th ed. 1999).
[144] VA. CODE ANN. § 46.2-935 (2007) provides that:

> The governing bodies of counties, cities, and towns may enact ordinances requiring *pedestrians* to obey signs and signals *erected on highways therein for the direction and control of traffic*, to obey the orders of law-enforcement officers engaged in directing traffic on such highways, and may provide penalties not exceeding those of a traffic infraction (emphasis added).

[145] UNIFORM VEHICLE CODE § 1-163.
[146] UNIFORM VEHICLE CODE § 1-208.
[147] VA. CODE ANN. § 46.2-904 (2007).

§ 46.2-826. Stop before entering public highway or sidewalk from private road, etc.; yielding right-of-way.

> The driver of a vehicle entering a public highway or sidewalk from a private road, driveway, alley, or building shall stop immediately before entering such highway or sidewalk and yield the right-of-way to vehicles approaching on such public highway and to pedestrians or vehicles approaching on such public sidewalk.
>
> The provisions of this section shall not apply at an intersection of public and private roads controlled by a traffic signal. At any such intersection, all movement of traffic into and through the intersection shall be controlled by the traffic signal.

It is not clear why drivers must yield the right of way to pedestrians on sidewalks when approaching from a private road or driveway but not when turning into a private road or driveway. "Sidewalks are the domain of pedestrians and, in some cases, bicycles. Requiring motor vehicles that cross sidewalks to yield is logical, is appropriate for the circumstances and assists the decision-making of all parties."[148] The UVC provides that "[t]he driver of a vehicle crossing a sidewalk shall yield the right of way to any pedestrian and all other traffic on the sidewalk."[149] Thirty-two states also require drivers to yield the right of way to pedestrians on sidewalks, and another 13 (including Virginia) require drivers to yield only when emerging from an alley, private road, or driveway (some states limit this even further by requiring drivers to yield only when emerging while in a business district). Further, because Virginia has a number of shared-use paths that are used by pedestrians in lieu of sidewalks, it follows that any changes requiring drivers to yield to pedestrians on sidewalks should also include yielding to pedestrians on shared-use paths.

§ 46.2-833. Traffic Lights; Penalty.

> A. Signals by traffic lights shall be as follows:
>
> Steady red indicates that moving traffic shall stop and remain stopped as long as the red signal is shown, except in the direction indicated by a lighted green arrow.
>
> Green indicates the traffic shall move in the direction of the signal and remain in motion as long as the green signal is given, except that such traffic shall yield to other vehicles and pedestrians lawfully within the intersection.
>
> Steady amber indicates that a change is about to be made in the direction of the moving of traffic. When the amber signal is shown, traffic which has not already entered the intersection, including the crosswalks, shall stop if it is not reasonably safe to continue, but traffic which has already entered the intersection shall continue to move until the intersection has been cleared. The amber signal is a warning that the steady red signal is imminent.

Although pedestrians are required to obey pedestrian control signals when such signal are in place,[150] in the absence of pedestrian signals the Code does not specifically require pedestrians

[148] NAT'L HIGHWAY TRAFFIC SAFETY ADMIN. U.S. DEP'T OF TRANSP., RESOURCE GUIDE ON LAWS RELATED TO PEDESTRIAN AND BICYCLE SAFETY (2002).
[149] UNIFORM VEHICLE CODE § 11-509.
[150] VA. CODE ANN. § 46.2-925 (2007).

to obey standard red, amber, and green traffic lights. Every other state and the UVC specifically define the expected behavior of pedestrians in response to regular red, yellow, and green traffic signals when pedestrian control signals are not in place. The majority of states prohibits pedestrians from entering the roadway when faced with either a red or amber signal and allows them to proceed on green.

Despite the Code's silence on pedestrian obedience to red, amber, and green signals, the Supreme Court of Virginia has refused to grant a pedestrian crossing while facing a red light the right of way, holding that "[t]o give a pedestrian, crossing an intersection on a red light, the right of way would create much confusion, hinder the orderly movement of traffic and unreasonably impair the safety of travelers upon the highway."[151] Even in the face of a provision granting pedestrians crossing highways or streets at intersections the "right-of-way over vehicles making turns into the highways or streets being crossed by the pedestrians,"[152] the court in *Floyd v. Nunn* nevertheless held that a pedestrian crossing with a red light did not have the right of way over vehicles turning at intersections, relying instead on a provision that contained an exception to a driver's duty to yield the right of way to a pedestrian when the movement of traffic was regulated by "traffic officers or traffic direction devices."[153] The dissent in *Floyd* disagreed, however, arguing that because "neither *Sanders* nor any other decided case or statute forbids them to enter or cross an intersection against a red light when there is no approaching traffic," and because at the time Nunn (pedestrian) started to cross, there was no approaching traffic, Floyd (driver) was required to yield to Nunn. In 1976, the provision relied upon by the majority was amended to state that it is the *driver* who must yield to the direction of the traffic officer or device,[154] a requirement that is still in place today.[155] Although Belongia found that this change alleviates the conflict between sections of the Code that arose in *Floyd*, when "the traffic light would simultaneously control the actions of a motorist and a pedestrian"[156] (e.g., when a driver with a green light is turning into the path of a pedestrian crossing with a green light), this change does not address the hazard created by a pedestrian crossing against a red light into the path of a driver turning with a green light. Requiring pedestrians to obey red, amber, and green traffic signals in the absence of pedestrian control signals (as well as giving them the right of way only over vehicles making turns when crossing *lawfully*, see the previous analysis of § 46.2-924) would address this hazard by more clearly defining pedestrians' right of way when crossing at intersections controlled by traffic control signals.

Further, the Code does not define "traffic."[157] Whether or not pedestrians are considered "traffic" is a matter of interpretation; this would be resolved by the addition of a definition of "traffic" that includes pedestrians, an approach taken by 43 other states and the UVC. Adding this definition alone would bring pedestrians within the ambit of § 46.2-833, which applies to "moving traffic." Pedestrians would be required to stop on red and allowed to proceed on green,

[151] Sanders v. Newsome, 19 S.E.2d 883, 888, 179 Va. 582, 595 (1942).
[152] VA. CODE ANN. § 46.2-231 (1972), which has been replaced by Va. Code Ann. § 46.2-924 (2007). The sentence granting pedestrians the right of way over turning vehicles is almost identical ("or streets" has been removed).
[153] Floyd v. Nunn, 232 S.E. 2d 813, 217 Va. 834 (1977).
[154] Belongia, *supra* note 17, at 193.
[155] VA. CODE ANN § 46.2-924(B) (2007).
[156] Belongia, *supra* note 17, at 194.
[157] VA. CODE ANN. § 46.2-100 (2007).

and when facing an amber signal they would be required to stop when it is not reasonably safe to continue.

§ 46.2-834. Signals by law-enforcement officers and crossing guards.

> A. Law-enforcement officers may assume control of traffic at any intersection, regardless of whether such intersection is controlled by lights, controlled by other traffic control devices, or uncontrolled. Whenever any law-enforcement officer so assumes control of traffic, all drivers of vehicles shall obey his signals.

This provision applies to "all drivers of vehicles" and does not expressly apply to pedestrians, bicyclists, or anyone else who may or may not fit the definition of "traffic" (if such a definition is added to the Code). A pedestrian or bicyclist (when *not riding on the highway* and thus not bound by vehicle laws[158]) can choose not to obey the signals of a law enforcement officer directing traffic and not be in violation of this statute. Considering that situations where a law enforcement officer is likely to assume control of traffic are likely to be situations involving malfunctioning lights or signals, heavy traffic flow, accidents, or special events, a pedestrian or bicyclist who crosses against an officer's direction could cause a great deal of increased congestion and confusion and could potentially increase the risk of an accident, either between himself or herself and a motor vehicle or between nearby motor vehicles. Although § 46.2-935 authorizes localities to require pedestrians to obey the directions of law enforcement officers directing traffic, it is not clear why this provision operates at only a local level. The addition of the words "and pedestrians" after "vehicles" would require pedestrians to obey the signals of law enforcement officers and alleviate this potential problem and would also apply to bicyclists who are riding on a sidewalk, shared-use path, or in a crosswalk.[159]

§ 46.2-858. Passing at a railroad grade crossing.

> A person shall be guilty of reckless driving who overtakes or passes any other vehicle proceeding in the same direction at any railroad grade crossing or at any intersection of highways unless such vehicles are being operated on a highway having two or more designated lanes of roadway for each direction of travel or unless such intersection is designated and marked as a passing zone or on a designated one-way street or highway, or while pedestrians are passing or about to pass in front of either of such vehicles, unless permitted so to do by a traffic light or law-enforcement officer.

The title of this section is misleading. Although the title does not have the force of law,[160] it should still appropriately describe the behavior the statute is intended to cover. The text of the statute encompasses passing not only at a railroad grade crossing but also at an intersection and passing while pedestrians are crossing as well. In *Holland v. Edelblute,*[161] the driver of an automobile that passed to the left of another automobile while a pedestrian was

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[158] VA. CODE ANN. § 46.2-800 (2007) provides that "[e]very person riding a bicycle . . . on a highway shall be subject to the provisions of this chapter and shall have all of the rights and duties applicable to the driver of a vehicle, unless the context of the provision clearly indicates otherwise."

[159] VA. CODE ANN. § 46.2-904 (2007) provides that "[a] person riding a bicycle . . . on a sidewalk, shared-use path, or across a roadway on a crosswalk, shall have all the rights and duties of a pedestrian under the same circumstances."

[160] Good v. Commonwealth, 155 Va. 996, 1000, 154 S.E. 477, 478 (1930).

[161] 179 Va. 685, 20 S.E. 2d 506 (1942).

crossing at an intersection was held to have violated the equivalent section of the Code in effect at the time.[162] Forty-seven states prohibit a driver from overtaking or passing a vehicle stopped to allow a pedestrian to cross; however, 45 of them include the prohibition in the section of their respective code governing the rights and duties of pedestrians or in a statute with a heading that specifically mentions pedestrians, not buried in a provision governing railroad crossings. Only the District of Columbia and Virginia include this prohibition in other sections of their code. It is important for drivers and pedestrians to be aware of what is expected of them in this situation in order to better protect pedestrians crossing at crosswalks from being struck by a passing car while crossing in front of a stopped car. Indeed, the findings of one study suggested that a significant problem is caused by these "multiple-threat" crashes.[163] This study of pedestrian crashes at marked and unmarked crosswalks at uncontrolled locations found that although there were no multiple-threat crashes at unmarked crosswalks, there was a significant number (17.6% of the total) of multiple-threat crashes at marked crosswalks.[164] The authors suggested that this was because "pedestrians in some instances may be more likely to step out in front of oncoming traffic in a marked crosswalk (particularly after the first vehicle stops) than at an unmarked location."[165]

The UVC provides the following: "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,"[166] which prohibits passing only when a vehicle is stopped to allow a pedestrian to cross and not when a vehicle that is approaching slowly (i.e., a vehicle that is *yielding*) is passed by a vehicle whose driver is driving much faster. The language in the Code prohibits passing when a pedestrian is crossing regardless of whether or not the vehicle is stopped, yielding, or approaching the intersection at a slower speed.

Although statutes prohibiting this behavior are virtually universal, there is a slight problem raised by the possibility that a driver passing another vehicle might not see the pedestrian because the pedestrian is obscured by the other vehicle or that the driver might not realize why the other vehicle is stopped and assume that it is safe to pass. In such a case, the driver of the passing vehicle would not be on notice that he or she was violating the law in a situation where, absent the pedestrian, his or her behavior would be legal. Although the researchers were unable to find a statute in effect in the codes of other states that directly addressed this potential problem, it would seem that the statutes prohibiting passing when a vehicle is *stopped* to allow a pedestrian to cross *at a crosswalk* give the driver of the passing vehicle more notice than does Virginia's statute, since a driver who sees that the other vehicle is stopped in a traffic lane at a pedestrian crossing should be alert to the possibility that a pedestrian may be crossing. Further, one possible solution to this problem is found in the following model statute that was provided by the authors of the NHTSA Resource Guide on Laws Related to Pedestrian and Bicycle Safety:

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[162] The statute in effect at the time defined as "reckless driving 'passing other vehicles going in the same direction while crossing an intersection, or while pedestrians are passing or about to pass in front of either of such vehicles.'" *Id*. at 689, 508.
[163] Zegeer et al., *supra* note 80, at 60.
[164] *Id*. at 60–61.
[165] *Id*. at 61.
[166] UNIFORM VEHICLE CODE § 11-502(d).

> § 3. Passing stopped vehicle prohibited
>
> Whenever any vehicle is stopped in a lane for moving traffic at a crosswalk or at any stop line in advance of a crosswalk, the driver of any other vehicle approaching from the rear in an adjacent lane shall not overtake and pass such stopped vehicle until the approaching driver has brought his/her vehicle to a stop and determined that it is safe to proceed.[167]

Thus, a driver must stop before passing any vehicle in an adjacent lane stopped at a crosswalk, regardless of whether or not a pedestrian is present, providing more security for the pedestrian and ensuring that the overtaking driver has the opportunity to see a pedestrian who is obscured by the stopped vehicle.

§ 46.2-923. How and where pedestrians to cross highways.

> When crossing highways, pedestrians shall not carelessly or maliciously interfere with the orderly passage of vehicles.

This passage is vague, is confusing, and depends more on the pedestrian's *state of mind* than on his or her *actions* when crossing the street. The language used in this provision comes from the first statutory codification of the rights and responsibilities of pedestrians—an act passed in 1926![168] Considering that this language is more than 80 years old and comes from a time when vehicle and pedestrian interactions were very different than they are today, it is no wonder that Virginia is the only state that regulates pedestrian behavior in this way. An alternative approach regulates pedestrians who suddenly run out in front of traffic, such as the UVC's version: "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"[169] or, for example, "[a] pedestrian shall not suddenly leave any curb or other place of safety and walk or run into the path of a vehicle that is so close that it is impossible for the driver to yield."[170] California also provides that "[n]o pedestrian may unnecessarily stop or delay traffic while in a marked or unmarked crosswalk."[171] Provisions such as these, which focus on the behavior of the pedestrian, more clearly define what is expected of pedestrians.

> They shall cross, wherever possible, only at intersections or marked crosswalks.

"Wherever possible" is vague—it does not clearly tell a pedestrian when he or she must move to the nearest crosswalk before crossing. Further, the analysis of Virginia crash data revealed that adults (20 through 64 years) and senior citizens (65 years and older) trying to cross roads between intersections or on uninterrupted stretches of primary and arterial highways

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[167] NAT'L HIGHWAY TRAFFIC SAFETY ADMIN. U.S. DEP'T OF TRANSP., RESOURCE GUIDE ON LAWS RELATED TO PEDESTRIAN AND BICYCLE SAFETY (2002).

[168] "When crossing highways within incorporated towns or cities, pedestrians shall not carelessly or maliciously interfere with the orderly passage of vehicles, and shall cross whenever possible only at intersections or crosswalks." Act of Mar. 25, 1926, ch. 474, 1926 Va. Acts 763, 789. A careful search revealed no statutory codification of the rights and responsibilities of pedestrians before 1926.

[169] UNIFORM VEHICLE CODE § 11-502 (b).

[170] ARIZ. REV. STAT. § 28-792 (LexisNexis 2007).

[171] CAL. VEH. CODE § 21950(b) (Deering 2007). *See also* WIS. STAT. § 346.29(2) (2006) ("No person shall stand or loiter on any roadway other than in a safety zone if such act interferes with the lawful movement of traffic.").

comprise the most serious pedestrian traffic safety problem, accounting for two-thirds of all pedestrian fatalities. Yet, because of the vague language in this provision, it is likely difficult for law enforcement officers to enforce the requirement that pedestrians use crosswalks "wherever possible."

Although 42 other states provide that a pedestrian must use a crosswalk when between "adjacent" intersections where traffic control signals are in place, this is not necessarily any better because "adjacent" intersections may be quite far apart. Massachusetts, however, provides that:

> Pedestrians shall obey the directions of police officers directing traffic and whenever there is an officer directing traffic, a traffic control signal or a marked crosswalk within 300 feet of a pedestrian, no such pedestrian shall cross a way or roadway except within the limits of a marked crosswalk and as hereinafter provided in 720 CMR 9.00.[172]

Similarly, VDOT considers, among other factors, the distance from the nearest crossing when deciding whether or not a crosswalk should be installed.[173] Basically, a new crosswalk should not be installed if there is another crossing location or controlled crossing location within 300 feet.[174] Using this figure as a rough approximation for the distance that a reasonable pedestrian will walk to get to the nearest crosswalk, rather than "wherever possible," pedestrians should cross only at intersections or marked crosswalks when within 300 feet of an intersection or crosswalk. In addition, this section does not mention "unmarked crosswalks," as discussed earlier in the report. If unmarked crosswalks but no marked crosswalks or intersections are present, it is unclear why pedestrians are not expected to use the unmarked crosswalk.

> Where intersections contain no marked crosswalks, pedestrians shall not be guilty of negligence as a matter of law for crossing at any such intersection or between intersections when crossing by the most direct route.

This appears clear on its face, but may be ambiguous in the situation where a pedestrian seeks to cross between two intersections, one that contains a marked crosswalk and one that does not, as indicated in Figure 13. There are two possible interpretations with regard to the figure: either X is guilty of negligence as a matter of law because there is a marked crosswalk in the area and he or she elected not to use it or X is not guilty of negligence as a matter of law because there is an intersection present that contains no marked crosswalks. This is especially important in Virginia because Virginia is one of the few remaining jurisdictions that retains the defense of contributory negligence.[175] If X is guilty of negligence as a matter of law (and his or her negligence is a

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[172] 720 MASS. CODE REGS. 9.09(1) (2007). *See also* 350 MASS. CODE REGS. 3.01(1) (2007) ("Pedestrians shall obey all traffic signals, traffic control devices, and heed traffic pavement markings when they are within 300 feet of these elements unless directed otherwise by an Authorized Police Officer or an MDC Ranger.").

[173] TRAFFIC ENGINEERING DIVISION, VA. DEPT. OF TRANSP., GUIDELINES FOR THE INSTALLATION OF MARKED CROSSWALKS 10 (2006).

[174] *Id*.

[175] Moses v. Southwestern Va. Transit Management Co., 643 S.E.2d 156, 159–60 (Va. 2007). The other jurisdictions are Alabama, the District of Columbia, Maryland, and North Carolina. Jennifer J. Karangelen, Comment, *The Road to Judicial Abolishment of Contributory Negligence Has Been Paved by* Bozman v. Bozman, 34 U. BALT. L. REV. 265, 278 (2004). *See also* Christopher J. Robinette & Paul G. Sherland, *Contributory or Comparative: Which Is the Optimal Negligence Rule?*, 24 N. ILL. U. L. REV. 41, 44-45 (2003).

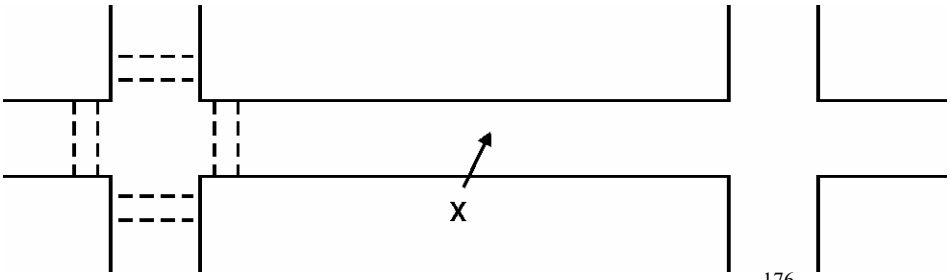

Figure 13. Pedestrian crossing between intersections.[176]

proximate cause of the accident), he or she cannot collect for the injury, even if the driver who strikes him or her is negligent as well.

The statute states that pedestrians shall not be guilty of negligence as a matter of law when crossing by the most "direct" route. In some situations, the most direct route from A to B might be a long diagonal across a multi-lane highway. In Figure 13, X's route may be the most direct one to his or her destination, but it is not the safest way for him or her to cross the street, as his or her diagonal path increases the time he or she must spend in the roadway. Further, in litigation, the meaning of the word "direct" might be disputed; e.g., does it mean "direct" with respect to the pedestrian's ultimate destination or "direct" with respect to the contemplated crossing of the particular street? An alternative would be to require pedestrians to use the *shortest* route across the street or to cross only at right angles, which would minimize their time in the roadway. Idaho, e.g., states that "[e]xcept where otherwise indicated by a crosswalk or other traffic-control devices a pedestrian shall cross the highway at right angles to the curb or by the shortest route to the opposite curb."[177]

Finally, it is important to note that this provision may lead to confusion among law enforcement officers, who may interpret it as a limitation on their right to ticket jaywalking pedestrians. A clearer approach would set this provision apart in its own paragraph or subsection and to add a preface specifically limiting the sentence to civil actions arising under the section.[178]

§ 46.2-924. Drivers to stop for pedestrians; installation of certain signs; penalty.

