

TRANSPORTATION SAFETY ANALYSIS AND PLAN

An Analysis of Crash Data and Recommended Safety Strategies for the Greater Philadelphia Region



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A product
of the





The Delaware Valley Regional Planning Commission is the federally designated Metropolitan Planning Organization for a diverse nine-county region in two states: Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer in New Jersey.



DVRPC's vision for the Greater Philadelphia Region is a prosperous, innovative, equitable, resilient, and sustainable region that increases mobility choices by investing in a safe and modern transportation system; that protects and preserves our natural resources while creating healthy communities; and that fosters greater opportunities for all.

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Executive Summary

For most people, a traffic fatality is a tragic story read about in the news. While many have witnessed the aftermath of a crash, others have actually been hurt in a crash or have lost friends or loved ones. Because a severe car crash is something we tend to think happens to other people, it can be hard to believe that in 2016 there were 37,461 people killed in traffic crashes in the United States. **Per capita, the crash fatality rate in the United States is twice as high as that of the European Union, and over three times the rate of the United Kingdom.**¹ Worldwide, 1.25 million people are killed in crashes on average each year. We can do better to make our transportation system safer for everyone.

In 2016, someone was killed or seriously injured in a crash on average every 5.5 hours in the Greater Philadelphia region. Traffic fatalities averaged 368 per year between 2013 and 2015, and in 2016 the trend worsened with 381 people killed and another 1,230 seriously injured in our nine counties. In that same year, 39 percent of the region's 352 municipalities experienced at least one traffic fatality, and 101 occurred in Philadelphia alone. Since 2012, 75 percent of the region's municipalities have experienced at least one fatal crash.

Safe walking is of particular concern in the region: pedestrian fatalities have made up approximately 25 percent, on average, of all fatalities since 2011, noticeably above the national average of 15 percent. Unfortunately, pedestrian fatalities in the region and in the nation rose considerably in 2016. This has led to both Pennsylvania and New Jersey being designated as Pedestrian and Bicycle Safety Focus States—a federal program that provides extra resources to address pedestrian and bicyclist safety. Pedestrians and bicyclists are our most vulnerable road users, and they require extra consideration to ensure our system moves all people safely, not just vehicles. **Every trip begins and ends by walking.**

Achieving a more livable region means making our roads safer for all users. The Delaware Valley Regional Planning Commission (DVRPC) has demonstrated its commitment to this standard by incorporating the zero

crash deaths goal into the *Connections 2045 Plan for Greater Philadelphia*, prioritizing safety projects through the Transportation Improvement Program (TIP) evaluation criteria process, and adopting our state partners' Moving Ahead for Progress in the 21st Century Act (MAP-21) and Fixing America's Surface Transportation Act (FAST Act) safety performance measure targets. Zero traffic fatalities is now the goal for New Jersey, Pennsylvania, and the City of Philadelphia, and it has been incorporated into the mission statement of DVRPC's Regional Safety Task Force (RSTF)—a multi-disciplinary group of safety stakeholders advancing regional road safety. Every DVRPC transportation study, regardless of mode, includes a crash analysis as a standard component. Our work and that of our partners follows the premise that traffic crashes are not accidents; they are preventable incidents that can and must be systemically eliminated.

In this, the fifth edition of the regional safety plan, we have again measured crash data according to the American Association of State Highway Transportation Officials (AASHTO) safety emphasis

In 2016, someone was killed or seriously injured in a crash on average every 5.5 hours in the Greater Philadelphia region.

¹ *International Road Traffic and Accident Database; Community Database on Accidents on the Roads of Europe.*

areas—a data-driven approach that considers infrastructure and behavioral crash factors. Here we present an expanded list of 13 safety emphasis areas, including a deeper look at eight factors that collectively contribute to 93 percent of the killed and serious injury (KSI) crashes that occur in the region each year. Based on data from 2013 to 2015, those eight critical factors are:

- intersection safety;
- lane departure;
- distracted driving;
- aggressive driving;
- impaired driving;
- pedestrian and bicyclist safety;
- older drivers; and
- young drivers.

Focusing on KSI crashes is an approach that is promoted by the Federal Highway Administration (FHWA) and embraced by both the New Jersey Department of Transportation (NJDOT) and the Pennsylvania Department of Transportation (PennDOT). Fatal crashes can be random in nature, but by combining them with serious injury crashes, trends can be more easily identified.

To assist local road safety planning efforts, this edition of the safety plan presents data at the county and municipal levels for each of the eight first-tier emphasis areas. This approach provides an opportunity to consider limited-access facilities separately by removing that data from the municipal analysis to avoid local overrepresentation. This edition also includes a regional overlap analysis to identify which emphasis areas coincide for more targeted safety interventions.

In the **first chapter**, there is a discussion of crash trends at various levels that includes regional rates by population, road miles, and traffic volume. The chapter ends with a discussion on current trends and future forces that influence road safety.

The **second chapter** presents an overview of DVRPC’s coordination with state and federal partners,

the statewide Strategic Highway Safety Planning process, and the requirements of the MAP-21 and FAST Act performance measures. Although DVRPC did not adopt federal safety targets distinct from the two states, the plan does present the region’s performance against the five measures: number of fatalities, fatality rate, number of serious injuries, serious injury rate, and number of non-motorized fatalities and serious injuries.

The **third chapter** is dedicated to the regional analysis of the AASHTO emphasis areas. Each includes a map presenting municipal data, emphasis area KSI significance by county, and trend data by county for years 2010 to 2016. This chapter also combines the data previously presented in the former *Analysis of Crashes* report with the improvement strategies found in previous safety plans. The result is a single report that combines the data analysis and policy discussion previously contained in two separate documents.

Vision Zero is an underlying theme in this report. Introduced by Sweden in the 1990s, Vision Zero is an approach to road safety thinking that can be summarized in one sentence: **“no loss of life is acceptable.”** What’s most important about this approach is the commitment to making the transportation system more forgiving when a crash does occur—humans will make mistakes, but the system should not. This approach is embraced by the many agencies, organizations, and individuals that helped shape this plan.

[1]

CRASH TRENDS IN THE GREATER PHILADELPHIA REGION

*Between 2012 and 2016, there were over **7,000 people killed or seriously injured** in KSI crashes in the region, amounting to over **\$3.9 billion** in economic costs over the five-year period.*



Measuring Safety in the Greater Philadelphia Region

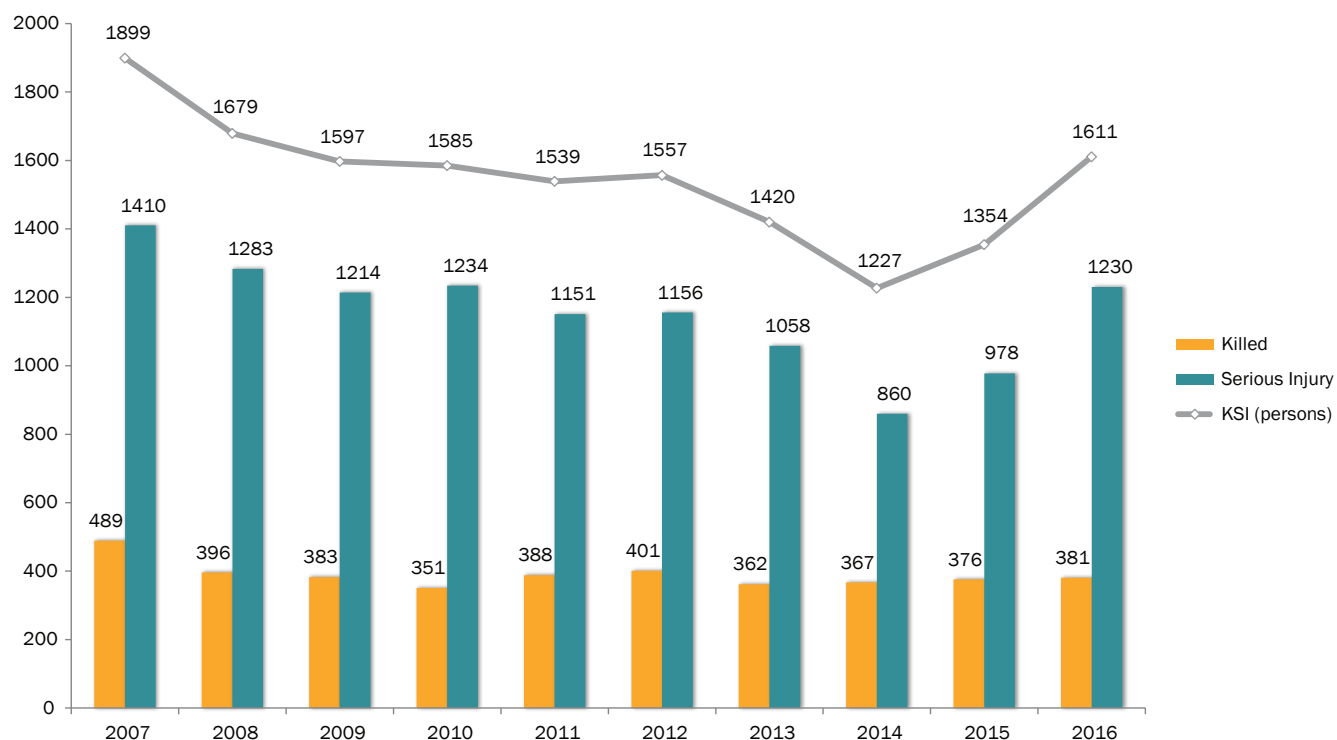
Using the transportation system should not have inherent safety risks. Yet in 2016, 37,461 people lost their lives in car crashes nationwide, and another 221,000 were seriously injured. These events forever change the lives of their victims, and those who live to tell about it are considered lucky.

Following federal guidance, DVRPC and our state partners now track serious injuries in addition to fatalities resulting from traffic crashes. Preventing fatalities remains the first objective, but eliminating injuries is also a primary goal that is individually tracked as part of the federal government’s safety performance measurement process holding states accountable. As our national and regional economies continue to expand, vehicle miles traveled (VMT) have increased. **Our transportation system needs an evolution which will accommodate all users safely, allowing our economy to improve without**

an increase in crash fatalities and injuries as a byproduct.

Over 81,000 roadway crashes occur on average annually in the Philadelphia area. Consistent with national crash trends, the Greater Philadelphia region experienced a notable increase in injuries and fatalities this decade. Data from 2016 marked a four-year high in crash fatalities, claiming the lives of 381 people, and a six-year high of 1,230 people seriously injured. Surprisingly, the total number of injury crashes has been trending downward slightly despite the increases in individuals killed or seriously injured. Figure 1.1 presents safety totals for those killed, those that suffered serious injuries, and KSI—the composite metric of both. KSI is used in nearly all analyses contained in this report and is the preferred data point for tracking progress.

Figure 1.1: Fatalities and Serious Injuries from Crashes in the Greater Philadelphia Region, 2007–2016



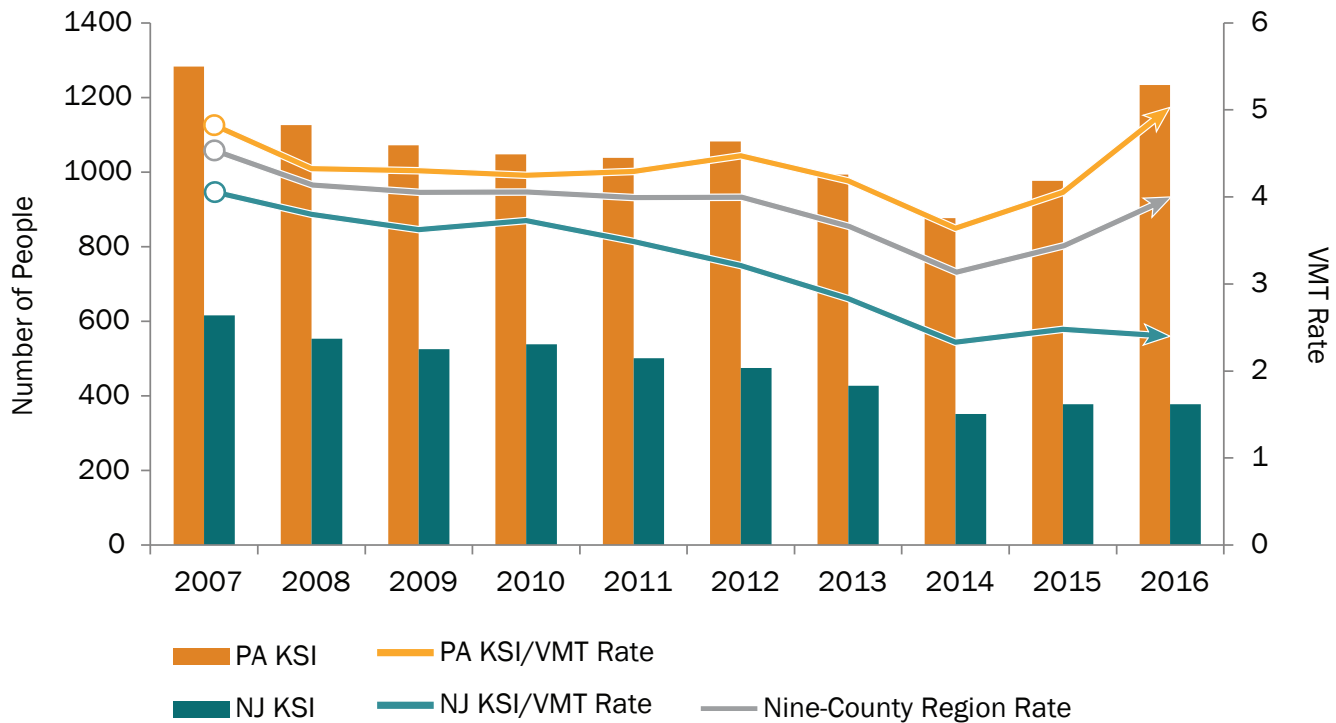
Sources: PennDOT, NJDOT, DVRPC

Figure 1.2 presents 10 years of KSI rate data for the New Jersey and Pennsylvania counties in the Greater Philadelphia region. Using traffic volume to capture exposure, the KSI crash rate data is consistent with the raw totals. Thus, rates are also increasing. An ideal situation is one where more travel does not lead to more crashes. According to the National Highway Traffic Safety Administration (NHTSA), “The number of vehicle miles traveled on U.S. roads in 2016 increased by 2.2 percent, and resulted in a fatality rate of 1.18 deaths per 100 million VMT—a 2.6 percent increase from the previous year.”

The Cost of KSI Crashes

Beyond the immeasurable sorrow that results from a fatal crash are the societal impacts. The financial costs associated with loss of life and even lost quality of life resulting from a KSI crash are in fact measurable. In a 2018 report titled *Crash Costs for Highway Safety Analysis*, the FHWA categorizes these costs into two types: economic cost and quality-adjusted life years. The economic cost of a crash is the cost that can be directly measured, including costs incurred during the response to the crash, resulting property damage, medical costs, and wages lost as a result of death or serious injury. Quality-adjusted life years accounts for the intangible costs of lost quality of life or emotional pain and suffering for crash victims or their families. The FHWA estimates that these costs together amount to approximately \$11.3 million per fatality and approximately \$655,000 for each serious injury that results from a crash. Considering this on a global scale, the World Health Organization

Figure 1.2: Total KSI and KSI Rate per Hundred Million VMT in the Greater Philadelphia Region, 2007–2016



Sources: PennDOT, NJDOT, DVRPC

states that road traffic crashes cost most countries 3 percent of their gross domestic product.

Table 1.1 shows the economic cost of KSI crashes in the region. Between 2012 and 2016, there were over 7,000 people killed or seriously injured in KSI crashes in the region, amounting to over \$3.9 billion in economic costs over the five-year period. The annual economic cost of KSI crashes in the region was approximately \$789 million, much more than the amount spent on safety investments each year. This amounts to a strong argument in favor of increasing transportation safety funding to address the economic cost borne by the region; however, this point should not obscure the fact that addressing fatalities and serious injuries from crashes is not only an economic consideration, but also a moral imperative for transportation planners and policymakers.

At the federal level, in fiscal year 2016, \$596 million was allocated nationally exclusively to highway

safety, according to the Governors Highway Safety Association (GHSA), although many transportation projects have elements that improve safety. According to the Congressional Budget Office (CBO), the total spending in the 2016 federal budget amounted to \$3.9 trillion. Of this \$3.9 trillion, \$91 billion was allocated to transportation. Therefore, safety funding represents less than 1 percent of the funding for transportation. Clearly, preventing future KSI crashes would have a positive economic effect, and the cost savings justify a greater investment in safety.

Table 1.1: Total and Annual Economic Cost of Regional KSI Crashes, 2012–2016

	Fatalities	Serious Injuries	KSI (Persons)
2012	402	1,160	1,562
2013	363	1,066	1,429
2014	367	860	1,227
2015	376	978	1,354
2016	381	1,230	1,611
Total	1,889	5,294	7,183
Estimated Economic Cost per Crash Victim*	\$1,722,991	\$130,068	-
Total Economic Cost*	\$3,254,729,999	\$688,579,992	\$3,943,309,991
Annual Economic Cost*	\$650,946,000	\$137,715,998	\$788,661,998

*in 2016 dollars

Sources: PennDOT, NJDOT, DVRPC

Regional Statistics and Background

Table 1.2 presents five-year KSI rates by county for three metrics: (1) population, (2) roadway miles, and (3) VMT. Regional numbers are also provided as a baseline against which to compare. KSI rates by VMT are the most commonly used metric and are also endorsed by the FHWA in the Transportation Performance Management (TPM) process for measuring safety. Normalizing by traffic volume keeps the crash experience in context of driving trips. Whereas most of DVRPC's New Jersey counties are below the regional average, DVRPC's Pennsylvania counties are closer to the regional average. Philadelphia is the one true outlier at nearly double

the regional number; Philadelphia also stands out statewide.

On balance, Philadelphia's KSI rate per 100,000 people is just under the regional average due to it being the most densely populated county in the region. The more rural counties are the worst performers when considering KSI by population with Bucks, Chester, and Burlington counties all above the regional average of 25.53, and Gloucester being well above at 32.87. Higher average speeds on rural local roads are likely contributing factors to these over-representations.

Table 1.2: Five-Year Average KSI Rates per County, 2012–2016

County	KSI rate per 100,000 people	KSI rate per 100 miles of roadway	KSI rate per 100,000,000 VMT
Bucks	30.19	5.37	4.06
Chester	28.50	4.00	3.44
Delaware	21.82	6.65	3.71
Montgomery	24.23	5.35	3.05
Philadelphia	25.56	15.46	7.32
PA Five Counties Total	25.92	6.90	4.37
Burlington	27.70	4.21	2.65
Camden	23.69	5.88	3.05
Gloucester	32.87	5.59	3.30
Mercer	16.22	3.94	1.69
NJ Four Counties Total	24.73	4.86	2.65
Region	25.53	6.19	3.70

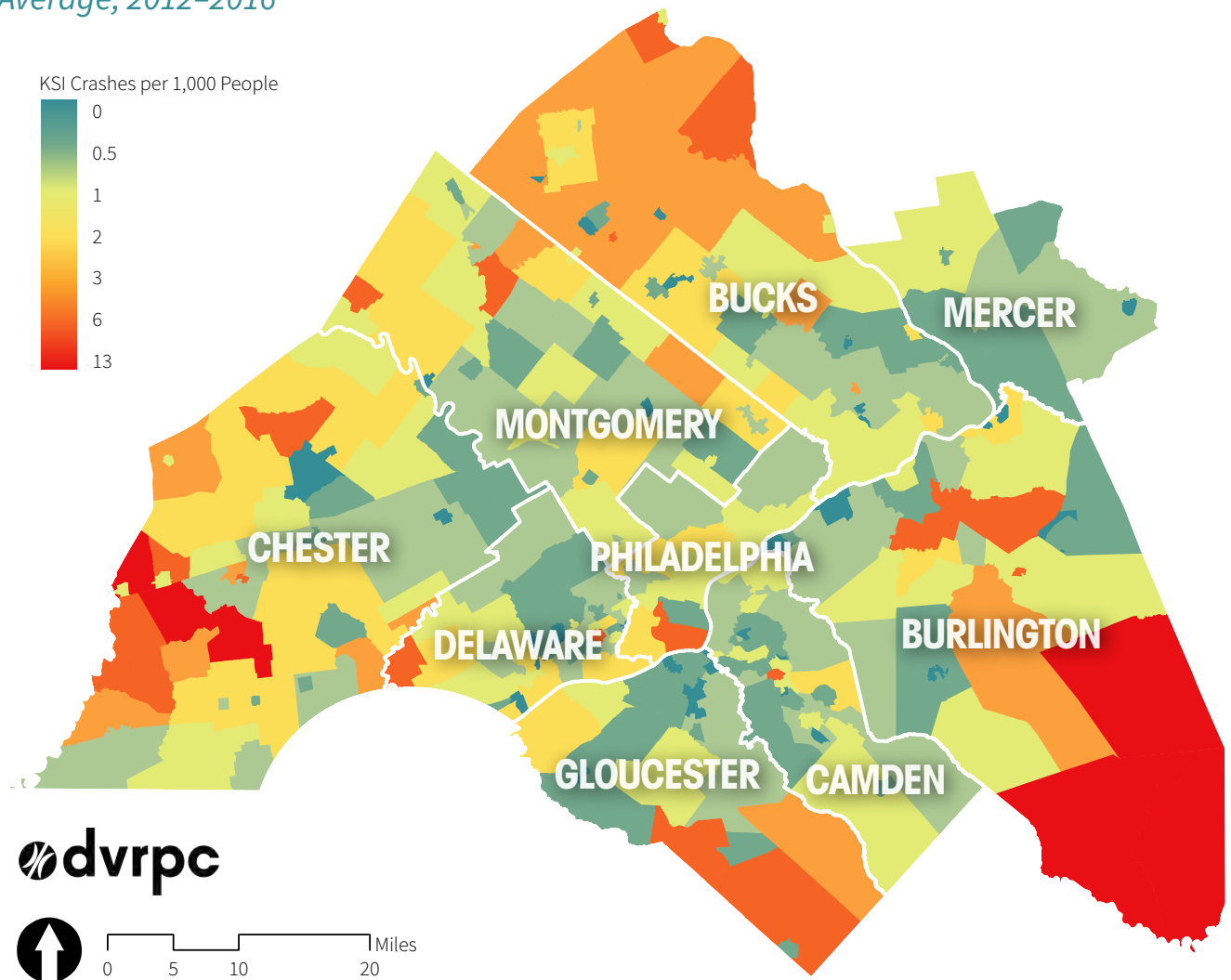
Sources: PennDOT, NJDOT, DVRPC

Crash Rates by Population

Figure 1.3 maps the KSI rate per 1,000 people based on a five-year average by municipality or planning district (in the case of Philadelphia). Unlike Table 1.2, these KSI rates exclude limited-access roads since they tend to skew data for smaller geographies like municipalities. Generally speaking, Figure 1.3

shows how municipalities with the lowest population densities in western Chester and Bucks counties, and eastern Gloucester and Burlington counties have the highest KSI rates by population. The complete dataset for the municipal crash rates is provided as Appendix A.

Figure 1.3: KSI Rate by Municipal or Planning District (Philadelphia) Population, Five-Year Average, 2012–2016



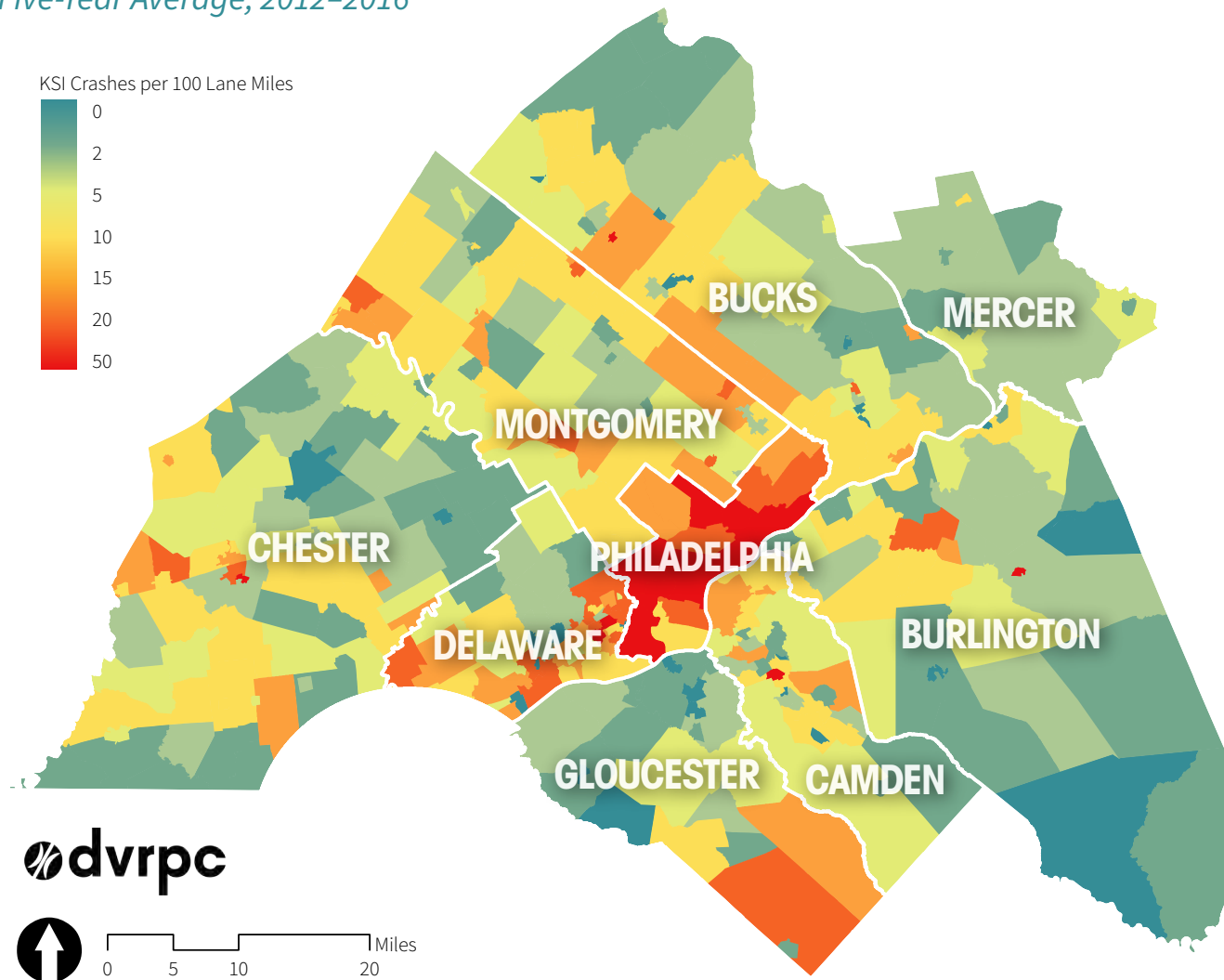
Sources: PennDOT, NJDOT, DVRPC

Crash Rates by Road Miles

Philadelphia's KSI crash rate by lane miles is over twice that of the next closest county in the region (Figure 1.4). This is because many more crashes occur for each mile of roadway in Philadelphia than in the more suburban and rural parts of the region,

which have many more miles of roadway for each car traveling on local streets. Aside from Philadelphia, urban parts of Delaware and Camden counties also perform poorly by this measure.