> A. The driver of any vehicle on a highway shall yield the right-of-way to any pedestrian crossing such highway:
>
> 1. At any clearly marked crosswalk, whether at mid-block or at the end of any block;
> 2. At any regular pedestrian crossing included in the prolongation of the lateral boundary lines of the adjacent sidewalk at the end of a block;
> 3. At any intersection when the driver is approaching on a highway or street where the legal maximum speed does not exceed 35 miles per hour.

[176] After Belongia, *supra* note 17, at 188.
[177] IDAHO CODE ANN. § 49-702(5) 2007.
[178] For example, CONN. GEN. STAT. § 14-300(d) (2007) provides that: "In any civil action arising under subsection (c) of this section or sections 14-300b to 14-300d, inclusive, the doctrine of negligence per se shall not apply" (sections 14-300, 14-300b, 14-300c, and 14-300d govern pedestrian crossing).

At first glance, this provision requires drivers to yield to pedestrians in crosswalks, regardless of whether traffic signals are in operation or not. In the jurisdictions surveyed, this was clearly the minority approach. Forty-six states specifically state in their provisions governing a driver's response to a pedestrian in a crosswalk that the provision is active only when traffic signals are not in place or not in operation. California provides that "[t]he driver of a vehicle shall yield the right of way to a pedestrian crossing the roadway within any marked crosswalk or within any unmarked crosswalk at an intersection, *except as otherwise provided in this chapter*" (emphasis added—the chapter contains instructions on proper behavior when facing a traffic control signal).[179] Virginia's approach is unusual in that Virginia amends this provision in the next section of § 46.2-924, which provides that "notwithstanding" a driver's duty to yield to a pedestrian in a crosswalk, when traffic control devices are in place, the driver must yield to the direction of the device. A clearer approach would be to follow the example of the UVC, which clearly states that "the driver of a vehicle shall yield the right of way" only "[w]hen traffic-control signals are not in place or not in operation."[180]

Although Virginia and 8 other states require drivers merely to "yield" for pedestrians in crosswalks, the UVC and 33 jurisdictions (using variations on the UVC's language) require drivers to "yield the right of way, slowing down or stopping if need be to yield to a pedestrian crossing the roadway within a crosswalk."[181] This added language, specifically instructing drivers to stop if necessary, provides a clearer idea of what is meant by the term "yield." Indeed, 8 jurisdictions go a step further and currently require a driver to stop for pedestrians in crosswalks. However, an analysis of crash data from the jurisdictions that had changed their laws between 1989 and 2004 did not find a statistically significant decrease in pedestrian crash fatalities after the law change.

The second part of this section differs slightly from the definition of "crosswalk" in § 46.2-100, although the provisions are similar enough to suggest that part two is intended to indicate an unmarked crosswalk. In order to be less ambiguous and provide more guidance, part two should be consistent with either the current definition of "crosswalk" or with an added definition of "unmarked crosswalk."

> B. Notwithstanding the provisions of subsection A of this section, at intersections or crosswalks where the movement of traffic is being regulated by law-enforcement officers or traffic control devices, the driver shall yield according to the direction of the law-enforcement officer or device.
>
> No pedestrian shall enter or cross an intersection in disregard of approaching traffic.
>
> The drivers of vehicles entering, crossing, or turning at intersections shall change their course, slow down, or stop if necessary to permit pedestrians to cross such intersections safely and expeditiously.
>
> Pedestrians crossing highways at intersections shall at all times have the right-of-way over vehicles making turns into the highways being crossed by the pedestrians.

[179] CAL. VEH. CODE § 21950(a) (Deering 2007).
[180] UNIFORM VEHICLE CODE § 11-502(a).
[181] *Id*.

It is not clear why the first sentence of section B requires only *drivers* to yield to the direction of a law enforcement officer or device. If pedestrians are expected to obey the direction of law enforcement officers or of traffic control devices specifically applicable to them, it follows that they be required to do so in this provision. Adding "and pedestrians" would also enforce the reasonable expectations of pedestrians—at least one study showed that pedestrians believe their right of way to be influenced by traffic control signals.[182] This would also be consistent with the requirement that pedestrians obey pedestrian control signals[183] and any amended changes requiring pedestrians to obey red, amber, and green traffic signals when pedestrian control signals are not in place, as discussed previously.

The second sentence ("No pedestrian shall enter or cross . . . .") of section B is out of place. The duties of pedestrians when crossing highways are covered in § 46.2-923, whereas this statute is directed at the duties of drivers. Further, the content of the sentence overlaps the content in the provision in § 46.2-923 prohibiting pedestrians from "carelessly or maliciously interfering with the orderly passage of vehicles"[184] and the provision in § 46.2-926 prohibiting pedestrians from stepping into the highway where they cannot be seen.[185] The UVC's approach, as discussed, provides that "[n]o 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."[186] Since pedestrians are not included in the group of individuals required to yield to the direction of law enforcement officers or traffic control devices, a potential problem arises between the first and second parts of this statute. When a pedestrian seeks to cross against a red light, does he or she have the right of way over approaching drivers facing a green light? How close does approaching traffic have to be in order for the pedestrian to be "in disregard" of it? The Supreme Court of Virginia set aside a jury verdict because the trial court had erred in allowing a jury instruction that would have inserted the words "close or approaching" into this language in order to determine whether a bicyclist, using a sidewalk and therefore granted all the rights of a pedestrian,[187] was in disregard of traffic when he crossed a street and was struck by an oncoming vehicle.[188] Unfortunately, this interpretation, which adheres to the plain language of the statute, does not clarify what it means to be "in disregard" of traffic.

If a pedestrian seeks to cross lawfully at a crosswalk at an intersection and begins to cross in front of an approaching driver who, unbeknownst to the pedestrian, does not intend to yield, the pedestrian is also at fault, since "notwithstanding" his or her right of way in section A, he or she is crossing an intersection in "disregard" of approaching traffic. Thus, a situation may arise where a pedestrian who reasonably expected that the vehicle would yield the right of way is barred from recovery because he or she was contributorily negligent in crossing in "disregard" of

[182] Hatfield, *supra* note 18, at 838.
[183] VA. CODE ANN. § 46.2-925 (2007).
[184] VA. CODE ANN. § 46.2-923 (2007).
[185] VA. CODE ANN. § 46.2-926 (2007) provides that "[n]o pedestrian shall step into a highway open to moving vehicular traffic at any point between intersections where his presence would be obscured from the vision of drivers of approaching vehicles by a vehicle or other obstruction at the curb or side."
[186] UNIFORM VEHICLE CODE § 11-502(b).
[187] VA. CODE ANN. § 46.2-904 (2007).
[188] Ross v. Destival, 267 Va. 458, 593 S.E.2d 201 (2004).

traffic. Similarly, a pedestrian unlawfully crossing against a "Don't Walk" signal[189] has the right of way over a vehicle making a left turn with a "green arrow" signal, since pedestrians have the right of way at "all times" over vehicles making turns into highways.

In Figure 14, the pedestrian's behavior may cause increased congestion at a busy intersection and the increased possibility of a rear end collision between the drivers waiting to turn left who are surprised by the first automobile's sudden stop. Yet, the pedestrian has the right of way over vehicles making turns, despite the fact that his or her behavior is unlawful. The addition of the word "lawfully" between "pedestrian" and "crossing" in the fourth sentence of section B would address this issue and be consistent with the requirement that pedestrians not begin to cross while a "Don't Walk" signal is displayed. This would also be consistent with § 46.2-835, which governs "right turn on red" and provides that "[s]uch turning traffic shall yield the right-of-way to pedestrians *lawfully* within an adjacent crosswalk and to other traffic using the intersection" (emphasis added).[190] Adding the word "lawfully" would not absolve drivers of their common law duty to use due care not to hit a pedestrian.

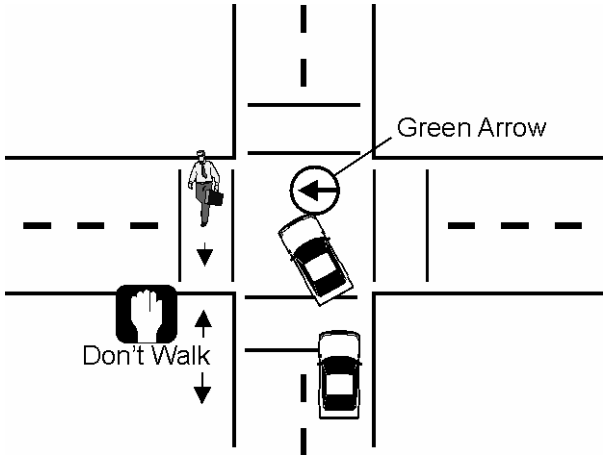

Figure 14. Pedestrian crossing against pedestrian control signal.

§ 46.2-925. Pedestrian control signals.

> Whenever special pedestrian control signals exhibiting the words "Walk" or "Don't Walk" are in place such signals shall indicate as follows:
>
> Walk.—Pedestrians facing such signal may proceed across the highway in the direction of the signal and shall be given the right-of-way by the drivers of all vehicles.
>
> Don't Walk.—No pedestrian shall start to cross the highway in the direction of such signal, but any pedestrian who has partially completed his crossing on the Walk signal shall proceed to a sidewalk or safety island and remain there while the Don't Walk signal is showing.

[189] VA. CODE ANN. § 46.2-925 (2007) defines and regulates pedestrian behavior when faced with a pedestrian control signal.
[190] VA. CODE ANN. § 46.2-835 (2007).

Pedestrian control signals are no longer limited to the words "Walk" and "Don't Walk." Currently, symbols such as an upraised palm, a figure of a walking person, and colored timers indicating how much time is left before the light changes are used in lieu of the words enumerated in this statute. To coincide better with the current symbols used in pedestrian control signals, the statute should be updated to indicate that pedestrians must also obey symbols that are intended to have the same meaning as "Walk" and "Don't Walk."

§ 46.2-926. Pedestrians stepping into highway where they cannot be seen.

> No pedestrian shall step into a highway open to moving vehicular traffic at any point between intersections where his presence would be obscured from the vision of drivers of approaching vehicles by a vehicle or other obstruction at the curb or side. The foregoing prohibition shall not apply to a pedestrian stepping into a highway to board a bus or to enter a safety zone, in which event he shall cross the highway only at right angles.

This provision is confusing. When must pedestrians cross the highway at right angles? When stepping out to board a bus or enter a safety zone *always* or only when stepping out from a point where his or her presence would be obscured from the vision of drivers in order to board a bus or enter a safety zone? It is also unclear why a pedestrian who is stepping into a highway to board a bus or enter a safety zone is exempt from this provision. If approaching drivers cannot see the pedestrian, why does the reason that he or she is stepping into the roadway matter? Further, if the pedestrian seeks to cross lawfully at a point where there are no nearby intersections or crosswalks and his or her presence is obscured by overgrown trees or by vehicles parked all along the street, he or she might be forced to step out while his or her presence is obscured. An alternative would be to follow the UVC's approach and require the pedestrian to yield the right of way to vehicles when crossing between intersections and not to step out suddenly in front of any vehicle so as to constitute an immediate hazard.[191] In addition, there are situations where a parked vehicle blocks approaching drivers' views of a pedestrian seeking to cross at a mid-block crosswalk that put the pedestrian in a situation where he or she must either violate this provision by stepping out where his or her presence is obscured from approaching vehicles or move away from the crosswalk and violate § 46.2-923, (which requires pedestrians to use marked crosswalks).

§ 46.2-927. Boarding or alighting from buses.

> When actually boarding or alighting from buses, pedestrians shall have the right-of-way over vehicles, but shall not, in order to board or alight from buses, step into the highway sooner or remain there longer than is absolutely necessary.

The first part of this provision grants the right of way to pedestrians who are boarding or alighting from buses; however, the second part is vague and appears to be a provision that will be difficult to enforce. It is not clear how much time is intended by "sooner" or "longer;" neither is it clear why this time frame would not automatically be encompassed within the first part of the statute, i.e., "[w]hen actually boarding or alighting from buses." Further, under this provision, does a pedestrian who alights from a bus that drops him or her off on the side of the street opposite his or her destination (or one who must cross the street in order to board the bus) have

[191] UNIFORM VEHICLE CODE § 11-502(b); UNIFORM VEHICLE CODE § 11-503(a).

to cross at a nearby crosswalk or does the pedestrian's "right-of-way over vehicles" entitle him or her to cross the street at the point of the bus stop, regardless of whether or not a crosswalk is present?

§ 46.2-928. Pedestrians not to use roadway except when necessary; keeping to left.

> Pedestrians shall not use the roadways for travel, except when necessary to do so because of the absence of sidewalks which are reasonably suitable and passable for their use. If they walk on the hard surface, or the main travelled portion of the roadway, they shall keep to the extreme left side or edge thereof, or where the shoulders of the highway are of sufficient width to permit, they may walk on either shoulder thereof.

This statute is ambiguous with regard to where pedestrians must walk in the absence of sidewalks, providing only that where shoulders are of sufficient width, pedestrians "may" walk on either shoulder. Where shoulders are present and of sufficient width and conditions to permit pedestrians to walk on them, pedestrians should be required to walk on the shoulder, as it would interfere with traffic to a greater extent for a pedestrian to walk in the roadway where a usable shoulder is present. Considering that roads where shoulders are present and usable are likely to have higher speed limits and be more heavily traveled, it would provide greater protection to pedestrians to require pedestrians to use the shoulder rather than the roadway in the absence of a sidewalk.

When pedestrians are walking on the hard surface or main traveled part of the road, requiring them to keep to the extreme left provides them with the opportunity to see approaching vehicles when this would mean that they would be walking facing traffic. However, on a one-way roadway, where faster traffic is likely to be traveling in the left lane, this advantage is absent and pedestrians may feel safer keeping to the right side of the roadway. The UVC's version of the statute provides that:

> (a) Where a sidewalk is provided and its use is practicable, it shall be unlawful for any pedestrian to walk along and upon an adjacent roadway.
> (b) Where a sidewalk is not available, any pedestrian walking along and upon a highway shall walk only on the shoulder, as far as practicable from the edge of the roadway.
> (c) 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.
> (d) Except as otherwise provided in this chapter, any pedestrian upon a roadway shall yield the right of way to all vehicles upon the roadway.[192]

Pedestrians must use the shoulder in the absence of sidewalks *and* stay as far from the edge of the roadway as practicable when using the shoulder. Further, they are required to walk on the left side only when on a two-way roadway. Finally, the style of this section, separating each provision and enumerating the duties of pedestrians sequentially, contributes to a much clearer explanation of where a pedestrian must walk at all times.

[192] UNIFORM VEHICLE CODE § 11-506.

Analysis of the Code: Bicycles

This section provides an analysis of the sections of the Code relevant to bicycles. It also reports the findings related to the comparison of the bicycle-related sections of the Code to those of the other states and the UVC.

§ 46.2-100. Definitions.

The definitions of the following bicycle-related words and terms are provided in the Code.

"Bicycle."

"Bicycle" means a device propelled solely by human power, upon which a person may ride either on or astride a regular seat attached thereto, having two or more wheels in tandem, including children's bicycles, except a toy vehicle intended for use by young children. For purposes of Chapter 8 (§ 46.2-800 et seq.) of this title, a bicycle shall be a vehicle while operated on the highway.

"Bicycle Lane."

"Bicycle lane" means that portion of a roadway designated by signs and/or pavement markings for the preferential use of bicycles, electric power-assisted bicycles, and mopeds.

"Electric Power-Assisted Bicycle."

"Electric power-assisted bicycle" means a vehicle that travels on not more than three wheels in contact with the ground and is equipped with (i) pedals that allow propulsion by human power and (ii) an electric motor with an input of no more than 1,000 watts that reduces the pedal effort required of the rider. For the purposes of Chapter 8 of this title, an electric power-assisted bicycle shall be a vehicle when operated on a highway.

"Moped."

"Moped" means every vehicle that travels on not more than three wheels in contact with the ground that has (i) a seat that is no less than 24 inches in height, measured from the middle of the seat perpendicular to the ground and (ii) a gasoline, electric, or hybrid motor that displaces less than 50 cubic centimeters. For purposes of Chapter 8 (§ 46.2-800 et seq.) of this title, a moped shall be a vehicle while operated on a highway.

"Vehicle."

"Vehicle" means every device in, on or by which any person or property is or may be transported or drawn on a highway, except devices moved by human power or used exclusively on stationary rails or tracks. For the purposes of Chapter 8 (§ 46.2-800 et seq.) of this title, bicycles, electric personal assistive mobility devices, electric power-assisted bicycles, and mopeds shall be vehicles while operated on a highway.

These definitions are relatively similar to those found in the UVC.[193] However, none of them appears to encompass non-motorized adult tricycles. The definition for "bicycle" requires wheels in tandem (one directly behind the other or in line), whereas the definitions for "electric power-assisted bicycle" and "moped" require a motor. This potentially leaves adult tricycles as something other then "vehicles" when operated on a highway. The UVC has a separate definition for "human powered vehicle."[194] Adding a similar definition to the Code would encompass adult non-motorized tricycles and bring them within the reach of Virginia's bicycle laws. Another approach would be simply to remove the tandem requirement while keeping the exception for children's toy vehicle intact.[195]

§ 46.2-839. Passing bicycle, electric personal assistive mobility device, electric power-assisted bicycle, moped, animal, or animal-drawn vehicle.

> Any driver of any vehicle overtaking a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, moped, animal, or animal-drawn vehicle proceeding in the same direction shall pass at a reasonable speed at least two feet to the left of the overtaken bicycle, electric personal assistive mobility device, electric power-assisted bicycle, moped, animal, or animal-drawn vehicle and shall not again proceed to the right side of the highway until safely clear of such overtaken bicycle, electric personal assistive mobility device, electric power-assisted bicycle, moped, animal, or animal-drawn vehicle.

This provision was amended in 2004 to require motorists to pass at a minimum distance of 2 feet. The previous version required motorists to pass at a "safe" distance.[196] This type of provision is uncommon; similar provisions appear only in the state codes of Arizona, Oklahoma, Wisconsin, Minnesota, and Missouri.[197] Other than specifying an absolute minimum distance, the 2004 amendment does not change the effect of the provision very much, since what constitutes a "reasonable speed" will vary with the motorist's distance from the bicyclist. For example, when a driver is passing only 2 feet to the left of a bicyclist, it is difficult to see how a speed as high as 55 mph could be considered "reasonable."

§ 46.2-849. How signals given.

> A. Signals required by § 46.2-848 shall be given by means of the hand and arm or by some mechanical or electrical device approved by the Superintendent, in the manner specified in this section. Whenever the signal is given by means of the hand and arm, the driver shall indicate his intention to start, stop, turn, or partly turn by extending the hand and arm beyond the left side of the vehicle in the manner following:
>
> 1. For left turn or to pull to the left, the arm shall be extended in a horizontal position straight from and level with the shoulder;
>
> 2. For right turn or to pull to the right, the arm shall be extended upward;
>
> 3. For slowing down or stopping, the arm shall be extended downward.

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[193] UNIFORM VEHICLE CODE § 1-109; UNIFORM VEHICLE CODE § 1-154. It is important to note that, although not defined, an electric power-assisted bicycle is subsumed by the definition of "moped."
[194] UNIFORM VEHICLE CODE § 1-140 defines "human-powered vehicle" as "[e]very vehicle designed to be moved solely by human power."
[195] *See, e.g.,* IND. CODE ANN. § 9-13-2-14 (LexisNexis 2007).
[196] VA. CODE ANN. § 46.2-839 (2003).
[197] *See, e.g.,* MINN. STAT. § 169.18(3) (2007).

> B. Wherever the lawful speed is more than 35 miles per hour, such signals shall be given continuously for a distance of at least 100 feet, and in all other cases at least 50 feet, before slowing down, stopping, turning, or partly turning.
>
> C. A person riding a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped shall signal his intention to stop or turn. Such signals, however, need not be given continuously if both hands are needed in the control or operation of the bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped.
>
> D. Notwithstanding the foregoing provisions of this section, a person operating a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped may signal a right turn or pull to the right by extending the right hand and arm in a horizontal position straight from and level with the shoulder beyond the right side of the bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped, and may signal slowing down or stopping by extending the right arm downward.

This provision was amended in 2004 to allow bicyclists (among others) to use their right arm to signal a turn or pull to the right as well as slowing or stopping,[198] which brought the Virginia statute in line with the UVC.[199] It is important to note that turns or pulls to the left must still be indicated with the left arm and that the signal for a right turn or pull is different depending on whether it is given with the left arm or with the right arm. Although this is the approach used in the UVC, the use of different arm movements for each side is a potential source of confusion for both cyclists and motorists. Finally, the statute is unclear with regard to situations where both hands are needed for control. With regard to such situations, it dispenses with the requirement that the hand signal be given continuously but not with the requirement that the signal be given at all. If both hands are needed to control the bicycle, it is unclear why letting go of one arm for a short period is any safer than letting go "continuously." Such a requirement could place a cyclist in an untenable position, apparently requiring him or her either to violate the law (by not signaling) or to risk injury (by releasing one hand to signal).

§ 46.2-904. Use of roller skates and skateboards on sidewalks and shared-use paths; operation of bicycles, motorized skateboards or scooters, motor-driven cycles, electric power-assisted bicycles, and electric personal assistive mobility devices on sidewalks and crosswalks and shared-use paths; local ordinances.