Figure 1.4: KSI Rate by Total Municipal or Planning District (Philadelphia) Lane Miles, Five-Year Average, 2012–2016



Sources: PennDOT, NJDOT, DVRPC

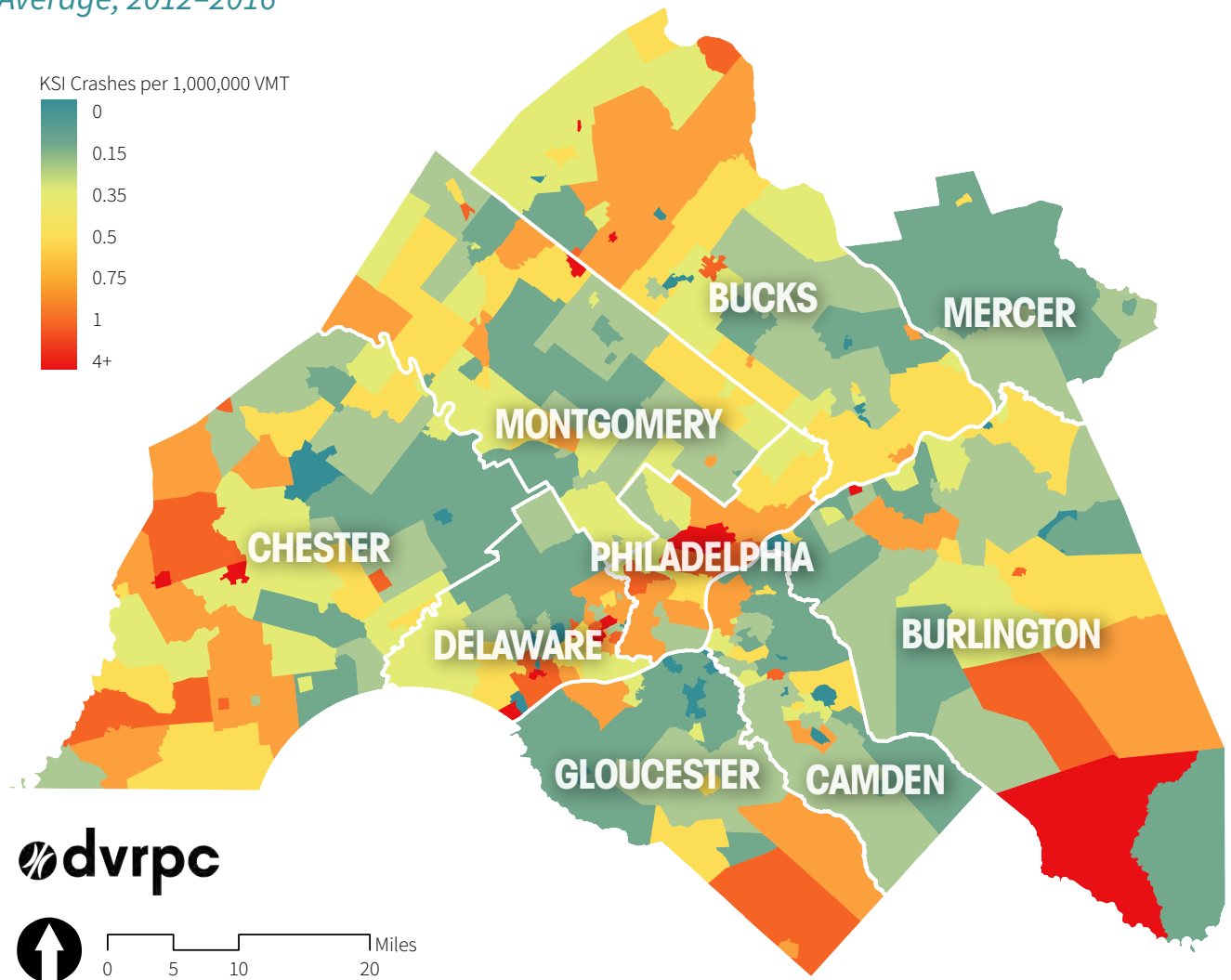


Crash Rates by Volume

Determining crash rates by traffic volume, despite some drawbacks, is generally considered to be the most accurate method used to normalize crash data. Traffic volumes by municipality for this analysis were estimated using traffic simulation model output estimates by road segment, aggregated to the municipal level (Figure 1.5). For some smaller municipalities this method may result in less accurate estimates; for larger municipalities, it is more

accurate. Areas of the region with the worst crash rates by this measure include North Philadelphia, parts of eastern Delaware County, western Chester County, and eastern parts of Gloucester and Burlington counties. The split between urban and more rural locations reinforces the lack of bias by development patterns, although other biases are present, particularly the failure to account for pedestrian and bicyclist volumes.

Figure 1.5: KSI Rate by Municipal or Planning District (Philadelphia) Daily VMT, Five-Year Average, 2012–2016



Sources: PennDOT, NJDOT, DVRPC

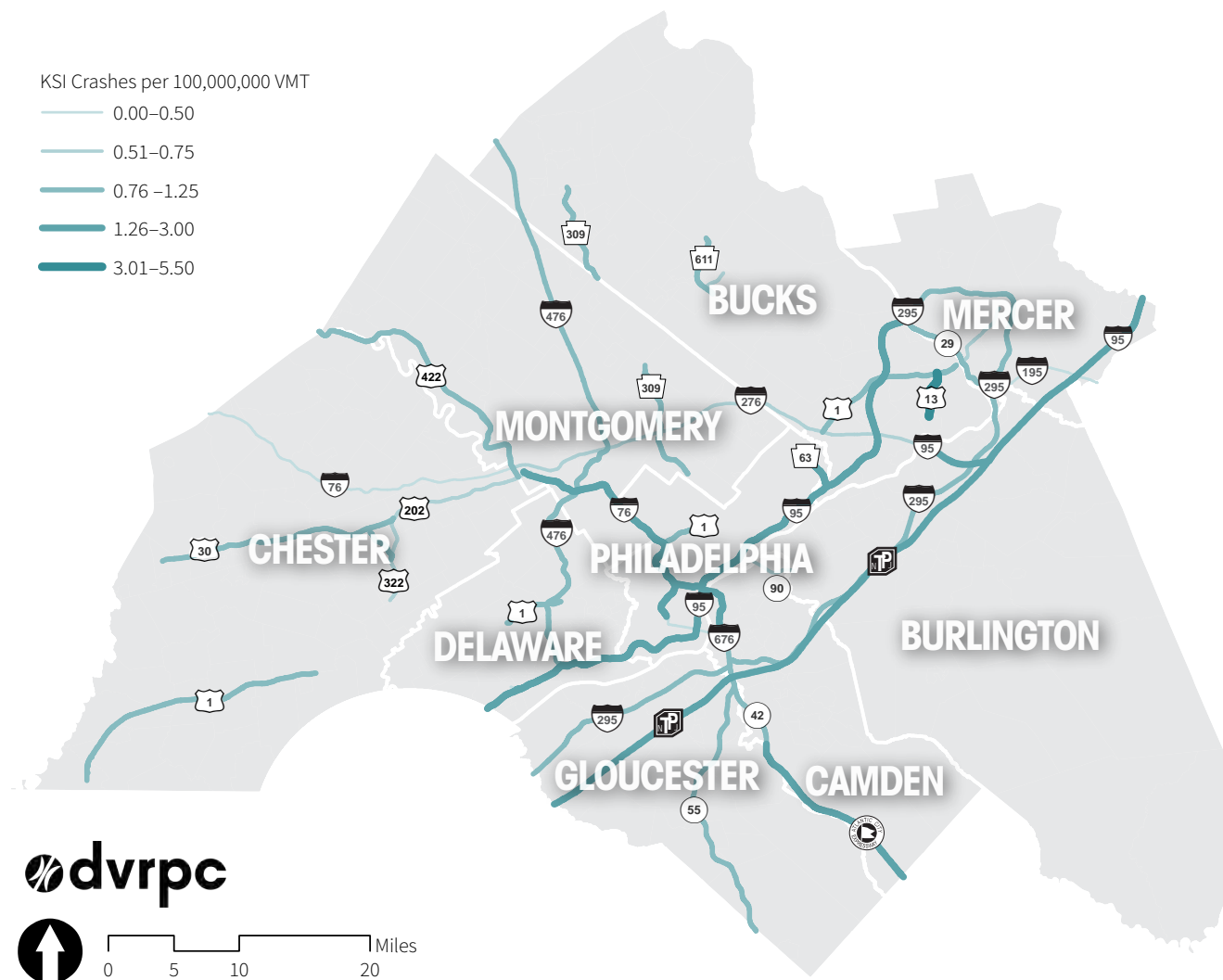
Limited-Access Network

Limited-access roads were excluded from the municipal crash rates analysis because they tend to skew the crash data in the municipalities that they travel through. Eleven percent of KSI crashes between 2012 and 2016 occurred on limited-access roads, despite limited-access roads making up just 3 percent of the total road miles in the region. Limited-access roads tend to have higher speed limits, as

well as more congestion during peak hours, which can lead to aggressive driving and increased crash severity.

Figure 1.6 shows the KSI crash rate by traffic volume for the limited-access roads in the region. Because the traffic volume on limited-access roads is much higher than on local streets, the rate used is KSI crashes per 100 million VMT instead of per 1 million

Figure 1.6: KSI Rate by VMT for Limited-Access Roads, Five-Year Average, 2012–2016



Sources: PennDOT, NJDOT, NJ Turnpike Commission*

*To calculate VMT, the limited-access network analysis used the most recent Annual Average Daily Traffic (AADT) values that were available from these sources.

VMT. Note that the rate was calculated using the total number of KSI crashes and the average volume along the entire limited-access facility, and therefore the crash rate appears to be uniform for each road. This approach normalizes the rate for the whole corridor to allow for comparison between limited-access facilities in the region. In reality, crashes are distributed unevenly throughout these limited-access roads, and traffic volume fluctuates throughout the facility as well.

US 13 in Bucks County had the highest crash rate of any limited-access road in the region, with a rate of 5.46 KSI crashes per 100 million VMT. On average, Pennsylvania had slightly higher rates along its limited-access roads than New Jersey did, even along those roads that crossed through both states. I-676 in Pennsylvania has a rate of 2.95 KSI crashes per 100 million VMT, while I-676 in New Jersey has a slightly lower rate of 2.78. After US 13 and I-676, however, the New Jersey Turnpike has the third highest rate of 2.65 KSI crashes per 100 million VMT. I-95 in Pennsylvania also had a relatively high rate of 1.49 KSI crashes per 100 million VMT.

A common characteristic of the limited-access facilities with higher KSI rates is that they carry both regional and interstate traffic, e.g., I-95 and the New Jersey Turnpike. Through-traffic motorists may not be prepared to navigate local conditions that regional drivers are accustomed to. Roadway configuration variations combined with a mix of interchange types, especially when densely located, can lead to higher crash trends as these changing conditions demand more from drivers. I-76 is an example of a limited-access road with multiple interchange types that handles high-volume traffic from other regionally significant facilities and mixes local and interstate travelers. A hot-spot analysis of these limited-access roads can help to identify interchanges or other potentially problematic locations along these facilities where systemic improvements can be made to prevent crashes and reduce crash severity.

Current Trends and Future Forces

Technology is featured as a key “future force” in DVRPC’s *Connections 2045 Plan for Greater Philadelphia*. Among other areas of transportation and regional planning, advancements in technology both inside and outside of the vehicle are having a significant influence on crash safety, both negative and positive. As humans become ever more connected, our increasing level of distraction, or conversely, our hyper-focused attention to screens, is resulting in grave consequences when operating a motor vehicle is the de-prioritized task. According to NHTSA, in 2016, distracted driving crashes were the cause of 3,450 fatalities, almost 10 percent of the national total. Concerningly, some studies suggest distracted driving data is severely underreported so we may not fully understand the scope of this challenge. At the same time, it has become increasingly common to point to distraction as a primary cause for non-motorized user crashes; however, there is not currently data to back up the phenomenon of the “distracted pedestrian” as a growing trend. The best advice is two-fold: for vulnerable users, be cautious when walking or biking; and for drivers, with great power comes great responsibility.

On the upside, the technological advancement toward an autonomous vehicle society is starting to make cars smarter, helping protect humans from themselves. According to NHTSA, “human choices are linked to 94 percent of serious crashes.”² Level 5 automation—driverless vehicles operating on any road in any condition, reliant only on humans for entering a destination—is purported to be many decades away, if actually achievable. In the meantime, more and more auto manufacturers are offering smart safety technologies as standard vehicle equipment, even on more affordable models. Technologies like front-end collision avoidance and lane-keeping assist are designed to take over where humans cannot, or as a result of poor choice, do not prevent a crash from happening.

These technological forces have already changed the way we travel, as well as the way we live, and will

2. www.nhtsa.gov/press-releases/usdot-releases-2016-fatal-traffic-crash-data

continue to do so for the foreseeable future. Despite technological progress toward achieving safety goals, we must continue to make the best use of currently available tools, to promote and project safe behaviors, and to support legislation that advances a safety culture and the only defensible goal: zero deaths.

Vision Zero: The New Way

Vision Zero is certainly a current trend and may also be a future force. Introduced in Sweden in the 1990s, Vision Zero is an approach to road safety thinking, that can be summarized in one sentence: “No loss of life is acceptable.” Thus, the goal of Vision Zero is to eliminate traffic fatalities and serious injuries.

Vision Zero recognizes that human beings make mistakes, and that the transportation system can be designed to minimize the severity of those mistakes. This philosophy does not relieve people of making the safest choices. Instead it promotes engineering, education, and collaboration to address system needs that, when met, will protect all users.

Cities across America and throughout the world, as well as some nations, have adopted Vision Zero, or one of its sister movements: Toward Zero Deaths, and the Road to Zero Coalition. The FHWA, New Jersey, and Pennsylvania have all incorporated Toward Zero Deaths into their safety goals. In 2016, City of Philadelphia mayor Jim Kenney signed a Vision Zero executive order, joining New York City, Los Angeles, and Boston, among others, in their Vision Zero efforts. Since publishing the 2015 Transportation Safety Action Plan, DVRPC has embraced the zero goal, as has the RSTF.

Achieving zero deaths starts with a change to the way we think about crashes. Even small paradigm shifts like replacing the word “accident” with the word “crash” embraces the idea that these events are preventable. Through smarter and better-designed infrastructure and vehicles, safer work zones, and increased walkability and bike-ability, we are promoting safe and equitable access for all ability levels systemwide, helping us move closer to zero deaths.

Is Vision Zero also a future force? When leaders embrace this philosophy they are making a

commitment to prioritize safety, a place once held by other goals like congestion relief. This shift in thinking can bring currently unanticipated benefits to society. If America truly commits to eliminating fatalities, which totaled 37,461 deaths in 2016 alone, the cost savings and financial benefit to society would be unprecedented. If no lives were lost in the region in 2016, at a minimum it would mean 381 people would still be here, 381 fewer emergency response calls would have been dispatched, and countless hours of crash-related congestion would never have occurred, just to name a few of the more tangible benefits.

Thinking more broadly, safety and health have improved for people in many aspects of life. For example, in the recent past, exposure to cigarette smoke was an unavoidable fact of public life. To the amazement of many, that has changed, and society is better for it. Children born in the region today will likely never have to breathe second-hand smoke. These societal changes typically come from concerned individuals in pursuit of a better way.

Eliminating crash fatalities and lessening crash severity is consistent with public health goals designed to keep residents healthy and working, yielding lower medical costs. Yet, there is still a pervasive complacency about the inherent safety risks associated with driving a car, walking, or biking. America loses about 101 people to car crashes per day across its 50 states; it is a silent killer. Similar death rates for any other mode—airplanes, trains, ferries—would elicit a public outcry. Vision Zero is that outcry, and the time is now to eliminate fatal and serious injury crashes.

Vision Zero recognizes that humans make mistakes; our transportation system should minimize the severity of those mistakes.

[2]

SAFETY PLANNING IN THE GREATER PHILADELPHIA REGION

*The Greater Philadelphia region
is **plagued** by many of the
same **safety priority issues**
faced statewide by Pennsylvania
and New Jersey, in addition to
uniquely regional concerns.*



Creating a Safety Plan

This is the fifth edition of the Transportation Safety Analysis and Plan (TSAP; formerly the Transportation Safety Action Plan) for the Greater Philadelphia region, building on over a decade's worth of data-driven analysis and coordination among traditional and non-traditional partners and focused on improving transportation safety for all road users. In order to guarantee the most useful product, each TSAP is designed and developed in coordination with state and federal partners to ensure a consistent approach and to align goals across agencies. The following section presents the federal requirements for transportation safety planning, a short overview of both the Pennsylvania and New Jersey Strategic Highway Safety Plans (SHSP), followed by DVRPC's approach where it overlaps with the state plans.

Federal Regulations

The Fixing America's Surface Transportation (FAST) Act (December 2015) reinforced the safety priorities articulated in MAP-21 (2012). Each state department of transportation (DOT) is required to develop a data-driven SHSP in coordination with their planning partners in order to receive federal Highway Safety Improvement Program (HSIP) funding. DVRPC is a partner in planning for the Philadelphia metropolitan region with PennDOT, NJDOT, and the FHWA, along with a multi-disciplinary group of stakeholders.

The data-driven analysis required for an SHSP commonly begins with the 22 national safety emphasis areas described in the AASHTO Strategic Highway Safety Plan, published in 1997 and updated in 2004. Both New Jersey and Pennsylvania used this approach, and this is the fifth edition of DVRPC's TSAP built on emphasis area data measurement. AASHTO's guidance on use of the emphasis areas approach provides states the freedom to combine similar emphasis areas into larger categories, organize them into tiers defined by expected benefits, and even define new emphasis areas.

New Jersey's Approach (Updated 2015)

With the 2015 update of their SHSP, New Jersey announced their commitment to the Towards Zero Deaths movement, specifically stating that "it is no longer acceptable to say that traffic crashes and the resulting injuries and fatalities are the price we pay for mobility." The update process engaged traditional stakeholders, including metropolitan planning organizations (MPO) and county partners, as well as less traditional partners, like advocacy groups and the medical community.

New Jersey's refresh of the 22 AASHTO emphasis areas was based on data for the five-year period of 2008 to 2012. The final plan addresses 16 safety emphasis areas organized into these AASHTO categories: Drivers, Special Users, Vehicles, Highways, and Other (see Table 2.1). The following emphasis areas were identified as first priority of three priority levels: Lane Departure, Drowsy and Distracted Driving, Aggressive Driving, Intersections, Pedestrians and Bicyclists, and Mature Drivers. New Jersey used the following crash thresholds to determine the priority levels:

- First Priority: >2,000 KSI crashes;
- Second Priority: 1,000 to 2,000 KSI crashes;
- Third Priority: <1,000 KSI crashes.

DVRPC participates in quarterly MPO coordination meetings hosted by NJDOT designed to track safety project progress, discuss updates, and strategize new approaches to expanding the scope and breadth of the HSIP program. Each New Jersey MPO facilitates a competitive HSIP local safety program, which awards safety project funding on an annual basis. Through this program DVRPC works closely with local roadway owners to identify HSIP-eligible locations, analyze safety data, and serve as a liaison between locals and state and federal partners to advance projects to implementation.

Table 2.1: New Jersey’s Safety Emphasis Areas

Categories	Safety Emphasis Areas
Drivers	Drowsy and Distracted Aggressive Driving (including Speeding) Impaired Driving Mature Drivers Teen Drivers Unbelted Vehicle Occupants Unlicensed Drivers
Special Users	Pedestrians and Bicyclists
Vehicles	Motorcyclists Heavy Vehicles
Highways	Lane Departure Intersections Work Zones Vehicle-Train Collisions
Other	Improved Data Analysis Driver Safety Awareness

Source: NJDOT

Pennsylvania’s Approach (Updated 2017)

Completed in 2017, Pennsylvania describes this SHSP update as a “blueprint to reduce fatalities and serious injuries on Pennsylvania roadways and targets priority Safety Focus Areas (SFAs) that have the most influence on improving highway safety throughout the state,” as depicted in Figure 2.1.

The focus areas are prioritized according to these criteria:

- potential for overall fatality reduction (with execution of improvements);
- number of fatalities (based on historic five-year average);
- cost effectiveness (cost/benefit);
- ease of strategy implementation within focus area (proven countermeasures); and
- resources (funding, time, partners).

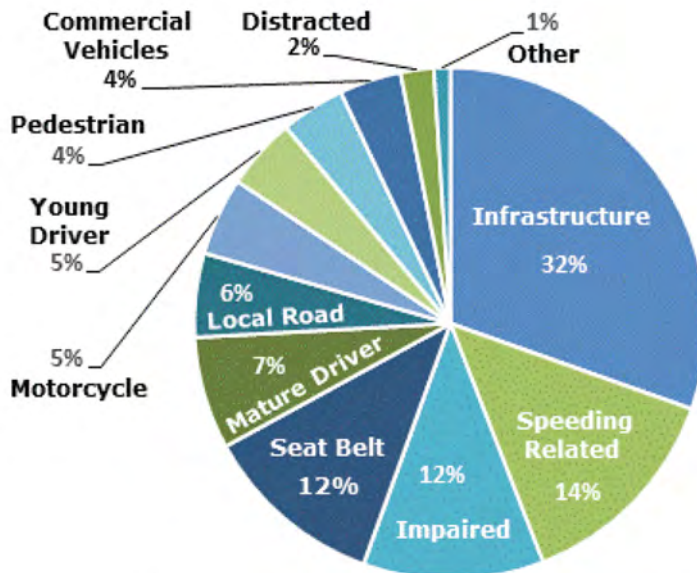
Based on crash data for years 2011–2015, this

iteration of Pennsylvania’s SHSP continues their Toward Zero Deaths approach to traffic safety, originally established in the 2012 SHSP. The 2017 plan update engaged a wide variety of stakeholders from the public, non-profit, and private sectors to ensure a multi-disciplinary approach.

Pennsylvania is also supporting the NHTSA-led Road to Zero Coalition’s goal to end roadway fatalities within 30 years, although their plan establishes a more specific five-year goal to reduce the current number of fatalities and serious injuries by 120 and 305, respectively. Their crash reduction fatality goal is stated to be 2.5 percent per year.

DVRPC maintains ongoing collaboration with PennDOT’s District 6-0 office to assist with tracking progress, helping identify new HSIP-eligible projects, and coordinating with county partners. District 6-0 is also engaged in DVRPC’s RSTF and at the transportation study level as needed.

Figure 2.1: Pennsylvania's Safety Focus Areas (Not Including Traffic Records Data or Emergency/Incident Influence Time)*



*Based on historic 5-year average (2011-2015)

Source: PennDOT

DVRPC's Approach (Updated 2018)

In 2016 there were over 81,000 crashes in the nine-county Greater Philadelphia region, which claimed the lives of 381 people, and injured another 43,067. For context, the Greater Philadelphia region includes five of Pennsylvania's 67 counties representing just 5 percent of the state's land area, but 32 percent of the population, and 29 percent of the crashes (based on 2016 Census and crash data). The four New Jersey counties (out of 21) represent a greater portion of the state's land area at 21 percent, accounting for 18 percent of the population, and 17 percent of the crashes (based on 2016 Census and crash data).

The Greater Philadelphia region is plagued by many of the same safety priority issues faced statewide by Pennsylvania and New Jersey, in addition to uniquely regional concerns. For instance, pedestrian and bicyclist crashes are overrepresented in the Greater Philadelphia region. Thus, DVRPC's TSAP is designed to support and enhance the work of each state.

The **Regional Safety Task Force** (RSTF), a multi-disciplinary stakeholder group founded in 2005, provided substantial guidance in the development of each TSAP to date, including this iteration. The RSTF meets quarterly, focusing on a different safety emphasis area that includes the development of actions to improve safety. The RSTF includes representatives from federal, state, county, and municipal governments, plus private sector, advocacy groups, and the general public. See Appendix B for the list of members and agencies actively involved in shaping this safety plan.

This safety plan seeks to advance DVRPC's overall safety goals as set out in *Connections 2045 Plan for Greater Philadelphia*. *Connections 2045* is the long-range plan for the Greater Philadelphia region; it presents a regional vision around five core principles, and identifies strategies to achieve that vision. Transportation safety is prioritized across the plan and integrated into each of the core principles: Sustain the Environment; Develop Livable Communities; Expand

the Economy; Advance Equity and Foster Diversity; and Create an Integrated, Multimodal Transportation Network. The Plan's approach to increasing safety for both motorized and non-motorized users advances the U.S. Department of Transportation's Key Planning Factors and specifically identifies the goal of moving toward zero transportation deaths within the transportation principle (Create An Integrated, Multimodal Transportation Network). DVRPC's Transportation Improvement Program (TIP) evaluation criteria—a data-informed investment decision tool—uses safety as the second-most heavily weighted criteria, designed to prioritize transportation projects that advance the region's safety goal.

Setting Performance Measures

In December 2015, the federal transportation funding and authorization legislation called Moving Ahead for Progress in the 21st Century Act (MAP-21) was replaced by the FAST Act—Fixing America's Surface Transportation Act. The FAST Act authorized \$305 billion over fiscal years 2016 through 2020 and carried forward and expanded MAP-21's transportation performance management (TPM) requirements. These changes require the use of performance-based approaches in metropolitan and statewide transportation planning to measure if goals are being met.

TPM regulations hold state DOTs, MPOs, and transit agencies to a level of performance accountability. In particular, state DOTs must establish baseline conditions and performance targets, demonstrate acceptable progress in meeting those targets, and update them annually.

FAST Act Performance Measures

Safety transportation performance measures were the first to advance, with states required to submit their targets to federal partners on August 1, 2017, although requirements, timelines, and penalties are different for MPOs. Specifically, MPO's have the option to adopt state targets or establish their own. DVRPC elected to support state targets established by the Pennsylvania and New Jersey Departments of Transportation rather than establish regional targets

which incidentally would consist of unique targets for our New Jersey and Pennsylvania counties—a requirement of the regulation. MPOs were required to report their preference six months after states reported their targets.

The safety performance measures track progress using five-year rolling averages for the following five metrics:

- Number of Fatalities;
- Rate of Fatalities per 100 Million VMT;
- Number of Serious Injuries;
- Rate of Serious Injuries per 100 Million VMT; and
- Number of Non-motorized Fatalities and Non-motorized Serious Injuries (essentially bicyclists and pedestrians killed or seriously injured).

The data source for fatalities is NHTSA's Fatality Analysis Reporting System (FARS), and each state uses their own data for serious injuries. State targets are applicable to all public roads.

State Safety Targets

Considerable coordination occurred among DVRPC, MPO partners, and state and federal partners, to establish the state targets in both New Jersey and Pennsylvania. This collaboration, informed by a data-driven analysis, is critical for guiding planning and engineering to ensure that transportation safety is held as a high priority for each state.

Pennsylvania's initial targets were designed to reflect their 2017 SHSP goal of reducing KSI by 2 percent. Table 2.2 presents Pennsylvania's TPM baseline and targets.

New Jersey's safety target-setting exercise proceeded in a collaborative way similar to Pennsylvania's and with careful consideration of previous trends, recently built projects, and the current socioeconomic climate. Table 2.3 presents New Jersey's TPM baseline and targets.

Table 2.2: Pennsylvania Safety Performance Measures (Statewide Targets)

Performance Measure	Five-Year Rolling Averages	
	TARGET	BASELINE
	2014–2018	2012–2016
<i>Number of Fatalities</i>	1,177.6	1,220.2
<i>Fatality Rate</i>	1.161	1.220
<i>Number of Serious Injuries</i>	3,799.8	3,434.0
<i>Serious Injury Rate</i>	3.746	3.433
<i>Number of Non-motorized Fatalities and Serious Injuries</i>	654.4	602.4

Source: PennDOT

Table 2.3: New Jersey Safety Performance Measures (Statewide Targets)

Performance Measure	Five-Year Rolling Averages	
	TARGET	BASELINE
	2014–2018	2012–2016
<i>Number of Fatalities</i>	586.0	571.0
<i>Fatality Rate</i>	0.778	0.762
<i>Number of Serious Injuries</i>	1,105.0	1,135.6
<i>Serious Injury Rate</i>	1.467	1.516
<i>Number of Non-motorized Fatalities and Serious Injuries</i>	386.5	390.3

Source: NJDOT

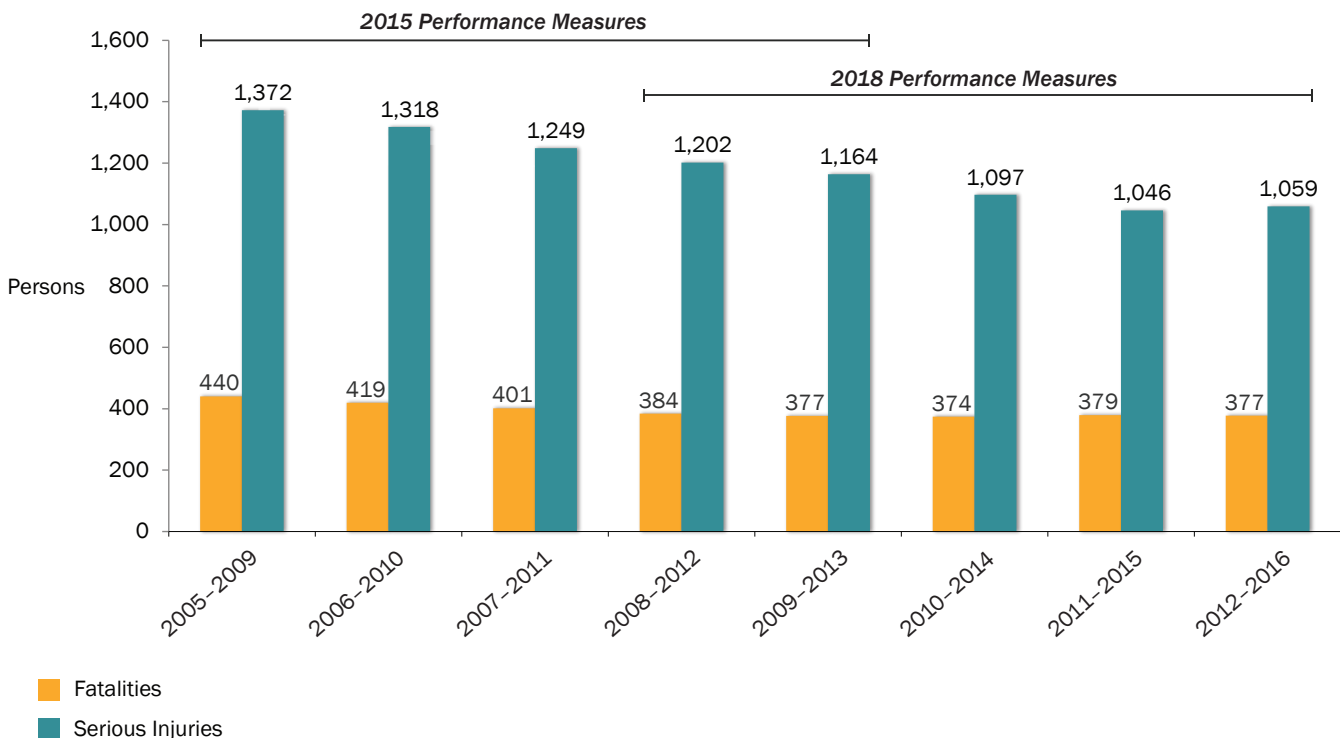
Safety Performance Measures in the Greater Philadelphia Region

Figure 2.2 shows the five-year rolling averages for fatalities and serious injuries in the Greater Philadelphia region. The first five pairs of columns correspond to the five-year rolling averages of fatalities and serious injuries that were reported in the 2015 TSAP, beginning with the 2005–2009 five-year average and ending with the 2009–2013 five-year average. The current iteration of the plan covers the rolling averages from the 2008–2012 five-year average to the 2012–2016 five-year average.

In this update we see that the five-year rolling averages for fatalities and serious injuries have

steadily decreased over the last eight years. The 2011–2015 and 2012–2016 five-year averages, however, saw increases in fatalities and serious injuries, respectively. This reflects a slowdown and reversal of the gains in decreasing severe crashes that were made in the period following the financial crisis in 2008, when the national economic downturn had a negative impact on traffic volume which corresponded with a drop in crashes, both regionwide and nationwide.

Figure 2.2: Fatalities and Serious Injuries, Greater Philadelphia Region, Five-Year Rolling Averages

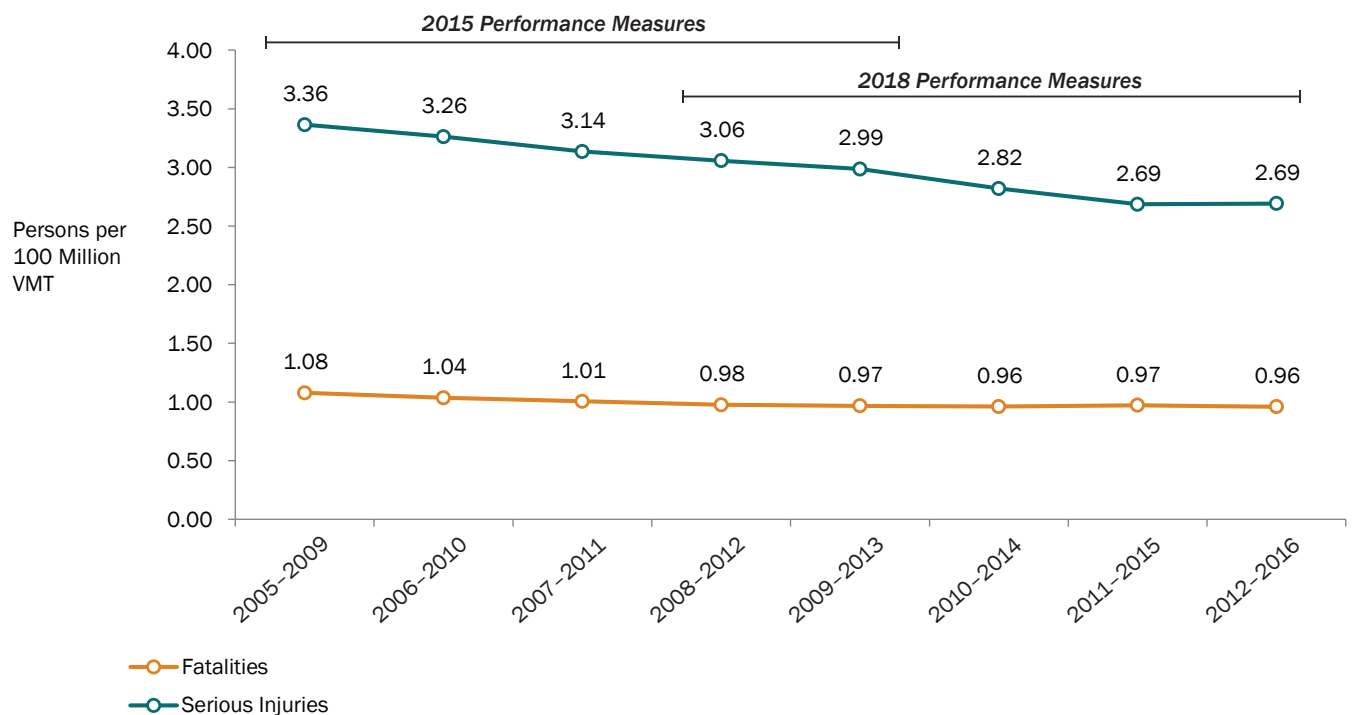


Sources: PennDOT, NJDOT, DVRPC

Figure 2.3 shows the five-year rolling averages for rates of fatalities and serious injuries per 100 million VMT in the Greater Philadelphia region. The crash rate is useful because it accounts for changes in travel activity, which can have a significant impact on the number of severe crashes. Figure 2.3 also divides the five-year averages into their corresponding TSAPs. The rate of fatalities and serious injuries, like

the total number of fatalities and serious injuries, fell throughout the rolling averages corresponding to the 2015 TSAP. The current update, however, has seen the rate of fatalities plateau. Serious injuries continued to fall for the first three rolling averages of the current TSAP cycle, but, like fatalities, plateaued in the final two rolling averages.

Figure 2.3: Rate of Fatalities and Serious Injuries by 100 Million VMT, Greater Philadelphia Region, Five-Year Rolling Averages

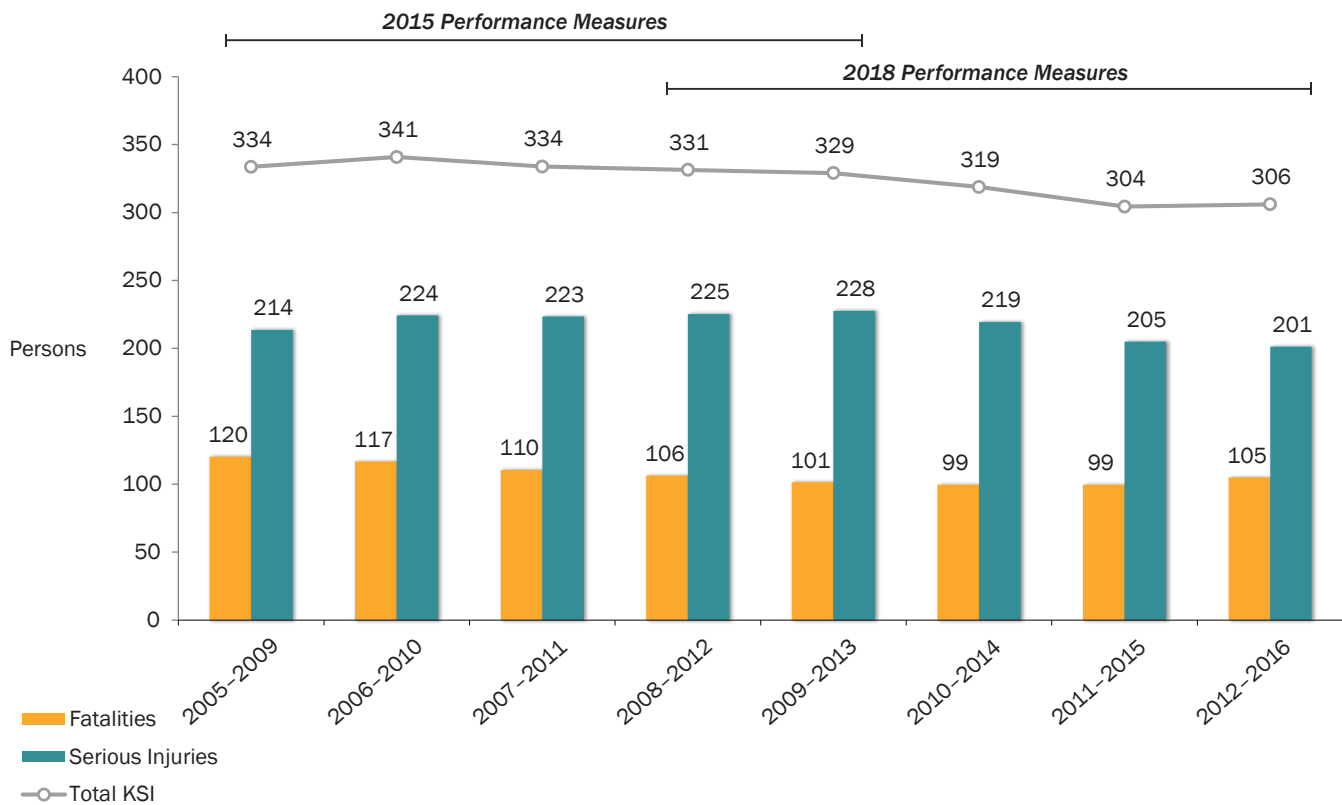


Sources: PennDOT, NJDOT, DVRPC

Figure 2.4 shows the five-year rolling average of non-motorized fatalities and serious injuries, specifically pedestrian and bicyclist KSI, also known as vulnerable users. Like the five-year rolling average numbers and rates of all KSI crashes, non-motorized KSI had generally been decreasing across the years covered in the 2015 TSAP (there was an increase between the first and second rolling averages). This pattern continued during the first three rolling averages of the current TSAP cycle, until the final five-year average in which the non-motorized KSI number increased slightly. If national trends continue

to play out locally, it is likely that the non-motorized KSI five-year averages will continue to trend upward over the next few years. Tracking this data for the Greater Philadelphia region is especially important because both New Jersey and Pennsylvania are FHWA Pedestrian and Bicycle Safety Focus States. This is a designation that identifies states for which these crash types are higher than the national average, and provides additional resources to help address the problem.

Figure 2.4: Non-Motorized Fatalities and Serious Injuries, Greater Philadelphia Region, Five-Year Rolling Averages



Sources: PennDOT, NJDOT, DVRPC

Regional Safety Task Force

The RSTF is a multi-disciplinary team of transportation safety professionals and stakeholders that promotes transportation safety in the Greater Philadelphia region and offers guidance for DVRPC's efforts. The goal of the RSTF is to reduce roadway crashes and eliminate serious injuries and fatalities from crashes in the region. Established in 2005, the task force seeks to build and maintain effective partnerships to improve safety for all users of the regional transportation system. The RSTF meets quarterly focusing on one of AASHTO's safety emphasis areas through presentations by practitioners and subject matter experts. Each meeting also includes small group discussions targeted at identifying action items that help improve safety on that meeting's topic.

The RSTF has two objectives that provide specifics about how to accomplish its goal and mission. They are:

- Build, maintain, and leverage partnerships among both traditional and non-traditional transportation safety stakeholders.
- Increase the effectiveness of the RSTF through strategies and actions.

In 2017, following similar resolutions by key member governments, including the City of Philadelphia, PennDOT, and NJDOT, the RSTF adopted Vision Zero as the guiding principle of the task force. This led immediately to the RSTF adopting a new goal focused on the elimination of deaths and serious injuries from crashes in the Greater Philadelphia region. It also refocuses the task force's work onto the crashes that lead to the greatest KSI, in keeping with shifts in transportation safety data analysis and strategies being adopted at the local, state, and federal levels.

Volunteer Actions

RSTF members volunteer to take on "action items" that will address the crash trend arising from the emphasis area focus of each meeting. Examples of action items from each emphasis area meeting over the last cycle are included in Table 2.4 on the following pages (the current cycle concludes in 2019). Action items typically revolve around information sharing or small analysis projects. A new cycle of emphasis

area meetings and accompanying action plan development is underway. Action items are tracked and reported on at each RSTF meeting.

Special Project: Speed Management

In collaboration with the RSTF, DVRPC staff developed a Municipal Implementation Tool (MIT) to inform municipalities about the dangers of speeding (see Figure 2.5). The MIT includes its contributing factors, and strategies to reduce speeding, as well as where these strategies have been implemented in the region. The MIT is available as a free download from DVRPC's products web page.

In 2016, 28 percent of traffic fatalities in the Greater Philadelphia region were speeding-related. While speeding is not one of the AASHTO emphasis areas, it is an aggressive driving behavior, and contributes to more traffic fatalities in the region than impaired driving. Speeding-related crashes are typically lethal compared to lower-speed crashes, because speeding increases both one's chances of being involved in a crash and the likelihood that a crash will be fatal. A 5 percent increase in average speed has been shown to increase traffic fatalities by 20 percent overall.

Figure 2.5: Speeding MIT



Source: DVRPC

Table 2.4: Sample Volunteer Actions from 2015 Transportation Safety Action Plan Cycle

<i>Volunteer Action Item</i>	<i>Lead Person (Agency)</i>	<i>Action Update</i>
INTERSECTION SAFETY: October 2016		
Create and distribute a brochure on intersection safety when an ambulance approaches.	Peggy Schmidt (Partnership TMA)	Action completed. The brochure was drafted and distributed to relevant parties.
Share information about connected vehicles, including demo video.	Paul Carafides (DVRPC)	Action completed. Information was shared at a Connected Vehicle Technology demonstration event held on August 30, 2017, at Penn State's Larson Institute in conjunction with the Institute of Transportation Engineers Annual Meeting.
SENIOR DRIVERS: June 2016		
Identify nodes (specifically intersections) that are heavily used by seniors.	Janet Arcuicci (Montgomery County Planning Commission)	Action completed. Ms. Arcuicci provided DVRPC with a list of intersections near senior developments for DVRPC to map.
Talk to NJDOT and report back with ways that NJDOT can partner on senior driver safety issues, especially extending crossing times at intersections.	Bill Beans (MBO Engineering)	Action completed. Mr. Beans spoke with NJDOT staff and reported that they go well beyond Manual of Uniform Traffic Control Devices minimum design standards to improve safety for seniors and all users, including the installment of enhanced crosswalk striping to increase pedestrian and intersection visibility.
AGGRESSIVE DRIVING: December 2015		
Share AAA's brochure on procedures to take if a vehicle breaks down on a highway.	AAA Mid-Atlantic, DVRPC	Action completed.
YOUNG DRIVERS: June 2015		
Identify and map locations with high young driver populations and significant crash trends for consideration of improvements.	Vince Cerbone (PennDOT District 6)	Action completed. Mr. Cerbone developed a map for distribution.

<i>Volunteer Action Item</i>	<i>Lead Person (Agency)</i>	<i>Action Update</i>
DISTRACTED/IMPAIRED DRIVING: March 2015		
Track Pennsylvania House Transportation Subcommittee actions on driving under the influence (DUI) legislation.	Ryan McNary (PennDOT)	Action completed. Mr. McNary provided a list of bills compiled by Senator Rafferty's office.
UNBELTED: December 2014		
Report statistics for any non-traditional seatbelt education programs.	Sarah Oaks (DVRPC)	Action completed. Ms. Oaks reported on the Delaware County TMA's High School Seatbelt Challenge, which has from three to 11 participating schools. The challenge is also done in conjunction with the Survival 101 program taught by police officers trained by Buckle Up PA instructors. There is typically a 20–30% increase in seatbelt use over the course of the school year.
PEDESTRIAN SAFETY: September 2014		
Look into adding Safe Passage bill to the New Jersey Department of Highway Traffic Safety agenda.	Violet Marrero (NJDHHS)	Action completed. Ms. Marrero provided the Safe Passing bill (A1577/1600) to the Governor's Highway Traffic Safety Policy Advisory Council, where it was discussed.

Source: DVRPC

[3]

REGIONAL SAFETY EMPHASIS AREAS

*When combined, the first- and second-tier **emphasis areas** account for **98 percent of KSI crashes** in the region.*



Introduction

The regional safety emphasis area analysis identifies the AASHTO emphasis areas with the greatest impact on KSI in the Greater Philadelphia region. Unlike previous iterations of the plan, all emphasis areas measurable with crash data are included in this version, which is consistent with a renewed focus on addressing every single crash that results in a fatality or serious injury.³ Nevertheless, more attention is devoted to those that lead to the greatest number of KSI crashes, as well as those that were selected for particular consideration by members of the RSTF. Ultimately, through collapsing categories and following guidance from state partners, eight emphasis areas were selected for a deeper analysis, while five additional emphasis areas are considered in shorter form.

Methodology

The AASHTO emphasis areas analysis uses a data-driven process to identify the contributing factors involved in the greatest number of KSI in the region. The analysis uses database “flags” intended to identify contributing factors in crashes included on police reporting forms (see Appendix D). In some cases, the application of a flag to a crash may not be as clear cut as in other cases. For instance, while an “older driver” flag is assigned based on the age of the driver and is therefore clearly identifiable, “driver inattention” is dependent on whether police identify this on their state’s crash reporting form and may differ substantially depending on state law, circumstances of the crash, and even discretion, among other factors. The analysis uses a three-year dataset of 2013–2015 data, which picks up after the final year of the previous TSAP cycle (2010–2012).

The following questions were answered for each of the eight top tier emphasis areas:

How many KSI were there from crashes for which that emphasis area was a contributing factor, by county? What percentage of all the KSI from crashes in a county had a specific emphasis as a contributing factor?

The answers to these questions are presented in a single figure to assist the reader in drawing conclusions. The number of KSI for which the given emphasis area was a contributing factor is shown as a bar for each county. The dot above the county represents the percentage of all crash KSI in that county to which the emphasis area was a contributing factor. A county might have relatively few KSI in a given emphasis area compared to other counties, but the percentage of KSI where that emphasis area was a contributing factor may be very high, identifying that emphasis area as a priority for that county.

What is the rate (by total traffic volume) of crashes for which that emphasis area was a contributing factor, by municipality?

The maps for each emphasis area are color coded by the rate of crashes involving that emphasis area, normalized by an estimated traffic volume for each municipality. The full table of estimated volume and number of crashes by municipality is available as Appendix A. The map gives a more fine-grained analysis of where certain emphasis areas are most prevalent and can help municipalities to focus resources on the emphasis areas of greatest concern to them.

3. Of the 22 AASHTO emphasis areas, only 17 are directly measurable with crash data.

What additional emphasis areas overlap more frequently with the emphasis area?

Since a single crash can involve more than one emphasis area, crash data was analyzed to determine what, if any, other emphasis areas disproportionately overlap with the emphasis area. See “Overlapping Emphasis Areas” below for more discussion of this topic.

How are the number of fatalities, serious injuries, and KSI crashes changing over time?

Seven years of data are provided in the accompanying tables for historical context.

What strategies and programs exist to address this emphasis area?

Strategies identified by the RSTF to address each emphasis area are listed in order of priority and grouped by strategy type: education, engineering, enforcement, and policy. A sample of existing programs and policies in the Greater Philadelphia region to address each emphasis area is also listed.

Findings

Table 3.1 presents the results of the emphasis area analysis for the region, sorted by total regional KSI. Total crashes associated with each emphasis area are provided to demonstrate the relative crash exposure of each. This table was presented to the RSTF at the July 2017 meeting; it was accepted by the task force and became the foundation for this plan and a subsequent strategies development session. Note that a 2014 rank is missing for seven of the emphasis areas because they were not included in the 2014 iteration of the plan.

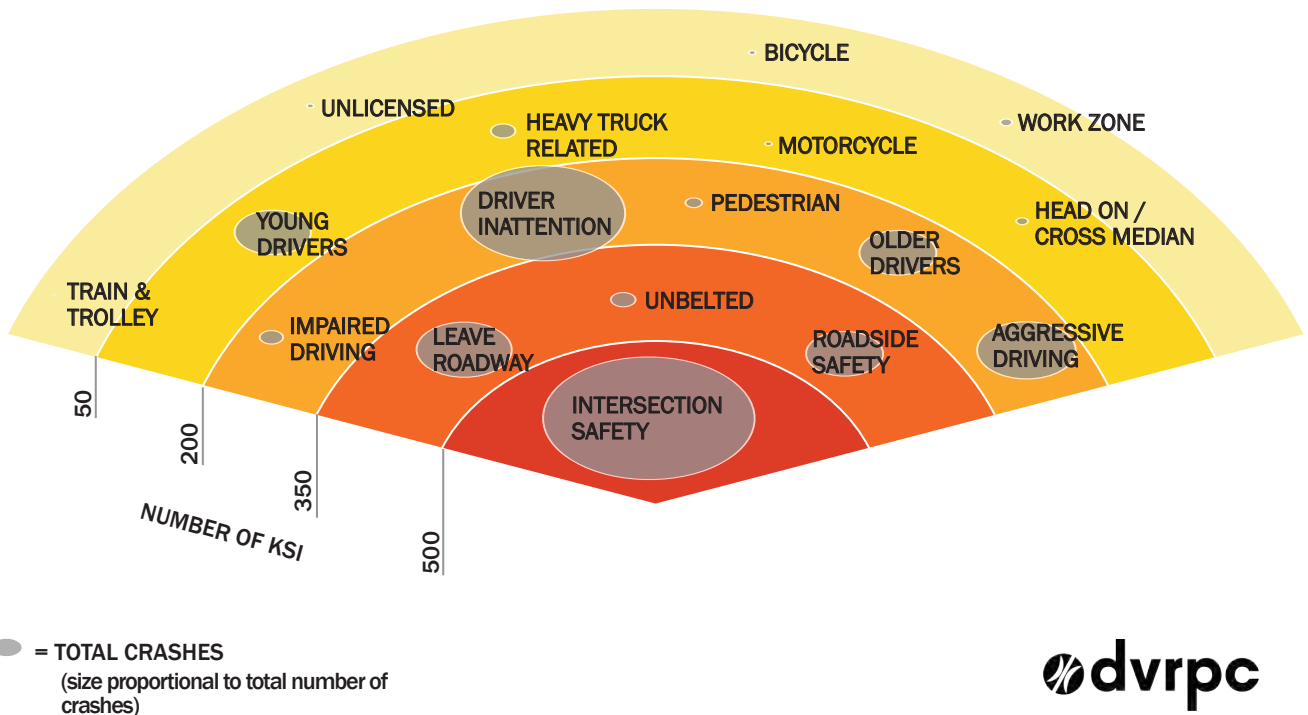
“Intersection Crash” was the emphasis area involved in the most KSI in both the Pennsylvania and New Jersey counties in the Greater Philadelphia region. Figure 3.1 shows how the intersection safety emphasis area is the most critical emphasis area to the region in terms of both KSI and total number of crashes. By showing both the number of KSI as well as the number of total crashes, Figure 3.1 shows the relative importance of each emphasis area in the region by both crash severity (which colored band it falls into), and crash frequency (the size of the gray circle). For instance, the chart demonstrates how “Impaired Driver” and “Driver Inattention” result in a similar number of KSI, but the universe of all “Driver Inattention” crashes is far larger. This speaks to both the likelihood that a given crash will lead to a KSI and the size of the problem that must be addressed (“Driver Inattention” is, in fact, likely underreported and thus should be represented by an even larger circle than is shown in Figure 3.1 if better data collection were possible).

Table 3.1: KSI and Crash Incidence by Emphasis Area, Three-Year Average, 2013–2015

AASHTO Emphasis Area	Total Crashes	KSI (Persons)			2014 Rank
		PA	NJ	Total	
AASHTO #17: Intersection Crash	28,604	372	135	507	3
AASHTO #16: Leave Roadway	15,876	317	133	449	2
AASHTO #15: Run Off Road	12,789	284	126	410	2
AASHTO #08: Unbelted	4,173	252	77	329	5
AASHTO #06: Driver Inattention	27,344	55	193	249	4
AASHTO #05: Impaired Driver	3,945	173	74	247	4
AASHTO #09: Pedestrian	2,800	185	62	247	6
AASHTO #03: Older Drivers	12,839	154	89	243	7
AASHTO #04: Aggressive Driving	16,394	87	156	243	1
AASHTO #11: Motorcyclist	1,195	136	40	175	
AASHTO #01: Young Drivers	12,775	107	55	162	8
AASHTO #18: Head On/Cross Median	1,994	96	39	135	
AASHTO #12: Heavy Truck Related	4,696	53	36	89	
AASHTO #10: Bicycle	993	33	8	41	
AASHTO #19: Work Zone	1,800	16	7	23	
AASHTO #02: Unlicensed	1,395	16	7	22	
AASHTO #14: Train and Trolley	37	2	1	2	

Sources: PennDOT, NJDOT, DVRPC

Figure 3.1: KSI and Crash Incidence by Emphasis Area, Three-Year Average, 2013–2015



Sources: PennDOT, NJDOT, DVRPC

Organizing and Prioritizing

Based on guidance from the crash data analysis, the SHSPs from PennDOT and NJDOT, and members of the RSTF, the 17 AASHTO emphasis areas were distilled into eight first-tier and five second-tier groupings. This allowed for all areas to be considered, at least to some extent. The first-tier emphasis areas, which account for 93 percent of all KSI crashes in the region, are:

- Intersection Safety;
- Lane Departure (combining the Leave Roadway, Run Off Road, and Head On/Cross Median emphasis areas);
- Distracted Driving (or Driver Inattention);
- Aggressive Driving;
- Impaired Driving;
- Pedestrian and Bicyclist Safety (combining the Pedestrian and Bicycle emphasis areas);
- Older Drivers; and
- Young Drivers.

When combined, the first- and second-tier emphasis areas account for 98 percent of KSI crashes in the region. The second-tier emphasis areas are:

- Seat Belt Use (or Unbelted);
- Heavy Truck-Related;
- Motorcycle;
- Work Zone; and
- Train and Trolley.

New for this Edition

This edition represents a significant departure from previous iterations of the TSAP in several respects. First and foremost, this is the first plan to consider all the emphasis areas. This enables the plan to incorporate recommended strategies for all emphasis areas and to show the year-over-year trend. First-tier emphasis areas received greater attention; however, all emphasis areas are addressed. (The one exception is “Unlicensed,” which is also de-emphasized in the NJDOT SHSP.)

In addition, several emphasis areas were moved into newly created categories. The “Leave Roadway,” “Roadside Safety,” and “Head On/Cross Median” emphasis areas were all combined into a single category called, “Lane Departure.” There is a significant amount of overlap between these emphasis areas, both in the strategies to address them and in the crashes for which they are flagged. Conversely, “Distracted Driving” and “Impaired Driving” had previously been combined into a single category; in this iteration of the TSAP they are disaggregated. “Pedestrian” and “Bicycle” are combined into a single category called “Pedestrian and Bicyclist Safety.” While these crashes rarely overlap in reported data, they share many features as “vulnerable users” and are often considered together in safety planning. Finally, “Unbelted” is included, but as a second-tier emphasis area called “Seat Belt Use.” While “Unbelted” results in a high number of KSI, the total number of crashes is relatively small

and the emphasis area was not selected as a topic for special consideration by the RSTF.

The 13 emphasis areas were presented to the RSTF at a Special Strategies Session on July 25, 2017. At the session, all 13 emphasis areas were discussed and strategies developed to address the crash experience corresponding to each one in the region. Those strategies are presented for each emphasis area.

Overlapping Emphasis Area Analysis

Often a crash will involve more than one emphasis area. For example, an impaired driving crash could also involve a young driver. Identifying overlaps between emphasis areas allows planners to pool resources and make strategic investments in countermeasures that are proven to address both emphasis areas.

In order to determine how much each emphasis area overlaps with the others, the number of fatal and injury crashes in the region that fell into any two emphasis areas was calculated (see Appendix C). **This analysis includes all injury crashes rather than just serious injury crashes, in order to create a larger dataset from which to draw conclusions.** Next, the percentage that these coinciding crashes made up of the total number of crashes in each emphasis area was calculated (see Table 3.2).

Note that the percentages add up to more than 100 percent for each emphasis area because a crash can involve more than two emphasis areas. For example, a crash could involve both an unbelted driver and a pedestrian, while also occurring in an intersection. Moreover, note that the x-axis includes only the first-tier emphasis areas, while the y-axis includes both the first-tier and second-tier emphasis areas.⁴ 88 percent of all fatal and injury crashes in the region involve at least one first-tier emphasis area, whereas 95 percent of all fatal and injury crashes in the region involve at least one first-tier or second-tier emphasis area. The emphasis areas on the y-axis are grouped into collision type, road user, and dangerous behavior emphasis areas.

4. Second-tier emphasis areas were only compared with first-tier emphasis areas and not with each other.

These percentages were then divided by the percentage of all fatal and injury crashes that an emphasis area makes up, thus creating a “coincidence ratio” (see Table 3.3). A coincidence ratio above 1 means that two emphasis areas coincided more frequently than the emphasis area’s percentage of all fatal and injury crashes, while a

coincidence ratio below 1 means that two emphasis areas coincided less frequently. For example, aggressive driving crashes make up 17.2 percent of all fatal and injury crashes in the region, but 20.6 percent of fatal and injury crashes involving older drivers. Therefore, aggressive driving and older drivers have a coincidence ratio of 1.20. In Table 3.3,

Table 3.2: Overlapping Emphasis Area Crashes as Percentage of All Fatal and Injury Crashes by Emphasis Area

Emphasis Area	Intersection Safety	Lane Departure	Older Drivers	Young Drivers	Pedestrian & Bicyclist Safety	Impaired Driving	Distracted Driving	Aggressive Driving
Collision Type								
Intersection Safety	—	23.2%	52.1%	47.3%	56.5%	33.7%	39.2%	44.9%
Work Zone	0.8%	1.9%	1.8%	1.7%	0.8%	2.0%	1.6%	3.4%
Lane Departure	11.4%	—	14.0%	22.7%	4.1%	49.9%	20.0%	23.6%
Road User								
Older Drivers	19.6%	10.7%	—	10.9%	10.7%	7.6%	18.7%	20.5%
Young Drivers	15.4%	14.9%	9.4%	—	4.3%	8.5%	17.6%	19.4%
Truck-Related	3.0%	3.4%	4.0%	2.3%	1.6%	2.1%	4.4%	5.7%
Motorcycle	3.3%	6.4%	2.3%	2.4%	0.7%	3.4%	1.9%	3.3%
Train/Trolley	0.1%	0.0%	0.1%	0.0%	0.1%	0.1%	0.1%	0.0%
Pedestrian	10.6%	1.7%	5.5%	2.6%	—	7.6%	3.6%	1.7%
Bicycle	4.2%	0.4%	1.8%	0.8%	—	1.6%	1.5%	0.7%
Dangerous Behavior								
Impaired Driving	4.8%	14.4%	2.9%	3.7%	5.2%	—	6.0%	5.7%
Unbelted	9.1%	13.1%	7.3%	9.7%	7.2%	19.2%	6.5%	6.2%
Distracted Driving	22.2%	22.9%	28.0%	30.5%	10.9%	23.6%	—	19.8%
Aggressive Driving	17.0%	18.0%	20.6%	22.6%	3.7%	15.2%	13.3%	—

Sources: PennDOT, NJDOT, DVRPC

all coincidence ratios greater than 1.10 are bolded. A coincidence ratio greater than 1.10 was considered to be of note and it indicates that two emphasis areas coincided at least 10 percent more frequently than the emphasis area's percentage of all fatal and injury crashes.