> The governing body of any county, city, or town may by ordinance prohibit the use of roller skates and skateboards and/or the riding of bicycles, electric personal assistive mobility devices, motorized skateboards or scooters, motor-driven cycles, or electric power-assisted bicycles on designated sidewalks or crosswalks, including those of any church, school, recreational facility, or any business property open to the public where such activity is prohibited. Signs indicating such prohibition shall be conspicuously posted in general areas where use of roller skates and skateboards, and/or bicycle, electric personal assistive mobility devices, motorized skateboards or scooters, motor-driven cycles, or electric power-assisted bicycle riding is prohibited.
>
> A person riding a bicycle, electric personal assistive mobility device, motorized skateboard or scooter, motor-driven cycle, or an electric power-assisted bicycle on a sidewalk, shared-use path, or across a roadway on a crosswalk, shall yield the right-of-way to any pedestrian and shall give an audible signal before overtaking and passing any pedestrian.

[198] Act of Apr. 15, 2004, ch. 947, 2004 Va. Acts 1849, 1850.
[199] UNIFORM VEHICLE CODE § 11-606.

No person shall ride a bicycle, electric personal assistive mobility device, motorized skateboard or scooter, motor-driven cycle, or an electric power-assisted bicycle on a sidewalk, or across a roadway on a crosswalk, where such use of bicycles, electric personal assistive mobility devices, motorized skateboards or scooters, motor-driven cycles, or electric power-assisted bicycles is prohibited by official traffic control devices.

A person riding a bicycle, electric personal assistive mobility device, motorized skateboard or scooter, motor-driven cycle, or an electric power-assisted bicycle on a sidewalk, shared-use path, or across a roadway on a crosswalk, shall have all the rights and duties of a pedestrian under the same circumstances.

A violation of any ordinance adopted pursuant to this section shall be punishable by a civil penalty of not more than $50.

This provision is substantially identical with that in the UVC.[200] Eighteen other states have substantially similar provisions, and all states allow bicycles to be ridden on sidewalks subject to occasional restrictions. As noted earlier, the term "traffic control device" is not defined in the Code, which might cause confusion among individuals who are not aware that the signs mentioned in the first paragraph are the "official traffic control devices" mentioned in the third paragraph.

§ 46.2-905. Riding bicycles, electric personal assistive mobility devices, electric power-assisted bicycles, motor-driven cycles, and mopeds on roadways and bicycle paths.

Any person operating a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped on a roadway at less than the normal speed of traffic at the time and place under conditions then existing shall ride as close as safely practicable to the right curb or edge of the roadway, except under any of the following circumstances:

1. When overtaking and passing another 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, pedestrians, animals, surface hazards, or substandard width lanes that make it unsafe to continue along the right curb or edge;

4. When avoiding riding in a lane that must turn or diverge to the right; and

5. When riding upon a one-way road or highway, a person may also ride as near the left-hand curb or edge of such roadway as safely practicable.

For purposes of this section, a "substandard width lane" is a lane too narrow for a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, motorized skateboard or scooter, or moped and another vehicle to pass safely side by side within the lane.

Persons riding bicycles, electric personal assistive mobility devices, or electric power-assisted bicycles on a highway shall not ride more than two abreast. Persons riding two abreast shall not impede the normal and reasonable movement of traffic, shall move into a single file formation as quickly as is practicable when being overtaken from the rear by a faster moving vehicle, and, on a laned roadway, shall ride in a single lane.

[200] UNIFORM VEHICLE CODE § 11-1209.

> Notwithstanding any other provision of law to the contrary, the Department of Conservation and Recreation shall permit the operation of electric personal assistive mobility devices on any bicycle path or trail designated by the Department for such use.

This provision was amended in 2003 and 2004[201] and is now virtually identical with the bicycle-related provisions in the UVC.[202] Almost one-half of the states use similar language in their provisions, and only eight have no requirement for bicycles to travel on the right edge of the road.

§ 46.2-906. Carrying articles or passengers on bicycles, electric personal assistive mobility devices, electric power-assisted bicycles, and mopeds.

> No person operating a bicycle, electric personal assistive mobility device, electric power-assisted bicycle, or moped on a highway shall carry any package, bundle, or article that prevents the driver from keeping at least one hand on the handlebars.
>
> No bicycle or moped shall be used to carry more persons at one time than the number of persons for which it was designed or is equipped, except that an adult bicycle rider may carry a child less than six years old if such child is securely attached to the bicycle in a seat or trailer designed for carrying children.

This provision was amended in 2003 to prevent bicycles from carrying any more people than the bicycle was designed to carry (with the exception for children under age 6).[203] The UVC also allows an adult to carry a child in a sling or backpack.[204] Forty-four states have provisions restricting the carrying of passengers. Virginia's approach is simply to specify that a bicycle can have no more passengers then the bicycle is designed or equipped for, although this approach is somewhat ambiguous as it is unclear whether additional seats can be installed or whether a child can be carried in a backpack or sling. The Code specifies that adult riders can carry children in seats or trailers if the children are under the age of 6, which implies that "aftermarket" seats are acceptable only for children under 6, even if they are designed to carry children older than 6. In addition, rather than define the upper limits on the child that can be carried on a bicycle by *age*, it would be safer to use *weight*, since there are 7-year-old children who can safely fit in a child bicycle seat and 6-year-old children who may have grown too large to ride safely in a child seat or trailer.

§ 46.2-906.1. Local ordinances may require riders of bicycles, electric personal assistive mobility devices, and electric power-assisted bicycles to wear helmets.

> The governing body of any county, city or town may, by ordinance, provide that every person 14 years of age or younger shall wear a protective helmet that at least meets the Consumer Product Safety Commission standard whenever riding or being carried on a bicycle, an electric personal assistive mobility device, a toy vehicle, or an electric power-assisted bicycle on any highway as defined in § 46.2-100, sidewalk, or public bicycle path.

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[201] Act of Apr. 15, 2004, ch. 947, 2004 Va. Acts 1849, 1850–51; Act of Mar. 16, 2003, ch. 29, 2003 Va. Acts 30, 34–35.
[202] UNIFORM VEHICLE CODE § 11-1205; UNIFORM VEHICLE CODE § 11-1206.
[203] Act of Mar. 16, 2003, ch. 29, 2003 Va. Acts 30, 35.
[204] UNIFORM VEHICLE CODE § 11-1203.

> Violation of any such ordinance shall be punishable by a fine of $25. However, such fine shall be suspended (i) for first-time violators and (ii) for violators who, subsequent to the violation but prior to imposition of the fine, purchase helmets of the type required by the ordinance.
>
> Violation of any such ordinance shall not constitute negligence, or assumption of risk, be considered in mitigation of damages of whatever nature, be admissible in evidence, or be the subject of comment by counsel in any action for the recovery of damages arising out of the operation of any bicycle, electric personal assistive mobility device, toy vehicle, or electric power-assisted bicycle, nor shall anything in this section change any existing law, rule, or procedure pertaining to any civil action.

The UVC does not contain a helmet provision. Twenty-three states have adopted statewide laws mandating helmet use by children (the age requirement varies), and localities in 15 other states have adopted local helmet requirement ordinances.[205] No statewide law requires adults to wear helmets, although several localities have done so.[206] It is not clear how Virginia localities that choose to require helmet use could collect the fine for violation of a local ordinance unless they ticket children, since the provision does not make parents explicitly liable for knowingly permitting their children to violate the law.

§ 46.2-1015. Lights on bicycles, electric personal assistive mobility devices, electric power-assisted bicycles, and mopeds.

> A. Every bicycle, electric personal assistive mobility device, electric power-assisted bicycle, and moped when in use between sunset and sunrise shall be equipped with a headlight on the front emitting a white light visible in clear weather from a distance of at least 500 feet to the front and a red reflector visible from a distance of at least 600 feet to the rear when directly in front of lawful lower beams of headlights on a motor vehicle. Such lights and reflector shall be of types approved by the Superintendent.
>
> In addition to the foregoing provisions of this section, a bicycle or its rider may be equipped with lights or reflectors. These lights may be steady burning or blinking.
>
> B. Every bicycle, or its rider, shall be equipped with a taillight on the rear emitting a red light plainly visible in clear weather from a distance of at least 500 feet to the rear when in use between sunset and sunrise and operating on any highway with a speed limit of 35 mph or greater. Any such taillight shall be of a type approved by the Superintendent.

This provision was amended in 2004,[207] which brought the reflector visibility requirements in line with the UVC.[208] The language and requirements are clear, appear to offer strong protection to bicyclists, and are substantially similar to provisions in nearly all of the states.

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[205] H.B. 1117, 66th Gen. Assem., 1st Reg. Sess. (Colo. 2007), 2007 Colo. Sess. Laws 1480; Bicycle Helmet Safety Institute, Bicycle Helmet Laws, http:// www.helmets.org/ mandator.htm (last visited July 18, 2007).
[206] Bicycle Helmet Safety Institute, Bicycle Helmet Laws, http://www.helmets.org/ mandator.htm (last visited July 18, 2007).
[207] Act of Apr. 15, 2004, ch. 947, 2004 Va. Acts 1849, 1851.
[208] UNIFORM VEHICLE CODE § 12-703.

Statutes That Are in the Uniform Vehicle Code But Not in the Code of Virginia

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.

Although both drivers and pedestrians have a common law duty to use due care,[209] the provision as a whole would be strengthened by a statutorily enumerated duty to use due care. When assessing liability, a "due care" provision makes it clear that a driver cannot avoid liability simply because he or she had the right of way. Pedestrians are admonished not to "carelessly or maliciously interfere with the orderly passage of vehicles,"[210] not to "enter or cross an intersection in disregard of approaching traffic,"[211] and not to "step into a highway . . . at any point between intersections where [their] presence would be obscured from the vision of drivers,"[212] yet drivers are not cautioned to use reasonable care not to strike a pedestrian. Considering that in an accident, the pedestrian is likely to suffer the greatest injury, it makes sense to caution drivers to use due care all the time, not only when "entering, crossing, or turning at intersections."[213]

UVC 11-510—Pedestrians yield to authorized emergency vehicles.

> (a) Upon the immediate approach of an authorized emergency vehicle making use of an audible signal meeting the requirements of § 12-401(d) and visual signals meeting the requirements of § 12-214 of this code, or of a police vehicle properly and lawfully making use of an audible signal only, every pedestrian shall yield the right of way to the authorized emergency vehicle.
>
> (b) This section shall not relieve the driver of an authorized emergency vehicle from the duty to drive with due regard for the safety of all persons using the highway nor from the duty to exercise due care to avoid colliding with any pedestrian.

Twenty-three states and the UVC require pedestrians to yield to authorized emergency vehicles. This provision makes it clear that pedestrians' right of way must be yielded to an emergency vehicle displaying the proper signal. Emergency vehicles are easily noticeable and travel at high speeds. Between the emergency vehicle and the pedestrian, it is clear that it is much easier for the pedestrian to yield the right of way than it is for the emergency vehicle to do so. As bicyclists are assigned the rights and duties of pedestrians while traveling on shared-use paths and sidewalks and those of vehicles when traveling on the highway, they would also be expected to yield to authorized emergency vehicles if this provision were enacted.[214]

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[209] Brown v. Arthur, 202 Va. 624, 629, 119 S.E.2d 315, 318 (1961).
[210] VA. CODE ANN. § 46.2-923 (2007).
[211] VA. CODE ANN. § 46.2-924(B) (2007).
[212] VA. CODE ANN. § 46.2-926 (2007).
[213] VA. CODE ANN. § 46.2-924(B) (2007).
[214] VA. CODE ANN. § 46.2-800 (2007); VA. CODE ANN. § 46.2-904 (2007).

UVC 11-512—Pedestrians under the influence of alcohol or drugs.

> A pedestrian who is under the influence of alcohol or any drug to a degree which renders such pedestrian a hazard shall not walk or be upon a highway except on a sidewalk.

The authors of the NHTSA Resource Guide on Laws Related to Pedestrian and Bicycle Safety found that: "The use of alcohol by adult pedestrians is implicated in a large percentage of their crashes. If this provision were followed, interactions of impaired pedestrians with vehicular traffic would be reduced thereby decreasing exposure to crash risk."[215] Indeed, 18.7 percent of the fatal pedestrian crashes in Virginia in 2005 involved a drinking pedestrian.[216] Currently, 17 states prohibit intoxicated pedestrians from walking on the roadway itself, most of them following the UVC's language closely. One interesting alternative approach has been taken by the state of Washington, which does not prohibit pedestrians from walking on the roadway while intoxicated but instead allows a law enforcement officer to offer to transport the pedestrian:

> A law enforcement officer may offer to transport a pedestrian who appears to be under the influence of alcohol or any drug and who is walking or moving along or within the right of way of a public roadway, unless the pedestrian is to be taken into protective custody under RCW 70.96A.120.
>
> The law enforcement officer offering to transport an intoxicated pedestrian under this section shall:
>
> (1) Transport the intoxicated pedestrian to a safe place; or
>
> (2) Release the intoxicated pedestrian to a competent person.
>
> The law enforcement officer shall take no action if the pedestrian refuses this assistance. No suit or action may be commenced or prosecuted against the law enforcement officer, law enforcement agency, the state of Washington, or any political subdivision of the state for any act resulting from the refusal of the pedestrian to accept this assistance.[217]

UVC 11-513—Bridge and railroad signals.

> (a) After a bridge operation signal has been given, no pedestrian shall enter or remain upon the bridge or approach thereto beyond the bridge signal, gate or barrier.
>
> (b) No pedestrian shall pass through, around, over or under any crossing gate or barrier at a railroad grade crossing or bridge while such gate or barrier is closed or is being opened or closed.

It would offer greater protection to pedestrians and bicyclists to require them to obey the same bridge and railroad safety protection measures undertaken for the safety of drivers. Although train-pedestrian accidents may occur less often than road-pedestrian accidents, the impact of a train-pedestrian accident is "high in both human and financial terms because, although not all result in serious injury, many cause death or high morbidity such as amputation

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[215] NAT'L HIGHWAY TRAFFIC SAFETY ADMIN. U.S. DEP'T OF TRANSP., RESOURCE GUIDE ON LAWS RELATED TO PEDESTRIAN AND BICYCLE SAFETY (2002).
[216] VA. TRANSPORTATION RESEARCH COUNCIL, WHAT CAN WE DO TO PROTECT PEDESTRIANS? (Va. Transp. Research Council 2007).
[217] WASH. REV. CODE ANN. § 46.61.266 (LexisNexis 2007).

of limbs."[218] Indeed, educational interventions alone may have a limited effect in reducing dangerous pedestrian crossing behavior, as studies have shown that, when making crossing decisions, pedestrians "weigh perceived safety of a route against the time and effort required to use it."[219] Even though the potential consequences of a train accident are extremely severe, it is the small probability of such a risk materializing that pedestrians most likely weigh against the inconvenience of the longer crossing (i.e., waiting for the gate or barrier to go up or taking a longer, but safer route using a pedestrian bridge over the train).[220] However, studies have shown that "punishment may be more effective than education in reducing unsafe pedestrian behavior in the vicinity of railway stations, and considerably more effective than communications to raise awareness."[221] Thus, prohibiting this type of dangerous behavior provides a threat of punishment for passing under or around a closed railroad crossing gate that may add an additional consequence to the pedestrians' cost-benefit calculation, increasing the likelihood that the pedestrian will take the safer crossing option.

UVC 11-1201(b)—Effect of regulations (parental responsibility for bicycle violations).

> (b) The parent of any child and the guardian of any ward shall not authorize or knowingly permit any such child or ward to violate any of the provisions of this article.

Twenty-five states have adopted identical or substantially similar provisions, and an additional five have adopted more limited parental responsibility provisions. Holding parents liable for knowingly permitting their children to violate state bicycle laws could potentially ensure greater compliance with state bicycle laws and local helmet ordinances as a law enforcement officer is likely to be more comfortable ticketing a parent than a young child.[222]

Surveys Regarding Pedestrian and Bicycle Safety Education

An important aspect of introducing any major changes in pedestrian- and bicycle-related legislation is making sure that the public knows about the new changes and understands the rights and duties of all road users. Education is also necessary to ensure that the public is aware of current legislation even when no changes have been enacted—several studies have found that both pedestrians and drivers often misunderstand the right-of-way rules of the road.[223] It is especially important to ensure that vulnerable road users, such as children and the elderly,[224] are aware of their rights and responsibilities when using the roads.

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[218] Lobb, *supra* note 92, at 359..
[219] *Id*. at 363.
[220] *Id*. at 364.
[221] *Id*. at 363.
[222] NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., BICYCLE HELMET USE LAWS: LESSONS LEARNED FROM SELECTED SITES 23–24 (2004).
[223] *See, e.g.,* Hatfield et al., *supra* note 17; Martinez & Porter, *supra* note 18.
[224] NAT'L HIGHWAY TRAFFIC SAFETY ADMIN. U.S. DEP'T OF TRANSP., UNIFORM GUIDELINES FOR STATE HIGHWAY SAFETY PROGRAMS 4 (2006).

In 1995, Stoke and Sullivan conducted a survey of state department of education pedestrian education policies as part of their VTRC report on pedestrian safety.[225] After meeting with a steering committee, the researchers in the current study decided to include a similar section in this report in order to achieve a basic understanding of other states' policies on pedestrian and bicycle safety education. Two surveys were sent: one to the bicycle and pedestrian coordinator in all 50 states and the District of Columbia (shown in Appendix C) and one to the office of the superintendent of education in all 50 states and the District of Columbia (shown in Appendix F). The survey sent to the bicycle and pedestrian coordinators addressed pedestrian and bicycle safety education and outreach to the general public; the survey sent to the offices of the superintendent of education addressed pedestrian and bicycle safety education in public schools. The names of the recipients of the first survey were obtained from the website of the American Association of State Highway and Transportation Officials' Subcommittee on Design[226] The names of the recipients of the second survey were obtained from the websites of the respective state departments of education.

Survey Sent to Bicycle and Pedestrian Coordinators

The response rate to the survey sent to the bicycle and pedestrian coordinators was 55 percent; 28 of the 51 states surveyed responded (as mentioned previously, for the purposes of this report, the District of Columbia is referred to as a state). The spreadsheet compilations of the abbreviated survey answers from each state are provided in Appendix D. The full text responses are available from the authors upon request.

Departments Responsible for Pedestrian and Bicycle Education

With respect to departments responsible for pedestrian and bicycle education, 68 percent of responses indicated that the state department of transportation was responsible for the pedestrian and bicycle safety education of the general public; other responses included state departments of education, health, and motor vehicles. In Virginia, public outreach and education in these areas, including the Safe Routes to School Coordinator, are the responsibility of VDOT; they are also covered under the Bike Smart Virginia program at the Virginia Department of Health.

Relationship Between State and Pedestrian and Bicycle Advisory and Advocacy Groups

Although Virginia does not have any state-affiliated pedestrian or bicycle advisory groups, about two-thirds of responding states indicated that they did have pedestrian or bicycle advisory groups. Seventy-nine percent of those states also indicated that the advisory groups assisted with pedestrian and bicycle outreach and education. With regard to seeking the assistance of pedestrian and bicycle advocacy groups in general, 76 percent of responding states indicated that they either currently enlist the help of such groups, have enlisted help in the past, or enlist help from advocacy groups on an as-needed basis.

[225] STOKE & SULLIVAN, *supra* note 7, at 24–25.
[226] AASHTO, Subcommittee on Design—Bike/Pedestrian Coordinators, http://design.transportation.org/?siteid=59&pageid=852 (last visited Oct. 10, 2007).

State Regulations and Laws Governing Pedestrian and Bicycle Safety Education

Only 2 respondents indicated that there were state agency regulations in place, and only 4 indicated that there were state laws in place concerning pedestrian and bicycle safety outreach to the general public. However, a number of "other" text responses revealed the presence of internal agency policies that, although not codified in state law or in the state administrative code, served as guidelines for development of pedestrian and bicycle education programs.

Structure of Pedestrian and Bicycle Education Policies and Guidelines

Pedestrian and bicycle education and outreach to the general public were most often described as loose guidelines or as policies that were not formally articulated in a written plan. Seventy-six percent of the respondents indicated that policies governing pedestrian and bicycle safety education were not written in a formal plan. Virginia's response to this question was in the majority—pedestrian and bicycle outreach to the general public was described as "not formally articulated," e.g., not written down or contained in an able-to-be-referenced format. Only two respondents indicated the presence of a formal, written policy on pedestrian and bicycle education.

Vulnerable Pedestrians and Bicyclists

Sixty-two percent of respondents indicated that their state targets vulnerable road users; of these states, 72 percent target both elementary school age bicyclists and pedestrians and 22 percent target both intermediate school age bicyclists and pedestrians. Four respondents also indicated targeting high-school students. Although 5 respondents indicated that their state also targets elderly pedestrians, this number was much lower than those who target school children. Only 4 respondents indicated that they target immigrant populations. Immigrant populations are especially at risk in pedestrian crashes.[227] Hispanic pedestrians are hospitalized at a rate of 8 per 100,000 people, which is more than double the rate for non-Hispanic whites.[228]

Resources Used in the Design of Pedestrian and Bicycle Safety Education Plans

Last, the responses revealed that a wide array of resources is used in the design and execution of pedestrian and bicycle safety plans. More than two-thirds of the responses indicated that pedestrian and bicycle safety education is a cooperative endeavor. Indeed, 86 percent of the responses indicated that their state has more than one agency in charge of pedestrian and bicycle safety education. Although it is not surprising that state-funded research efforts and standards promulgated by the FHWA are also commonly used resources, it is somewhat surprising to note that more than one-half of the respondents cited using Internet guides, such as the one available at the Pedestrian and Bicycle Information Center (www.pedbikeinfo.org), as a resource in designing and implementing their pedestrian and bicycle safety plans.

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[227] NAT'L HIGHWAY TRAFFIC SAFETY ADMIN. U.S. DEP'T OF TRANSP., UNIFORM GUIDELINES FOR STATE HIGHWAY SAFETY PROGRAMS 4 (2006).
[228] Michael Chandler, *Without a Car, Suburbanites Tread in Peril*, WASH. POST, July 16, 2007, at B1.

Survey Sent to Offices of the Superintendent of Education

The response rate to the survey sent to the offices of the superintendent of education was 51 percent; 26 of the 51 states surveyed responded. The spreadsheet compilations of the abbreviated survey answers from each state are provided in Appendix G. The full text responses are available from the authors upon request.

Departments Responsible for Pedestrian and Bicycle Education

The respondents indicated that a variety of agencies were responsible for pedestrian and bicycle education—the two most common responses, each representing 50 percent of responses, were the departments of transportation and the departments of education, although 5 states indicated that pedestrian and bicycle safety in public schools is under local control and is not administered at a statewide level.

State Regulations and Laws Governing Pedestrian and Bicycle Safety Education

A number of survey respondents indicated that there were codified state regulations or state laws in place addressing pedestrian and bicycle education in public schools. Nine respondents indicated that there were state agency regulations in place, and 3 indicated that there were state laws governing pedestrian and bicycle safety education in public schools. However, as in the responses to the pedestrian and bicycle coordinator survey, a number of "other" text responses revealed the existence of internal agency policies that, although not codified in state law or in the state administrative code, served as guidelines for development of pedestrian and bicycle education programs. The response from the Virginia Department of Education indicated that there are both state laws and state agency regulations governing pedestrian and bicycle education in public schools. Both the Code and the Virginia Administrative Code require elementary and secondary schools to provide health education (including accident prevention) to school children.[229]

Structure of Pedestrian and Bicycle Education Policies and Guidelines

Fifty-eight percent of the respondents reported that their pedestrian and bicycle education policies either were loose guidelines or were not formally articulated in a written plan. In fact, only the state of Montana indicated the existence of a formal, written policy for pedestrian and bicycle education in public schools. The remainder of respondents either did not answer this particular question or indicated that pedestrian and bicycle education in public schools was under local control.

Vulnerable Pedestrians and Bicyclists

Not surprisingly, 81 percent of respondents target their education efforts at elementary and intermediate school aged children; 7 respondents also indicated targeting high-school

[229] VA. CODE ANN. § 22.1-200 (2007); VA. CODE ANN. § 22-1-207 (2007); VA. CODE ANN. § 22.1-253.13:1 (2007); 8 VA. ADMIN. CODE § 20-131-80 (2007); 8 VA. ADMIN. CODE § 20-131-90 (2007); 8 VA. ADMIN. CODE § 20-131-100 (2007); 8 VA. ADMIN. CODE § 20-320-10 (2007).

students. Twenty-three percent of respondents reported targeting students for whom English is a second language.

Resources Used in the Design of Pedestrian and Bicycle Safety Education Plans

Eleven respondents listed multiple agencies as being responsible for pedestrian and bicycle education in public schools. Further, 15 respondents reported that there was some coordination between the pedestrian and bicycle coordinator and the department of education concerning pedestrian and bicycle education in public schools and 14 respondents cited cooperation with other state organizations as one of the other resources used in designing and implementing a pedestrian and bicycle education plan. Interestingly, 5 respondents reported using plans developed by other states or by the federal government; 6 respondents reported using FHWA recommendations; 4 states reported using state-funded research efforts; and 2 states each reported using Internet guides to develop a pedestrian and bicycle education plan and using privately funded research efforts.

Discussion

Education is an important part of enacting any new legislation. In order to provide the most protection for pedestrians and bicyclists, not only must Virginia's laws be clear and unambiguous, but Virginia's citizens and school children must also be aware of their rights and responsibilities. Unfortunately, there is not a clear answer on the best way to accomplish the goal of educating school children and the general public about pedestrian and bicycle safety. It is clear from the responses that in many states, many state agencies take part in pedestrian and bicycle safety education and many resources are employed. It is also clear that there is a number of states where pedestrian and bicycle safety is not addressed at the statewide level and also a number of states where there is no pedestrian and bicycle safety plan at all. This survey was designed to give a broad picture of the different practices and policies concerning pedestrian and bicycle safety education nationwide in the hope that a better understanding of ways to increase public awareness and knowledge of state law can help Virginia improve pedestrian and bicycle safety in the future.

SUMMARY OF FINDINGS

Crash Data Analysis

- In terms of the raw number of pedestrian-involved fatal crashes, Virginia's number was lower than the numbers in Maryland and North Carolina but higher than the numbers in West Virginia, Tennessee, Kentucky, and the District of Columbia. However, the numbers in North Carolina and Maryland have decreased over the past 20 years and have become close to Virginia's number in recent years.

- In terms of the rate of pedestrian-involved fatal crashes (per million population), Virginia's rate is lower than the rates of Maryland and the District of Columbia and similar to the rates of the other four states.

- Changes in the laws of states from requiring drivers to yield to pedestrians in crosswalks to requiring drivers to stop for pedestrians in crosswalks were not statistically associated with a reduction in the number or rate of pedestrian-involved fatal crashes on roads with speed limits of 35 mph or lower.

- In Virginia, the greatest number of pedestrian fatalities occurred when the pedestrian was crossing mid-block (i.e., between intersections not at a crosswalk), often on arterial highways. Other identified situations included when pedestrians were walking or lying in the roadway or were crossing in a crosswalk.

Analysis of Pedestrian and Bicycle Provisions in the Code of Virginia, the Codes of Other States, and the Uniform Vehicle Code and Recommendations for Possible Changes to the Code of Virginia

- The majority of states provide a definition of the terms "pedestrian," "traffic," "traffic control signal," and "traffic control device." Providing these definitions in the Code would aid in the correct interpretation of pedestrian- and bicycle-related statutes.

- The definition of "crosswalk" in § 46.2-100 would be more consistent with the language in § 46.2-924 if it was separated into "marked" and "unmarked" crosswalks.

- The definition of "shared-use path" in § 46.2-100 should be written to reflect the fact that shared-use paths are for the benefit of all non-motorized road users and not simply "bikeways" that other non-bicyclist road users are permitted to use.

- It is not clear why § 46.2-826 of the Code requires drivers to yield to pedestrians on sidewalks when entering a public highway from a private road or driveway but does not require them to yield to pedestrians on sidewalks when entering a private road or driveway from a public highway. The sidewalk is the domain of the pedestrian.

- Greater protection would be provided to pedestrians if Virginia followed the example of every other state and required pedestrians to obey vehicular red, amber, and green traffic signals when no pedestrian control signals are in place. The Supreme Court of Virginia has refused to grant a pedestrian crossing against a red light at an intersection the right of way over vehicles.

- Requiring pedestrians to follow the direction of law enforcement officers would offer greater protection to both pedestrians and motorists.

- The provision prohibiting drivers from passing a vehicle while a pedestrian is passing in front of that vehicle is hidden in a provision governing passing at a railroad crossing in § 46.2-858 and is difficult to find. This prohibition should be moved to Article 16 of the Motor Vehicle Title, which concerns pedestrians.

- No other state phrases its prohibition on pedestrians suddenly stepping out in front of traffic in terms of the mental state of the pedestrian. The words "carelessly" and "maliciously" as contained in § 46.2-923 are vague standards that are difficult to apply.

- The Code should enumerate exactly when pedestrians *must* cross at crosswalks or intersections and where they *may* cross when not at a crosswalk or an intersection.

- The Code would more clearly define the expected behavior of drivers approaching pedestrians in crosswalks if Virginia followed the majority of other states by clearly specifying that drivers must not only yield to pedestrians in crosswalks but must also slow down and stop if necessary to avoid striking a pedestrian.

- The prohibition in § 46.2-924 on pedestrians crossing intersections in disregard of approaching traffic is vague. The Code is not clear on how close approaching traffic needs to be in order for a pedestrian to be "in disregard" of it.

- Although the Code currently gives pedestrians crossing highways at intersections the right of way over turning vehicles at all times, this provision, in § 46.2-924, should be amended to limit this right of way to pedestrians who are *lawfully* crossing intersections in order to be more consistent with cases in which the Supreme Court of Virginia refused to grant pedestrians the right of way when crossing against a red light and with provisions such as the right-turn-on-red provision, § 46.2-835, which grants the right of way only to pedestrians crossing lawfully when a vehicle is turning at a red light.

- Pedestrian control signals are no longer limited to displaying the words "Walk" and "Don't Walk." The Code does not specifically require pedestrians to obey symbols on pedestrian control signals and should be updated to reflect the current symbols used on pedestrian control signals.

- In situations where vehicles are parked along the side of a street or where low-hanging trees block an approaching driver's view of the sidewalk, a pedestrian seeking to cross will be forced to step out into a roadway where he or she cannot be seen. Pedestrians should be required to look for vehicles when stepping out into a roadway from behind a vehicle, tree, building, sign, etc.

- The Code, in § 46.2-928, does not clearly state where on the roadway pedestrians must walk in the absence of a sidewalk. Although pedestrians "may" walk on the shoulder, they are not required to do so.

- The Code, in § 46.2-928, does not differentiate between one-way and two-way roadways when requiring pedestrians to stay to the left when walking on the roadway. Requiring them to stay to the left when on a two-way roadway (when facing traffic) provides them with the opportunity to see oncoming traffic. . With a one-way roadway, this advantage is not present and pedestrians walking on the left side of the roadway may find themselves in the faster travel lane.

- The definitions of "bicycle," "electric power-assisted bicycle," "moped," and "vehicle" found in § 46.2-100 do not encompass adult tricycles, where the wheels are not in tandem, and thus adult tricycles are not covered under Virginia's bicycle-related statutes.

- Although motorists are required by § 46.2-839 to give a minimum of 2 feet of clearance while passing a bicyclist, they are required only to pass "at a reasonable speed." It is not clear what constitutes "a reasonable speed" for passing a bicyclist, particularly if a motorist is passing as close as 2 feet from the bicyclist.

- The provision in § 46.2-849 allowing bicyclists to signal a right turn with their right arm but with a different arm motion than when signaling a right turn with their left arm is potentially confusing.

- It is not immediately apparent from reading § 46.2-904 that the signs posted by localities that prohibit bicyclists from riding on sidewalks are the same "official traffic control devices" that riders must obey.

- Although drivers in Virginia have a common-law duty to use due care to avoid striking a pedestrian, the Code would be clearer if this were codified.

- Emergency vehicles are noticeable and travel at high speeds. Between a pedestrian and an emergency vehicle, it follows that it will be much easier for a pedestrian to stop than for an emergency vehicle to stop. Virginia should follow the 23 other states that require pedestrians to yield the right of way to emergency vehicles.

- Nineteen percent of the fatal pedestrian crashes in Virginia in 2005 involved a drinking pedestrian. Seventeen states prohibit impaired pedestrians from walking on the roadway (not from walking on sidewalks). Considering that the second greatest number of fatalities in Virginia during the years used in the microscopic crash data analysis occurred when pedestrians were walking on the roadway, pedestrians would be provided more protection if this issue were addressed in the Code.

- Bridge and railroad signals and gates provide warnings and protection from dangerous situations. Pedestrians and bicyclists should not be permitted to bypass these safety precautions.

- A provision making parents responsible for the bicycle violations of their children would aid in enforcement of bicycle-related provisions in the Code. Enforcement of helmet laws is difficult when the only person a law enforcement officer can ticket is a young child.

- Virginia should ensure that *all* vulnerable road users are considered—including immigrant populations and the elderly—when designing and implementing a pedestrian or bicycle safety education plan.

Pedestrian and Bicycle Education Surveys

- The majority of responses to the survey sent to the pedestrian and bicycle coordinators indicated that the state department of transportation is responsible for pedestrian and bicycle outreach education to the general public.

- The responses to the survey sent to the offices of the superintendent of education indicated that a number of state agencies share responsibility for pedestrian and bicycle safety education.

- The responses to both surveys revealed that most of the responding states target elementary and intermediate school aged children. The responses to the survey sent to the pedestrian and bicycle coordinators indicated that only a small number target other vulnerable road users, such as the elderly and immigrant populations.

- The responses to the survey sent to the pedestrian and bicycle coordinators revealed that most of the responding states use some combination of FHWA standards, state-funded research efforts, Internet resource guides, public service messages, physical highway signs, and cooperation among agencies to design and implement their pedestrian and bicycle safety action plan.

- The responses to the survey sent to the offices of the superintendent of education indicated that, in addition to standards issued by the FHWA and cooperation among state agencies, a number of states use state-funded research efforts and pedestrian and bicycle plans issued by other states or the federal government in their efforts to instruct school children in pedestrian and bicycle safety.

- In both surveys, a number of states responded that they do not have a statewide pedestrian and bicycle safety plan or that they implement pedestrian and bicycle safety education only at a local level.

- It is clear from the responses to both surveys that a cooperative approach using a number of state agencies and resources is common.

CONCLUSIONS

This study focused on an analysis of the pedestrian- and bicycle-related provisions in the Code and a comparison of these provisions with those in the codes of the other 49 states and the District of Columbia. Many of the pedestrian-related statutes in the Code are confusing, ambiguous, and peppered with archaic language written more than 80 years ago. Most of the bicycle-related statutes, however, have been continually updated and reflect a protective approach that appropriately balances the rights and duties of motorists and bicyclists.

Studies have shown that pedestrians and motorists often misunderstand their respective rights and duties.[230] To clarify these misunderstandings, educators and outreach coordinators need to be able to understand and clearly explain the law in order to produce educational materials. Indeed, in the crash analysis conducted in this study, a sizable percentage of Virginia's pedestrian crashes occurred in situations where the Code is less than clear concerning the respective rights and duties of pedestrians and motorists. Clarifying Virginia's pedestrian- and bicycle-related legislation would also further three of the strategies—strategy PB-4, which recommends informing drivers of their responsibilities; strategy PB-5, which seeks to understand better the causes of non-motorized crashes; and strategy PB-14, which suggests enforcing or modifying existing pedestrian and bicycle-related laws—of the Virginia Strategic Highway Safety Plan.[231]

An analysis of crash data found no statistically significant reduction in pedestrian-involved fatal crashes on roads with speed limits of 35 mph or lower among states that had changed their laws from requiring drivers to yield to pedestrians in crosswalks to requiring drivers to stop for pedestrians in crosswalks. However, limitations of the analysis exist, such as the omission of traffic and pedestrian volume data. Including such factors might result in different results, and analysis using pedestrian injury crash data might construct different findings. Thus, more analysis overcoming such limitations should be performed to provide a more definitive conclusion.

An analysis of individual Virginia crash reports revealed that the greatest number of pedestrian fatalities occurred when pedestrians were not using crosswalks or were crossing streets between intersections, especially on arterial highways. Enforcement of statutes requiring pedestrians to use crosswalks or intersections is likely to be difficult considering the Code's vague explanation of exactly when pedestrians must use crosswalks and must cross at intersections and when they are permitted to cross without using a crosswalk or when not at an intersection.

Overall, the bicycle-related statutes in the Code are consistent with those in the statutes of the other states and clearly define the rights and duties of bicyclists and motorists. However, the Code contains several pedestrian-related provisions where the language is ambiguous and does not clearly define the rights and responsibilities of pedestrians and motorists. In addition, there are also provisions in the statutes of other states and in the UVC that would offer greater protection to pedestrians, such as a provision requiring pedestrians to yield to emergency vehicles and a provision requiring drivers to use due care not to strike a pedestrian.

[230] Hatfield et al., *supra* note 18; Martinez & Porter, *supra* note 19.
[231] Va.'s Surface Transp. Safety Executive Comm., Commonwealth of Virginia's Strategic Highway Safety Plan, at i (2006), *available at* http://www.virginiadot.org/info/resources/Strat_Hway_Safety_Plan_FREPT.pdf.

APPENDIX A: PEDESTRIAN FATALITY RATES PER MILLION POPULATION OF THE 50 U.S. STATES AND THE DISTRICT OF COLUMBIA

Table A-1. Pedestrian Fatality Rates in 1999

Rank	State	Pedestrians Killed	Population in 1000	Pedestrians Killed per Million Population
1	Nevada	67	1809	37.0
2	Florida	488	15111	32.3
3	District of Columbia	16	519	30.8
4	Arizona	143	4778	29.9
5	New Mexico	52	1740	29.9
6	Wyoming	14	480	29.2
7	South Carolina	113	3886	29.1
8	Louisiana	107	4372	24.5
9	Maryland	114	5172	22.0
10	Mississippi	60	2769	21.7
11	Texas	426	20044	21.3
12	New York	378	18197	20.8
13	Georgia	159	7788	20.4
14	North Carolina	155	7651	20.3
15	California	665	33145	20.1
16	Alabama	86	4370	19.7
17	New Jersey	154	8143	18.9
18	Oklahoma	60	3358	17.9
19	Utah	38	2130	17.8
20	Hawaii	21	1185	17.7
21	Michigan	173	9864	17.5
22	Arkansas	41	2551	16.1
23	West Virginia	29	1807	16.0
24	Delaware	12	754	15.9
25	Connecticut	51	3282	15.5
26	Colorado	63	4056	15.5
27	Pennsylvania	183	11994	15.3
28	South Dakota	11	733	15.0
29	Oregon	48	3316	14.5
30	Illinois	175	12128	14.4
31	Rhode Island	14	991	14.1
32	Tennessee	76	5484	13.9
33	Kentucky	52	3961	13.1
34	Alaska	8	620	12.9
35	Kansas	33	2654	12.4
36	Virginia	84	6873	12.2
37	Massachusetts	74	6175	12.0
38	Missouri	65	5468	11.9
39	Indiana	68	5943	11.4
40	Idaho	14	1252	11.2
41	Ohio	122	11257	10.8
42	Minnesota	51	4776	10.7
43	Washington	60	5756	10.4
44	Wisconsin	54	5250	10.3
45	Maine	11	1253	8.8
46	Nebraska	14	1666	8.4
47	Montana	7	883	7.9
48	Vermont	4	594	6.7
49	North Dakota	4	634	6.3
50	Iowa	17	2869	5.9
51	New Hampshire	5	1201	4.2
U.S.		4939	272691	18.1

Note: Rank is based on the number of pedestrians killed per million population.

Table A-2. Pedestrian Fatality Rates in 2000

Rank	State	Pedestrians Killed	Population in 1000	Pedestrians Killed per Million Population
1	District of Columbia	18	572	31.5
2	Florida	492	16051	30.7
3	Delaware	22	787	28.0
4	New Mexico	48	1822	26.3
5	Arizona	130	5167	25.2
6	Wyoming	12	494	24.3
7	Hawaii	29	1213	23.9
8	Mississippi	64	2849	22.5
9	Louisiana	100	4470	22.4
10	Nevada	43	2019	21.3
11	South Carolina	82	4024	20.4
12	Texas	417	20955	19.9
13	California	670	34010	19.7
14	North Carolina	159	8082	19.7
15	Colorado	80	4327	18.5
16	New York	335	19000	17.6
17	Tennessee	99	5703	17.4
18	South Dakota	13	756	17.2
19	New Jersey	145	8433	17.2
20	Maryland	91	5312	17.1
21	Michigan	170	9956	17.1
22	Georgia	137	8234	16.6
23	Alaska	10	628	15.9
24	Missouri	88	5605	15.7
25	Illinois	187	12441	15.0
26	Utah	33	2243	14.7
27	Oregon	50	3431	14.6
28	Arkansas	38	2679	14.2
29	Connecticut	48	3412	14.1
30	Alabama	62	4452	13.9
31	Pennsylvania	170	12286	13.8
32	West Virginia	25	1807	13.8
33	Kentucky	53	4049	13.1
34	Virginia	92	7106	12.9
35	Massachusetts	82	6362	12.9
36	Oklahoma	43	3454	12.4
37	Montana	11	903	12.2
38	Maine	15	1277	11.7
39	Nebraska	20	1713	11.7
40	Vermont	7	610	11.5
41	Washington	65	5912	11.0
42	Wisconsin	51	5374	9.5
43	Indiana	54	6092	8.9
44	Iowa	25	2929	8.5
45	Ohio	97	11364	8.5
46	North Dakota	5	641	7.8
47	Minnesota	38	4934	7.7
48	Kansas	19	2693	7.1
49	Rhode Island	6	1051	5.7
50	New Hampshire	7	1240	5.6
51	Idaho	6	1300	4.6
U.S.		4763	282224	16.9

Note: Rank is based on the number of pedestrians killed per million population.