Table 3.3: Coincidence Ratios by Emphasis Area

Emphasis Area	Inter-section Safety	Lane Departure	Older Drivers	Young Drivers	Pedestrian & Bicyclist Safety	Impaired Driving	Distracted Driving	Aggressive Driving
Collision Type								
Intersection Safety	—	0.51	1.15	1.04	1.24	0.74	0.86	0.99
Work Zone	0.43	0.99	0.94	0.88	0.44	1.03	0.81	1.76
Lane Departure	0.51	—	0.62	1.01	0.18	2.22	0.89	1.05
Road User								
Older Drivers	1.15	0.62	—	0.64	0.62	0.44	1.09	1.20
Young Drivers	1.04	1.01	0.64	—	0.29	0.57	1.19	1.31
Truck-Related	0.71	0.79	0.92	0.54	0.37	0.48	1.01	1.32
Motorcycle	0.95	1.81	0.66	0.67	0.19	0.97	0.54	0.95
Train/Trolley	1.38	0.35	0.72	0.30	0.76	0.87	0.52	0.33
Pedestrian	1.20	0.20	0.62	0.30	—	0.87	0.41	0.20
Bicycle	1.36	0.14	0.60	0.26	—	0.51	0.47	0.24
Dangerous Behavior								
Impaired Driving	0.74	2.22	0.44	0.57	0.80	—	0.92	0.88
Unbelted	0.97	1.40	0.78	1.03	0.77	2.05	0.70	0.66
Distracted Driving	0.86	0.89	1.09	1.19	0.43	0.92	—	0.77
Aggressive Driving	0.99	1.05	1.20	1.31	0.21	0.88	0.77	—

Sources: PennDOT, NJDOT, DVRPC

Analysis of Coincidence Ratios

As mentioned previously, a coincidence ratio greater than 1.10 was considered to represent a notable overlap between two emphasis areas. The most notable overlap is between impaired driving and lane departure crashes, with a coincidence ratio of 2.22 (see Table 3.3). It can be inferred that impaired drivers are more likely to leave the roadway than non-impaired drivers. Impaired driving crashes also have a notable overlap with seat belt use (unbelted), with a coincidence ratio of 2.05. Likewise, it can be inferred that non-impaired drivers may be more likely than impaired drivers to use their seat belts.

There is a notable overlap between motorcycle and lane departure crashes as well, with a coincidence ratio of 1.81. Motorcyclists may not be more likely to leave the roadway than other road users, but because motorcycles do not afford the same protection as a passenger vehicle, these lane departure crashes are more likely to be fatal or injurious.

Aggressive driving also has a notable overlap with work zone crashes, with a coincidence ratio of 1.76. It is possible that aggressive driving is more common in work zones because speeding is an aggressive driving behavior, and speed limits are often lowered in work zones. It is also possible that because construction workers are exposed in work zones, aggressive driving in work zones is more likely to be fatal or injurious. Aggressive driving crashes also overlapped with crashes involving older drivers, young drivers, and trucks, but all three were less significant compared to the overlap with work zone crashes.

Besides aggressive driving, intersection safety was the emphasis area that overlapped with the most emphasis areas. Crashes involving older drivers, trains and trolleys, and pedestrians and bicyclists each overlapped with intersection crashes, with coincidence ratios of 1.15, 1.38, and 1.24, respectively. In fact, intersection crashes was the only emphasis area with which some of these emphasis areas have a coincidence ratio above 1.10. While

intersection crashes make up 45.5 percent of all fatal and injury crashes in the region, 52.1 percent of fatal and injury crashes involving older drivers and 56.5 percent of fatal and injury crashes involving bicyclists or pedestrians occurred at intersections (see Table 3.2). Vulnerable road users like bicyclists and pedestrians are most exposed at intersections, and intersections can be difficult for older drivers to navigate.

Emphasis Area Summaries

The remainder of this report is devoted to individual considerations of each of the 13 emphasis areas. Each section devoted to a first-tier emphasis area contains a map presenting municipal data, emphasis area KSI significance by county, and trend data by county for years 2010 to 2016. Each section also presents improvement strategies. The second-tier emphasis area sections include trend data, improvement strategies, and current policies in the region.



Intersection Safety

- Philadelphia has both the greatest average KSI and greatest percentage of all KSI in which intersections were a factor.
- Smaller urban areas, such as Burlington City, Chester, Coatesville, Norristown, Princeton, and Pottstown, also have higher rates of intersection KSI than those of surrounding suburban and rural municipalities.

Where Roads Meet

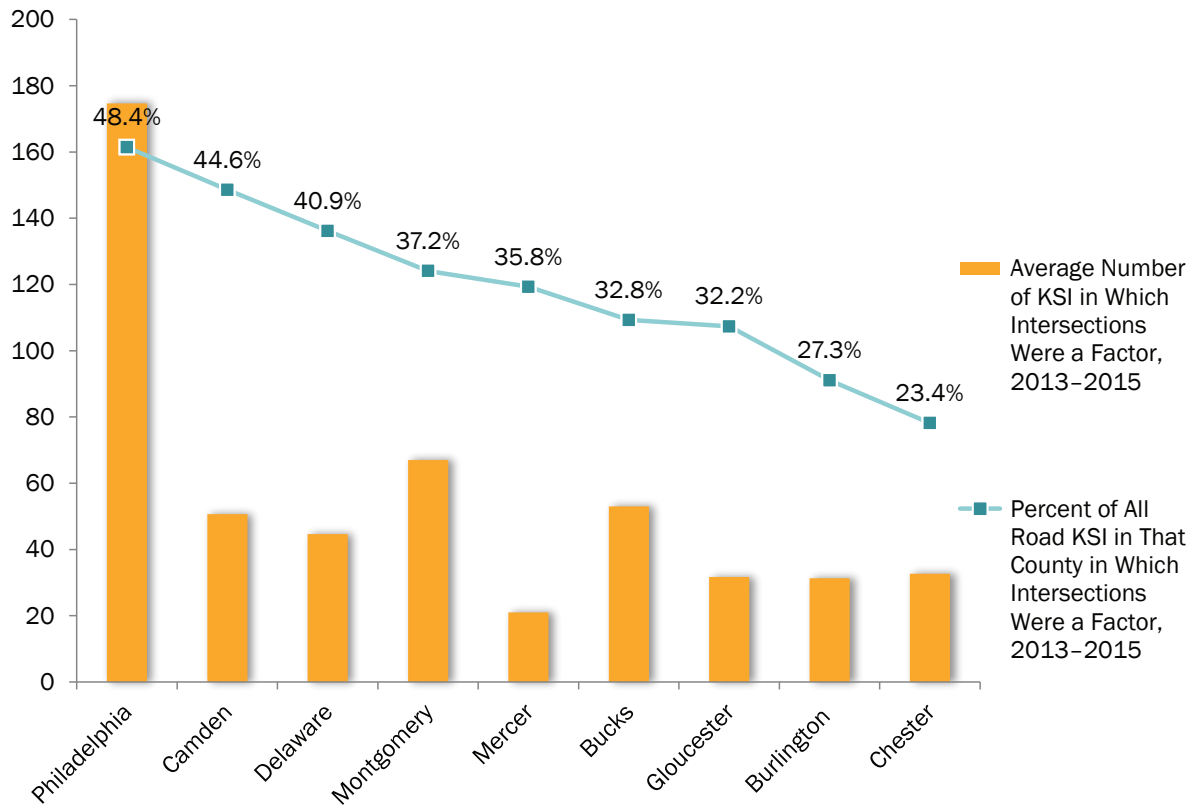
Intersections, despite making up a very small percentage of the surface mileage of all roads in the United States, are the most dangerous part of the road. The FHWA estimates that one-quarter of traffic fatalities and one-half of all traffic injuries, on average, occur at intersections. This is because intersections are where drivers are most likely to come into conflict with each other, as well as with bicyclists and pedestrians. **Thirty-eight percent of all KSI crashes between 2013 and 2015 in the Greater Philadelphia region occurred at intersections.** Changes to intersection design can yield dramatic reductions in crashes. According to the FHWA, converting a four-way signalized intersection to a roundabout may reduce severe crashes by as much as 78 percent.⁵

As seen in Figure 3.2 on the next page, within the region, Philadelphia has both the greatest average KSI and greatest percentage of all KSI in which intersections were a factor. As a percentage of all KSI, however, it is followed closely by Camden and Delaware counties. These are all more urban counties where intersection density is greater. Burlington and Chester counties have the lowest percentage of KSI in which intersections were a factor.

Half of all traffic injuries occur at intersections, according to the FHWA.

5. FHWA Proven Safety Countermeasures.

Figure 3.2: Importance of Reducing Intersection Crashes by County



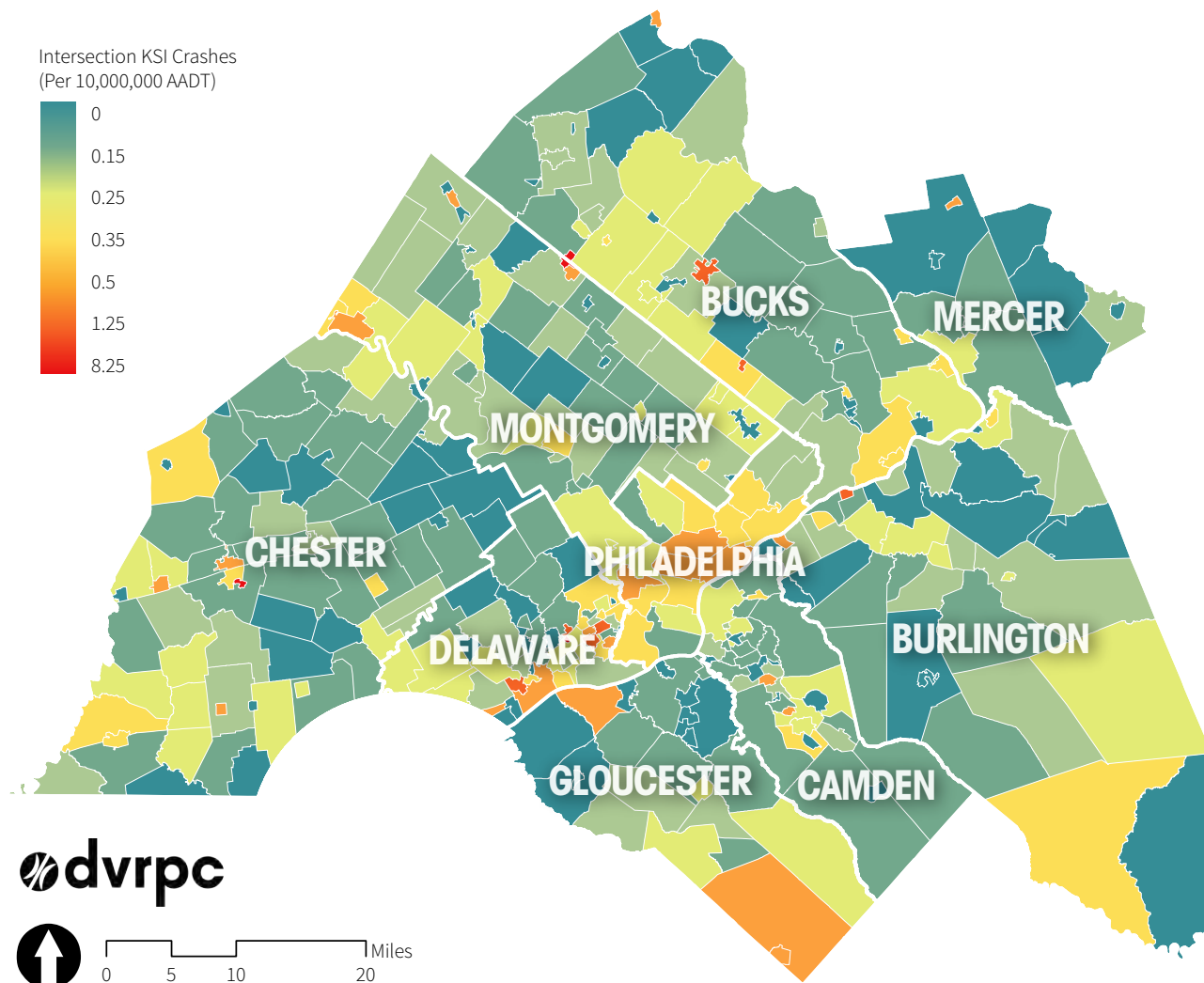
Sources: PennDOT, NJDOT, DVRPC

Rates by Municipality

Figure 3.3, on the next page, maps the rate of KSI crashes that occurred at an intersection by municipality in Pennsylvania and New Jersey (Philadelphia County is broken down by planning district). The map shows that urbanized areas have higher rates of intersection KSI, given the higher road

density in those locations. Even smaller cities and towns, such as Burlington City, Chester, Coatesville, Norristown, Princeton, and Pottstown, have higher rates of intersection KSI than those of surrounding suburban and rural municipalities.

Figure 3.3: Intersection KSI Crash Rate by AADT by Municipality or Planning District (Philadelphia), 2012–2016



Sources: PennDOT, NJDOT, DVRPC

Overlapping Emphasis Areas

Intersection crashes overlapped disproportionately with older driver, train and trolley, and pedestrian and bicyclist crashes (see Table 3.3). Pedestrian and bicyclist crashes made up 11.8 percent of all fatal and injury crashes in the region, compared to 14.8 percent of fatal and injury intersection crashes. The

percent of older driver fatal and injury crashes occurring at intersections was 19.6, compared to 17.1 percent of all fatal and injury crashes that involved an older driver.

Table 3.4 shows the year-over-year trend in KSI by county that occurred at an intersection. The regional trend in KSI at intersections has fluctuated since 2010. In 2016, the number of KSI reached its peak of 606 after a low of 470 in 2015.

Strategies

Table 3.5, on the next page, shows the strategies identified by the RSTF to address intersection KSI in the region. These strategies were drawn from the 2017 Pennsylvania SHSP, the 2015 New Jersey SHSP, DVRPC's 2015 TSAP, and input from participants in the RSTF during a special strategies session held in the summer of 2017. Note that legislative strategies recommended by safety partners do not constitute endorsement by specific agencies. Priority strategies are bolded.

Table 3.4: Trend in KSI That Occurred at an Intersection

County	2010	2011	2012	2013	2014	2015	2016
<i>Burlington</i>	34	41	41	27	45	22	27
<i>Camden</i>	45	51	52	42	71	39	41
<i>Gloucester</i>	41	29	39	28	48	19	25
<i>Mercer</i>	29	28	21	23	28	12	17
New Jersey Total	149	149	153	120	192	92	110
<i>Bucks</i>	64	65	74	58	41	60	80
<i>Chester</i>	43	48	42	35	28	35	50
<i>Delaware</i>	43	47	37	52	41	41	72
<i>Montgomery</i>	58	49	71	72	66	63	106
<i>Philadelphia</i>	179	189	198	166	179	179	188
Pennsylvania Total	387	398	422	383	355	378	496
Regional Total	536	547	575	503	547	470	606
<i>Fatalities</i>	99	114	118	92	118	107	136
<i>Serious Injuries</i>	437	433	457	411	429	363	470

Sources: PennDOT, NJDOT, DVRPC

Table 3.5: RSTF Key Strategies to Promote Intersection Safety in the Greater Philadelphia Region

Key Strategies	Education	Engineering	Enforcement	Policy
Promote and incentivize the use of FHWA’s proven intersection safety countermeasures to local and county roadway owners, (e.g., roundabouts, pedestrian crossing refuge islands, signal back plates with retro-reflective borders), and provide information on funding these improvements.	✓	✓		
Promote systemic analysis of intersections and application of pedestrian safety measures (systemic implementation of low-cost safety improvements yields high value and consistency).			✓	
Promote the benefits of making roadway signage and signalized intersections as clear, simple, and consistent as possible.	✓	✓		
Work with local officials and roadway owners to evolve our transportation networks to better balance competing needs, prioritizing intersection safety, and managing circulation.	✓			✓
Share engineering best practices for pedestrian safety at intersections like Continental crosswalks (zebra crossings), red light cameras, and pedestrian phase signal timing.	✓	✓		
Promote policy that (1) continues to examine intersections to identify appropriate locations to install roundabouts, and (2) include a companion piece that ensures consistent signing at roundabouts and education programs to help new users navigate safely and efficiently.	✓	✓		✓
Research intersections in the region where innovative pedestrian crossing improvements, like all-way stops/Barnes Dances (also known as exclusive pedestrian intervals, where all vehicular traffic is stopped in order to allow pedestrians to cross in all directions) would be appropriate safety improvements.	✓	✓		

Source: DVRPC

Programs and Policies

Table 3.6 identifies a sample of the existing programs and policies in the Greater Philadelphia region to promote intersection safety. Although programs and policies are confined to a single category for the purposes of this document, they may have benefits in multiple categories. Many of the current policies and

programs to address intersection safety reflect the priorities identified in Table 3.5, including NJDOT's focus on installing roundabouts where possible and the use of red light cameras in Philadelphia and Abington Township, Pennsylvania.

Table 3.6: Programs and Policies Available in the Greater Philadelphia Region That Help Promote Intersection Safety

Engineering

Consider roundabouts first for all intersection projects (NJDOT)

Transit First signal prioritization program for buses and trolleys (Southeastern Pennsylvania Transportation Authority [SEPTA])

Locate bus stops on far side of intersection when possible (SEPTA)

Intersection Safety Implementation Plan (PennDOT)

Regional Systemic Pilot Roundabout Program (NJDOT)

Enforcement

Automated Red Light Enforcement [ARLE] (Philadelphia Parking Authority; Abington Township, Pennsylvania)

Traffic signal preemption for emergency vehicles (Burlington County Engineering Department, PA municipalities)

Education

Operation Life Saver program: safety education for at-grade highway and rail grade crossings (NJDOT, PennDOT)

Sources: PennDOT, NJDOT, DVRPC



Lane Departure

- More urbanized counties, like Philadelphia, Montgomery, and Mercer, tend to have a lower proportion of KSI attributable to lane departure.
- The number of regional lane departure KSI decreased significantly between 2010 and 2014 but rose again by 2016.

Driving Off Course

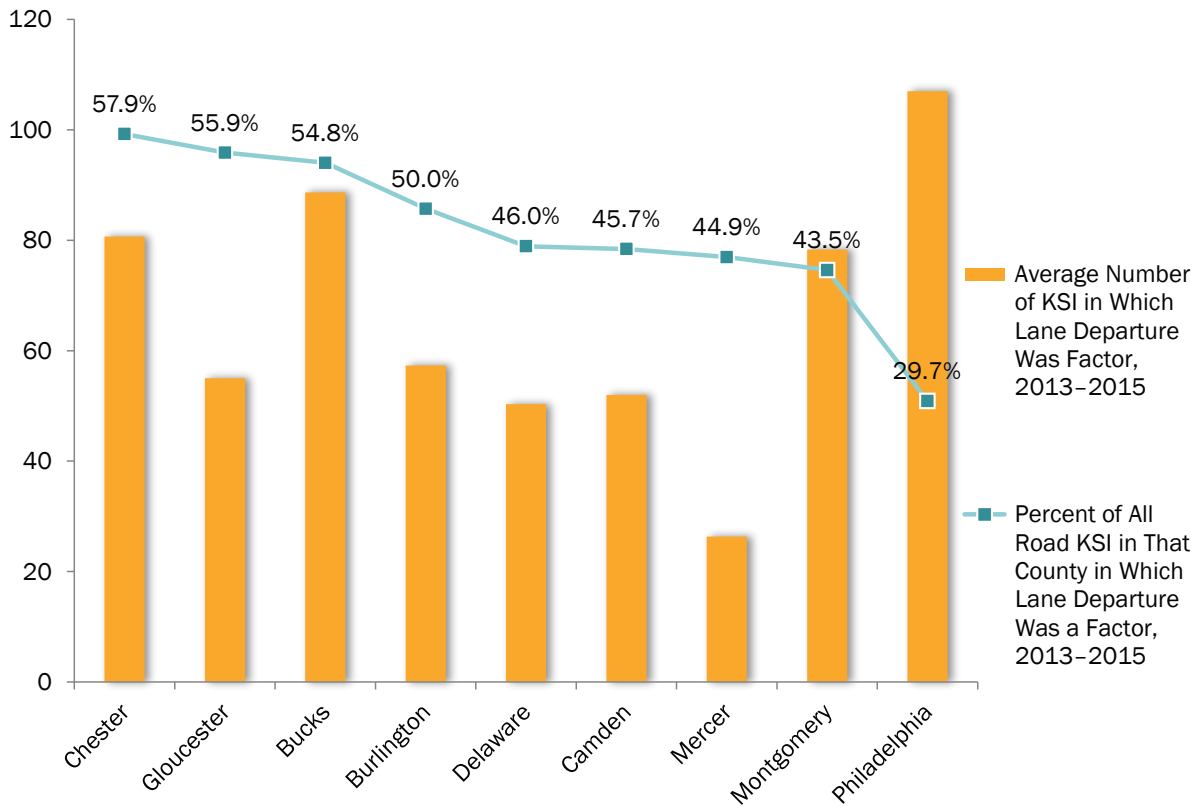
Forty-five percent of all KSI crashes between 2013 and 2015 in the Greater Philadelphia region can be attributed to lane departure, which can be characterized as a vehicle crossing the median, resulting in a head-on crash, or as a vehicle leaving the roadway. Lane departure was a contributing factor in 55 percent of traffic fatalities nationally between 2013 and 2014.

Lane departure warning (LDW) systems are helping to curb this crash type. LDW systems alert drivers when they are drifting out of their lane, and have been found to reduce head-on and single-vehicle injury crashes by 53 percent on roads with speed limits between 45 and 75 miles per hour, and by slightly less, 30 percent, on roads with lower speed limits. However, crash avoidance features will take a long time to be phased in for the general public, given the slow rate of fleet turnover in the United States (the average car is nearly 12 years old).

Figure 3.4 on the next page shows that Chester and Gloucester counties had the greatest percent of KSI attributable to lane departure in the region, followed by Bucks and Burlington counties. More urbanized counties, like Philadelphia, Montgomery, and Mercer, tended to have a lower proportion of KSI attributable to lane departure, despite Philadelphia also having the greatest average number of KSI where lane departure was a factor.

Lane departure was a factor in 55 percent of traffic fatalities from 2013-2014.

Figure 3.4: Importance of Reducing Lane Departure Crashes by County



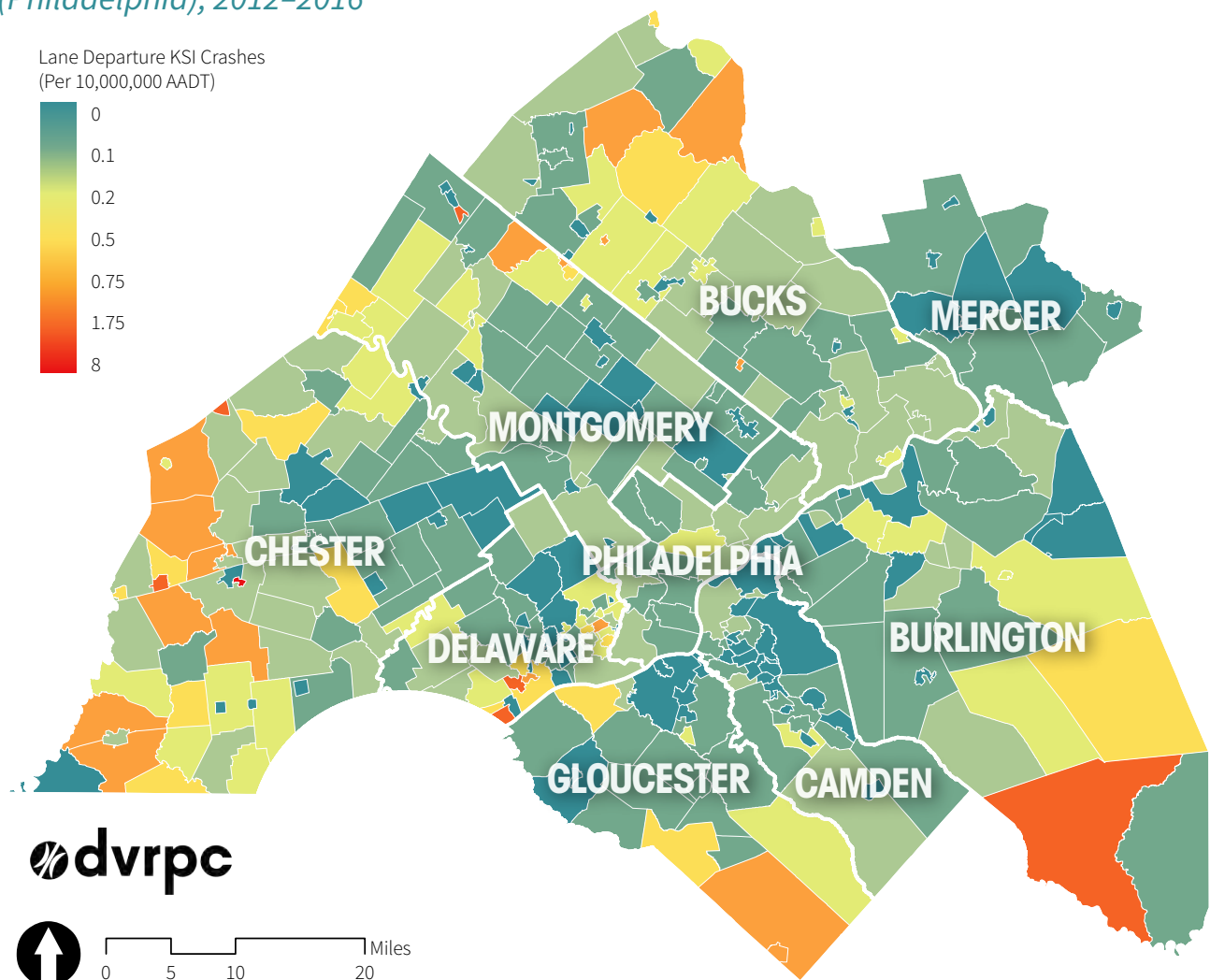
Sources: PennDOT, NJDOT, DVRPC

Rates by Municipality

Figure 3.5, on the next page, maps the rate of KSI crashes where lane departure was a contributing factor by municipality in Pennsylvania and New Jersey (Philadelphia County is broken down by planning district). As lane departure crashes are

more common in less densely developed areas, higher rates of lane departure KSI can be found in more suburban and rural communities, mostly on the periphery of the region. Mercer, Montgomery, and Philadelphia counties have the lowest rates.

Figure 3.5: Lane Departure KSI Crash Rate by AADT by Municipality or Planning District (Philadelphia), 2012–2016



Sources: PennDOT, NJDOT, DVRPC

Overlapping Emphasis Areas

Lane departure crashes overlapped disproportionately with motorcycle, impaired driving, and seat belt use (unbelted) crashes (see Table 3.3). Lane departure and impaired driving crashes had the most disproportionate overlap of any two emphasis areas. Impaired driving is a factor in 6.5 percent of all fatal and injury crashes in the region compared to 14.4 percent of fatal and injury crashes in which lane

departure was also a factor. There is also a noteworthy overlap between lane departure and motorcycle crashes. Motorcyclists are involved in 3.5 percent of all fatal and injury crashes in the region compared to 6.4 percent of fatal and injury crashes in which lane departure was a factor. Drivers were unbelted in 13.1 percent of lane departure crashes compared to 9.3 percent of all fatal and injury crashes in the region.

Table 3.7 shows the year-over-year trend in KSI by county where lane departure was a factor. The regional trend in lane departure KSI has fluctuated

since 2010. The number of lane departure KSI decreased significantly from 746 to 524 between 2010 and 2014 but by 2016 had risen again to 726.