Table A-3. Pedestrian Fatality Rates in 2001

Rank	State	Pedestrians Killed	Population in 1000	Pedestrians Killed per Million Population
1	New Mexico	72	1831	39.3
2	Arizona	160	5307	30.1
3	Florida	489	16373	29.9
4	South Carolina	107	4062	26.3
5	Hawaii	30	1227	24.4
6	Louisiana	99	4470	22.1
7	Nevada	45	2098	21.5
8	Delaware	17	797	21.3
9	Texas	450	21371	21.1
10	Mississippi	59	2860	20.6
11	California	711	34600	20.5
12	South Dakota	15	758	19.8
13	District of Columbia	11	574	19.2
14	Maryland	101	5386	18.8
15	New York	356	19084	18.7
16	Georgia	156	8406	18.6
17	North Carolina	149	8206	18.2
18	Oregon	58	3473	16.7
19	Michigan	162	10006	16.2
20	West Virginia	28	1801	15.5
21	New Jersey	132	8511	15.5
22	Pennsylvania	188	12303	15.3
23	Alabama	68	4469	15.2
24	Arkansas	41	2695	15.2
25	Illinois	185	12520	14.8
26	Missouri	83	5637	14.7
27	Utah	33	2279	14.5
28	Oklahoma	49	3470	14.1
29	Virginia	101	7197	14.0
30	Colorado	61	4431	13.8
31	Tennessee	77	5749	13.4
32	Kentucky	53	4069	13.0
33	Massachusetts	79	6401	12.3
34	Washington	73	5993	12.2
35	Alaska	7	634	11.0
36	Wyoming	5	494	10.1
37	Montana	9	905	9.9
38	Connecticut	33	3435	9.6
39	Rhode Island	10	1060	9.4
40	Maine	12	1284	9.3
41	Indiana	56	6127	9.1
42	Idaho	12	1321	9.1
43	Kansas	24	2702	8.9
44	Ohio	99	11390	8.7
45	Minnesota	43	4985	8.6
46	Wisconsin	45	5406	8.3
47	Vermont	5	613	8.2
48	New Hampshire	9	1259	7.1
49	Nebraska	12	1720	7.0
50	Iowa	19	2932	6.5
51	North Dakota	3	637	4.7
U.S.		4901	285318	17.2

Note: Rank is based on the number of pedestrians killed per million population.

Table A-4. Pedestrian Fatality Rates in 2002

Rank	State	Pedestrians Killed	Population in 1000	Pedestrians Killed per Million Population
1	New Mexico	60	1852	32.4
2	Florida	487	16692	29.2
3	Arizona	154	5441	28.3
4	Hawaii	33	1241	26.6
5	Alaska	16	641	24.9
6	Nevada	52	2167	24.0
7	South Carolina	98	4104	23.9
8	Louisiana	103	4476	23.0
9	North Carolina	176	8306	21.2
10	New Jersey	177	8575	20.6
11	California	709	35002	20.3
12	Delaware	16	806	19.9
13	Maryland	105	5451	19.3
14	Texas	418	21737	19.2
15	Mississippi	55	2867	19.2
16	Georgia	161	8544	18.8
17	New York	337	19134	17.6
18	Michigan	175	10043	17.4
19	West Virginia	28	1805	15.5
20	Oklahoma	54	3490	15.5
21	Montana	14	910	15.4
22	Missouri	87	5670	15.3
23	Colorado	69	4501	15.3
24	Illinois	191	12586	15.2
25	Connecticut	50	3459	14.5
26	Oregon	48	3520	13.6
27	Alabama	61	4479	13.6
28	Kentucky	55	4090	13.4
29	Tennessee	72	5790	12.4
30	Pennsylvania	153	12329	12.4
31	District of Columbia	7	569	12.3
32	Arkansas	33	2706	12.2
33	Virginia	88	7288	12.1
34	Washington	69	6067	11.4
35	Idaho	15	1343	11.2
36	Maine	14	1295	10.8
37	Utah	25	2319	10.8
38	South Dakota	8	760	10.5
39	Minnesota	50	5026	9.9
40	Wisconsin	50	5440	9.2
41	Massachusetts	59	6422	9.2
42	Indiana	53	6157	8.6
43	Kansas	23	2712	8.5
44	Rhode Island	9	1068	8.4
45	Wyoming	4	499	8.0
46	Ohio	87	11409	7.6
47	Nebraska	12	1728	6.9
48	Vermont	4	616	6.5
49	Iowa	19	2936	6.5
50	New Hampshire	6	1274	4.7
51	North Dakota	2	634	3.2
U.S.		4851	287975	16.8

Note: Rank is based on the number of pedestrians killed per million population.

Table A-5. Pedestrian Fatality Rates in 2003

Rank	State	Pedestrians Killed	Population in 1000	Pedestrians Killed per Million Population
1	District of Columbia	18	558	32.3
2	Florida	500	16999	29.4
3	Nevada	65	2242	29.0
4	New Mexico	51	1879	27.1
5	Delaware	19	818	23.2
6	Arizona	121	5579	21.7
7	Louisiana	93	4494	20.7
8	Maryland	114	5512	20.7
9	California	704	35463	19.9
10	South Carolina	80	4149	19.3
11	Hawaii	23	1249	18.4
12	North Carolina	153	8421	18.2
13	Texas	401	22103	18.1
14	Georgia	156	8676	18.0
15	New York	334	19212	17.4
16	Michigan	166	10082	16.5
17	Tennessee	96	5845	16.4
18	New Jersey	137	8642	15.9
19	Arkansas	41	2728	15.0
20	Illinois	189	12649	14.9
21	Kentucky	61	4118	14.8
22	New Hampshire	19	1289	14.7
23	Wyoming	7	502	13.9
24	Alaska	9	648	13.9
25	Mississippi	40	2883	13.9
26	Alabama	62	4504	13.8
27	Pennsylvania	170	12371	13.7
28	Missouri	78	5719	13.6
29	Massachusetts	86	6420	13.4
30	South Dakota	10	765	13.1
31	Oregon	46	3564	12.9
32	Colorado	56	4548	12.3
33	Washington	75	6131	12.2
34	West Virginia	22	1811	12.1
35	Rhode Island	13	1076	12.1
36	Utah	28	2352	11.9
37	Virginia	86	7365	11.7
38	Vermont	7	619	11.3
39	North Dakota	7	633	11.1
40	Montana	10	918	10.9
41	Oklahoma	37	3506	10.6
42	Minnesota	53	5064	10.5
43	Connecticut	35	3487	10.0
44	Indiana	62	6200	10.0
45	Maine	13	1309	9.9
46	Wisconsin	54	5474	9.9
47	Idaho	13	1367	9.5
48	Kansas	25	2725	9.2
49	Ohio	99	11438	8.7
50	Nebraska	12	1737	6.9
51	Iowa	18	2942	6.1
USA		4774	290789	16.4

Note: Rank is based on the number of pedestrians killed per million population.

Table A-6. Pedestrian Fatality Rates in 2004

Rank	State	Pedestrians Killed	Population in 1000	Pedestrians Killed per Million Population
1	New Mexico	56	1903	29.4
2	Florida	493	17397	28.3
3	Nevada	60	2335	25.7
4	Hawaii	30	1263	23.8
5	Louisiana	103	4516	22.8
6	Arizona	130	5744	22.6
7	South Carolina	86	4198	20.5
8	Texas	447	22490	19.9
9	Delaware	16	830	19.3
10	California	684	35894	19.1
11	North Carolina	161	8541	18.8
12	Alabama	81	4530	17.9
13	New Jersey	152	8699	17.5
14	Maryland	97	5558	17.5
15	Georgia	153	8829	17.3
16	New York	317	19227	16.5
17	District of Columbia	9	554	16.3
18	Alaska	10	655	15.3
19	Colorado	70	4601	15.2
20	Mississippi	44	2903	15.2
21	West Virginia	26	1815	14.3
22	Oklahoma	50	3524	14.2
23	Missouri	81	5755	14.1
24	Tennessee	83	5901	14.1
25	Michigan	137	10113	13.5
26	Massachusetts	81	6417	12.6
27	Illinois	156	12714	12.3
28	Idaho	17	1393	12.2
29	Pennsylvania	150	12406	12.1
30	Oregon	43	3595	12.0
31	Indiana	73	6238	11.7
32	South Dakota	9	771	11.7
33	Arkansas	32	2753	11.6
34	Kentucky	48	4146	11.6
35	New Hampshire	15	1300	11.5
36	Virginia	85	7460	11.4
37	Vermont	7	621	11.3
38	Utah	25	2389	10.5
39	Wisconsin	54	5509	9.8
40	Washington	60	6204	9.7
41	Ohio	94	11459	8.2
42	Iowa	24	2954	8.1
43	North Dakota	5	634	7.9
44	Connecticut	27	3504	7.7
45	Kansas	21	2736	7.7
46	Maine	10	1317	7.6
47	Montana	7	927	7.6
48	Minnesota	37	5101	7.3
49	Rhode Island	7	1081	6.5
50	Wyoming	3	507	5.9
51	Nebraska	9	1747	5.2
U.S.		4675	293655	15.9

Note: Rank is based on the number of pedestrians killed per million population.

Table A-7. Pedestrian Fatality Rates in 2005

Rank	State	Pedestrians Killed	Population in 1000	Pedestrians Killed per Million Population
1	Florida	576	17,790	32.4
2	New Mexico	61	1,928	31.6
3	District of Columbia	16	551	29.1
4	Hawaii	35	1,275	27.4
5	Arizona	157	5,939	26.4
6	Nevada	63	2,415	26.1
7	Mississippi	72	2,921	24.6
8	Louisiana	109	4,524	24.1
9	South Carolina	98	4,255	23.0
10	California	742	36,132	20.5
11	North Carolina	164	8,683	18.9
12	Texas	419	22,860	18.3
13	Maryland	102	5,600	18.2
14	South Dakota	14	776	18.0
15	New Jersey	154	8,718	17.7
16	New York	321	19,255	16.7
17	Georgia	150	9,073	16.5
18	Alabama	72	4,558	15.8
19	Missouri	88	5,800	15.2
20	North Dakota	9	637	14.1
21	Oklahoma	50	3,548	14.1
22	Montana	13	936	13.9
23	Wyoming	7	509	13.7
24	Michigan	137	10,121	13.5
25	Arkansas	37	2,779	13.3
26	Oregon	48	3,641	13.2
27	Delaware	11	844	13.0
28	Rhode Island	14	1,076	13.0
29	Kentucky	54	4,173	12.9
30	Illinois	164	12,763	12.8
31	Pennsylvania	159	12,430	12.8
32	West Virginia	23	1,817	12.7
33	Massachusetts	76	6,399	11.9
34	Tennessee	70	5,963	11.7
35	Virginia	88	7,567	11.6
36	Washington	71	6,288	11.3
37	Alaska	7	664	10.5
38	Colorado	48	4,665	10.3
39	Indiana	63	6,272	10.0
40	Connecticut	34	3,510	9.7
41	Kansas	24	2,745	8.7
42	Minnesota	44	5,133	8.6
43	Ohio	95	11,464	8.3
44	Iowa	24	2,966	8.1
45	Utah	20	2,470	8.1
46	Wisconsin	44	5,536	7.9
47	Maine	9	1,322	6.8
48	Idaho	9	1,429	6.3
49	Vermont	3	623	4.8
50	Nebraska	8	1,759	4.5
51	New Hampshire	5	1,310	3.8
U.S.		4881	296,410	16.5

Note: Rank is based on the number of pedestrians killed per million population.

APPENDIX B: LETTER SENT TO THE BICYCLE AND PEDESTRIAN COORDINATOR IN EACH STATE DEPARTMENT OF TRANSPORTATION

<Date>

Name of Bicycle and Pedestrian Coordinator
State Department of Transportation
Address

Dear Dr./Mr./Ms. Name:

Improving accommodation for bicyclists and pedestrians has been an important priority for the Commonwealth of Virginia for a number of years. The Virginia Department of Transportation has been asked by the Secretary of Transportation to conduct a comprehensive review of Virginia's laws regarding the status, rights, and responsibilities of pedestrians and bicyclists and, if needed, to suggest potential statutory changes.

In addition to revising statutes, an important aspect of pedestrian and bicycle safety is the public's awareness of the laws concerning pedestrians and bicyclists and their interaction with motorists. At a meeting with representatives from bicycle and pedestrian advocacy organizations, the Virginia Department of Transportation, and several municipalities throughout Virginia, an interest was expressed in conducting a review of the education policies and practices of other states with regard to pedestrian and bicycle safety public outreach education programs, in order to compare them with those of Virginia. Because education is a key component of adopting new pedestrian and bicycle legislation, it is our hope that information concerning the public education practices of all fifty states will enable us to conduct a more comprehensive evaluation of Virginia's laws.

The link below will connect you to a short survey that asks several questions about pedestrian and bicycle safety education in <State>. Please feel free to reply to this email with any questions or to provide us with any additional information. We would greatly appreciate it if you would respond by <date>. If, after reviewing your response, we have any additional questions, we will send a follow up to this email, or if you prefer, get in touch with you by telephone. If you are not the current pedestrian and bicycle coordinator, please let us know by calling (434) 293-1986 or by sending a quick email to sarah.hartman@vdot.virginia.gov.

Thank you very much for taking the time to complete this survey. It is our hope that an exchange of information will enable us to develop laws and programs that increase pedestrian and bicycle safety. If you would like a copy of the results, please contact us via email or phone (provided above) and we would be happy to provide you with one.

Sincerely,

S. Emily Hartman
Graduate Legal Assistant

Heath Roettig
Graduate Legal Assistant

APPENDIX C: SURVEY SENT TO THE BICYCLE AND PEDESTRIAN COORDINATOR IN EACH STATE DEPARTMENT OF TRANSPORTATION

VIRGINIA TRANSPORTATION RESEARCH COUNCIL
Pedestrian and Bicycle Safety Education Outreach to the General Public Survey

Complete responses from representatives from all states are very important to us, so we ask that you please complete the entire survey – if you do not know the answer to a question, please select "don't know" and move to the next question.

1. What departments or divisions of state agencies are responsible for educating the general public about pedestrian and bicycle safety?

2. Does your state have some sort of pedestrian and bicycle advisory group or task force? (Yes, No, Don't Know)

> 2a. If yes, does the task force assist with pedestrian and bicycle safety outreach and education? (Yes, No, Don't Know)

3. Does your state enlist the assistance of pedestrian and bicycle advocacy organizations in implementing public outreach programs? (Yes, No, Don't Know)

"Public outreach programs" are programs, initiatives, or action plans designed to educate the general public about pedestrian and bicycle safety in general, including education efforts designed to bring about awareness of changes in pedestrian and bicycle legislation.

4. "Pedestrian and bicycle safety education and outreach" includes programs, initiatives, or action plans designed to educate the general public about pedestrian and bicycle safety in general, including education efforts designed to bring about awareness of changes in pedestrian and bicycle legislation.

Are there any state agency regulations addressing "pedestrian and bicycle safety education and outreach?"

- Yes (pedestrian only)
- Yes (bicycle only)
- Yes (both pedestrian and bicycle)
- No specific policy in place
- Don't know

> 4a. Are there any state laws addressing "pedestrian and bicycle safety education and outreach?"
>
> - Yes (pedestrian only)
> - Yes (bicycle only)
> - Yes (both pedestrian and bicycle)
> - No specific policy in place
> - Don't know

5. Would you describe your state's approach to implementing a plan for "pedestrian and bicycle education outreach to the general public" as (check all that apply):

- A formally articulated policy
- Not formally articulated
- Requirements
- Guidelines
- Other (please explain)

A plan for "pedestrian and bicycle education outreach to the general public" is an action plan designed to educate the general public about pedestrian and bicycle safety in general, including education efforts designed to bring about awareness of changes in pedestrian and bicycle legislation.

6. Does your state specifically target vulnerable road users, such as young children and the elderly, when formulating a public outreach education plan?

6a. If yes, which groups are targeted (check all that apply)?

PEDESTRIAN	BICYCLE
Elderly individuals	Elderly individuals
Elementary-school children	Elementary-school children
Intermediate-school children	Intermediate-school children
High-school children	High-school children
Immigrant populations	Immigrant populations

7. What other resources do you use in designing and implementing a pedestrian and bicycle safety education plan? (Check all that apply)

- Recommendations and standards promulgated by the Federal Highway Administration.
- Internet guides such as those provided by the Pedestrian and Bicycle Information Center (http://www.pedbikeinfo.org)
- State-funded research efforts into various aspects of pedestrian and bicycle safety.
- Private research efforts into various aspects of pedestrian and bicycle safety.
- Pedestrian and bicycle safety plans issued by other states or the federal government.
- Physical signs posted on roads and highways
- Information displayed on electronic signs positioned on major roads
- Advertisements on television or in print media (newspapers, magazines)
- Cooperation with other state organizations (e.g., the Department of Education, the Department of Transportation, the Department of Motor Vehicles)
- Other (please explain)

APPENDIX D: RESPONSES TO THE SURVEY SENT TO THE BICYCLE AND PEDESTRIAN COORDINATOR IN EACH STATE DEPARTMENT OF TRANSPORTATION

Table D-1
Responses to Pedestrian and Bicycle Safety Outreach to General Public Survey

- The responses to the survey sent to the pedestrian and bicycle coordinator in each state department of transportation are provided in the spreadsheet that follows.
- Responses were categorized as either "yes," "no," "local only," or "no answer" in the spreadsheet. When the response was not clear, the full text response was included or an explanatory parenthetical statement was added. The full text of all responses is available from the authors upon request.
- AASHTO indicated that Minnesota had separate bicycle and pedestrian coordinators; therefore, a survey was sent to each coordinator. These responses were largely identical; any variations in responses are included in the spreadsheet.
- The following abbreviations were used:
  - DOT—State Department of Transportation
  - Transp. —Transportation
  - Dept. —Department
  - MPO—Metropolitan Planning Organization.
- For brevity, some of the survey response options were abbreviated in the spreadsheet. Please see questions 6 and 7 in Appendix C for the full text of the options.

State	Departments responsible for outreach and education?	Does your state have some sort of pedestrian and bicycle advisory group or task force?	If yes, does the task force assist with pedestrian and bicycle outreach and education?	Does your state enlist the assistance of pedestrian and bicycle advocacy organizations in implementing public outreach programs?	Are there any state agency regulations addressing "pedestrian and bicycle safety education and outreach?"	Are there any state laws addressing "pedestrian and bicycle safety education and outreach?"
Arizona	Govenor's Office on Highway Safety; DOT, Bicycle and Pedestrian Program	Yes	Yes	Yes	No	Yes (Bicycle only)
Connecticut	Don't know	Yes	No	No	No	No
District of Columbia	DOT	Yes	Yes	Yes	No	No
Florida	DOT; Dept. of Highway Safety & Motor Vehicles Division of Driver Licenses (Driver Handbooks)	No	N/A	Yes	No	No
Georgia	Governor's Office of Highway Safety	Yes	No	Yes	No	No
Hawaii	Dept. of Health; DOT; Dept. of Education	Yes	Yes	Yes	Don't know	No
Idaho	DOT's Division of Transp. Planning; Dept. of Highways' Office of Highway Safety	No	N/A	Yes	No	No
Iowa	DOT's Office of Systems Planning and Office of Traffic and Safety	Yes	Yes	Yes	No	Yes (Bicycle only)
Kansas	Dept. of Health and Environment Safe Kids Coalition; DOT Division of Planning and Development - Bike/Ped Coordinator & Bureau of Traffic Safety	No	N/A	Yes	No	No
Kentucky	Bike/Ped Program; Safe Routes to School Program	Yes	Yes	Don't know	Don't know	Don't know
Louisiana	DOT, Safety Section	Within MPOs only	Yes	Yes	No	No
Maine	DOT, Office of Passenger Transp.	Yes	No	Yes	No	No

State	Departments responsible for outreach and education?	Does your state have some sort of pedestrian and bicycle advisory group or task force?	If yes, does the task force assist with pedestrian and bicycle outreach and education?	Does your state enlist the assistance of pedestrian and bicycle advocacy organizations in implementing public outreach programs?	Are there any state agency regulations addressing "pedestrian and bicycle safety education and outreach?"	Are there any state laws addressing "pedestrian and bicycle safety education and outreach?"
Maryland	Highway Safety Office; Comprehensive Traffic Safety Program Coordinators; Districts; Counties	Yes	Yes	Yes	Yes (both pedestrian and bicycle)	No
Massachusetts	Executive Office of Transp.; MassHighway; Registry of Motor Vehicles; Governor's Highway Safety Bureau; Dept. of Public Health; MassRIDES (a service of EOT)	Yes	Yes	Yes	No	Yes (Pedestrian and Bicycle)
Michigan	Bureau of Transp. Planning, Intermodal Policy Division	No	N/A	Yes	Don't know	Don't know
Minnesota	Dept. of Public Safety, Office of Traffic Safety; DOT, Bike/Ped Section	Yes	Yes	Yes	Unfunded mandates; Yes (bicycle only)	Unfunded mandates; No
Nebraska	SHA; DMV	No	N/A	No	No	No
New Hampshire	DOT Bike/Ped Program; Safe Routes to School	Yes	Yes	Yes	Don't know	Don't know
New Jersey	Dept. of Law & Public Safety (DOT does participate)	Yes	Yes	No	No	Don't know
New York	Dept. of Health; Governor's Traffic Safety Committee; DOT	Yes	Yes	Yes	No	No
North Dakota	DOT, Traffic Safety Section	No	N/A	No	Don't know	Don't know
Oregon	DOT, Transp. Safety, Bike/Ped Safety	No	N/A	Yes	No	Yes (Bicycle only)
Rhode Island	DOT; Dept. of Health/Division of Injury Prevention	Yes	Yes	Yes	No	No
South Dakota	Governor's Office of Highway Safety	Yes	Yes	Don't know	No	No
Utah	DOT; Dept. of Public Safety; Dept. of Health	Yes	Yes	Yes	Don't know	Don't know
Virginia	**DOT, Safe Routes to School, Dept. of Health**	**No**	**N/A**	**Yes**	**No**	**No**
Wisconsin	DMV; State Patrol	Yes	No	Yes	No	No
Wyoming	DOT, Planning program	No	N/A	Yes	No	No

State	Would you describe your state's approach to implementing a plan for "pedestrian and bicycle education outreach to the general public" as (check all that apply):	Does your state specifically target vulnerable road users, such as young children and the elderly, when formulating a public outreach education plan?	If yes, which groups are targeted? (Check all that apply)	What other resources do you use in designing and implementing a pedestrian and bicycle safety education plan? (Check all that apply)
Arizona	Not formally articulated	Yes	Elderly pedestrians; Elementary-pedestrians; Elementary-bicyclists; Intermediate-pedestrians; Intermediate-bicyclists; Immigrant populations (pedestrians); Immigrant populations (bicyclists)	FHWA Recommendations; Internet guides;State funded research; Ped/bike safety plans issued by other states/federal government; Cooperation with other state organizations
Connecticut	No answer	No	N/A	No answer
District of Columbia	Loose guidelines	Yes	Elementary-pedestrians; Elementary-bicyclists; Immigrant populations (pedestrians); Immigrant populations (bicyclists)	Public service messages; Cooperation with other state organizations
Florida	Not formally articulated	Yes	Elementary-pedestrians; Elementary-bicyclists	State funded research; Public service messages
Georgia	Not formally articulated	No	N/A	No answer
Hawaii	Loose guidelines	Yes	Elderly pedestrians; Elementary-pedestrians; Elementary-bicyclists	FHWA Recommendations; Internet guides; Private research efforts; Ped/bike safety plans issued by other states/federal government; Physical signs; Public service messages; Cooperation with other state organizations
Idaho	No answer	No answer	N/A	No answer
Iowa	Not formally articulated	Yes	Elementary-bicyclists	FHWA Recommendations; Internet guides; State funded research; Private research efforts; Ped/bike safety plans issued by other states/federal government; Physical signs; Cooperation with other state organizations
Kansas	Not formally articulated	No	N/A	Cooperation with other state organizations

State	Would you describe your state's approach to implementing a plan for "pedestrian and bicycle education outreach to the general public" as (check all that apply):	Does your state specifically target vulnerable road users, such as young children and the elderly, when formulating a public outreach education plan?	If yes, which groups are targeted? (Check all that apply)	What other resources do you use in designing and implementing a pedestrian and bicycle safety education plan? (Check all that apply)
Kentucky	Loose guidelines	No	N/A	Internet guides; Physical signs; Cooperation with other state organizations
Louisiana	A formally articulated (i.e. written) policy	Yes	Elementary-pedestrians; Elementary-bicyclists; Intermediate-pedestrians; Intermediate-bicyclists	FHWA Recommendations; Internet guides;Ped/bike safety plans issued by other states/federal government; Physical signs; Cooperation with other state organizations
Maine	Not formally articulated	Yes	Elementary-pedestrians; Intermediate-pedestrians; High school-pedestrians	FHWA Recommendations; Internet guides;State funded research; Private research efforts; Ped/bike safety plans issued by other states/federal government; Physical signs; Public service messages; Cooperation with other state organizations
Maryland	Not formally articulated	Yes	Elementary-pedestrians; Elementary-bicyclists; High school-pedestrians; Immigrant populations (pedestrians)	State funded research; Physical signs; Electronic signs positioned on major roads; Public service messages
Massachusetts	A formally articulated (i.e. written) policy	Yes	Elementary-pedestrians; Elementary-bicyclists; Intermediate-pedestrians; Intermediate-bicyclists	FHWA Recommendations; Internet guides; Physical signs; Public service messages; Cooperation with other state organizations
Michigan	Not formally articulated	No	N/A	FHWA recommendations; Internet guides; State funded research; Physical signs; Cooperation with other state organizations
Minnesota	Not formally articulated	No	N/A	Internet guides; State funded research efforts; Physical signs posted on roads and highways
Nebraska	Loose guidelines	Yes	Elderly pedestrians; Elderly bicyclists; Elementary-pedestrians; Elementary-bicyclists	FHWA Recommendations; Cooperation with other state organizations
New Hampshire	Loose guidelines	No	N/A	FHWA Recommendations; Internet guides; State funded research; Ped/bike safety plans issued by other states/federal government; Physical signs; Public service messages;Cooperation with other state organizations

State	Would you describe your state's approach to implementing a plan for "pedestrian and bicycle education outreach to the general public" as (check all that apply):	Does your state specifically target vulnerable road users, such as young children and the elderly, when formulating a public outreach education plan?	If yes, which groups are targeted? (Check all that apply)	What other resources do you use in designing and implementing a pedestrian and bicycle safety education plan? (Check all that apply)
New Jersey	Loose guidelines	Yes	Elderly pedestrians; Elderly bicyclists; Elementary-pedestrians; Elementary-bicyclists; Intermediate-pedestrians; Intermediate-bicyclists; High school-pedestrians; High school-bicyclists; Immigrant populations (pedestrians); Immigrant populations (bicyclists)	FHWA Recommendations; State funded research; Pedestrian and bicycle safety plans issued by other states or by the federal government; Physical signs; Public service messages; Cooperation with other state organizations
New York	Not formally articulated; Loose guidelines	Yes	No answer	FHWA Recommendations; Internet guides; Ped/bike safety plans issued by other states/federal government; Cooperation with other state organizations
North Dakota	No education plan exists	N/A	N/A	N/A
Oregon	A formally articulated (i.e. written) policy	Yes	Elementary-pedestrians; Elementary-bicyclists; Intermediate-pedestrians; Intermediate-bicyclists	State funded research; Physical signs; Public service messages; Cooperation with other state organizations
Rhode Island	Not formally articulated	Yes	Elementary-pedestrians; Elementary-bicyclists; Intermediate-bicyclists	FHWA Recommendations; Internet guides; Public service messages; Cooperation with other state organizations
South Dakota	Not formally articulated	Yes	Elementary-pedestrians; Elementary-bicyclists	FHWA Recommendations; Internet guides; Physical signs; Public service messages; Cooperation with other state organizations
Utah	Not formally articulated	Yes	Elderly pedestrians; Elementary-pedestrians; Elementary-bicyclists	FHWA Recommendations; Internet guides; Ped/bike safety plans issued by other states/federal government;Public service messages; Cooperation with other state organizations
Virginia	**Not formally articulated**	**Don't know**	**N/A**	**State funded research**
Wisconsin	Loose guidelines	Yes	Elementary-pedestrians	Internet guides; State funded research; Cooperation with other state organizations
Wyoming	Not formally articulated; Loose guidelines	Yes	Elementary-pedestrians; Elementary-bicyclists	State funded research; Private research efforts

APPENDIX E: LETTER SENT TO THE OFFICE OF THE SUPERINTENDENT OF EDUCATION IN EACH STATE

<Date>

Name of Superintendent
State Department of Education
Address

Dear Dr./Mr./Ms. Name:

Improving accommodation for bicyclists and pedestrians has been an important priority for the Commonwealth of Virginia for a number of years. The Virginia Department of Transportation has been asked by the Secretary of Transportation to conduct a comprehensive review of Virginia's laws regarding the status, rights, and responsibilities of pedestrians and bicyclists and, if needed, to suggest potential statutory changes.

In addition to revising statutes, an important aspect of pedestrian and bicycle safety is the public's awareness of the laws concerning pedestrians and bicyclists and their interaction with motorists. At a meeting with representatives from bicycle and pedestrian advocacy organizations, the Virginia Department of Transportation, and several municipalities throughout Virginia, an interest was expressed in conducting a review of the education policies and practices of other states with regard to pedestrian and bicycle safety in public schools, in order to compare them with those of Virginia. Because education is a key component of adopting new pedestrian and bicycle legislation, it is our hope that information concerning the public school education practices of all fifty states will enable us to conduct a more comprehensive evaluation of Virginia's laws.

The link below will connect you to a short survey that asks several questions about pedestrian and bicycle safety education in <State> public schools. Please feel free to reply to this email with any questions or to provide us with any additional information. We would greatly appreciate it if you would respond by <date>. If, after reviewing your response, we have any additional questions, we will send a follow up to this email, or if you prefer, get in touch with you by telephone. If you are not the current Superintendent of Education, please let us know by calling (434) 293-1986 or by sending a quick email to sarah.hartman@vdot.virginia.gov.

Thank you very much for taking the time to complete this survey. It is our hope that an exchange of information will enable us to develop laws and programs that increase pedestrian and bicycle safety. If you would like a copy of the results, please contact us via email or phone (provided above) and we would be happy to provide you with one.

Sincerely,

S. Emily Hartman
Graduate Legal Assistant

Heath Roettig
Graduate Legal Assistant

APPENDIX F: SURVEY SENT TO THE OFFICE OF THE SUPERINTENDENT OF EDUCATION IN EACH STATE

VIRGINIA TRANSPORTATION RESEARCH COUNCIL
Pedestrian and Bicycle Safety Education in Public Schools Survey

Complete responses from representatives from all states is very important to us, so we ask that you please complete the entire survey – if you do not know the answer to a question, please select "don't know" and move to the next question. If this survey has reached an individual other than the Superintendent of the State Department of Education, please let us know by sending a quick reply to the email that contained the link to this survey.

1. What departments or divisions of state agencies are responsible for education about pedestrian and bicycle safety in public schools?

2. "Pedestrian and bicycle safety education in public schools" includes programs, initiatives, or action plans designed to educate school children about pedestrian and bicycle safety in general, including education efforts designed to bring about awareness of changes in pedestrian and bicycle legislation.

Are there any state agency regulations addressing "pedestrian and bicycle safety education in public schools?"

- Yes (pedestrian only)
- Yes (bicycle only)
- Yes (both pedestrian and bicycle)
- No specific policy in place
- Don't know

2a. Are there any state laws addressing "pedestrian and bicycle safety education in public schools?"

- Yes (pedestrian only)
- Yes (bicycle only)
- Yes (both pedestrian and bicycle)
- No specific policy in place
- Don't know

3. Would you describe your agency's and your state's policies toward pedestrian and bicycle education in public schools as (check all that apply):

- A formally articulated policy
- Not formally articulated
- Requirements
- Guidelines
- Other (please explain)

4. At what grade levels are education efforts targeted? (please check all that apply from K-12)

5. What other resources do you use in designing and implementing a pedestrian and bicycle safety education plan? (check all that apply)

- Recommendations and standards promulgated by the Federal Highway Administration.
- Internet guides such as those provided by the Pedestrian and Bicycle Information Center (http://www.pedbikeinfo.org)
- State-funded research efforts into various aspects of pedestrian and bicycle safety.
- Private research efforts into various aspects of pedestrian and bicycle safety.
- Pedestrian and bicycle safety plans issued by other states or the federal government.
- Cooperation with other state organizations (e.g., the Department of Education, the Department of Transportation, the Department of Motor Vehicles)
- Other (please explain)

6. Does your state include education programs directed at students for whom English is a second language when educating students about pedestrian and bicycle safety? (Yes, No, Don't Know)

7. Is there coordination between the state Department of Transportation Pedestrian and Bicycle Safety Coordinator and the Department of Education? Such coordination might include students being provided for materials to show to their parents, for example. (Yes, No, Don't Know)

8. Is there coordination between the pedestrian and bicycle safety programs and the pupil transportation system (i.e., training students to load and unload buses safely)? (Yes, No, Don't Know)

9. Are there requirements for students to engage in safe practices, such as wearing seat belts and bicycle helmets, on school property? (Yes, No, Don't Know)

10. Does the Department of Education disseminate materials (e.g., curricula, textbooks, handouts, or other printed material) on pedestrian and bicycle safety to school divisions. (Yes, No, Don't Know)

APPENDIX G: RESPONSES TO THE SURVEY SENT TO THE OFFICE OF THE SUPERINTENDENT OF EDUCATION IN EACH STATE

Table G-1
Responses to Pedestrian and Bicycle Safety Education in Public Schools Survey

- The responses to the survey sent to the pedestrian and bicycle coordinators of each state department of transportation are summarized in the following spreadsheet.
- Responses were categorized as either "yes," "no," "local only," or "no answer" in the spreadsheet. When the response was not clear, the full text response was included or an explanatory parenthetical statement was added. The full text of all responses is available from the authors upon request.
- The following abbreviations were used:
  - DOT—State Department of Transportation
  - DOE—State Department of Education
  - DPI; OPI—Department/Office of Public Instruction
  - DHHS—Department of Health and Human Services
  - SR2S—Safe Routes to School
  - Transp.—Transportation
  - Dept. —Department
- For brevity, some of the survey response options were abbreviated in the spreadsheet. Please see question 5 in Appendix F for the full text of the options.
- Virginia's responses are in bold.

State	What departments or divisions of state agencies are responsible for education about pedestrian and bicycle safety in public schools?	Are there any state agency regulations addressing "pedestrian and bicycle safety education" in public schools?	Are there any state laws addressing "pedestrian and bicycle safety education in public schools?"	Would you describe your agency's and your state's policies toward pedestrian and bicycle education in public schools as (check all that apply):	At what grade levels are education efforts targeted? (Please check all that apply)	What other resources do you use in designing and implementing a pedestrian and bicycle safety education plan? (Check all that apply)
Alabama	DOE; DOT; Dept. of Public Health	Yes (bicycle only)	No	Loose guidelines	3	Cooperation with other state organizations
Arizona	DOT	Yes (Both pedestrian and bicycle)	Don't know	Loose guidelines	K-12	Cooperation with other state organizations
Connecticut	DOT; DOE	Yes (Both pedestrian and bicycle)	No	Not formally articulated	K-8	FHWA Recommendations; Ped/bike safety plans issued by other states/federal government; Cooperation with other state organizations
Delaware	None responsible	No	No	Not formally articulated	No answer	Cooperation with other state organizations
Idaho	None responsible	No	No	Local only	Local only	Local only
Illinois	None responsible	No answer	No answer	No answer	No answer	No answer
Iowa	DOT	Don't know	Don't know	Loose guidelines	K-8	FHWA Recommendations; Ped/bike safety plans issued by other states/federal government; Cooperation with other state organizations
Kansas	None responsible; DOT provides funding	No	No	Not formally articulated	6	State funded research efforts
Kentucky	Transp. Cabinet	No	Don't know	No answer	K-8	FHWA Recommendations; State funded research; Ped/bike safety plans issued by other states/federal government
Maine	DOT; Bicycle and Pedestrian Travel Programs; SR2S	Yes (Both pedestrian and bicycle)	No	Not formally articulated	K-9	FHWA Recommendations; Internet guides; State funded research; Private research efforts; Ped/bike safety plans issued by other states/federal government; Cooperation with other state organizations
Maryland	Division of Instruction	No	Don't know	No answer	K-6	No answer
Mississippi	Office of Healthy Schools	Yes	No answer	No answer	K-8	No answer

State	What departments or divisions of state agencies are responsible for education about pedestrian and bicycle safety in public schools?	Are there any state agency regulations addressing "pedestrian and bicycle safety education" in public schools?	Are there any state laws addressing "pedestrian and bicycle safety education in public schools?"	Would you describe your agency's and your state's policies toward pedestrian and bicycle education in public schools as (check all that apply):	At what grade levels are education efforts targeted? (Please check all that apply)	What other resources do you use in designing and implementing a pedestrian and bicycle safety education plan? (Check all that apply)
Missouri	DOT, Highway Safety, Transp. Planning, Local Districts; Highway Patrol	No	No	Not formally articulated	3-5	FHWA Recommendations; Internet guides; State funded research; Private research efforts; Ped/bike safety plans issued by other states/federal government; Cooperation with other state organizations
Montana	Limited responsibility in OPI; DOT	Yes (Both pedestrian and bicycle)	Yes (Both pedestrian and bicycle)	A formally articulated (i.e. written) policy	No answer	Cooperation with other state organizations
Nebraska	Local; DHHS; DOT	No	No	Local only	Local only	Local only
North Carolina	DHHS; DPI	Don't know	Don't know	No answer	K-4; 8-9	FHWA Recommendations; State funded research; Cooperation with other state organizations
North Dakota	None responsible	No answer	No answer	No answer	No answer	No answer
Ohio	DOE; Local; Highway Patrol	No	No	Not formally articulated	No answer	No answer
Pennsylvania	DOE	Yes (Both pedestrian and bicycle)	No	Loose guidelines	3; 9	Cooperation with other state organizations
South Carolina	DOT	No	No	Not formally articulated	6	Cooperation with other state organizations
Texas	Education Agency; DOT	No	Don't know	Not formally articulated	No answer	Cooperation with other state organizations
Virginia	**Division of Instruction**	**Yes (Both pedestrian and bicycle)**	**Yes (Both pedestrian and bicycle)**	**No answer**	**K-10**	**Cooperation with other state organizations**
Washington	OPI; DOT; Traffic Safety Commission	No	No	Not formally articulated	No answer	No answer
West Virginia	DOE	No	No	Loose guidelines	K-9	No answer
Wisconsin	DOT; DPI; Local	Yes (Both pedestrian and bicycle)	Yes (Both pedestrian and bicycle)	No answer	10-11	Cooperation with other state organizations
Wyoming	None responsible	Don't know	Don't know	Loose guidelines	No answer	No answer

State	Does your state include education programs directed at students for whom English is a second language when educating students about pedestrian and bicycle safety?	Is there coordination between the state Department of Transportation Pedestrian and Bicycle Safety Coordinator and the Department of Education? Such coordination might include students being provided with materials to show to their parents, for example.	Is there coordination between the pedestrian and bicycle safety programs and the pupil transportation system (e.g. training students to load and unload buses safely)?	Are there requirements for students to engage in safe practices, such as wearing bicycle helmets, on school property?	Does the Department of Education disseminate materials (e.g. curricula, textbooks, handouts, or other printed material) on pedestrian and bicycle safety to school divisions?
Alabama	Don't know	Yes	Yes	Yes	Yes
Arizona	Yes	Yes	Don't know	Don't know	No
Connecticut	Yes	Yes	Yes	Local only	Yes
Delaware	Local only	No (plan in progress)	Local only	Don't know	No
Idaho	Local only	Local only	Local only	Local only	Local only
Illinois	No answer	No answer	No answer	No answer	No answer
Iowa	Don't know	Yes	Yes	Don't know	No
Kansas	No	No	Yes	Yes	No
Kentucky	Don't know	Yes	Yes	Don't know	Yes
Maine	Yes	Yes	Yes	Local only	Yes
Maryland	Don't know	Yes	Local only	Don't know	Yes
Mississippi	No answer	Yes	Yes	Yes	No (plan in progress)
Missouri	No	Yes	Yes	No	Don't know
Montana	No (limited need)	Yes	Local only	Local only	Yes
Nebraska	Local only	Local only	Local only	Local only	Local only
North Carolina	Yes	Don't know	Don't know	Don't know	Yes
North Dakota	No answer	No answer	No answer	No answer	No answer
Ohio	No	No	No	Local only	No
Pennsylvania	Local only	Yes	Yes	Local only	No
South Carolina	Don't know	Yes	Yes	No	No
Texas	Don't know	No	No	Local only	No
Virginia	**No**	**Yes**	**Yes**	**Local only**	**Yes**
Washington	Local only	Local only	Local only	Local only	No
West Virginia	Yes	Yes	Yes	Yes	No
Wisconsin	Don't know	Yes	No	Yes	Yes
Wyoming	Yes	No	No	Local only	No

APPENDIX H: TABLE OF STATE LAWS

Table H-1
Table of State Laws

This table was designed to provide a quick reference tool that details state-by-state positions with respect to areas of legal variance addressed in this report.

Legend:

- The information in the spreadsheet that follows is based on state codes found on state government websites and through the LexisNexis Academic service and the LexisNexis for Law Schools service. The text of each statute is not included in the spreadsheet. Rather, individual legal rules are simplified into legal questions (such as "Does the definition of 'traffic' include pedestrians?"). The answers to these legal questions provided in the spreadsheet reflect the opinions and interpretations of the codes of each state of the authors of this report and do not reflect an authoritative statement from any of the surveyed jurisdictions.
- When state codes were analyzed with respect to a specific provision of the UVC, the UVC language is included in the column heading.
  - "UVC – Exact or equivalent" indicates that the language is either identical with that of the UVC or closely follows the UVC with no significant variations.
  - "UVC – Variation" indicates that there is some notable difference from the UVC provision but that the two provisions are functionally similar.
  - Where provisions are in effect that serve the same purpose as the UVC provision but use language that is significantly different than that in the UVC, the specific language is given.
- The State of Michigan has enacted only a few pedestrian-related statutes at the state level; however, MICH. COMP. LAWS SERV. § 257.951 (2007) authorizes a city, township, or village to "adopt by reference a code or ordinance for the regulation of traffic within cities, townships, and villages that has been promulgated by the director of the department of state police." The uniform traffic code promulgated by the Department of State Police that localities *may* adopt is located at MICH. ADMIN. CODE R 28.1001–28.2075 (2005). Anything based on these regulations is noted as "local only" in the spreadsheet.