Table 3.7: Trend in KSI Where Lane Departure Was a Factor

County	2010	2011	2012	2013	2014	2015	2016
<i>Burlington</i>	79	87	83	70	37	65	58
<i>Camden</i>	88	53	46	54	42	60	40
<i>Gloucester</i>	60	57	52	61	56	48	54
<i>Mercer</i>	42	30	28	22	30	27	28
New Jersey Total	269	227	209	207	165	200	180
<i>Bucks</i>	95	108	120	93	66	107	137
<i>Chester</i>	110	89	74	78	91	73	98
<i>Delaware</i>	57	70	63	60	42	49	87
<i>Montgomery</i>	99	110	116	92	65	78	119
<i>Philadelphia</i>	116	123	147	95	95	131	105
Pennsylvania Total	477	500	520	418	359	438	546
Regional Total	746	727	729	625	524	638	726
<i>Fatalities</i>	170	192	195	169	153	199	158
<i>Serious Injuries</i>	576	535	534	456	371	439	568

Sources: PennDOT, NJDOT, DVRPC

Strategies

Table 3.8 shows the strategies identified by the RSTF to address lane departure KSI in the region. These strategies were drawn from the 2017 Pennsylvania SHSP, the 2015 New Jersey SHSP, DVRPC’s 2015 TSAP, and input from participants in the RSTF during

a special strategies session held in the summer of 2017. Note that legislative strategies recommended by safety partners do not constitute endorsement by specific agencies. Priority strategies are bolded.

Table 3.8: RSTF Key Strategies to Address Lane Departure Crashes in the Greater Philadelphia Region

Key Strategies	Education	Engineering	Enforcement	Policy
Promote engineering best practices used by NJDOT and PennDOT, or recommended by FHWA (including proven countermeasures) in keeping vehicles on the roadway; incentivize county and local road operators to use them and provide information on grants and other funding opportunities.	✓			
Promote use of edgeline and centerline rumble strips and look to best practices (Minnesota Department of Transportation) for effectiveness of sinusoidal rumble strips—a new technology that reduces ambient noise outside the car. Help promote the benefits of rumble strips as the “sound of safety.”	✓	✓		
Analyze data to identify run-off-the-road and cross-median crash trend locations in the region, specifically on county and local roads as candidate locations for the New Jersey local safety program and PA local safety efforts.	✓	✓		
Promote use of Clear Zones (typically in rural areas) to minimize the consequences of leaving the roadway and to also create space for people to stop if they do leave their lane (in places where the context is appropriate).	✓		✓	
Promote the safety benefits of new in-vehicle technologies like lane keeping, advance their availability in cheaper-model vehicles, and better educate new vehicle owners on how to use these safety features.	✓			✓

Source: DVRPC

Programs and Policies

Table 3.9 identifies a sample of the existing programs and policies in the Greater Philadelphia region to address lane departure crashes. Although programs and policies are confined to a single category for the purposes of this document, they may have benefits in multiple categories. Many of the current policies

and programs to address lane departure crashes reflect the priorities identified in Table 3.8, including NJDOT's and PennDOT's programs to implement FHWA proven safety countermeasures to prevent lane departure crashes.

Table 3.9: Programs and Policies Available in the Greater Philadelphia Region That Help Address Lane Departure Crashes

Engineering

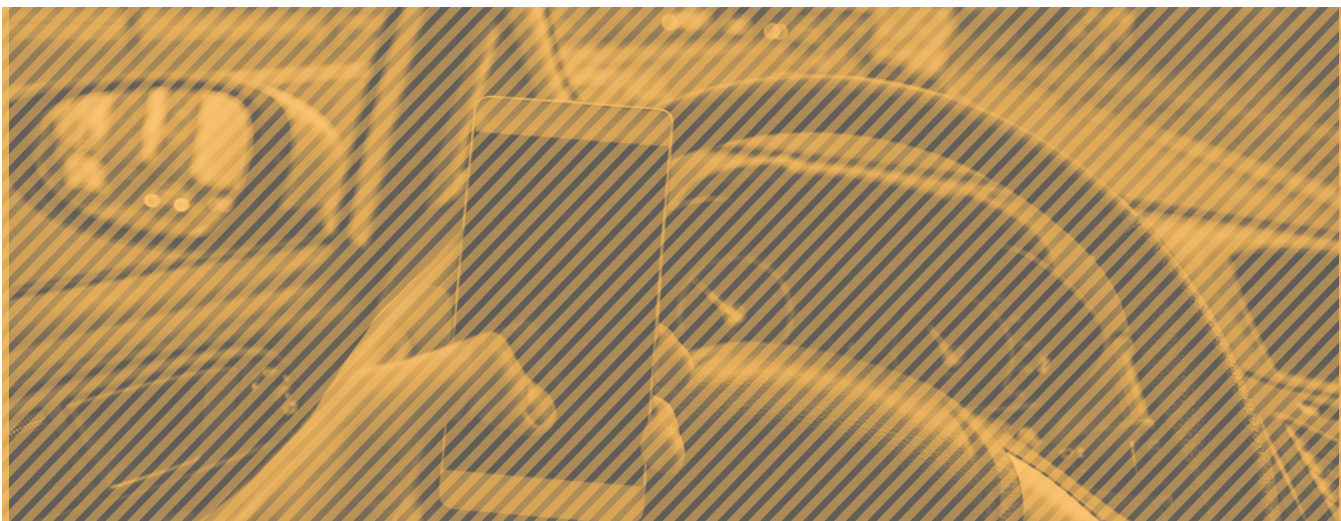
Systemic centerline and edgeline rumble strip initiative (NJDOT)

Roadway Departure Implementation Plan and High Friction Surface Treatment Program; safety edge requirement on all resurfacing, rehabilitation, and restoration projects; and highway cable median barrier applications (PennDOT)

Annual roadway resurfacing and restriping program (New Jersey and Pennsylvania counties, state DOTs)

New Jersey Regional Curve Inventory and Safety Assessment (New Jersey counties)

Sources: PennDOT, NJDOT, DVRPC



Distracted Driving

- Within each state, distracted driving crashes have fluctuated over the past five years, with any drops quickly erased in subsequent years.
- Distracted driving data differs markedly between Pennsylvania and New Jersey, making regional comparisons difficult to perform.

Staying Focused

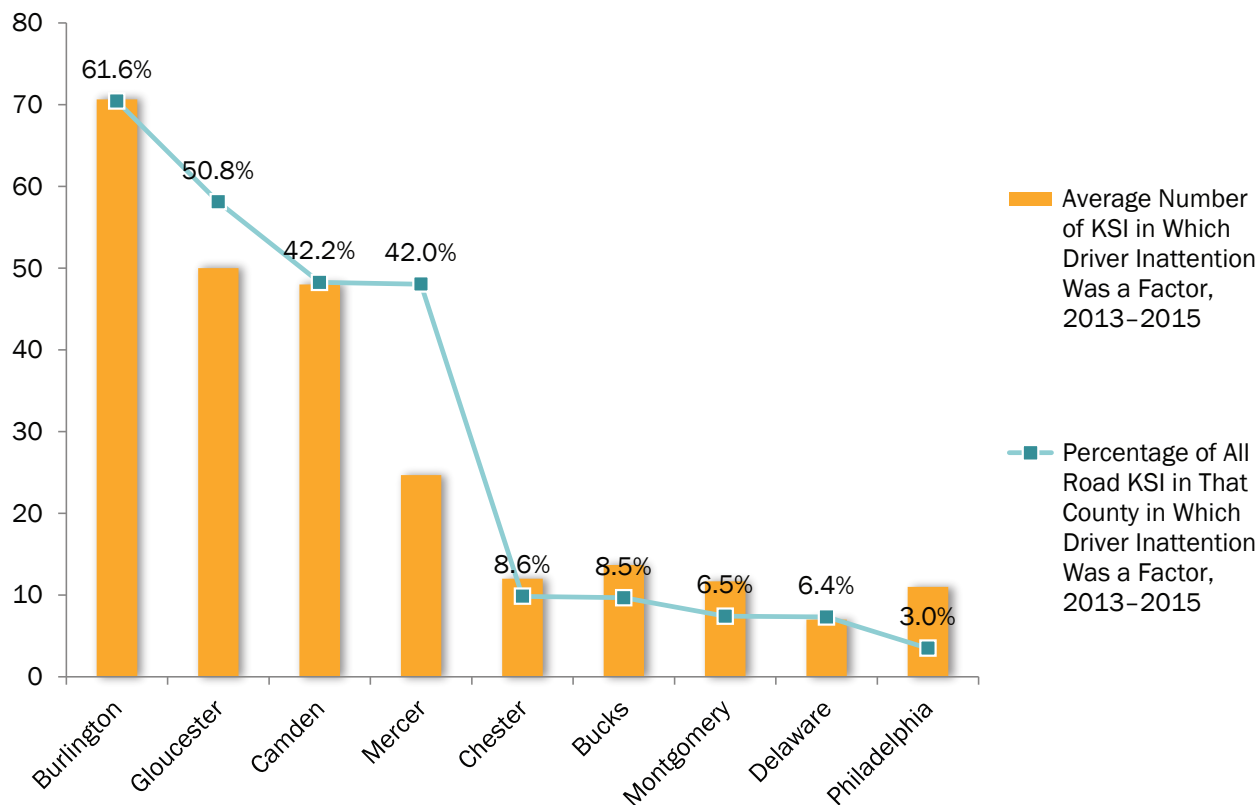
Distracted driving is any non-driving activity that could divert a person's attention away from the primary task of driving. While distractions can include anything from eating to looking at billboards, cell phone use is an increasing concern as a contributor to distracted driving. Distracted driving can be difficult to analyze because of underreported crash data. The National Safety Council found that many fields relevant to distracted driving crashes—such as texting while driving—are not included on crash forms, and even when relevant fields are available, police inconsistently record cell phone use. In addition, laws that apply to distracted driving differ by state. In New Jersey, use of a mobile device while driving has been banned since 2004. Pennsylvania banned texting while driving in 2012, but other uses of handheld mobile devices remain legal. This may contribute to differences in data collection because

police are more likely to assign a contributing factor to a crash if the behavior is illegal.

Distracted driving was a contributing factor in 33 percent of annual KSI in the region, on average, for the period 2013–2015. The data associated with distracted driving, however, is very different between the Pennsylvania and New Jersey sub-regions. In the New Jersey sub-region, distracted driving (listed as “Driver Inattention”) is reported as a contributing factor in 50.2 percent of KSI, while in the Pennsylvania sub-region, it is reported as a contributing factor in just 5.8 percent of KSI.

The differences in the definition and frequency of citation of distracted driving violations between New Jersey and Pennsylvania make comparison between counties in different states extremely difficult. Nevertheless, Figure 3.6 shows that within New

Figure 3.6: Importance of Reducing Distracted Driving by County



Sources: PennDOT, NJDOT, DVRPC

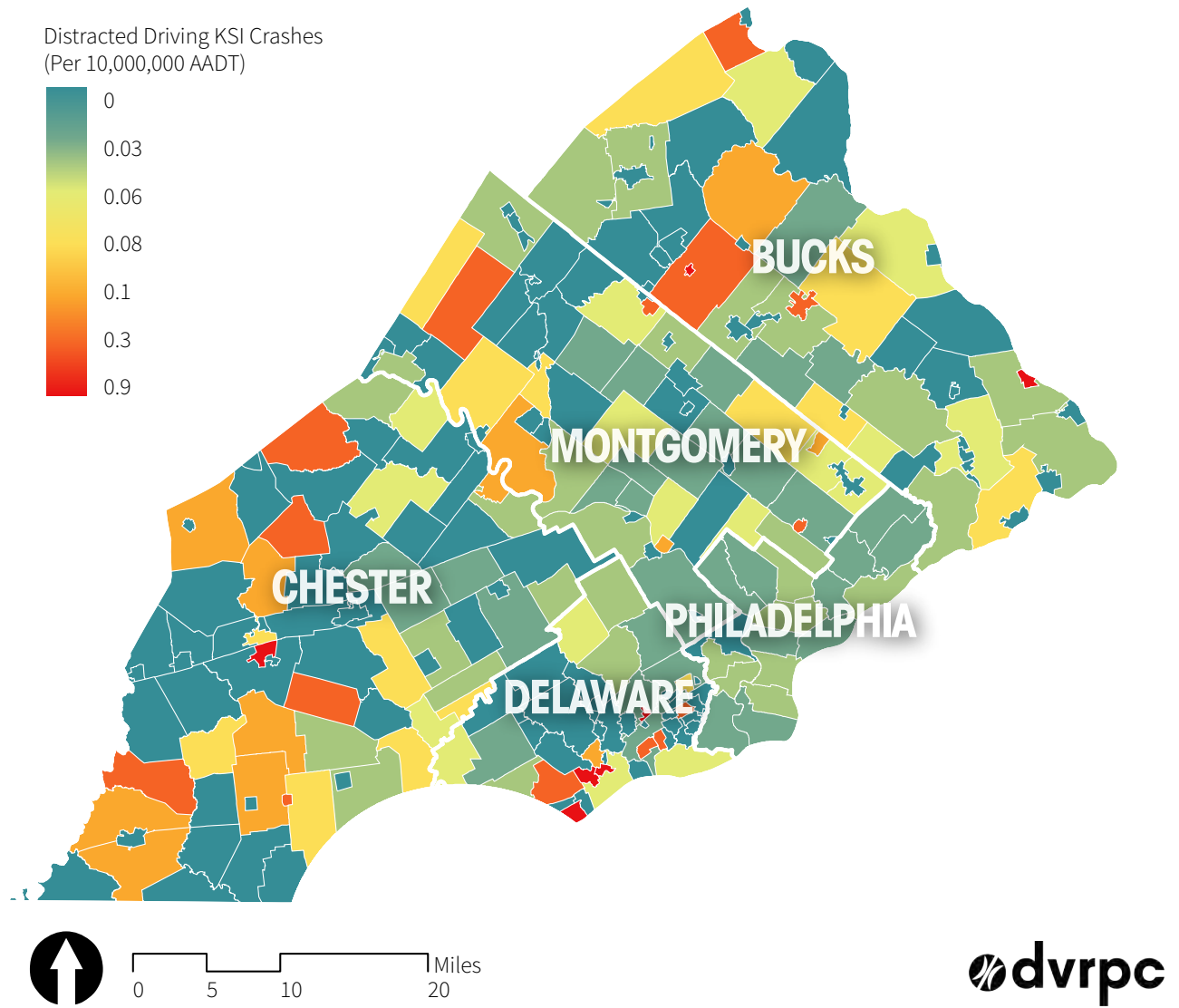
Jersey, Burlington County had the greatest number and greatest percentage of KSI attributable to driver inattention, followed by Gloucester, Camden, and Mercer counties. In Pennsylvania, Bucks County had the greatest number of average KSI per year attributable to distracted driving, but Chester County had the greatest proportion of KSI. Philadelphia County had the second-lowest average KSI per year attributed to distraction (followed by Delaware County) and the lowest proportion of all counties in the region.

County is broken down by planning district); Figure 3.8 displays distracted driving KSI rates in New Jersey. Similar to Figure 3.6, the maps show how Burlington and Gloucester counties in New Jersey and Chester and Bucks counties in Pennsylvania have the highest KSI rates in their respective states. Philadelphia has the lowest rate in Pennsylvania, while Mercer County has the lowest rate in New Jersey. The maps also identify locations with high distracted driving KSI rates within counties that have generally lower rates overall, and vice versa.

Rates by Municipality

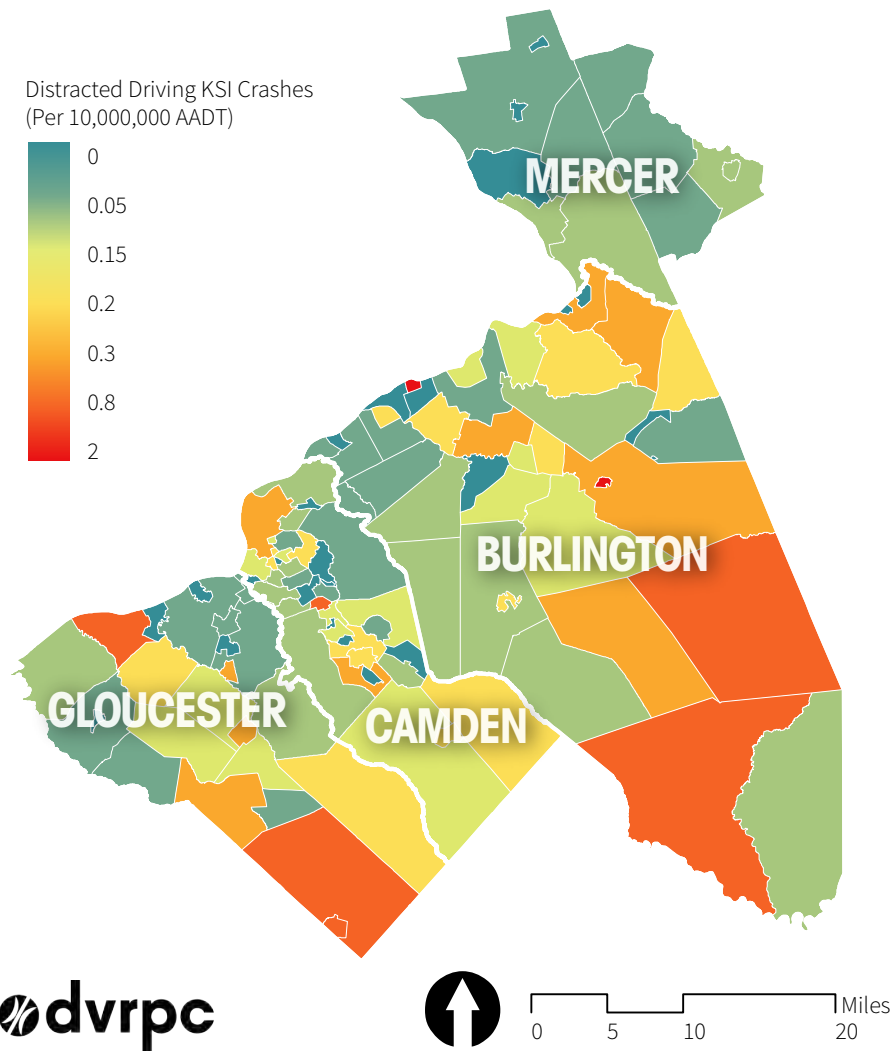
Figure 3.7, on the next page, maps the rate of KSI crashes where distracted driving was a contributing factor by municipality in Pennsylvania (Philadelphia

Figure 3.7: Distracted Driving KSI Crash Rate by AADT by Municipality or Planning District (Philadelphia), 2012–2016 (Pennsylvania)



Sources: PennDOT, DVRPC

Figure 3.8: Distracted Driving KSI Crash Rate by AADT by Municipality, 2012–2016 (New Jersey)



0 5 10 20 Miles

Sources: NJDOT, DVRPC

Overlapping Emphasis Areas

The only emphasis area with which distracted driving crashes overlapped disproportionately is young driver crashes (see Table 3.3). Young drivers, aged 16 to 20, are involved in 14.8 percent of all fatal and injury

crashes in the region, compared to 17.6 percent of fatal and injury crashes in which distracted driving was a factor.

Table 3.10 shows the year-over-year trend in KSI by county where distracted driving was a factor. The regional trend in distracted driving KSI has fluctuated

since 2010. Starting in 2015, the number of KSI rose again after experiencing a significant drop from 2012 to 2013.

Table 3.10: Trend in KSI Where Distracted Driving Was a Factor

County	2010	2011	2012	2013	2014	2015	2016
<i>Burlington</i>	62	71	63	59	36	60	60
<i>Camden</i>	72	61	60	42	50	52	45
<i>Gloucester</i>	43	46	37	47	61	42	43
<i>Mercer</i>	44	33	36	30	31	13	24
New Jersey Total	221	211	196	178	178	167	172
<i>Bucks</i>	14	18	19	12	14	15	20
<i>Chester</i>	13	11	10	16	8	12	22
<i>Delaware</i>	4	1	9	9	6	6	9
<i>Montgomery</i>	15	19	28	16	6	13	19
<i>Philadelphia</i>	20	7	19	8	9	16	12
Pennsylvania Total	66	56	85	61	43	62	82
Regional Total	287	267	281	239	221	229	254
<i>Fatalities</i>	58	54	61	71	61	65	65
<i>Serious Injuries</i>	229	213	220	168	160	164	189

Sources: PennDOT, NJDOT, DVRPC

Cell phone use is a major focus of distracted driving prevention measures. Both Pennsylvania and New Jersey currently provide a field for cell phone use on their crash reporting forms. In Pennsylvania, this field is specifically tied to driver distraction as a contributing factor to the crash. In New Jersey, however, the field was not connected to distraction as a contributing factor through 2016; the updated crash reporting form does, and this will be reflected in 2017 data.

Table 3.11 shows the trend in KSI in crashes where cell phone use was reported. These figures are a small portion of the total KSI from distracted driving crashes (as previously noted, however, they are not necessarily a subset of the distracted driving crashes in New Jersey). It suggests that cell phone use in KSI crashes may be underreported in the region, and that better data collection methods may be needed in order to accurately capture the incidence of KSI crashes to which cell phone use contributed.

Table 3.11: Trend in KSI Crashes Where Cell Phone Use Was Reported

		2012	2013	2014	2015	2016
Pennsylvania	<i>Fatalities</i>	2	2	3	1	1
	<i>Serious Injuries</i>	7	4	7	6	11
	<i>KSI</i>	9	6	10	7	12
New Jersey	<i>Fatalities</i>	2	2	1	2	1
	<i>Serious Injuries</i>	4	3	2	2	2
	<i>KSI</i>	6	5	3	4	3
Region	<i>Fatalities</i>	4	4	4	3	2
	<i>Serious Injuries</i>	11	7	9	8	13
	<i>KSI</i>	15	11	13	11	15

Sources: PennDOT, NJDOT, DVRPC

Strategies

The RSTF is addressing distracted driving as a standalone emphasis area for the first time in the current TSAP cycle (previously, distracted driving was combined with impaired driving). Table 3.12 shows the strategies identified by the RSTF to address distracted driving in the region. These strategies were drawn from the 2017 Pennsylvania SHSP, the

2015 New Jersey SHSP, DVRPC's 2015 TSAP, and input from participants in the RSTF during a special strategies session held in the summer of 2017. Note that legislative strategies recommended by safety partners do not constitute endorsement by specific agencies. Priority strategies are bolded.

Table 3.12: RSTF Key Strategies to Address Distracted Driving in the Greater Philadelphia Region

Key Strategies	Education	Engineering	Enforcement	Policy
Encourage traffic calming, rumble strips, and other engineering treatments to reduce crashes from distracted or drowsy driving.		✓		
Promote wider enforcement of existing laws and help identify financing for targeted police details.			✓	
Promote laws and outreach campaigns implemented to reduce distracted driving and evaluate their effectiveness.	✓			✓
Promote policy change to better align Pennsylvania with New Jersey by making talking on a hand-held cell phone while driving an offense (texting while driving is a primary offense in Pennsylvania).				✓
Coordinate with appropriate road owners on analysis to identify opportunities to create and promote safe pull-over areas for people to text/talk (NJDOT Safe Phone Zones).		✓		
Promote organizations with successful bans on cell phone use while driving, and share model policy guidelines that others may use. Work with TMAs to encourage employers to institute distracted driving policies effective during work hours.	✓			
Promote better advertising to alert drivers of laws and their consequences as they cross from state to state, like the ban on texting while driving in Pennsylvania; explore technologies to alert drivers of these laws and their consequences to promote safer driving.	✓			
Share distracted driving educational resources and use social media widely as an outlet for messaging.	✓			

Source: DVRPC

Programs and Policies

Table 3.13 identifies a sample of the existing programs and policies in the Greater Philadelphia region to address distracted driving. Although programs and policies are confined to a single category for the purposes of this document, they may have benefits in multiple categories. Many of the current policies and

programs to address distracted driving reflect the priorities identified in Table 3.12, such as NJDHTS's UDrive. UText. UPay Distracted Driving Enforcement Campaign.

Table 3.13: Programs and Policies Available in the Greater Philadelphia Region That Help Address Distracted Driving Crashes

Engineering

Safe Phone Zone program (NJDOT in partnership with GEICO)

Enforcement

Ban on texting while driving (Pennsylvania)

U Drive. U Text. U Pay Distracted Driving Enforcement Campaign (NJDHTS)

Ban on handheld cell phone use while driving, as well as all cell phone use for school bus drivers, learner's permit, and intermediate license holders while driving (New Jersey)

Education

STOP Distracted Driving Campaign (3D Collision Centers and TPS Graphics)

Distracted Driving Mobilization (NJDHTS)

Distracted and drowsy driving program (Mid-Atlantic Foundation for Safety and Education)

Policy kit for companies interested in restricting cell phone use for their employees (National Safety Council)

Sources: PennDOT, NJDOT, DVRPC



Aggressive Driving

- New Jersey and Pennsylvania have different definitions for aggressive driving; as a result, fewer KSI are attributed to aggressive driving in Pennsylvania than in New Jersey.
- Automated speed enforcement (ASE) and red light cameras are becoming effective tools in preventing aggressive driving crashes; unfortunately, the implementation of ASE throughout the Greater Philadelphia region is politically complicated.

Slow Down!

Aggressive driving is defined by NHTSA as performing at least two of a number of dangerous and often illegal actions, such as running a stop sign or red light, passing in a no-passing zone, and speeding (see DVRPC's Municipal Implementation Tool, *Speeding and Traffic Safety*, for more information on the dangers of speeding). Pennsylvania has adopted this definition of aggressive driving, whereas New Jersey defines aggressive driving as performing at least one of these actions. As a result, New Jersey appears to have many more aggressive driving crashes than Pennsylvania. In New Jersey, aggressive driving was a factor in 35–45 percent of KSI crashes, whereas in Pennsylvania, aggressive driving contributed to only 7–13 percent of KSI crashes. Regardless of how each state defines aggressive driving, aggressive driving KSI crashes have been on the decline. In New Jersey, there has been an 11 percent decline in aggressive driving KSI crashes between 2010–2012

and 2013–2015. In Pennsylvania, there was a 29 percent decrease between the same time periods.

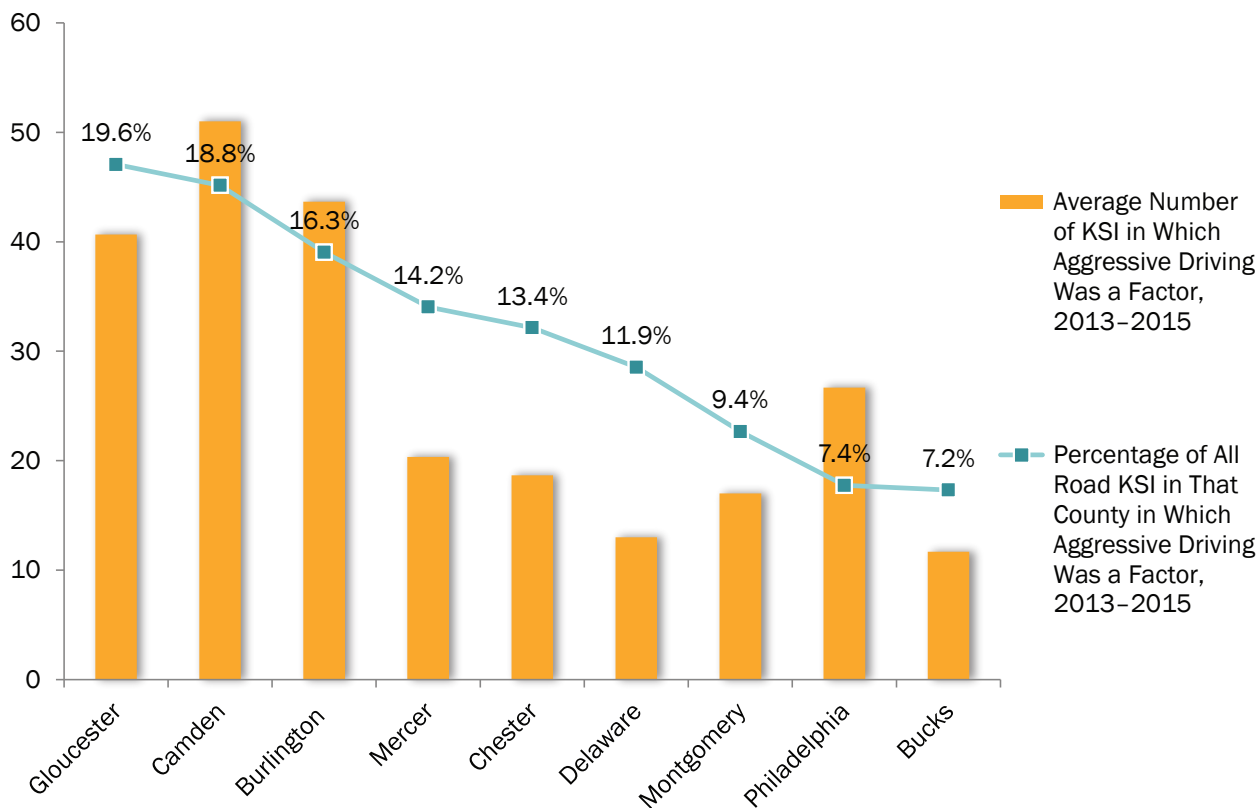
Despite this apparent reduction in aggressive driving KSI crashes, **aggressive driving was a factor in 18 percent of KSI crashes between 2013 and 2015 in the Greater Philadelphia region** and therefore remains a major issue that needs to be addressed in order to promote safety in the Greater Philadelphia region. Emerging technologies, such as automated speed enforcement (ASE) and red light cameras, are becoming effective tools in preventing aggressive driving crashes in various places in the United States and beyond. ASE has been found to reduce average speeds by up to 15 percent, with a resulting decrease in crashes of up to 49 percent. In Pennsylvania, Senate Bill 172 recently authorized the use of ASE in work zones as well as along Roosevelt Boulevard in Philadelphia. Unfortunately, ASE is prohibited in New

Jersey, which complicates the implementation of ASE throughout the Greater Philadelphia region.

Pennsylvania also has an Automated Red Light Enforcement Program (ARLE). Since ARLE began in 2002, 30 intersections in Philadelphia and three intersections in Montgomery County have been equipped with red light cameras. Revenue generated from fines has funded millions of dollars in traffic safety improvements statewide. Moreover, the number of injuries at ARLE intersections in Philadelphia decreased 30 percent between 2010 and 2015, compared to just 9 percent at non-ARLE intersections. New Jersey began a five-year pilot red light camera program in 2009, but at the conclusion of the pilot, the program was not renewed.

The differences in the definition and frequency of citation of aggressive driving violations between New Jersey and Pennsylvania make comparison between counties in different states extremely difficult. Figure 3.9 shows that within New Jersey, Camden County had the greatest number of KSI attributable to aggressive driving, but the second-greatest percentage of all KSI after Gloucester County. In Pennsylvania, Chester County had the greatest percentage of KSI attributable to aggressive driving, followed by Delaware County. Philadelphia County had the largest average number of KSI attributable to aggressive driving among the Pennsylvania counties, but the second-lowest proportion of all counties, virtually tied with Bucks County.

Figure 3.9: Importance of Reducing Aggressive Driving by County



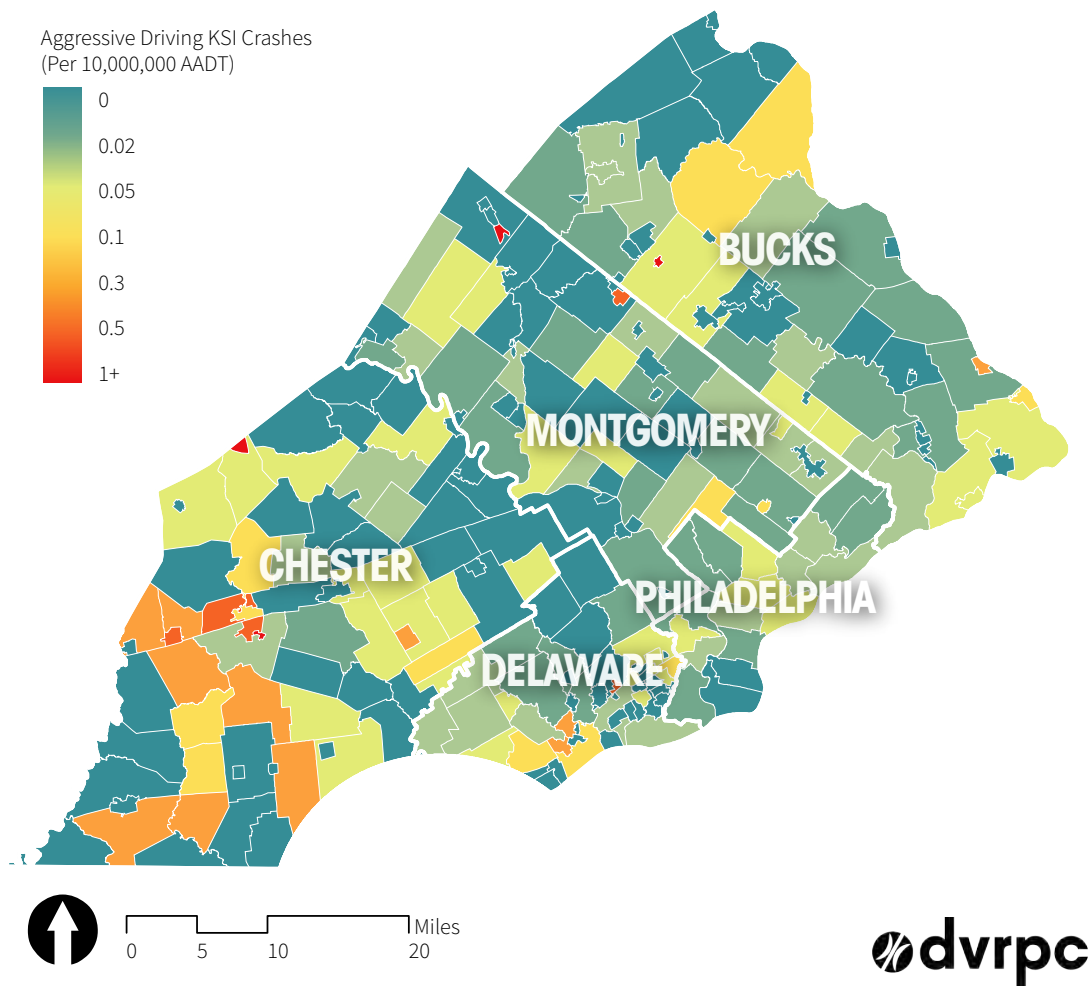
Sources: PennDOT, NJDOT, DVRPC

Rates by Municipality

Figure 3.10 maps the rate of KSI crashes where aggressive driving was a contributing factor by municipality in Pennsylvania (Philadelphia County is broken down by planning district); Figure 3.11 displays aggressive driving KSI rates in New Jersey. Chester County has the highest aggressive driving rate in Pennsylvania, while Gloucester, Camden, and Burlington counties in New Jersey each have high rates of aggressive driving. Providing this data at the

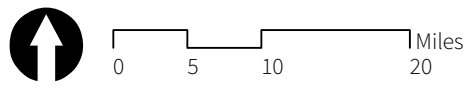
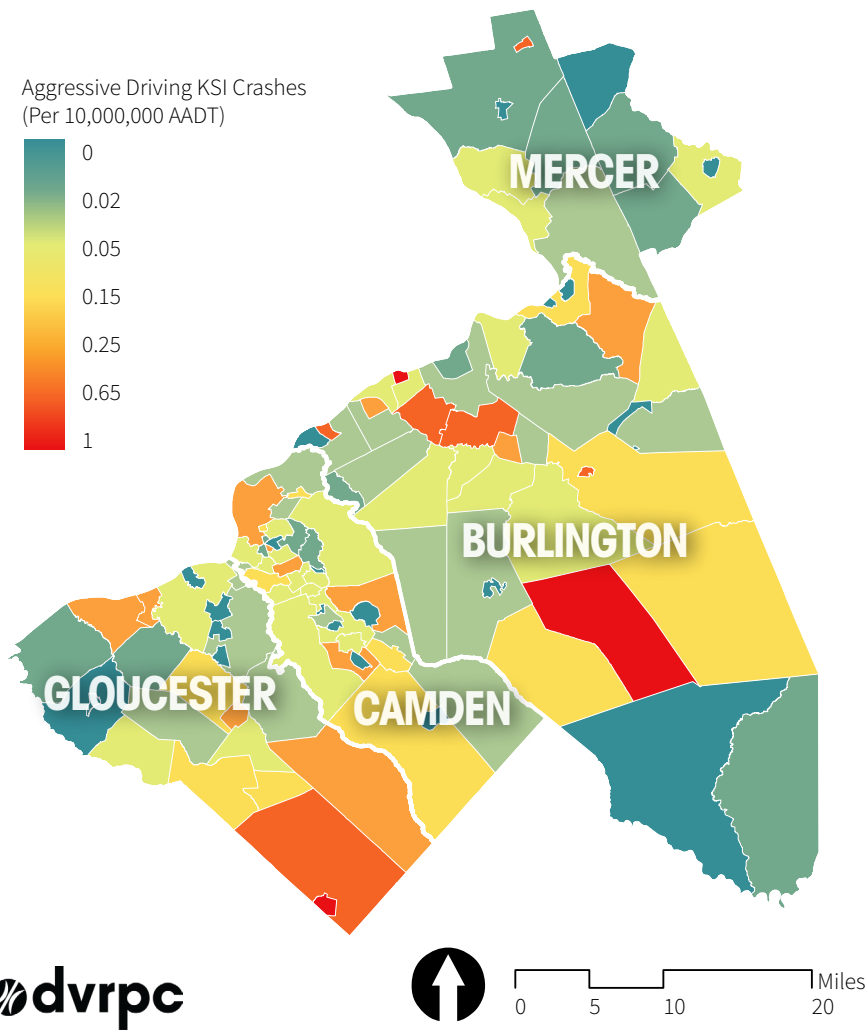
municipal level helps local police to identify trends for more targeted enforcement.

Figure 3.10: Aggressive Driving KSI Crash Rate by AADT by Municipality or Planning District (Philadelphia), 2012–2016 (Pennsylvania)



Sources: PennDOT, DVRPC

Figure 3.11: Aggressive Driving KSI Crash Rate by AADT by Municipality, 2012–2016 (New Jersey)



Source: NJDOT, DVRPC

Overlapping Emphasis Areas

Aggressive driving crashes overlapped disproportionately with work zone, heavy truck-related, young driver, and older driver crashes (see Table 3.3). Young drivers were involved in 14.8 percent of all fatal and injury crashes in the region, compared to 19.4 percent of fatal and injury crashes in which

aggressive driving was a factor. Older drivers were involved in 17.1 percent of all fatal and injury crashes in the region, compared to 20.5 percent of fatal and injury crashes in which aggressive driving was a factor.

Table 3.14 shows the year-over-year trend in KSI by county where aggressive driving was a factor. The regional trend in aggressive driving KSI has fluctuated since 2010. In 2016, the number of KSI rose again after experiencing a significant drop from 2014 to 2015.

Strategies

Table 3.15, on the next page, shows the strategies identified by the RSTF to address aggressive driving in the region. These strategies were drawn from the 2017 Pennsylvania SHSP, the 2015 New Jersey SHSP, DVRPC's 2015 TSAP, and input from participants in the RSTF during a special strategies session held in the summer of 2017. Note that legislative strategies recommended by safety partners do not constitute endorsement by specific agencies. Priority strategies are bolded.

Table 3.14: Trend in KSI Where Aggressive Driving Was a Factor

County	2010	2011	2012	2013	2014	2015	2016
<i>Burlington</i>	59	60	54	44	54	33	36
<i>Camden</i>	38	58	56	49	55	49	38
<i>Gloucester</i>	34	39	39	41	56	25	32
<i>Mercer</i>	38	29	21	18	25	18	15
New Jersey Total	169	186	170	152	190	125	121
<i>Bucks</i>	22	25	29	13	6	16	26
<i>Chester</i>	24	33	22	19	19	18	26
<i>Delaware</i>	12	15	14	15	12	12	11
<i>Montgomery</i>	20	25	18	16	18	17	25
<i>Philadelphia</i>	29	35	43	26	28	26	38
Pennsylvania Total	107	133	126	89	83	89	126
Regional Total	276	319	296	241	273	214	247
<i>Fatalities</i>	74	98	91	81	63	69	66
<i>Serious Injuries</i>	202	221	205	160	210	145	181

Sources: PennDOT, NJDOT, DVRPC

Table 3.15: RSTF Key Strategies to Address Aggressive Driving in the Greater Philadelphia Region

Key Strategies	Education	Engineering	Enforcement	Policy
Look for opportunities to implement, incentivize, and publicize engineering and technology strategies, such as traffic calming and road diets, that can help reduce aggressive driving.	✓	✓		
Provide information and analysis to inform policy discussions that address aggressive driving and its elements, such as helping New Jersey move toward the NHTSA definition of aggressive driving; helping advance use of radar for local police in Pennsylvania and advocating best practices modeled on Pennsylvania State Police radar use; and promoting expanded use of automated enforcement in Pennsylvania following Senate Bill 172, which recently authorized the use of speed cameras in work zones and along Roosevelt Boulevard in Philadelphia, as well as promoting the passage of similar legislation in New Jersey.				✓
Support the long-term need for culture change around aggressive driving by communicating to the public what aggressive driving behaviors are and why they are so dangerous, including correlation between higher speeds and higher-severity crashes, as well as the need to adjust driving to conditions/contexts.	✓			
Promote existing technologies and programs for reporting aggressive driving, like NJ's #77 Aggressive Driving Hotline; research easier and safer ways to report, like online forms or a voice-activated smart phone application; and use the report findings to target enforcement by location.	✓		✓	
Educate people on defensive driving around aggressive drivers to avoid escalating potentially dangerous situations. Piggyback on existing programs to promote aggressive driving prevention measures.	✓			
Share and promote aggressive driving campaigns (e.g., Put the Brakes on Fatalities Day, Spread The Love Let Somebody Merge, etc.) on websites, email blast, social media, etc., and use variable message signs to track severe crash trends by location to raise awareness.	✓			
Further publicize enforcement campaigns and special policing (like DUI check points) to increase their effectiveness and help disseminate factual information about enforcement.				✓
Better promote the fines and penalties resulting from speeding violations (e.g., penalties doubled in work zones, etc).	✓		✓	

Source: DVRPC

Programs and Policies

Table 3.16 identifies a sample of the existing programs and policies in the Greater Philadelphia region to address aggressive driving. Although programs and policies are confined to a single category for the purposes of this document, they may have benefits in multiple categories. Many of the current policies and programs to address aggressive driving reflect the priorities identified in Table 3.15, including New

Jersey State Police's #77 Aggressive Driving Hotline, to report aggressive driving and aggressive driving crashes; the NJDHTS's Put the Brakes on Fatalities Day, to raise awareness of aggressive driving; and the use of red light cameras in Philadelphia and Abington Township, Pennsylvania.

Table 3.16: Programs and Policies Available in the Greater Philadelphia Region That Help Address Aggressive Driving Crashes

Engineering
Speed Management Action Plan (PennDOT)
Enforcement
Red-Light Running Automated Enforcement (Philadelphia Parking Authority, Abington Township)
US 130 Burlington County aggressive driving enforcement project (NJDHTS)
#77 Aggressive Driving Hotline (New Jersey State Police)
Safe Corridors enforcement program (New Jersey State Police)
Pennsylvania Aggressive Driving Enforcement and Education Project (Pennsylvania State Police and PennDOT)
Automated Speed Enforcement in Work Zones (PennDOT and Pennsylvania Turnpike Commission; the program also permits the City of Philadelphia to install speed cameras along Roosevelt Boulevard)
Education
Put the Brakes on Fatalities Day (NJDHTS)

Sources: PennDOT, NJDOT, DVRPC



Impaired Driving

- Drugged driving fatalities have increased substantially; in response, NHTSA launched its Drug-Impaired Driving Initiative in January 2018.
- In the Greater Philadelphia region, impaired driving crashes tend to represent the greatest proportion of all KSI in more rural counties and they tend to involve lane departure and unbelted drivers or passengers.

Responsible Behavior

Impaired driving is defined as driving under the influence of alcohol or drugs, whether they are illegal, prescription, or over-the-counter drugs. Nationally, alcohol-impaired driving contributed to 28 percent of traffic fatalities in 2016, resulting in approximately 10,500 deaths, which represents a 20 percent decrease from the number of deaths caused by impaired driving in 2007. This decrease can be attributed in part to the success of groups such as Mothers Against Drunk Driving (MADD) and high-visibility and targeted enforcement campaigns (DUI checkpoints).

More recently, however, the number of alcohol-related traffic fatalities per year has not been decreasing; in fact, the number of alcohol-related traffic fatalities has increased year-over-year since 2014. This has led some states to consider lowering the legal blood alcohol limit from 0.08 to 0.05 to

deter drivers from driving at all after having a drink, intent on further reducing the number of alcohol-related crashes that occur as a result. The odds of a driver crashing with a blood alcohol level of 0.05 are double those of a sober driver, whereas those odds are tripled for a driver with a blood alcohol level of 0.08. Utah is the first state to lower the legal blood alcohol limit to 0.05, with the new law set to go into effect in December of 2018.

Alcohol contributed to 28 percent of traffic fatalities nationwide in 2016.

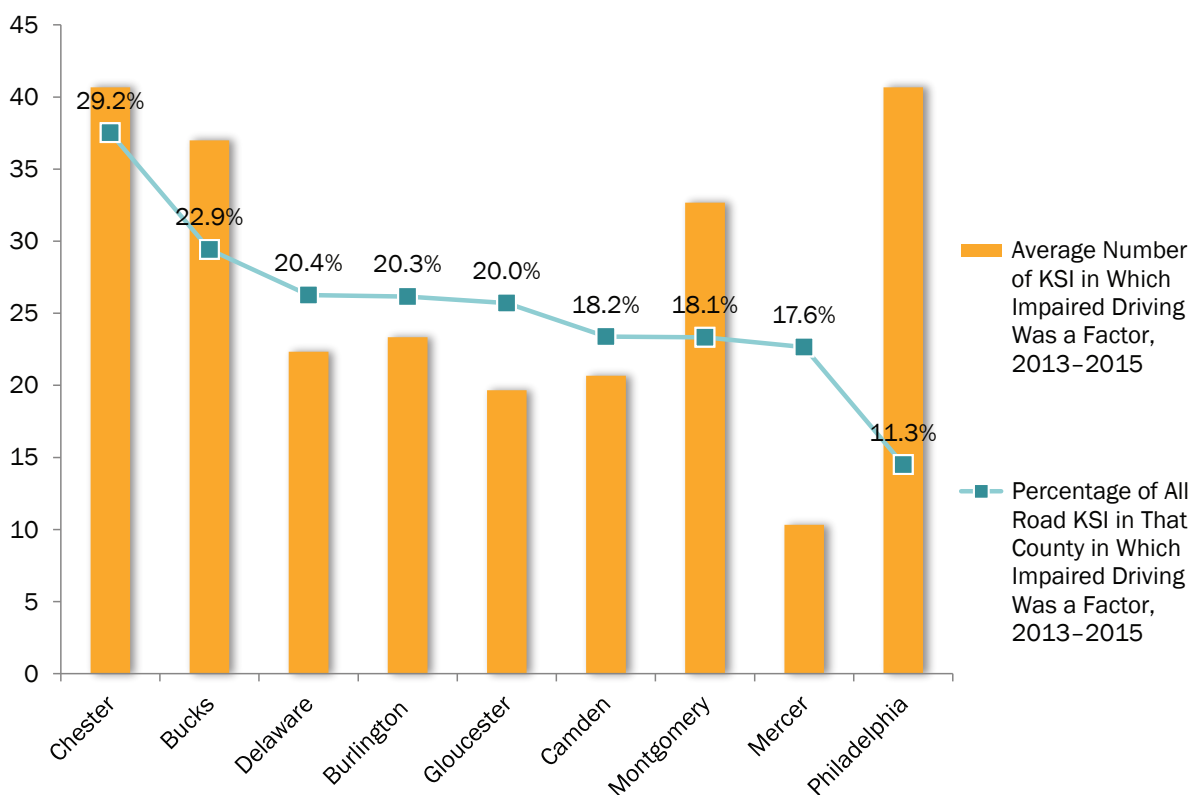
Drugged driving is also on the rise across the United States. In 2005, 28 percent of drivers involved in fatal crashes who were tested for drugs in their system tested positive; by 2015, that number had increased to 43 percent. However, only 57 percent of drivers in fatal crashes were tested for drugs in 2015. Therefore, it is likely that drug impairment is widely underreported. Given the recent legalization of recreational marijuana use in several states, as well as the national opioid epidemic, NHTSA launched its Drug-Impaired Driving Initiative in January 2018 to raise awareness of the issue and develop best practices to address it.

Impaired driving was a factor in 19 percent of KSI crashes between 2013 and 2015 in the Greater Philadelphia region. In this analysis, impaired driving includes only alcohol-impaired driving and does not include drugged driving, given the lack of reliable data on its prevalence. Alcohol-impaired driving is defined as operating a motor vehicle with a

blood alcohol level of 0.08 or higher for drivers who are 21 years old or older, with a lower legal limit for drivers under 21 years of age (who are prohibited from drinking alcohol nationwide, per the National Minimum Drinking Act of 1984). However, a person with a blood alcohol level lower than these amounts may still be considered driving under the influence of alcohol if they are determined to be too impaired to operate a motor vehicle safely. This definition is used in both states.

Philadelphia and Chester counties both experienced approximately the same average number of KSI per year in which impaired driving was a factor between 2013 and 2015 (see Figure 3.12). In Chester County, however, this accounts for the highest proportion of all KSI by county for any county in the region; in Philadelphia, it is the lowest proportion despite having the highest average number of KSI in which impaired driving was a factor.

Figure 3.12: Importance of Reducing Impaired Driving by County



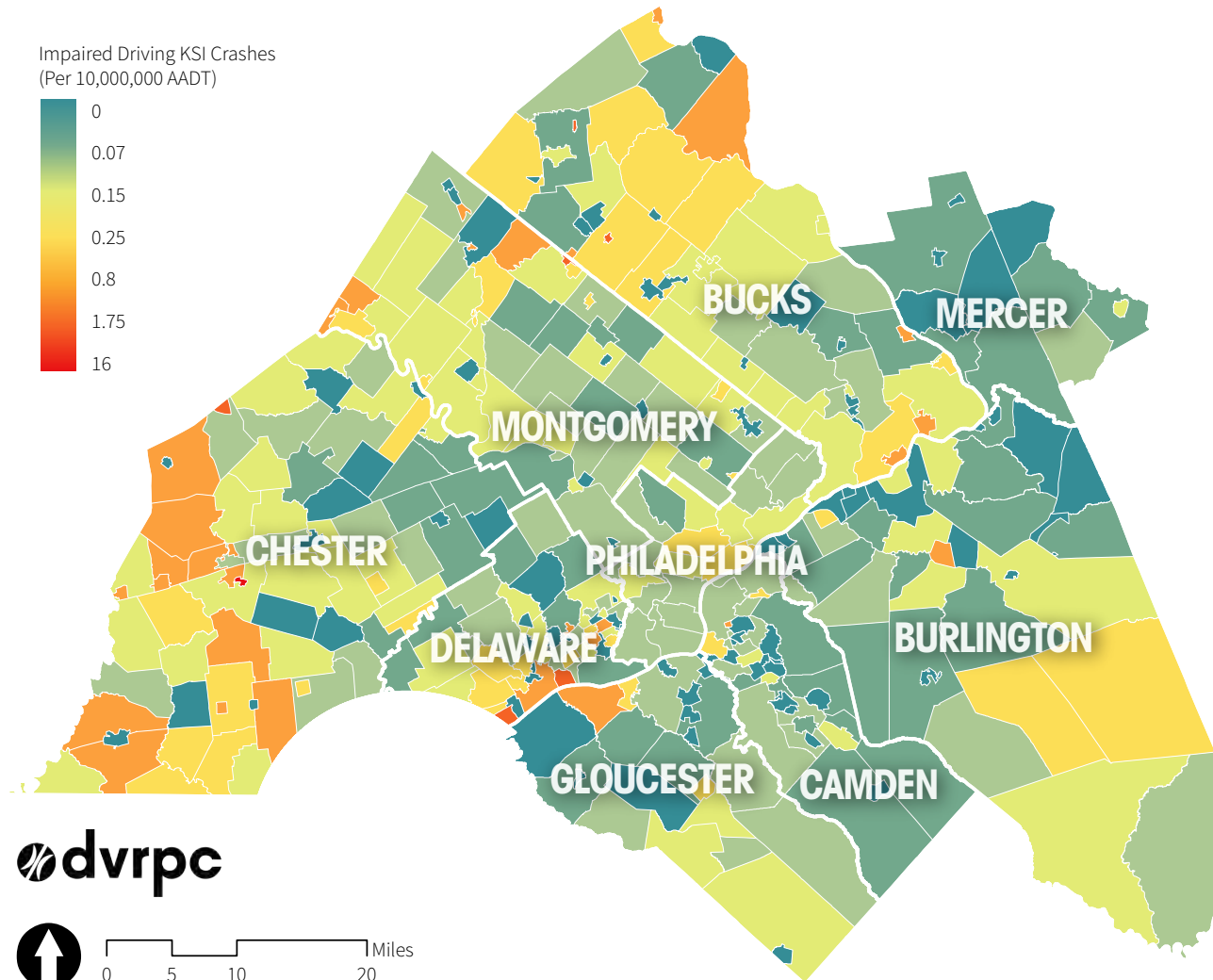
Sources: PennDOT, NJDOT, DVRPC

Rates by Municipality

Figure 3.13 maps the rate of KSI crashes where impaired driving was a contributing factor by municipality in Pennsylvania and New Jersey (Philadelphia County is broken down by planning district). Pennsylvania generally has higher rates of impaired driving KSI compared to New Jersey. Chester and Bucks counties, similar to Figure 3.12, have particularly high rates of impaired driving KSI. Suburban and rural municipalities appear to have higher impaired driving KSI rates when compared to

more urban locations, although there are exceptions to this trend. For instance, Delaware County, which is more urbanized than all other Pennsylvania suburban counties, has notably high rates.

Figure 3.13: Impaired Driving KSI Crash Rate by AADT by Municipality or Planning District (Philadelphia), 2012–2016



Sources: PennDOT, NJDOT, DVRPC

Overlapping Emphasis Areas

Crashes that involved impaired drivers overlapped disproportionately with lane departure and seat belt use (unbelted) crashes (see Table 3.3). Of these, lane departure crashes had the most disproportionate overlap. In fact, impaired driving crashes and lane departure crashes had the most disproportionate overlap of any two emphasis areas. Lane departure is a factor in 22.5 percent of all fatal and injury crashes in the region compared to 49.9 percent of fatal and injury crashes in which impaired driving was also a factor. There is also a noteworthy overlap between impaired driving and unbelted crashes. The overlap between impaired driving crashes and unbelted crashes is the second most disproportionate of all

the overlaps between emphasis areas. Unbelted crashes made up 9.3 percent of all fatal and injury crashes in the region, compared to 19.2 percent of fatal and injury impaired driving crashes.

Table 3.17 shows the year-over-year trend in KSI by county where impaired driving was a factor. The regional trend in impaired driving KSI has fluctuated since 2010. Between 2010 and 2014, impaired driving KSI fell by nearly a third, before rising again in 2015 and 2016.

Table 3.17: Trend in KSI Where Impaired Driving Was a Factor

County	2010	2011	2012	2013	2014	2015	2016
<i>Burlington</i>	79	87	83	70	37	65	58
<i>Camden</i>	88	53	46	54	42	60	40
<i>Gloucester</i>	60	57	52	61	56	48	54
<i>Mercer</i>	42	30	28	22	30	27	28
New Jersey Total	269	227	209	207	165	200	180
<i>Bucks</i>	95	108	120	93	66	107	137
<i>Chester</i>	110	89	74	78	91	73	98
<i>Delaware</i>	57	70	63	60	42	49	87
<i>Montgomery</i>	99	110	116	92	65	78	119
<i>Philadelphia</i>	116	123	147	95	95	131	105
Pennsylvania Total	477	500	520	418	359	438	546
Regional Total	746	727	729	625	524	638	726
<i>Fatalities</i>	170	192	195	169	153	199	158
<i>Serious Injuries</i>	576	535	534	456	371	439	568

Sources: PennDOT, NJDOT, DVRPC

Strategies

Table 3.18 shows the strategies identified by the RSTF to address impaired driving in the region. These strategies were drawn from the 2017 Pennsylvania SHSP, the 2015 New Jersey SHSP, DVRPC’s 2015 TSAP, and input from participants in the RSTF during

a special strategies session held in the summer of 2017. Note that legislative strategies recommended by safety partners do not constitute endorsement by specific agencies. Priority strategies are bolded.

Table 3.18: RSTF Key Strategies to Address Impaired Driving in the Greater Philadelphia Region

Key Strategies	Education	Engineering	Enforcement	Policy
Research and promote laws, policies, and technologies to reduce impaired driving and evaluate their effectiveness, including local examples and examples from states that have recently legalized marijuana.				✓
Expand successful outreach campaigns designed to combat drunk driving to address all types of impaired driving.	✓		✓	
Encourage a safety culture around impaired driving with targeted campaigns that emphasize the availability of transportation alternatives to impaired driving and the importance of telling an impaired person that they should not drive.	✓			
Support the development and evolution of standards for the definition of impairment for controlled substances (e.g., cocaine, heroin, fentanyl, etc.), prescription drugs, and drowsy driving in New Jersey and Pennsylvania.			✓	✓
Improve coordination with law enforcement to build on their experience in dealing with impaired driving (especially drugged) and support their enforcement efforts.			✓	
Continue to provide information for informed policy action on responsibilities of drivers, pedestrians, and bicyclists regarding both legal and illegal drugs.				✓
Support drug recognition expert (DRE) training to increase the availability of DREs and raise the profile of DREs in the region.			✓	

Source: DVRPC

Programs and Policies

Table 3.19 identifies a sample of the existing programs and policies in the Greater Philadelphia region to combat impaired driving. Although programs and policies are confined to a single category for the purposes of this document, they may have benefits in multiple categories. Many of the current policies

and programs to reduce impaired driving reflect the priorities identified in Table 3.18, including training local and state police to be Drug Recognition Experts (DREs) and a variety of awareness campaigns to discourage young drivers in particular from driving while impaired.