State	Definition of Pedestrian	Does the definition of "traffic" include pedestrians?	Defines "Traffic Control Signal"	Defines "Traffic Control Device"	Are pedestrians required to obey regular traffic signals?	Is it illegal for one car to pass another car that is stopped to allow a pedestrian to cross?	Is it illegal for a pedestrian to pass under or around a bridge or railroad signal?
Alabama	Any person afoot.	Not defined	Yes	No	Yes	Yes	Both
Alaska	"pedestrian" means any person afoot; it includes a person on skis or snowshoes;	Yes	No	Yes	Yes	Yes	Both
Arizona	"Pedestrian" means any person afoot. A person who uses an electric personal assistive mobility device or a manual or motorized wheelchair is considered a pedestrian unless the manual wheelchair qualifies as a bicycle. For the purposes of this paragraph, "motorized wheelchair" means a self-propelled wheelchair that is used by a person for mobility.	Yes	Yes	No	Yes	Yes	No
Arkansas	"Pedestrian" means any person afoot.	Yes	Yes	Yes	Yes	Yes	No
California	(a) A "pedestrian" is any person who is afoot or who is using any of the following: (1) A means of conveyance propelled by human power other than a bicycle. (2) An electric personal assistive mobility device. (b) "Pedestrian" includes any person who is operating a self-propelled wheelchair, motorized tricycle, or motorized quadricycle and, by reason of physical disability, is otherwise unable to move about as a pedestrian, as specified in subdivision (a).	Yes	Yes	Yes	Yes	Yes	No
Colorado	"Pedestrian" means any person afoot or any person using a wheelchair.	Yes	Yes	Yes	Yes	Yes	No
Connecticut	Not defined	Yes	Yes	Yes	Yes	Yes	No
Delaware	Not defined	Not defined	No	No	Yes	Yes	No
District of Columbia	Pedestrian -- any person afoot or who is using a wheelchair or motorized wheelchair.	Yes	Yes	Yes	Yes	Yes	No
Florida	PEDESTRIAN.--Any person afoot.	Yes	Yes	Yes	Yes	Yes	Both
Georgia	"Pedestrian" means any person afoot.	Yes	Yes	Yes	Yes	Yes	Both
Hawaii	"Pedestrian" means any person afoot, in an invalid chair, or in a vehicle propelled by a person afoot.	Yes	Yes	Yes	Yes	Yes	No
Idaho	"Pedestrian" means any person afoot and any person operating a wheelchair or a motorized wheelchair or an electric personal assistive mobility device.	Yes	No	Yes	Yes	Yes	Both
Illinois	Pedestrian. Any person afoot, including a person with a physical, hearing, or visual disability.	Yes	Yes	Yes	Yes	Yes	Both
Indiana	Not defined	Yes	No	Yes	Yes	Yes	Both
Iowa	"Pedestrian" means any person afoot.	Yes	Yes	Yes	Yes	No	No
Kansas	"Pedestrian" means: (a) Any person afoot; (b) any person in a wheelchair, either manually or mechanically propelled, or other low powered, mechanically propelled vehicle designed specifically for use by a physically disabled person; or (c) any person using an electric personal assistive mobility device.	Yes	Yes	Yes	Yes	Yes	Both
Kentucky	"Pedestrian" means any person afoot or in a wheelchair.	Not defined	No	No	Yes	Yes	Both
Louisiana	"Pedestrian" means any person afoot.	Yes	Yes	Yes	Yes	Yes	No

State	Definition of Pedestrian	Does the definition of "traffic" include pedestrians?	Defines "Traffic Control Signal"	Defines "Traffic Control Device"	Are pedestrians required to obey regular traffic signals?	Is it illegal for one car to pass another car that is stopped to allow a pedestrian to cross?	Is it illegal for a pedestrian to pass under or around a bridge or railroad signal?
Maine	"Pedestrian" means a person on foot or an operator of a wheelchair or a 4-wheeled or 3-wheeled motorized wheelchair	Yes	No	Yes	Yes	Yes	No
Maryland	"Pedestrian" means an individual afoot.	Yes	Yes	Yes	Yes	Yes	No
Massachusetts	Any person afoot or riding on a conveyance moved by human power, except bicycles or tricycles	Yes	Yes	No	Yes	Yes	Bridge only
Michigan	“Pedestrian” means any person afoot.	Yes	Yes	Yes	Yes	Yes (Local only)	Yes (Local only)
Minnesota	"Pedestrian" means any person afoot or in a wheelchair.	Yes	Yes	Yes	Yes	Yes	No
Mississippi	"Pedestrian" means any person afoot or a person who uses an electric personal assistive mobility device or a manual or motorized wheelchair.	Yes	Yes	Yes	Yes	No	No
Missouri	"Pedestrian", any person afoot;	Yes	Yes	Yes	Yes	Yes	Both
Montana	"Pedestrian" means any person on foot or any person in a manually or mechanically propelled wheelchair or other low-powered, mechanically propelled vehicle designed specifically for use by a physically disabled person.	Yes	Yes	Yes	Yes	Yes	Railroad only
Nebraska	Pedestrian shall mean any person afoot.	Yes	Yes	Yes	Yes	Yes	No
Nevada	“Pedestrian” means a person afoot, a person in a manual or motorized wheelchair, or a person on an electric personal assistive mobility device as defined in NRS 482.029.	Yes	Yes	Yes	Yes	Yes	No
New Hampshire	Not defined	Yes	Yes	No	Yes	Yes	No
New Jersey	"Pedestrian" means a person afoot.	Yes	Yes	Yes	Yes	Yes	No
New Mexico	"pedestrian" means any natural person on foot	Yes	Yes	Yes	Yes	Yes	No
New York	Pedestrian. Any person afoot or in a wheelchair.	Yes	Yes	Yes	Yes	Yes	No
North Carolina	Not defined	Not defined	No	No	Yes	Yes	No
North Dakota	"Pedestrian" means any person afoot.	Yes	Yes	Yes	Yes	Yes	Both
Ohio	“Pedestrian” means any natural person afoot	Yes	Yes	Yes	Yes	Yes	Both
Oklahoma	Pedestrian. Any person afoot.	Yes	Yes	Yes	Yes	Yes	Both
Oregon	Pedestrian” means any person afoot or confined in a wheelchair.	Not defined	No	Yes	Yes	Yes	Both
Pennsylvania	"Pedestrian." A natural person afoot.	Yes	Yes	Yes	Yes	Yes	Both
Rhode Island	"Pedestrian" means any person afoot.	Yes	No	Yes	Yes	Yes	No
South Carolina	Pedestrian. Any person afoot is a "pedestrian."	Yes	Yes	Yes	Yes	Yes	Both
South Dakota	The term, pedestrian, when used in this chapter means any person moving or traveling on foot, including any person wearing roller skates, riding on a skateboard, or riding on an electric personal assistive device.	Not defined	No	Yes	Yes	No	No

State	Definition of Pedestrian	Does the definition of "traffic" include pedestrians?	Defines "Traffic Control Signal"	Defines "Traffic Control Device"	Are pedestrians required to obey regular traffic signals?	Is it illegal for one car to pass another car that is stopped to allow a pedestrian to cross?	Is it illegal for a pedestrian to pass under or around a bridge or railroad signal?
Tennessee	“Pedestrian” means any person afoot;	Yes	Yes	Yes	Yes	Yes	No
Texas	"Pedestrian" means a person on foot.	Yes	Yes	Yes	Yes	Yes	No
Utah	"Pedestrian" means a person traveling: (a) on foot; or (b) in a wheelchair.	Yes	Yes	Yes	Yes	Yes	Both
Vermont	"Pedestrian" means any person afoot, and shall also include any person 16 years of age or older operating an electric personal assistive mobility device. The age restriction of this subdivision shall not apply to a person who has an ambulatory disability as defined in section 304a of this title.	Not defined	No	No	Yes	Yes	No
Virginia	**Not defined**	**Not defined**	**No**	**No**	**No**	**Yes**	**No**
Washington	"Pedestrian" means any person who is afoot or who is using a wheelchair, a power wheelchair, or a means of conveyance propelled by human power other than a bicycle.	Yes	Yes	Yes	Yes	Yes	Both
West Virginia	"Pedestrian" means any person afoot or any person using a wheelchair.	Yes	Yes	Yes	Yes	Yes	No
Wisconsin	"Pedestrian" means any person afoot or any person in a wheelchair, either manually or mechanically propelled, or other low-powered, mechanically propelled vehicle designed specifically for use by a physically disabled person, but does not include any person using an electric personal assistive mobility device.	Yes	Yes	Yes	Yes	Yes	No
Wyoming	"Pedestrian" means any person afoot	Yes	Yes	Yes	Yes	Yes	Both

State	Are drivers statutorily required to exercise due care?	Are pedestrians required to grant the right of way to emergency vehicles?	Is there a prohibition on a pedestrian running out in front of traffic? UVC - "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."	When pedestrians must use crosswalks? UVC - "Between adjacent intersections at which traffic-control signals are in operation pedestrians shall not cross at any place except in a marked crosswalk."	Drivers to yield to pedestrians on sidewalks?	Prohibition on pedestrians walking on roadway under the influence? UVC - A pedestrian who is under the influence of alcohol or any drug to a degree which renders such pedestrian a hazard shall now walk or be upon a highway except on a sidewalk.
Alabama	Yes	Yes	Yes. UVC - Exact or equivalent	UVC - Exact or equivalent	Yes	UVC - Variation
Alaska	Yes	Yes	Yes. UVC - Variation	UVC - Variation	Yes	No
Arizona	Yes	No	Yes. UVC - Variation	UVC - Exact or equivalent	Only when "emerging from an alley, driveway or building within a business or residence district ."	No
Arkansas	Yes	No	No	UVC - Exact or equivalent	No, but required to stop "in a business or residence district and emerging from an alley, driveway, or building"	No
California	Yes	No	Yes. UVC - Exact or equivalent	UVC - Variation	Yes	No
Colorado	Yes	Yes	Yes. UVC - Variation	UVC - Exact or equivalent	Yes	It is unlawful for any person who is under the influence of alcohol or of any controlled substance, as defined in section 12-22-303 (7), C.R.S., or of any stupefying drug to walk or be upon that portion of any highway normally used by moving motor vehicle traffic.
Connecticut	Yes	Yes	Yes. UVC - Exact or equivalent	UVC - Variation	Yes	UVC - Variation
Delaware	Yes	No	Yes. UVC - Exact or equivalent	UVC - Exact or equivalent	Yes	UVC - Variation
District of Columbia	Yes	Yes	Yes. UVC - Variation	UVC - Variation	Yes	No
Florida	Yes	No	Yes. UVC - Variation	UVC - Exact or equivalent	Only when "emerging from an alley, building, private road or driveway within a business or residence district "	No
Georgia	Yes	Yes	Yes. UVC - Variation	UVC - Exact or equivalent	Yes	UVC - Variation
Hawaii	Yes	No	Yes. UVC - Variation	UVC - Exact or equivalent	Yes	No
Idaho	Yes	Yes	Yes. UVC - Exact or equivalent	UVC - Exact or equivalent	Yes	UVC - Exact or equivalent
Illinois	Yes	Yes	Yes. UVC - Exact or equivalent	UVC - Exact or equivalent	Yes	UVC - Exact or equivalent
Indiana	Yes	Yes	Yes. UVC - Exact or equivalent	UVC - Exact or equivalent	Yes	No
Iowa	Yes	No	No	Where traffic-control signals are in operation at any place not an intersection pedestrians shall not cross at any place except in a marked crosswalk.	Only when "emerging from a private roadway, alley, driveway, or building"	No
Kansas	Yes	Yes	Yes. UVC - Exact or equivalent	UVC - Exact or equivalent	Yes	UVC - Exact or equivalent
Kentucky	Yes	Yes	Yes. UVC - Exact or equivalent	UVC - Variation	Yes	UVC - Exact or equivalent
Louisiana	Yes	No	Yes. UVC - Variation	UVC - Exact or equivalent	Yes	No
Maine	Yes	No	Yes. UVC - Variation	UVC - Exact or equivalent	Yes	No

State	Are drivers statutorily required to exercise due care?	Are pedestrians required to grant the right of way to emergency vehicles?	Is there a prohibition on a pedestrian running out in front of traffic? UVC - "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."	When pedestrians must use crosswalks? UVC - "Between adjacent intersections at which traffic-control signals are in operation pedestrians shall not cross at any place except in a marked crosswalk."	Drivers to yield to pedestrians on sidewalks?	Prohibition on pedestrians walking on roadway under the influence? UVC - A pedestrian who is under the influence of alcohol or any drug to a degree which renders such pedestrian a hazard shall now walk or be upon a highway except on a sidewalk.
Maryland	Yes	Yes	Yes. UVC - Variation	UVC - Exact or equivalent	Yes	No
Massachusetts	No	Yes	Yes. UVC - Variation	Pedestrians shall obey the directions of police officers directing traffic and whenever there is an officer directing traffic, a traffic control signal or a marked crosswalk within 300 feet of a pedestrian, no such pedestrian shall cross a way or roadway except within the limits of a marked crosswalk and as hereinafter provided in 720 CMR 9.00.	No	No
Michigan	Yes (Local only)	Yes (Local only)	Yes. UVC - Variation (Local only)	Where traffic-control signals are in operation, pedestrians shall not cross the roadway except in a marked crosswalk. (Local only)	Only when "merging from an alley, driveway, or building" (Local only)	No
Minnesota	Yes	No	Yes. UVC - Variation	UVC - Exact or equivalent	Only when "within a business or residence district emerging from an alley, driveway, or building"	No
Mississippi	Yes	No	No	UVC - Exact or equivalent	No, but required to stop before entering a sidewalk when "within a business or residence district emerging from an alley, driveway, or building"	No
Missouri	Yes	No	Yes. UVC - Variation	UVC - Variation	Only when "within a business or residence district emerging from an alley, driveway or building"	No
Montana	Yes	Yes	Yes. UVC - Variation	UVC - Exact or equivalent	Yes	Except in an authorized crosswalk, a person who is under the influence of alcohol or any drug may walk or stand in the public right-of-way, as defined in 60-1-103, but not on a roadway or a shoulder as is otherwise permissible under 61-8-506(2).
Nebraska	Yes	Yes	Yes. UVC - Variation	UVC - Exact or equivalent	Yes	No
Nevada	Yes	No	Yes. UVC - Variation	UVC - Exact or equivalent	No	It is unlawful for any pedestrian who is under the influence of intoxicating liquors or any narcotic or stupefying drug to be within the traveled portion of any highway.
New Hampshire	Yes	No	Yes. UVC - Exact or equivalent	UVC - Exact or equivalent	Only when "within a business or residence district emerging from an alley, driveway or building"	No
New Jersey	Yes	No	Yes. UVC - Variation	Where traffic is not controlled and directed either by a police officer or a traffic control signal, pedestrians shall cross the roadway within a crosswalk or, in the absence of a crosswalk, and where not otherwise prohibited, at right angles to the roadway.	Yes	No
New Mexico	Yes	No	Yes. UVC - Variation	UVC - Exact or equivalent	Only when " within a business or residence district emerging from an alley, driveway or building"	No

State	Are drivers statutorily required to exercise due care?	Are pedestrians required to grant the right of way to emergency vehicles?	Is there a prohibition on a pedestrian running out in front of traffic? UVC - "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."	When pedestrians must use crosswalks? UVC - "Between adjacent intersections at which traffic-control signals are in operation pedestrians shall not cross at any place except in a marked crosswalk."	Drivers to yield to pedestrians on sidewalks?	Prohibition on pedestrians walking on roadway under the influence? UVC - A pedestrian who is under the influence of alcohol or any drug to a degree which renders such pedestrian a hazard shall now walk or be upon a highway except on a sidewalk.
New York	Yes	No	Yes. UVC - Variation	Not located.	Yes	No
North Carolina	Yes	No	No	UVC - Exact or equivalent	Yes	No
North Dakota	Yes	Yes	Yes. UVC - Exact or equivalent	UVC - Exact or equivalent	Yes	UVC - Variation
Ohio	Yes	Yes	Yes. UVC - Variation	UVC - Exact or equivalent	Yes	UVC - Variation
Oklahoma	Yes	No	Yes. UVC - Variation	UVC - Exact or equivalent	Only when "within a business or residence district emerging from an alley, driveway or building "	No
Oregon	Yes	Yes	Yes. UVC - Exact or equivalent	Not located.	Yes	No
Pennsylvania	Yes	Yes	Yes. UVC - Exact or equivalent	UVC - Variation	Yes	UVC - Exact or equivalent
Rhode Island	Yes	No	Yes. UVC - Variation	UVC - Exact or equivalent	Yes	No
South Carolina	Yes	Yes	Yes. UVC - Exact or equivalent	UVC - Exact or equivalent	Yes	UVC - Exact or equivalent
South Dakota	No	No	No	Authorizes localities to require pedestrians to use crosswalks between adjacent intersections controlled by traffic control signals.	No, but required to stop before entering a sidewalk when "emerging from an alley, building, private road or driveway within a business or residence district "	No
Tennessee	Yes	No	Yes. UVC - Variation	UVC - Exact or equivalent	Only when "within a business or residence district emerging from an alley, driveway or building"	No
Texas	Yes	No	Yes. UVC - Variation	UVC - Exact or equivalent	Yes	No
Utah	Yes	Yes	Yes. UVC - Exact or equivalent	UVC - Exact or equivalent	Yes	UVC - Exact or equivalent

State	Are drivers statutorily required to exercise due care?	Are pedestrians required to grant the right of way to emergency vehicles?	Is there a prohibition on a pedestrian running out in front of traffic? UVC - "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."	When pedestrians must use crosswalks? UVC - "Between adjacent intersections at which traffic-control signals are in operation pedestrians shall not cross at any place except in a marked crosswalk."	Drivers to yield to pedestrians on sidewalks?	Prohibition on pedestrians walking on roadway under the influence? UVC - A pedestrian who is under the influence of alcohol or any drug to a degree which renders such pedestrian a hazard shall now walk or be upon a highway except on a sidewalk.
Vermont	Yes	No	Yes. UVC - Variation	UVC - Exact or equivalent	Only when "emerging from an alley, private road, legal trail, class 4 town highway, class 3 town highway serving only one residence or driveway"	No
Virginia	No	No	Yes. Pedestrians may not "[c]arelessly or maliciously interfere with the orderly passage of vehicles," "enter or cross an intersection in disregard of approaching traffic," or "step into a highway open to moving vehicular traffic at any point between intersections where his presence would be obscured from the vision of drivers of approaching vehicles by a vehicle or other obstruction at the curb or side."	"Wherever possible"	Only when the vehicle is "entering a public highway or sidewalk from a private road, driveway, alley, or building"	No
Washington	Yes	Yes	Yes. UVC - Variation	UVC - Exact or equivalent	Yes	No, but provides that a law enforcement officer may offer to transport a pedestrian who is walking on the roadway to safety.
West Virginia	Yes	No	Yes. UVC - Variation	UVC - Exact or equivalent	Only when "within a business or residence district emerging from any alley, driveway, or building"	No
Wisconsin	No	No	Yes. UVC - Variation	Not located.	Yes	No
Wyoming	Yes	Yes	Yes. UVC - Exact or equivalent	UVC - Exact or equivalent	Yes	UVC - Variation

State	Driver response when approaching pedestrians in crosswalks?	Definition of Bicycle	May adults carry children?	Is riding two abreast allowed?	Must cyclists ride to far right of roadway?	May cyclists signal right turn with right arm?
Alabama	Yield and stop if necessary.	A human-powered vehicle with two wheels in tandem design to transport by the act of pedaling one or more persons seated on one or more saddle seats on its frame. "Bicycle" includes, but is not limited to, a human-powered vehicle designed to transport by the act of pedaling which has more than two wheels when the vehicle is used on a public roadway, public bicycle path, or other public road or right-of-way, but does not include a tricycle.	No	Yes	Yes	No
Alaska	Yield	Not defined.	An adult may carry a child in a backpack or sling	Yes	Yes	Yes
Arizona	Yield and stop if necessary.	"Bicycle" means a device, including a racing wheelchair, that is propelled by human power and on which a person may ride and that has either: (a) Two tandem wheels, either of which is more than sixteen inches in diameter. (b) Three wheels in contact with the ground, any of which is more than sixteen inches in diameter.	No	Yes	UVC - Exact or equivalent	Yes
Arkansas	Yield and stop if necessary.	Not defined.	Yes	No	No	No
California	Yield	A bicycle is a device upon which any person may ride, propelled exclusively by human power through a belt, chain, or gears, and having one or more wheels.	No	No	UVC - Exact or equivalent	Yes
Colorado	Yield and stop if necessary.	"Bicycle" means every vehicle propelled solely by human power applied to pedals upon which any person may ride having two tandem wheels or two parallel wheels and one forward wheel, all of which are more than fourteen inches in diameter.	No	Yes	Yes	Yes
Connecticut	Yield and stop if necessary.	Not defined.	An adult may carry a child under 4 in a backpack or sling	Yes	Yes	No
Delaware	Yield and stop if necessary.	"Bicycle" shall include that certain class of vehicles which are exclusively human-powered by means of foot pedals, which the driver normally rides astride, which have not in excess of three wheels and which may be commonly known as unicycles, bicycles and tricycles. The term "bicycle" also includes a 2- or 3-wheeled vehicle with fully operable pedals and an electric motor of less than 750 watts (1 horsepower), whose maximum speed on a paved level surface, when powered solely by such motor while ridden by an operator who weighs 170 pounds, is less than 20 miles per hour.	An adult may carry a child in a backpack or sling	Yes	UVC - Exact or equivalent	Yes
District of Columbia	Stop	Not defined.	No	Yes	No	Yes