Table 3.19: Programs and Policies Available in the Greater Philadelphia Region That Help Address Impaired Driving Crashes

Engineering
Ignition interlock contract and quality assurance program with Pennsylvania DUI Association (PennDOT)
Enforcement
Provide funding for municipal and county DUI task forces (PennDOT)
NHTSA-funded sobriety checkpoints (Local and state police, Pennsylvania and New Jersey)
NHTSA-funded “Drive Sober or Get Pulled Over” Labor Day mobilization and other state mobilizations (Local and state police, Pennsylvania and New Jersey)
Drug Recognition Expert training for police (Local and state police, Pennsylvania and New Jersey)
Education
Defensive driving course (includes DUI in curriculum) through counties, DUI training for law enforcement,
Advanced Roadside Impaired Driving Enforcement (Local and state police, Pennsylvania and New Jersey)
Cruisin’ SMART: young driver peer-to-peer DUI program (Bryn Mawr Rehab Hospital)
Alcohol awareness program (Mid-Atlantic Foundation for Safety and Education)
Comprehensive alcohol traffic education and enforcement program (Rutgers University)
Impaired Driver Simulation Program (Cherry Hill Township, New Jersey Police)
New Jersey Teen Driver Program to educate teens on the consequences of DUI (New Jersey State Police)
Funding for Matt Maher DUI presentation to South Jersey high schools (State Farm Insurance)
Safety Bug and SAFETY SIMULATOR (Pennsylvania DUI Association)

Sources: PennDOT, NJDOT, DVRPC



Pedestrian and Bicyclist Safety

- Even as national traffic deaths hit historic lows over the past decade, pedestrian deaths continued to rise.
- Both New Jersey and Pennsylvania are designated as Pedestrian and Bicycle Safety Focus States by the FHWA.

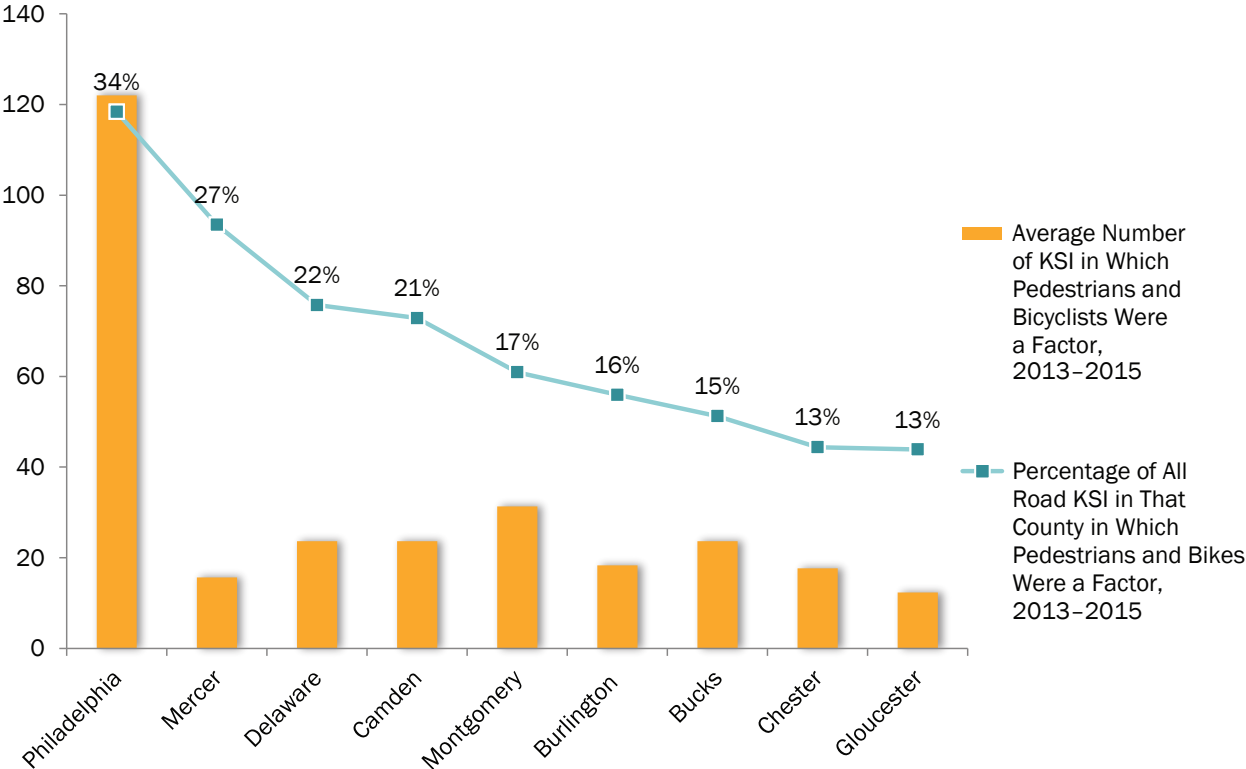
Vulnerable Users

Pedestrians and bicyclists are the most vulnerable users on the road, and therefore are more likely to be killed or seriously injured in a crash. Nationally, as cars have become safer for occupants, traffic deaths have decreased by 9 percent between 2007 and 2016, while pedestrian fatalities have increased by 27 percent in the same timeframe. **Twenty-two percent of traffic fatalities and serious injuries in the Greater Philadelphia region between 2013 and 2015 were pedestrians or bicyclists**, which is disproportionate to their relative mode shares. Therefore, it is unsurprising that both New Jersey and Pennsylvania are designated as Pedestrian and Bicycle Safety Focus States by the FHWA, which means that vulnerable user fatalities were higher than the national average in each state. The program provides special resources to focus states to help improve safety in these areas.

In the greater Philadelphia region, the percentage of all fatal and serious injury crashes that involved a pedestrian or bicyclist was highest in Philadelphia, the only Pedestrian and Bicycle Safety Focus City in the region, at 34 percent between 2013 and 2015 (see Figure 3.14). Philadelphia's Vision Zero Action Plan—adopted in September 2017—emphasizes interventions to reduce pedestrian and bicyclist fatalities, with the goal of reducing all traffic fatalities and serious injuries to zero by 2030. Mercer County in New Jersey had the second-highest percentage:

Nationally, pedestrian fatalities increased 27 percent from 2007 to 2016.

Figure 3.14: Importance of Promoting Pedestrian and Bicyclist Safety by County



Sources: PennDOT, NJDOT, DVRPC

27 percent of traffic fatalities and serious injuries between 2013 and 2015 were pedestrians and cyclists. Mercer and Camden counties have countywide Complete Streets policies, which support Vision Zero by emphasizing that roads accommodate all users safely, through road diets and roadway space redistribution, for example. In addition, both Pennsylvania and New Jersey have Complete Streets policies at the state level, and 31 municipalities in the Greater Philadelphia region have their own Complete Streets policies, including Philadelphia, Trenton, and Camden.

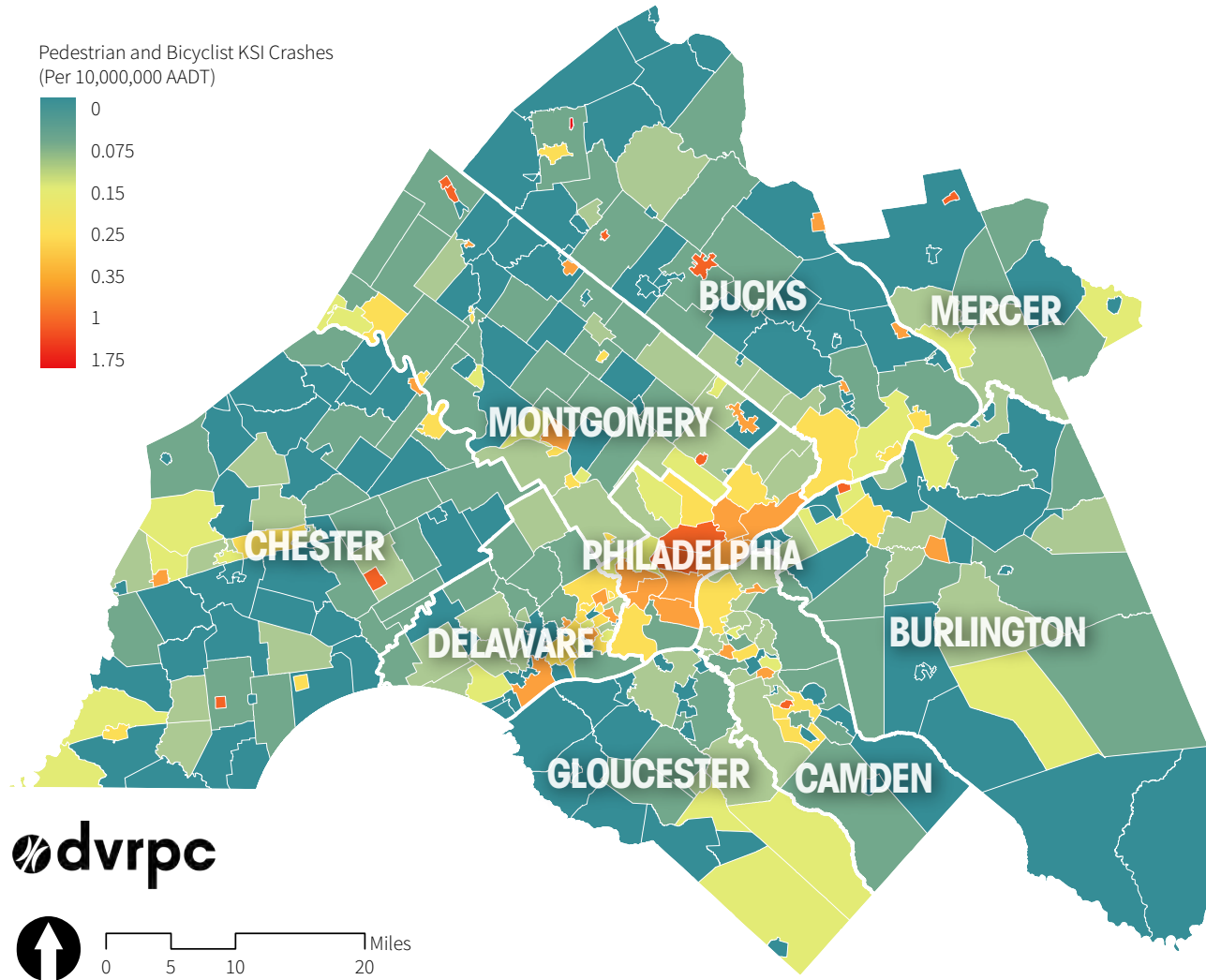
Philadelphia has the greatest average number of KSI per year involving pedestrians and bicyclists, as well as the highest proportion of all KSI involving this group. Overall, the counties that account for the largest cities in the region also see the greatest proportion of road KSI involving pedestrians and bicyclists, including Mercer (which includes the City of Trenton), Delaware (City of Chester), and Camden (City of Camden)

counties. The counties that are generally more rural, like Chester and Gloucester counties, see the lowest number of average pedestrian and bicyclist crashes, as well the lowest proportion of all KSI crashes.

Rates by Municipality

Figure 3.15, on the next page, maps the rate of KSI crashes that involved a pedestrian or a bicyclist by municipality in Pennsylvania and New Jersey (Philadelphia County is broken down by planning district). Philadelphia has the highest rate out of all the counties in the region, given that a higher proportion of trips are made by walking or bicycling in the city than in other areas in the region. Although pockets of higher rates are scattered throughout the region, there are concentrations in older suburban towns with higher development densities and walkable destinations. These concentrations can be found in Camden and Delaware counties, for example.

Figure 3.15: Pedestrian and Bicyclist KSI Crash Rate by AADT by Municipality or Planning District (Philadelphia), 2012-2016



Sources: PennDOT, NJDOT, DVRPC

Overlapping Emphasis Areas

The only emphasis area with which pedestrian and bicyclist crashes disproportionately overlapped is intersection crashes (see Table 3.3). Of all fatal and injury crashes in the region, 45.5 percent occurred in

an intersection, while 56.5 percent of fatal and injury crashes involving a bicyclist or pedestrian occurred in an intersection.

Table 3.20 shows the year-over-year trend in KSI by county that involved pedestrians or bicyclists. The regional trend in pedestrian and bicyclist KSI has fluctuated since 2010. The number of KSI decreased

from 348 in 2010 to 272 in 2014 but then increased again to 340 by 2016. This pattern reflects national trends.

Table 3.20: Trend in KSI in Which Pedestrians or Bicyclists Were Involved

County	2010	2011	2012	2013	2014	2015	2016
<i>Burlington</i>	24	16	24	19	18	17	26
<i>Camden</i>	40	42	46	31	22	17	32
<i>Gloucester</i>	22	14	12	12	10	15	14
<i>Mercer</i>	26	21	26	19	17	8	9
New Jersey Total	112	93	108	81	67	57	81
<i>Bucks</i>	38	23	32	23	23	25	21
<i>Chester</i>	12	16	18	14	20	19	22
<i>Delaware</i>	33	23	27	24	23	24	32
<i>Montgomery</i>	26	35	33	37	28	29	44
<i>Philadelphia</i>	127	138	129	132	111	123	140
Pennsylvania Total	236	235	239	230	205	220	259
Regional Total	348	328	347	311	272	277	340
<i>Fatalities</i>	84	91	108	96	116	85	119
<i>Serious Injuries</i>	264	237	239	215	156	192	221

Sources: PennDOT, NJDOT, DVRPC

Strategies

Table 3.21 shows the strategies identified by the RSTF to address pedestrian and bicyclist safety in the region. These strategies were drawn from the 2017 Pennsylvania SHSP, the 2015 New Jersey SHSP, DVRPC’s 2015 TSAP, and input from participants in

the RSTF during a special strategies session held in the summer of 2017. Note that legislative strategies recommended by safety partners do not constitute endorsement by specific agencies. Priority strategies are bolded.

Table 3.21: RSTF Key Strategies to Promote Pedestrian and Bicyclist Safety in the Greater Philadelphia Region

Key Strategies	Education	Engineering	Enforcement	Policy
Educate the public about existing traffic safety laws and safe practices, including the responsibilities of drivers, pedestrians, and bicyclists, as well as policies that can increase pedestrian and bicyclist safety if implemented locally (like Safe Routes to School).	✓			
Implement infrastructure and roadway improvements to support speed management (e.g., road diet, curb bump-outs, on-street parking) to reduce risk of pedestrian and bicyclist fatalities, and lessen the severity in the event of a crash.		✓		
Promote adoption and implementation of policies that prioritize pedestrian and bicycle safety through municipal land use regulations and infrastructure improvements that increase multimodal network connectivity, such as Livable Communities, Complete Streets, and Vision Zero policies.	✓			✓
Raise awareness of local and national data-driven best practices to improve pedestrian and bicycle safety in the region.		✓		
Explore and evaluate ways to enforce minor infractions on the part of all road users that can lead to potentially serious crashes involving bicyclists and pedestrians, like New Jersey’s Pedestrian Decoy Program.	✓		✓	
Work with police, hospitals, and other traffic safety professionals to begin to accurately capture the incidence of pedestrian and bicyclist crashes where a motor vehicle was not involved (in both Pennsylvania and New Jersey, a crash must involve a motor vehicle to be captured on a police crash reporting form).				✓
Explore ways to tie DMV fees and traffic violation fines to programs that will increase safety for pedestrians and bicyclists, like Pennsylvania’s Automated Red Light Enforcement grant program.				✓

Source: DVRPC

Programs and Policies

Table 3.22 identifies a sample of the existing programs and policies in the Greater Philadelphia region to promote pedestrian and bicyclist safety. Although programs and policies are confined to a single category for the purposes of this document,

they may have benefits in multiple categories. Many of the current policies and programs to promote pedestrian and bicyclist safety reflect the priorities identified in Table 3.21, such as the Safe Routes to School and Pedestrian Decoy programs.

Table 3.22: Programs and Policies Available in the Greater Philadelphia Region that Help Promote Pedestrian and Bicyclist Safety

Engineering

Local Technical Assistance Program Walkable Communities program (NJDOT, NJDHTS, PennDOT)

Pedestrian devices at railroad stations, including at-grade crosswalks with intertrack fencings, dedicated over- or underpasses, and audio/visual warning devices (SEPTA)

Retiming intersections for pedestrian walk times (Philadelphia Streets Department)

Safe Routes to School Program (Philadelphia Streets Department; PennDOT; NJDOT; NJDHTS; Greater Mercer TMA; Burlington, Camden, and Gloucester Counties Traffic Safety Task Force)

Regional Systemic Pilot Roundabout Program (NJDOT)

Enforcement

Safe Streets to Transit Program, Pedestrian Safety Corridor Program (DVRPC, NJDOT and NJDHTS)

NJDHTS-funded Pedestrian Decoy Program (municipal police forces in New Jersey)

DOT-funded Safe Routes to School Program (available to all municipalities)

School crossing guards (general)

Cops in Crosswalks (Chester County Highway Safety Project)

Education

New Jersey Pedestrian Safety Action Plan and Toolbox, Complete Streets policy support (NJDOT)

FHWA-designated Pedestrian Focus City (Philadelphia) and State (NJDOT, PennDOT, and NJDHTS)

Street Smart Pedestrian Safety Program (NJDHTS)

Philadelphia Complete Streets Design Handbook (City of Philadelphia)

“Otto the Auto”: talking robot car used for elementary school safety programs (Mid-Atlantic Foundation for Safety and Education/AAA)

Pennsylvania Bicycle and Pedestrian Master Plan (PennDOT)

Senior Safety Pedestrian Program and Safe Routes to School presentations (Greater Mercer TMA)

Child Walk to School Day, school guidance on both operation and safety efforts of “Walking School Bus” (Cross County Connection TMA)

Sources: PennDOT, NJDOT, DVRPC



Older Drivers

- Older drivers are more likely to be seriously injured or killed in a crash than are other drivers.
- By 2030, 73.1 million Americans are expected to be 65 years old or older, compared to 49.2 million in 2016, highlighting the need to address older driver safety in the coming years.

Sustaining Mobility

Older drivers, who are 65 years old or older, are more likely to be seriously injured or killed in a crash than other drivers, as susceptibility to injury and medical complications increases with age. Older drivers may also be more likely to crash due to impaired eyesight and slower reaction times, according to the Transportation Research Board. In fact, according to the Insurance Institute for Highway Safety, only young drivers—between the ages of 16 and 20—have higher rates of fatal crashes than older drivers.

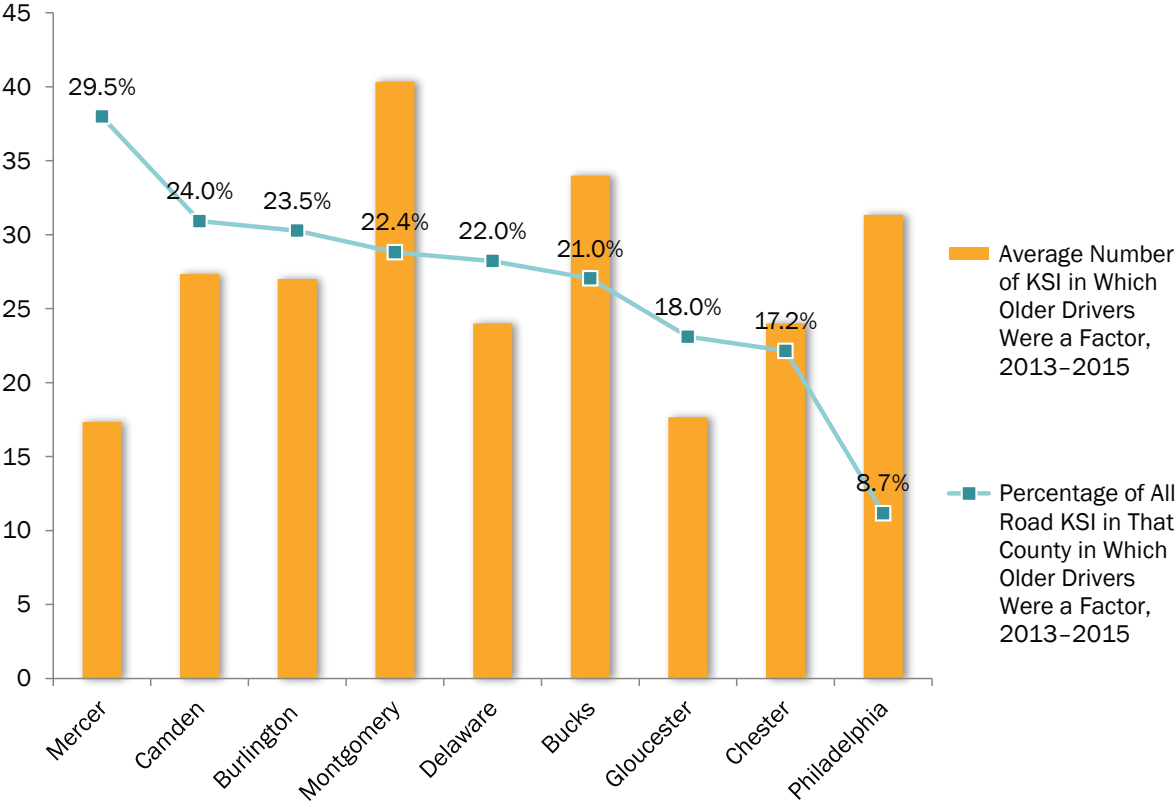
This is why some states require vision tests for older drivers who want to renew their licenses, require in-person renewal, or require renewal more often than is required for younger drivers. However, neither Pennsylvania nor New Jersey place such restrictions on older drivers. In 2015, older adults comprised 18 percent of all traffic fatalities in the United States. **In the Greater Philadelphia region as well, 18 percent of KSI crashes involved older drivers between 2013**

and 2015. As the proportion of older Americans grows and life expectancy increases, this issue will only worsen; by 2030, 73.1 million Americans are expected to be 65 years old or older. In 2016, only 49.2 million Americans were 65 years old or older.

Figure 3.16 shows the average number and

*Older drivers are more likely to be **seriously injured** in a crash than are younger drivers.*

Figure 3.16: Importance of Promoting Older Driver Safety by County



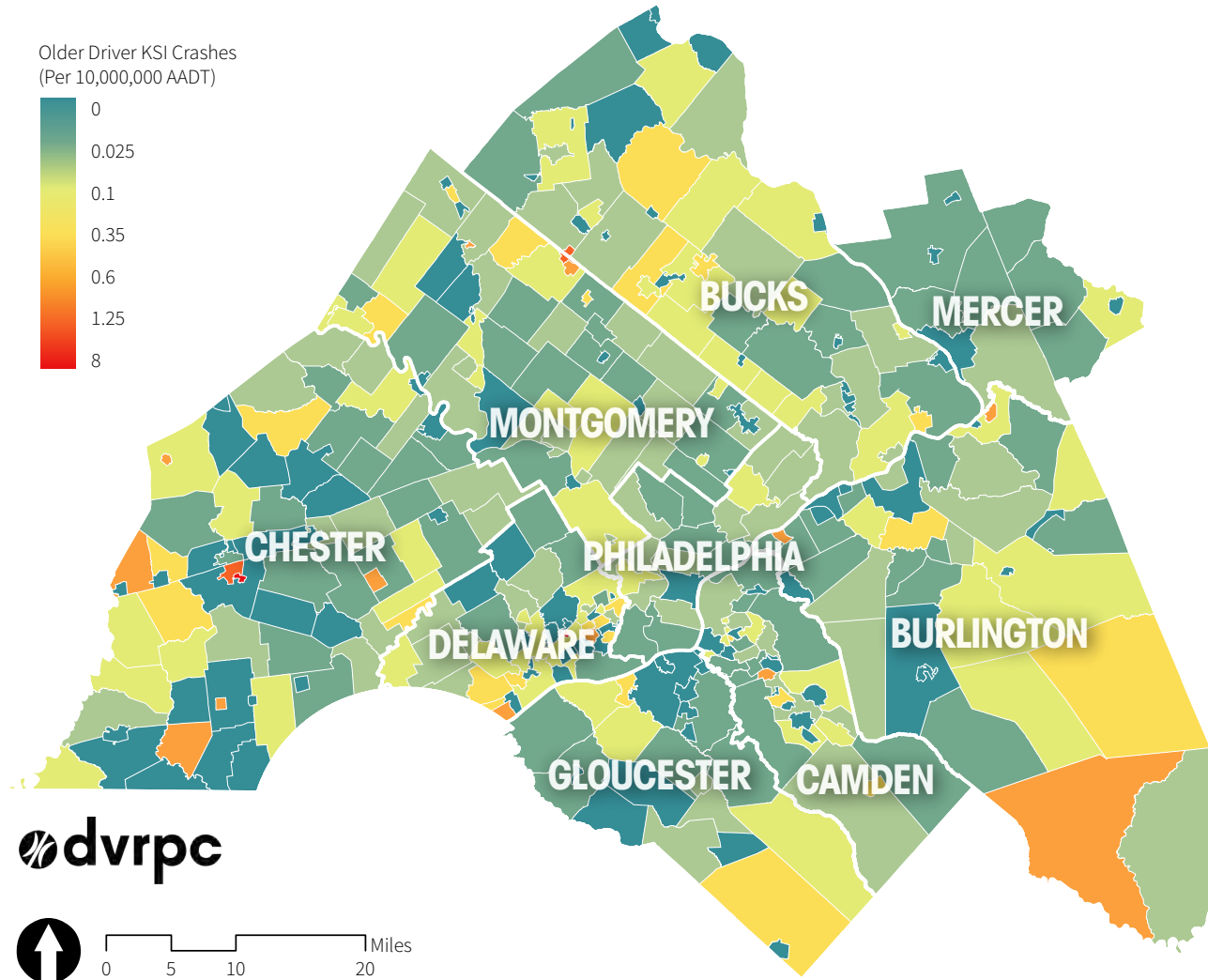
Sources: PennDOT, NJDOT, DVRPC

percentage of all KSI crashes by county in which an older driver was a factor. Montgomery County has the highest average number of KSI involving older drivers in the region, followed by Bucks and Philadelphia counties. The highest KSI rates involving older drivers, however, are in Mercer, Camden and Burlington counties. Despite having the third-highest average number of KSI crashes involving older drivers, Philadelphia has the lowest rate of these types of crashes in the region.

Rates by Municipality

Figure 3.17, on the next page, maps the rate of KSI crashes that involved an older driver by municipality in Pennsylvania and New Jersey (Philadelphia County is broken down by planning district). Older driver KSI rates tend to be higher in suburban and rural municipalities, such as in Bucks, Chester, Burlington and Gloucester counties, and lower in urban municipalities, like Philadelphia and Trenton.

Figure 3.17: Older Driver KSI Crash Rate by AADT by Municipality or Planning District (Philadelphia), 2012–2016



Sources: PennDOT, NJDOT, DVRPC

Overlapping Emphasis Areas

Older driver crashes overlapped disproportionately with intersection and aggressive driving crashes (see Table 3.3). Of all fatal and injury crashes in the region, 45.5 percent occurred at an intersection, compared to 52.1 percent of fatal and injury intersection

crashes that also involved an older driver. Likewise, aggressive driving was a factor in 17.2 percent of all fatal and injury crashes in the region, compared to 20.6 percent of fatal and injury crashes that involved older drivers.

Table 3.23 shows the year-over-year trend in KSI by county that involved older drivers. The regional trend remained consistent between 221 and 259 KSI

per year from 2010 to 2015. In 2016, however, the number of older driver KSI jumped to 291.

Table 3.23: Trend in KSI That Involved an Older Driver

County	2010	2011	2012	2013	2014	2015	2016
<i>Burlington</i>	29	38	46	25	27	29	21
<i>Camden</i>	21	25	20	27	32	23	25
<i>Gloucester</i>	15	25	13	21	21	11	18
<i>Mercer</i>	13	17	16	15	18	19	7
New Jersey Total	78	105	95	88	98	82	71
<i>Bucks</i>	43	29	40	36	24	42	51
<i>Chester</i>	26	22	32	22	26	24	38
<i>Delaware</i>	29	25	11	32	19	21	33
<i>Montgomery</i>	29	20	34	48	39	34	48
<i>Philadelphia</i>	30	20	34	33	32	29	50
Pennsylvania Total	157	116	151	171	140	150	220
Regional Total	235	221	246	259	238	232	291
<i>Fatalities</i>	64	80	60	86	86	78	75
<i>Serious Injuries</i>	171	141	186	173	152	154	216

Sources: PennDOT, NJDOT, DVRPC

Strategies

Table 3.24 shows the strategies identified by the RSTF to promote older driver safety in the region. These strategies were drawn from the 2017 Pennsylvania SHSP, the 2015 New Jersey SHSP, DVRPC’s 2015 TSAP, and input from participants in the RSTF during

a special strategies session held in the summer of 2017. Note that legislative strategies recommended by safety partners do not constitute endorsement by specific agencies. Priority strategies are bolded.

Table 3.24: RSTF Key Strategies to Promote Older Driver Safety in the Greater Philadelphia Region

Key Strategies	<i>Education</i>	<i>Engineering</i>	<i>Enforcement</i>	<i>Policy</i>
Explore Pennsylvania and New Jersey driver’s license retesting requirements that would inform a change to current policy, including practices from other states (such as Maryland’s Silver Alert retesting requirement).	✓			✓
Communicate to the public about "transportation retirement" and the need for seniors, adult children, and caretakers to begin planning for a carless future for aging drivers.	✓			
Promote use of best practices in senior-safe roadway design, like clear, concise messaging and highly legible design elements.	✓	✓		
Promote senior housing in walkable communities through municipal land use regulation and education to the public (particularly seniors and adult children/caretakers) about housing choices that enable a wider range of transportation options that are close to services and resources.			✓	✓
Partner with hospitals, universities, and other research groups to study trends unique to older drivers and develop new educational programs based on this data.	✓			
Publicize and coordinate to improve mobility alternatives to driving, including walking, public transportation, and new technology like ridesharing apps.	✓			✓

Source: DVRPC

Programs and Policies

Table 3.25 identifies a sample of the existing programs and policies in the Greater Philadelphia region to promote older driver safety. Although programs and policies are confined to a single category for the purposes of this document, they may have benefits in multiple categories. Many of the current policies and programs to promote older driver safety reflect

the priorities identified in Table 3.24, including both the PennDOT and the Burlington County Engineering Department senior-safe roadway design initiatives, and SEPTA, New Jersey Transit, and the Port Authority Transit Corporation's (PATCO's) efforts to improve the accessibility to transit for seniors.