State	Driver response when approaching pedestrians in crosswalks?	Definition of Bicycle	May adults carry children?	Is riding two abreast allowed?	Must cyclists ride to far right of roadway?	May cyclists signal right turn with right arm?
Florida	Yield and stop if necessary.	Every vehicle propelled solely by human power, and every motorized bicycle propelled by a combination of human power and an electric helper motor capable of propelling the vehicle at a speed of not more than 20 miles per hour on level ground upon which any person may ride, having two tandem wheels, and including any device generally recognized as a bicycle though equipped with two front or two rear wheels. The term does not include such a vehicle with a seat height of no more than 25 inches from the ground when the seat is adjusted to its highest position or a scooter or similar device.	An adult may carry a child in a backpack, sling, or child carrier seat	Yes	UVC - Exact or equivalent	No
Georgia	Stop	"Bicycle" means every device propelled by human power upon which any person may ride, having only two wheels which are in tandem and either of which is more than 13 inches in diameter.	An adult may carry a child under 1 in a sling or trailer and children under 4 in a sling, trailer or carrier seat	Yes	Yes	No
Hawaii	Stop	"Bicycle" means every vehicle propelled solely by human power upon which any person may ride, having two tandem wheels, and including any vehicle generally recognized as a bicycle though equipped with two front or two rear wheels except a toy bicycle.	No	No	UVC - Exact or equivalent	No
Idaho	Yield and stop if necessary.	"Bicycle" means every vehicle propelled exclusively by human power upon which any person may ride, having two (2) tandem wheels, and except scooters and similar devices.	An adult may carry a child in a backpack or sling	Yes	UVC - Exact or equivalent	Yes
Illinois	Yield and stop if necessary.	Bicycle. Every device propelled by human power upon which any person may ride, having two tandem wheels except scooters and similar devices.	An adult may carry a child in a backpack or sling	Yes	UVC - Exact or equivalent	No
Indiana	Yield and stop if necessary.	"Bicycle" means any foot-propelled vehicle, irrespective of the number of wheels in contact with the ground.	No	Yes	No	No
Iowa	Yield and stop if necessary.	"Bicycle" means either of the following: (1) A device having two wheels and having at least one saddle or seat for the use of a rider which is propelled by human power. (2) A device having two or three wheels with fully operable pedals and an electric motor of less than seven hundred fifty watts (one horsepower), whose maximum speed on a paved level surface, when powered solely by such a motor while ridden, is less than twenty miles per hour.	No	Yes	No	No
Kansas	Yield and stop if necessary.	"Bicycle" means every device propelled by human power upon which any person may ride, having two (2) tandem wheels, either of which is more than fourteen (14) inches in diameter.	No	Yes	UVC - Exact or equivalent	No

State	Driver response when approaching pedestrians in crosswalks?	Definition of Bicycle	May adults carry children?	Is riding two abreast allowed?	Must cyclists ride to far right of roadway?	May cyclists signal right turn with right arm?
Kentucky	Yield and stop if necessary.	Not defined.	No	Yes	No	Yes
Louisiana	Yield and stop if necessary.	"Bicycle" means every device propelled by human power upon which any person may ride and designed to travel on two tandem wheels.	No	Yes	Yes	No
Maine	Yield	"Bicycle" means a device primarily propelled by human power, operated by a person usually seated on a seat and driven on the ground on wheels by the operator.	No	Yes	Yes	Yes
Maryland	Stop	"Bicycle" means a vehicle that: (1) Is designed to be operated by human power; (2) Has two or three wheels, of which one is more than 14 inches in diameter; (3) Has a rear drive; and (4) Has a wheel configuration as follows: (i) If the vehicle has two wheels, with both wheels in tandem; or (ii) If the vehicle has three wheels, with one front wheel and with two rear wheels that are spaced equidistant from the center of the vehicle.	No	Yes	UVC - Exact or equivalent	Yes
Massachusetts	Yield and stop if necessary.	Bicycle. Any wheeled vehicle propelled by pedals and operated by one or more persons.	No	No	No	Yes
Michigan	Yield and stop if necessary (Local only).	"Bicycle" means a device propelled by human power upon which a person may ride, having either 2 or 3 wheels in a tandem or tricycle arrangement, all of which are over 14 inches in diameter.	No	Yes	UVC - Exact or equivalent	Yes
Minnesota	Stop	"Bicycle" means every device propelled solely by human power upon which any person may ride, having two tandem wheels except scooters and similar devices and including any device generally recognized as a bicycle though equipped with two front or rear wheels.	Yes, in a seat attached to the operator	Yes	Yes	Yes
Mississippi	Yield and stop if necessary.	Not defined.	Yes	Yes	UVC - Variation	No
Missouri	Yield and stop if necessary.	The word "bicycle" shall mean every vehicle propelled solely by human power upon which any person may ride, having two tandem wheels, or two parallel wheels and one or two forward or rear wheels, all of which are more than fourteen inches in diameter, except scooters and similar devices;	Yes	Yes	UVC - Variation	Yes
Montana	Yield and stop if necessary.	Not defined.	Yes	Yes	UVC - Exact or equivalent	Yes
Nebraska	Stop	Bicycle shall mean every device propelled solely by human power, upon which any person may ride, and having two tandem wheels either of which is more than fourteen inches in diameter.	No	No	UVC - Exact or equivalent	No
Nevada	Yield and stop if necessary.	"Bicycle" means a device propelled by human power upon which a person may ride, having two tandem wheels either of which is over 14 inches in diameter, or every such device generally recognized as a bicycle though equipped with two front or two rear wheels except a moped.	No	Yes	UVC - Variation	No
New Hampshire	Yield and stop if necessary.	"Bicycle" shall mean every pedalled vehicle propelled solely by human power upon which any person may ride, except child's tricycles and similar devices.	No	Yes	No	No

State	Driver response when approaching pedestrians in crosswalks?	Definition of Bicycle	May adults carry children?	Is riding two abreast allowed?	Must cyclists ride to far right of roadway?	May cyclists signal right turn with right arm?
New Jersey	Yield	"Bicycle" means a vehicle with two wheels propelled solely by human power and having pedals, handle bars and a saddle-like seat. The term shall include a bicycle for two or more persons having seats and corresponding sets of pedals arranged in tandem.	No	Yes	Yes	No
New Mexico	Yield and stop if necessary.	"Bicycle" means every device propelled by human power upon which any person may ride, having two tandem wheels, except scooters and similar devices;	No	Yes	Yes	No
New York	Yield and stop if necessary.	Bicycle. Every two or three wheeled device upon which a person or persons may ride, propelled by human power through a belt, a chain or gears, with such wheels in a tandem or tricycle, except that it shall not include such a device having solid tires and intended for use only on a sidewalk by pre-teenage children.	No	Yes	Yes	Yes
North Carolina	Yield and stop if necessary.	Bicycle. – A nonmotorized vehicle with two or three wheels tandem, a steering handle, one or two saddle seats, and pedals by which the vehicle is propelled.	Yes	No	No	No
North Dakota	Yield and stop if necessary.	"Bicycle" means every device propelled solely by human power upon which any person may ride, having two tandem wheels either of which is more than twenty inches [50.8 centimeters] in diameter.	Yes	Yes	Yes	No
Ohio	Yield and stop if necessary.	"Bicycle" means every device, other than a tricycle designed solely for use as a play vehicle by a child, propelled solely by human power upon which any person may ride having either two tandem wheels, or one wheel in the front and two wheels in the rear, any of which is more than fourteen inches in diameter.	No	Yes	Yes	No
Oklahoma	Yield and stop if necessary.	A bicycle is a device upon which any person or persons may ride, propelled solely by human power through a belt, chain, or gears, and having two or more wheels, excluding mopeds.	No	Yes	UVC - Exact or equivalent	No
Oregon	Stop	"Bicycle" means a vehicle that: (1) Is designed to be operated on the ground on wheels; (2) Has a seat or saddle for use of the rider; (3) Is designed to travel with not more than three wheels in contact with the ground; (4) Is propelled exclusively by human power; and (5) Has every wheel more than 14 inches in diameter or two tandem wheels either of which is more than 14 inches in diameter.	No	Yes	UVC - Variation	No
Pennsylvania	Yield	"Pedalcycle." A vehicle propelled solely by human-powered pedals. The term does not mean a three-wheeled human-powered pedal-driven vehicle with a main driving wheel 20 inches in diameter or under and primarily designed for children six years of age or younger.	No	Yes	Yes, when operating below normal speed of traffic	No
Rhode Island	Yield and stop if necessary.	"Bicycle" means every vehicle having two (2) tandem wheels, except scooters and similar devices, propelled exclusively by human power, and upon which a person may ride.	An adult may carry a child in a backpack or sling	Yes	Yes	No

State	Driver response when approaching pedestrians in crosswalks?	Definition of Bicycle	May adults carry children?	Is riding two abreast allowed?	Must cyclists ride to far right of roadway?	May cyclists signal right turn with right arm?
South Carolina	Yield and stop if necessary.	Every device propelled by human power upon which any person may ride, having two tandem wheels, is a "bicycle".	No	Yes	Yes	No
South Dakota	Yield when "within a business or residence district."	Not defined.	Yes	Yes	UVC - Variation	No
Tennessee	Yield and stop if necessary.	"Bicycle" means every device propelled by human power upon which any person may ride, having two (2) tandem wheels, either of which is more than twenty inches (20²) in diameter;	No	Yes	UVC - Exact or equivalent	No
Texas	Yield	"Bicycle" means a device that a person may ride and that is propelled by human power and has two tandem wheels at least one of which is more than 14 inches in diameter.	No	Yes	UVC - Exact or equivalent	No
Utah	Yield and stop if necessary.	(a) "Bicycle" means every device: (i) propelled by human power; (ii) upon which a person may ride; and (iii) having two tandem wheels. (b) "Bicycle" does not include scooters and similar devices.	An adult may carry a child in a backpack or sling	Yes	UVC - Exact or equivalent	No
Vermont	Yield and stop if necessary.	Not defined.	No	Yes	Yes	No
Virginia	Yield	"Bicycle" means a device propelled solely by human power, upon which a person may ride either on or astride a regular seat attached thereto, having two or more wheels in tandem, including children's bicycles, except a toy vehicle intended for use by young children. For purposes of Chapter 8 (§ 46.2-800 et seq.) of this title, a bicycle shall be a vehicle while operated on the highway.	No	Yes	UVC - Exact or equivalent	Yes
Washington	Stop	"Bicycle" means every device propelled solely by human power upon which a person or persons may ride, having two tandem wheels either of which is sixteen inches or more in diameter, or three wheels, any one of which is more than twenty inches in diameter.	No	Yes	UVC - Exact or equivalent	Yes
West Virginia	Yield and stop if necessary.	"Bicycle" means every device which does not have a motor attached and which is propelled by human power upon which any person may ride, having two tandem wheels either of which is more than twenty inches in diameter.	No	Yes	Yes	No
Wisconsin	Yield	"Bicycle" means every vehicle propelled by the feet acting upon pedals and having wheels any 2 of which are not less than 14 inches in diameter.	No	Yes	UVC - Variation	No
Wyoming	Yield and stop if necessary.	"Bicycle" means every vehicle propelled solely by human power upon which any person may ride, having two (2) tandem wheels except scooters and similar devices.	An adult may carry a child in a backpack or sling	Yes	Yes	No

State	Is use of bike lanes and paths by cyclists mandatory?	Is riding on sidewalks permitted?	Is helmet use mandatory statewide?	Are parents responsible for knowingly permitting minor's violation? UVC - The parent of any child and the guardian of any ward shall not authorize or knowingly permit any such child or ward to violate any of the provisions of this article.
Alabama	Yes, when adjacent to roadway	Yes	Yes, for children under 16 on public rights-of-way	UVC - Exact or equivalent
Alaska	No	UVC - Exact or equivalent	No	UVC - Exact or equivalent
Arizona	No	Yes	No	UVC - Exact or equivalent
Arkansas	No	Yes	No	No
California	Yes , when traveling below normal speed of traffic	Yes	Yes, for children under 18 on public rights-of-way	Yes
Colorado	No	UVC - Exact or equivalent	Yes, for children under 18 on public rights-of-way.	No
Connecticut	No	UVC - Variation	Yes, for children under 16 on public rights-of-way	UVC - Exact or equivalent
Delaware	No	UVC - Variation	Yes, for children under 16	UVC - Exact or equivalent
District of Columbia	No	UVC - Variation	Yes, for children under 16	Yes
Florida	No	UVC - Exact or equivalent	Yes, for children under 16	UVC - Exact or equivalent
Georgia	Localities may require	Yes	Yes, for children under 16 on public rights-of-way	UVC - Exact or equivalent
Hawaii	Yes , when traveling below normal speed of traffic	Only if not equipped with a motor	Yes, for children under 16 on public rights-of-way	Yes
Idaho	No	UVC - Exact or equivalent	No	No
Illinois	No	UVC - Variation	No	UVC - Exact or equivalent
Indiana	No	Yes	Yes, for children under 18 on public rights-of-way	UVC - Exact or equivalent
Iowa	No	Yes	No	No
Kansas	No	Yes	No	No
Kentucky	When feasible	Yes	No	No
Louisiana	Yes	Yes	Yes, for children under 12	No
Maine	No	Yes	Yes, for children under 16 on public rights-of-way	No
Maryland	No	Yes	Yes, for children under 16 on public rights-of-way	UVC - Variation
Massachusetts	No	Yes	Yes, for children under 16 on public rights-of-way	UVC - Variation
Michigan	No	UVC - Variation (no motorized bicycles)	No	UVC - Exact or equivalent
Minnesota	No	UVC - Variation	No	No
Mississippi	No	Yes	No	No

State	Is use of bike lanes and paths by cyclists mandatory?	Is riding on sidewalks permitted?	Is helmet use mandatory statewide?	Are parents responsible for knowingly permitting minor's violation? UVC - The parent of any child and the guardian of any ward shall not authorize or knowingly permit any such child or ward to violate any of the provisions of this article.
Missouri	No	No motorized bicycles	No	No
Montana	No	UVC - Exact or equivalent	No	No
Nebraska	Whenever such paths are adjacent to highway and in useable condition	Yes	No	No
Nevada	No	Yes	No	UVC - Exact or equivalent
New Hampshire	No	Yes	Yes, for children under 16 on public rights-of-way	No
New Jersey	No	Yes	Yes, for children under 17	Yes
New Mexico	No	Yes	Yes, for children under 18	UVC - Exact or equivalent
New York	Yes, if useable	Yes	Yes, for children under 14	UVC - Variation
North Carolina	No	Yes	Yes, for children under 16 on public rights-of-way	Yes
North Dakota	Yes, when adjacent to roadway	Yes	No	No
Ohio	No	Yes	No	No
Oklahoma	No	Yes	No	UVC - Exact or equivalent
Oregon	Yes, when adjacent to roadway	UVC - Variation	Yes, for children under 16 except on private property	Yes
Pennsylvania	No	UVC - Variation	Yes, for children under 12	UVC - Exact or equivalent
Rhode Island	No	UVC - Variation	Yes, for children under 15 on public rights-of-way	UVC - Exact or equivalent
South Carolina	Yes, when adjacent to roadway	Yes	No	No
South Dakota	No	UVC - Variation	No	No
Tennessee	No	Yes	No	UVC - Exact or equivalent
Texas	No	Yes	No	UVC - Exact or equivalent
Utah	Yes, when adjacent to roadway and directed by traffic control device	UVC - Exact or equivalent	No	UVC - Exact or equivalent
Vermont	No	Yes	No	UVC - Exact or equivalent
Virginia	No	UVC - Exact or equivalent	No	No
Washington	No	Yes	No	No
West Virginia	Yes, when adjacent to roadway	Yes	Yes, for children under 15 on public rights-of-way	UVC - Exact or equivalent
Wisconsin	No	UVC - Variation	No	UVC - Exact or equivalent
Wyoming	Yes, when adjacent to roadway	Yes	No	UVC - Exact or equivalent

APPENDIX I: 2001 VIRGINIA PEDESTRIAN FATAL CRASH DATA

Table I-1
2001 Virginia Pedestrian Fatal Crash Data

		Adult	Child	Teen	Senior	Total	Percent
Ped. struck in roadway not at crosswalk or intersection	SECONDARY - 1	4	1		2	7	**10.4%**
	ARTERIAL - 2	26	1	0	8	35	**52.2%**
	INTERSTATE - 3	9	0	2	1	12	**17.9%**
	LIMITED ACCESS - 4					0	**0.0%**
	CITY STREET - 5	7	4		2	13	**19.4%**
		46	**6**	**2**	**13**	**67**	**100.0%**
Ped. struck in roadway at intersection in crosswalk	AGAINST LIGHT - 6				2	2	**33.3%**
	WITH LIGHT - 7					0	**0.0%**
	UNKNOWN - 8	2				2	**33.3%**
	LEFT TURNING VEHICLE	1			1	2	**33.3%**
		3	**0**	**0**	**3**	**6**	**100.0%**
Ped. struck in roadway at intersection not in crosswalk	AGAINST LIGHT - 9	1			1	2	**20.0%**
	WITH LIGHT - 10					0	**0.0%**
	UNKNOWN - 11	5		1	1	7	**70.0%**
	LEFT TURNING VEHICLE				1	1	**10.0%**
		6	**0**	**1**	**3**	**10**	**100.0%**
Ped. struck on sidewalk	12		**1**	**1**		**2**	
Ped. struck on roadside	SECONDARY - 13	1			2	3	**21.4%**
	ARTERIAL - 14	3		1	1	5	**35.7%**
	INTERSTATE - 15	4				4	**28.6%**
	LIMITED ACCESS - 16					0	**0.0%**
	CITY STREET - 17	1		1		2	**14.3%**
		9	**0**	**2**	**3**	**14**	**100.0%**
Ped. Struck- other (specifiy)							
location unknown		1			1	**2**	
T O T A L		65	6	5	23	99	

APPENDIX J: 2006 VIRGINIA PEDESTRIAN FATAL CRASH DATA

Table J-1
2006 Virginia Pedestrian Crash Data

		Adult	Child	Teen	Senior	Age Unknown	Total	Percent
Ped. struck in roadway not at crosswalk or intersection	SECONDARY - 1	7	2				9	**18.0%**
	ARTERIAL - 2	21		1	6		28	**56.0%**
	INTERSTATE - 3	2					2	**4.0%**
	LIMITED ACCESS - 4						0	**0.0%**
	CITY STREET - 5	7	2		2		11	**22.0%**
		37	**4**	**1**	**8**		**50**	**100.0%**
Ped. struck in roadway at intersection in crosswalk	AGAINST LIGHT - 6	3			3		6	**50.0%**
	WITH LIGHT - 7						0	**0.0%**
	UNKNOWN - 8	1			3		4	**33.3%**
	LEFT TURNING VEHICLE	1		1			2	**16.7%**
		5	**0**	**1**	**6**		**12**	**100.0%**
Ped. struck in roadway at intersection not in crosswalk	AGAINST LIGHT - 9				1		1	**14.3%**
	WITH LIGHT - 10						0	**0.0%**
	UNKNOWN - 11	4			1		5	**71.4%**
	LEFT TURNING VEHICLE	1					1	**14.3%**
		5	**0**	**0**	**2**		**7**	**100.0%**
Ped. struck on sidewalk	12	**2**					**2**	
Ped. struck on roadside	SECONDARY - 13	1			1		2	**22.2%**
	ARTERIAL - 14	1		1			2	**22.2%**
	INTERSTATE - 15	4					4	**44.4%**
	LIMITED ACCESS - 16						0	**0.0%**
	CITY STREET - 17	1					1	**11.1%**
		7	**0**	**1**	**1**		**9**	**100.0%**
Ped. Struck- other (specifiy)	Location Unknown			1			**1**	
location unknown	Age Unknown					1	**1**	
T O T A L*		**54**	**4**	**5**	**17**	**1**	**82**	

* One crash involved a vehicle striking a house and killing an inhabitant, and thus, was not a pedestrian crash.