Table 3.25: Programs and Policies in the Greater Philadelphia Region That Help Promote Older Driver Safety

Engineering
Sign improvements: Clearview font; larger, higher, advance warning signs (PennDOT, Burlington County Engineering Department)
CCT Connect Services (SEPTA)
Senior ID cards, senior discounts, shared-ride program (SEPTA)
Courtesy transportation for seniors (New Jersey Transit)
Reduced transit fare program (New Jersey Transit, PATCO, SEPTA)
TRADE Transportation demand-responsive transit for seniors funded by the Senior Citizen and Disabled Resident Transportation Assistance Program (Mercer County)
Ride Provide personal transportation for seniors, transit travel training program at senior centers (Greater Mercer TMA)
Enforcement
Pennsylvania Medically Impaired Driver Law (medical professionals, PennDOT)
Education
Car Fit program (AAA, AARP, Burlington County Sheriff's Department, Chester County Highway Safety Project, and NJDHTS)
Senior driver evaluation tools, Roadwise Rx, defensive driving refresher courses (AAA, AARP)
Ambassador program, personnel located at each station to provide assistance (PATCO)
AARP Driver Safety Program (Chester County Highway Safety Project)
Driver Simulation Program, Fitness-to-Drive screening tool, Smart Driver Course, Safe Driver Videos, Livable Communities Campaign (AARP)
Roadwise Review DVD (AAA Mid-Atlantic Foundation for Safety and Education)
Skill testing for seniors to check for alertness, eye sight, etc. (Virtua Hospital and other local hospitals)
Senior Defensive Driver Program, Senior Safety Task Force (NJDHTS)
Senior Pedestrian Safety Program (Greater Mercer TMA)
Policy
Classic Towns of Greater Philadelphia, Transit-Oriented Development (DVRPC)

Sources: PennDOT, NJDOT, DVRPC



Young Drivers

- Young drivers between 16 and 20 years old have the highest crash rate of any age group.
- New Jersey and Pennsylvania have some of the strictest graduated driver licensing programs in the nation.

The Next Generation

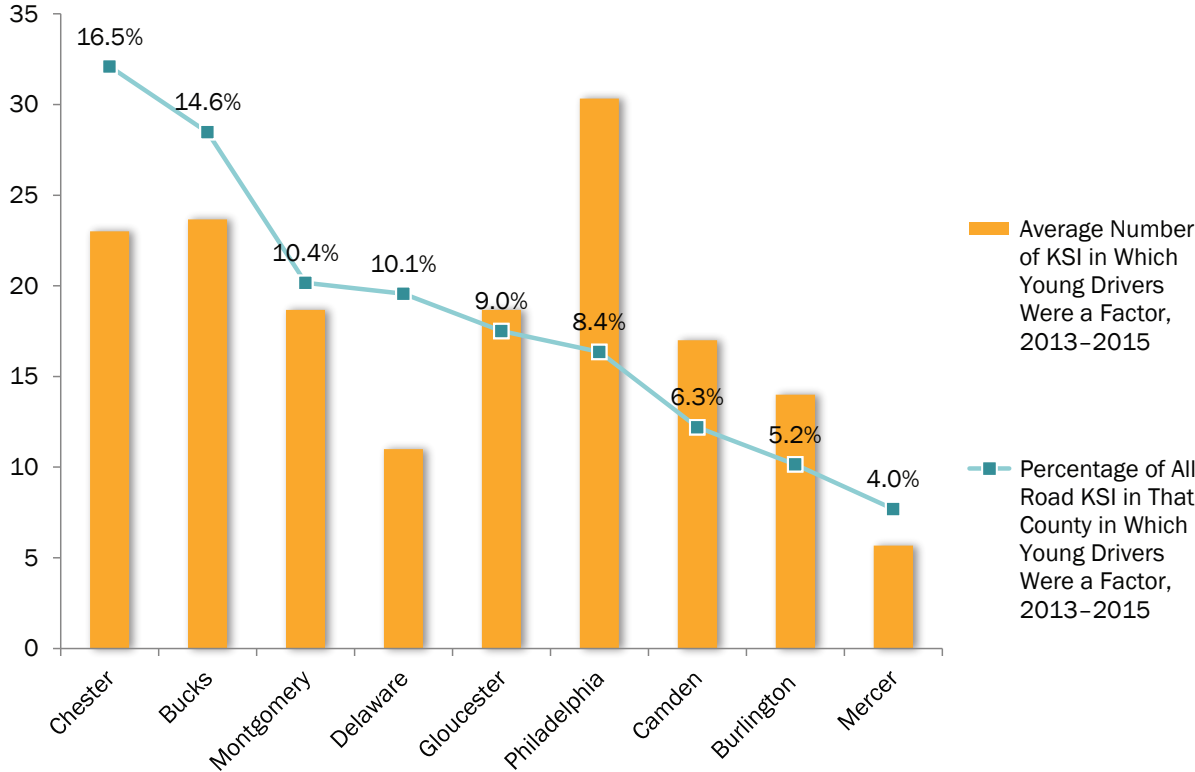
Young drivers, defined in this analysis as those between 16 and 20 years old, are more likely to be in a crash due to their inexperience behind the wheel; in fact, they have the highest crash rate of any age group. In addition, due to their greater propensity for risky behaviors, such as not wearing a seatbelt, speeding, or driving under the influence of drugs or alcohol, young drivers are also more likely to be seriously injured or killed in a crash. As a result, motor vehicle crashes were the leading cause of death for 16-to-20-year-olds in the United States between 2013 and 2015, according to the Centers for Disease Control and Prevention (CDC).

Twelve percent of traffic fatalities and serious injuries in the Greater Philadelphia region between 2013 and 2015 involved young drivers. Both Pennsylvania and New Jersey have graduated driver licensing (GDL) programs, which place certain

restrictions on young drivers as they learn how to drive and for some time afterward. New Jersey is unique in that it has a minimum licensing age of 17, whereas Pennsylvania requires the most supervised driving hours of any state, at 65. Studies show that states with strict GDL programs have fewer fatal crashes involving young drivers than do states with more lax programs.

Young drivers have the highest crash rate of any age group.

Figure 3.18: Importance of Promoting Young Driver Safety by County



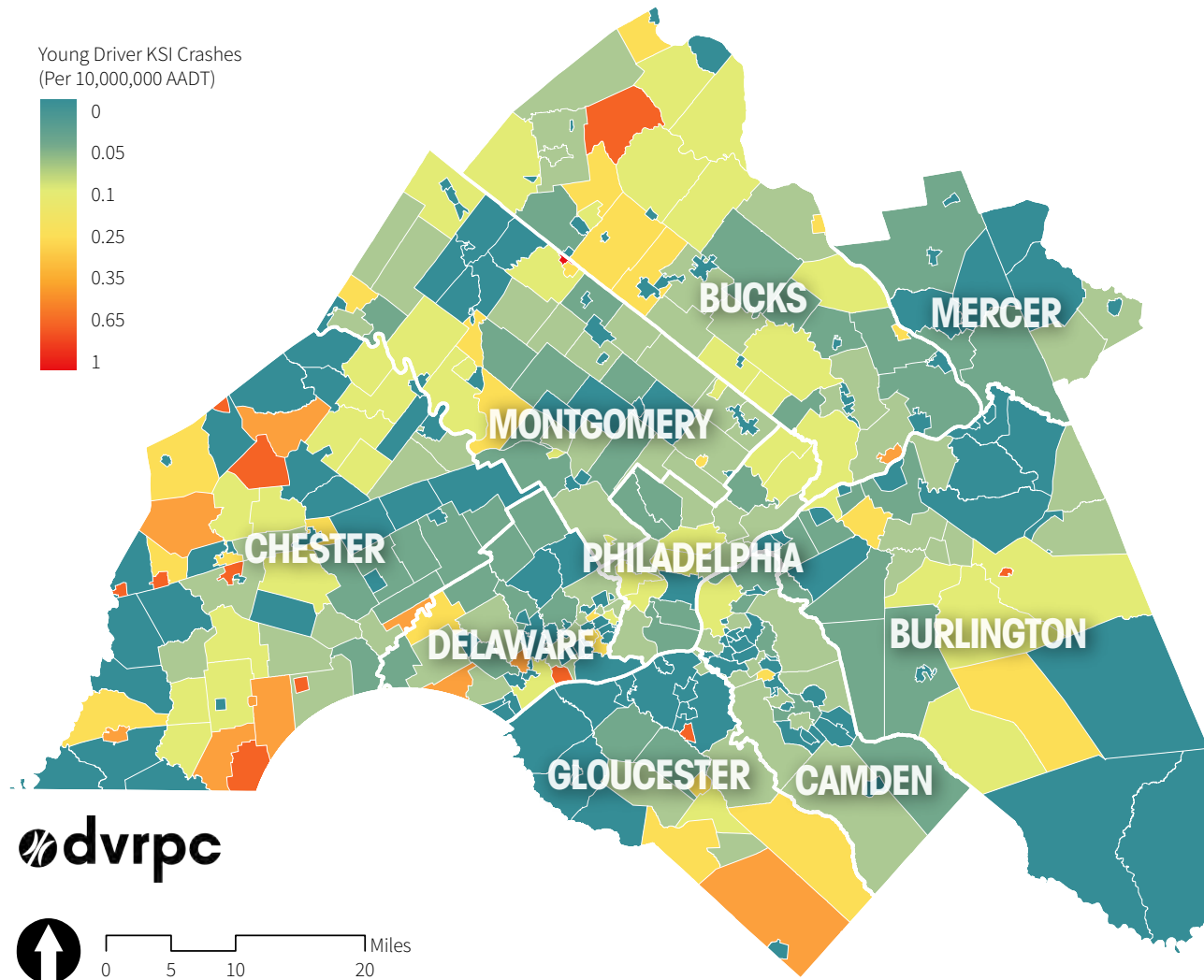
Sources: PennDOT, NJDOT, DVRPC

Figure 3.18 shows the average number and percentage of all crashes by county in which a young driver was a factor. Philadelphia had the largest average number of KSI in which young drivers were a factor from 2013 to 2015, but the fourth-lowest overall percentage. The highest percentage of all KSI that involved a young driver was in Chester County, followed by Bucks County. New Jersey counties in the Greater Philadelphia region generally saw lower rates of young driver KSI crashes, with the highest in Gloucester County and the lowest in the region in Mercer County.

Rates by Municipality

Figure 3.19, on the next page, maps the rate of KSI crashes that involved a young driver by municipality in Pennsylvania and New Jersey (Philadelphia County is broken down by planning district). Young driver KSI rates were generally higher in municipalities in rural Pennsylvania than in the rest of the region. In New Jersey, young driver KSI rates were highest in southern Gloucester County.

Figure 3.19: Young Driver KSI Crash Rate by AADT by Municipality or Planning District (Philadelphia), 2012–2016



Sources: PennDOT, NJDOT, DVRPC

Overlapping Emphasis Areas

Young driver crashes overlapped disproportionately with distracted driving and aggressive driving crashes (see Table 3.3). Distracted driving was a factor in 25.7 percent of all fatal and injury crashes in the region, compared to 30.5 percent of fatal and injury

distracted driving crashes that also involved a young driver. Likewise, aggressive driving was a factor in 17.2 percent of all fatal and injury crashes in the region, compared to 22.6 percent of fatal and injury crashes that involved a young driver.

Table 3.26 shows the year-over-year trend in KSI by county where a young driver was a factor. The number of KSI rose in both 2015 and 2016 after decreasing steadily between 2010 and 2014.

Table 3.26: Trend in KSI That Involved a Young Driver

County	2010	2011	2012	2013	2014	2015	2016
<i>Burlington</i>	28	22	21	20	13	9	10
<i>Camden</i>	23	13	22	13	23	15	16
<i>Gloucester</i>	21	14	18	17	26	13	10
<i>Mercer</i>	16	11	9	5	9	3	4
New Jersey Total	88	60	70	55	71	40	40
<i>Bucks</i>	33	23	41	26	16	29	40
<i>Chester</i>	47	41	17	29	17	23	22
<i>Delaware</i>	26	21	13	17	3	13	22
<i>Montgomery</i>	41	38	35	19	16	21	27
<i>Philadelphia</i>	30	41	39	33	23	35	31
Pennsylvania Total	177	164	145	124	75	121	142
Regional Total	265	224	215	179	146	161	182
<i>Fatalities</i>	52	60	45	41	36	44	40
<i>Serious Injuries</i>	213	164	170	138	110	117	142

Sources: PennDOT, NJDOT, DVRPC

Strategies

Table 3.27 shows the strategies identified by the RSTF to promote young driver safety in the region. These strategies were drawn from the 2017 Pennsylvania SHSP, the 2015 New Jersey SHSP, DVRPC's 2015 TSAP, and input from participants in the RSTF during

a special strategies session held in the summer of 2017. Note that legislative strategies recommended by safety partners do not constitute endorsement by specific agencies. Age-specific strategies tend to be education focused. Priority strategies are bolded.

Table 3.27: RSTF Key Strategies to Promote Young Driver Safety in the Greater Philadelphia Region

Key Strategies	<i>Education</i>	<i>Engineering</i>	<i>Enforcement</i>	<i>Policy</i>
Incentivize schools to better incorporate safety programs, such as making driver education programs mandatory and tying parking permits to participation in programs like Share the Keys.	✓			✓
Identify locations with large young driver populations and significant crash trends for consideration of improvements; share this information with municipalities and school districts to advance a safety culture.	✓	✓		
Partner with hospitals, universities, and other research groups to study trends unique to young drivers and develop new educational programs, including ones that emphasize peer-to-peer engagement.	✓			
Educate young drivers and parents/guardians on the increased risk of a crash when Graduated Driver Licensing (GDL) requirements are violated.	✓			
Work with insurance companies to create financial incentives for increased participation in young driver safety programs.				✓
Ensure GDL violations and penalties are enforced and tracked, such as license plate stickers in New Jersey. Align GDL requirements in Pennsylvania with New Jersey.			✓	
Explore policy recommendations that shift focus from the age of the driver to their level of experience.				✓
Spread the word about local and national young driver safety education and media campaigns (e.g., Gloucester County Highway Safety Task Force's high school video contest).	✓			

Source: DVRPC

Programs and Policies

Table 3.28 identifies a sample of the existing programs and policies in the Greater Philadelphia region to promote young driver safety. Although programs and policies are confined to a single category for the purposes of this document, they may have benefits

in multiple categories. Many of the current policies and programs to promote young driver safety reflect the priorities identified in Table 3.27, such as New Jersey State Police’s Graduated Driver Licensing Decal Program.

Table 3.28: Programs and Policies in the Greater Philadelphia Region That Help Promote Young Driver Safety

Engineering
Graduated Driver Licensing Decal Program (New Jersey State Police)
Graduated Driver Licensing Program (Pennsylvania, New Jersey)
Education
New Jersey Drive: educates young drivers on the consequences of DUI (New Jersey State Police)
Share the Keys: parent/child contract seminar (New Jersey and Pennsylvania)
Teen Driver Safety Video PSA Challenge (TMA Bucks)
How to Park: The Must-Read Manual for Teen Drivers (AAA Mid-Atlantic Foundation for Safety and Education)
Consumer safety brochure on choosing the best vehicle for your teen (Insurance Institute for Highway Safety)
“Survival 101” youth program, “16 Minutes” youth program (Buckle Up PA)
Cruisin’ SMART: young driver peer-to-peer DUI program (Bryn Mawr Rehab Hospital)
Teen Safe Driving Competition (PennDOT and partners, Brain Injury Alliance of New Jersey)

Source: PennDOT, NJDOT, DVRPC

Seat Belt Use

NHTSA estimates that the national seat belt use rate was 90 percent in 2016, compared to 81 percent just 10 years earlier in 2006. States in which failure to wear a seat belt is a primary offense, which means that drivers can be pulled over for that offense alone, have a higher rate of seat belt use than do states in which it is not (92 and 83 percent, respectively). Not wearing a seat belt is a primary offense in 37 states, including New Jersey. In Pennsylvania, not wearing a seat belt is only a primary offense for children under 18. Seat belts have been shown to reduce the risk of death by 45 percent and the risk of serious injury by 50 percent for drivers and front-seat passengers.

Not using a seat belt was a contributing factor in 12 percent of KSI crashes in the Greater Philadelphia region between 2013 and 2015.

Table 3.29 shows the year-over-year trend in KSI by county where seat belt use (unbelted) was a factor. The regional trend in unbelted KSI has fluctuated since 2010. Between 2010 and 2015, the number of KSI decreased from 378 to 316, but it rose again to 398 in 2016.

Table 3.30 shows the strategies identified by the RSTF to promote seat belt use in the region. These strategies were drawn from the 2017 Pennsylvania

Table 3.29: Trend in KSI in Which One or More Persons Were Unbelted

County	2010	2011	2012	2013	2014	2015	2016
<i>Burlington</i>	28	25	27	21	31	21	19
<i>Camden</i>	26	27	28	14	26	12	17
<i>Gloucester</i>	17	20	15	23	38	17	9
<i>Mercer</i>	17	8	8	9	10	8	4
New Jersey Total	88	80	78	67	105	58	49
<i>Bucks</i>	50	85	63	47	30	74	67
<i>Chester</i>	63	50	42	50	58	48	46
<i>Delaware</i>	39	35	30	40	33	30	55
<i>Montgomery</i>	64	70	82	64	61	40	76
<i>Philadelphia</i>	74	94	80	49	66	66	105
Pennsylvania Total	290	334	297	250	248	258	349
Regional Total	378	414	375	317	353	316	398
<i>Fatalities</i>	105	104	117	90	96	96	86
<i>Serious Injuries</i>	273	310	258	227	257	220	312

Sources: PennDOT, NJDOT, DVRPC



SHSP, the 2015 New Jersey SHSP, DVRPC’s 2015 TSAP, and input from participants in the RSTF during a special strategies session held in the summer of 2017. Note that legislative strategies recommended by safety partners do not constitute endorsement by specific agencies. Priority strategies are bolded.

Table 3.31 identifies a sample of the existing programs and policies in the Greater Philadelphia region to promote seat belt use. Although programs and policies are confined to a single category for the purposes of this document, they may have benefits in multiple categories.

Table 3.30: RSTF Key Strategies to Address Seat Belt Use in the Greater Philadelphia Region

Key Strategies	<i>Education</i>	<i>Engineering</i>	<i>Enforcement</i>	<i>Policy</i>
Enact and enforce primary seat belt laws in Pennsylvania and support primary seat belt legislation covering all passengers in all seating positions in New Jersey.				✓
Promote legislation to increase fines for violating seat belt and child restraint laws.			✓	✓
Implement parent education programs on topics related to child restraints and child occupant safety practices.	✓			
Continue to conduct high-profile child passenger safety inspection clinic events at multiple community locations to educate on the proper use of restraint devices.	✓			
Focus on night-time seat belt enforcements, when usage is lowest.			✓	
Provide access to appropriate information, materials, and guidelines for those implementing programs to increase occupant restraint use.	✓			

Source: DVRPC

Table 3.31: Programs and Policies in the Greater Philadelphia Region That Promote Seat Belt Use

Enforcement
High-visibility enforcement campaigns, such as Click It or Ticket (NJDOT, PennDOT)
Education
Child safety seat checks (NJDHTS, Children’s Hospital of Philadelphia, Safe Kids Pennsylvania & New Jersey)
Child seat loan program (Pennsylvania Traffic Injury Prevention Project)
Partner with employers to develop seat belt policies (NJDHTS)

Sources: PennDOT, NJDOT, DVRPC

Heavy Truck-Related

Six percent of KSI crashes in the region between 2013 and 2015 involved a heavy truck. Heavy trucks are defined by NHTSA as any vehicle, except for a bus or a motor home, that weighs more than 10,000 pounds. In recent years, fatalities resulting from heavy truck crashes have been on the rise across the country; between 2009 and 2015, the number of fatalities increased by 20 percent from 3,380 to 4,067. Although heavy truck frequency is comparatively low, crash severity is high.

Heavy trucks are more likely to be in a crash because they have larger blind spots and a wider turning radius than those of other vehicles. In addition, because of their weight, they have a longer stopping distance

than a passenger vehicle does. Their heavier weight also affords the occupants of heavy trucks more protection than a passenger vehicle does. Of those 4,067 fatalities in 2015 that involved a heavy truck, only 16 percent were occupants of heavy trucks.

In order to address the recent rise in traffic fatalities resulting from heavy truck crashes, Congress mandated electronic logging devices to help enforce legal limits on the number of hours a truck driver may drive per day to combat drowsy driving. Legally, truck drivers may only drive 11 hours within a 14-hour workday, and must be off duty for 10 hours afterward. The new congressional mandate went into effect in December 2017.

Table 3.32: Trend in KSI That Involved a Heavy Truck

County	2010	2011	2012	2013	2014	2015	2016
<i>Burlington</i>	21	16	17	10	12	9	15
<i>Camden</i>	11	16	6	8	6	8	6
<i>Gloucester</i>	14	7	12	6	11	12	4
<i>Mercer</i>	10	4	9	10	13	3	9
New Jersey Total	56	43	44	34	42	32	34
<i>Bucks</i>	16	21	11	14	13	13	13
<i>Chester</i>	11	13	13	6	13	15	20
<i>Delaware</i>	5	6	7	7	3	5	9
<i>Montgomery</i>	8	17	14	10	12	12	14
<i>Philadelphia</i>	19	6	19	13	12	11	24
Pennsylvania Total	59	63	64	50	53	56	80
Regional Total	115	106	108	84	95	88	114
<i>Fatalities</i>	35	32	40	40	44	29	33
<i>Serious Injuries</i>	80	74	68	44	51	59	81

Sources: PennDOT, NJDOT, DVRPC

Table 3.32 shows the year-over-year trend in KSI by county that were heavy truck-related. The regional trend in heavy truck-related KSI has fluctuated since 2010. Between 2010 and 2015, the number of KSI decreased from 115 to 88, but rose again in 2016 to 114.

Table 3.33 shows the strategies identified by the RSTF to promote truck safety in the region. These strategies were drawn from the 2017 Pennsylvania SHSP, the 2015 New Jersey SHSP, DVRPC's 2015 TSAP, and input from participants in the RSTF during a special strategies session held in the summer of 2017. Note that legislative strategies recommended

by safety partners do not constitute endorsement by specific agencies. Priority strategies are bolded.

Table 3.34 identifies a sample of the existing programs and policies in the Greater Philadelphia region to promote truck safety. Although programs and policies are confined to a single category for the purposes of this document, they may have benefits in multiple categories. Regarding heavy truck safety, both states enforce regulations that ensure drivers are abiding by the drive/sleep rules, and weight restrictions, and both states have education programs for other drivers to promote safe driving practices around heavy trucks.

Table 3.33: RSTF Key Strategies to Promote Truck Safety in the Greater Philadelphia Region

Key Strategies	<i>Education</i>	<i>Engineering</i>	<i>Enforcement</i>	<i>Policy</i>
Improve access between the state highway network and truck generators to reduce interactions between heavy trucks and passenger vehicles.		✓		
Use traffic and crash data to identify critical corridors for focused enforcement.			✓	
Promote vehicle safety technologies for commercial vehicles and their drivers.	✓			✓
Promote development of a regional system for truck and bus parking facilities to reduce driver fatigue.		✓		
Consider commercial vehicle safety and size/weight enforcement in the planning, design, and operation of the regional transportation system.		✓		
Promote trucks equipped with added safety measures such as under-ride guards, especially for fleets serving urban areas.	✓			

Source: DVRPC

Table 3.34: Programs and Policies in the Greater Philadelphia Region That Promote Truck Safety

Education
New Jersey and Pennsylvania participate with the federal government in the Motor Carrier Safety Assistance Program, a grant program to reduce commercial motor vehicle accidents, fatalities, and injuries through consistent, uniform, and effective safety programs for trucks and buses.

Sources: PennDOT, NJDOT, DVRPC

Motorcycle Safety

Motorcyclists were involved in 4 percent of KSI crashes in the Greater Philadelphia region between 2013 and 2015. NHTSA estimates that motorcyclists were 27 times more likely to die in a crash than occupants of other vehicles, because motorcycles afford very little protection in a crash compared to passenger vehicles. Furthermore, NHTSA estimates that only 64 percent of motorcyclists wore DOT-compliant helmets in 2015. New Jersey requires all motorcyclists to wear DOT-compliant helmets, whereas Pennsylvania only requires a DOT-compliant helmet for riders under 21 years of age or for those

riders with less than two years of riding experience, or who have not completed a PennDOT-approved motorcycle safety course.

Table 3.35 shows the year-over-year trend in KSI by county that involved a motorcycle. In 2016, the number of motorcycle KSI rose again after experiencing a significant drop from 2010 to 2015.

Table 3.36 shows the strategies identified by the RSTF to promote motorcycle safety in the region. These strategies were drawn from the 2017 Pennsylvania SHSP, the 2015 New Jersey SHSP, DVRPC's 2015

Table 3.35: Trend in KSI That Involved a Motorcycle

County	2010	2011	2012	2013	2014	2015	2016
<i>Burlington</i>	22	18	18	11	16	12	13
<i>Camden</i>	14	19	15	7	12	10	12
<i>Gloucester</i>	17	8	12	11	20	7	10
<i>Mercer</i>	7	8	2	5	5	3	5
New Jersey Total	60	53	47	34	53	32	40
<i>Bucks</i>	35	36	49	36	20	34	55
<i>Chester</i>	30	27	21	23	22	26	33
<i>Delaware</i>	19	19	18	21	16	11	28
<i>Montgomery</i>	29	18	28	25	16	28	42
<i>Philadelphia</i>	48	60	40	42	53	34	42
Pennsylvania Total	161	160	156	147	127	133	200
Regional Total	221	213	203	181	180	165	240
<i>Fatalities</i>	60	64	61	61	54	51	66
<i>Serious Injuries</i>	141	149	142	120	126	114	174

Sources: PennDOT, NJDOT, DVRPC

TSAP, and input from participants in the RSTF during a special strategies session held in the summer of 2017. Note that legislative strategies recommended by safety partners do not constitute endorsement by specific agencies. Proper roadway maintenance provides safety benefits for users and is especially important for motorcycle safety. Priority strategies are bolded.

Table 3.37 identifies a sample of the existing programs and policies in the Greater Philadelphia region to promote motorcycle safety. Although programs and policies are confined to a single category for the purposes of this document, they may have benefits in multiple categories.

Table 3.36: RSTF Key Strategies to Address Motorcycle Safety in the Greater Philadelphia Region

Key Strategies	<i>Education</i>	<i>Engineering</i>	<i>Enforcement</i>	<i>Policy</i>
Enact and enforce motorcycle helmet legislation for all ages and riders in Pennsylvania.				✓
Promote the importance of all levels of motorcycle rider training and increase the availability of trainings.	✓			
Increase general motorcycle awareness campaigns, and promote existing programs.	✓			
Work with roadway owners to identify roadway deficiencies that hinder motorcyclists.			✓	
Work to enhance education efforts related to motorcycle-specific roadway concerns.	✓		✓	

Source: DVRPC

Table 3.37: Programs and Policies in the Greater Philadelphia Region That Help Promote Motorcycle Safety

Education
Pennsylvania Motorcycle Safety Program courses (PennDOT)
Motorcycle Basic and Experienced Rider courses (New Jersey Motor Vehicle Commission)

Sources: PennDOT, NJDOT, DVRPC

Work Zone Safety

Two percent of KSI crashes in the Greater Philadelphia region between 2013 and 2015 occurred in a work zone.

A work zone is an area of a roadway that is undergoing construction or maintenance, often resulting in lane closures and detours. In Pennsylvania, fines are doubled for speeding, impaired driving, and failure to obey traffic devices in an active work zone, and those convicted of homicide by vehicle for a crash in an active work zone face an additional five years of jail time. “Excessive speeding,” or driving 11 miles per hour or more above the posted speed limit in an active work zone, can result in a 15-day suspension of a driver’s license. New Jersey has similarly increased

penalties for all moving violations in both inactive and active work zones. In Pennsylvania, Senate Bill 172 recently authorized the use of automated speed enforcement in work zones in order to better enforce these laws, while New Jersey is currently considering similar legislation (A5082).

Table 3.38 shows the year-over-year trend in KSI by county that occurred in a work zone. The regional trend in work zone KSI has remained fairly constant since 2010. This is one of the few emphasis areas that has not followed the national trend. Notably, the number of fatalities that occurred in a work zone decreased from 14 in 2012 to 2 in 2016.

Table 3.38: Trend in KSI That Occurred in a Work Zone

County	2010	2011	2012	2013	2014	2015	2016
<i>Burlington</i>	8	9	6	1	2	0	1
<i>Camden</i>	4	6	3	5	7	0	3
<i>Gloucester</i>	2	2	0	0	0	2	1
<i>Mercer</i>	0	1	5	2	2	0	0
New Jersey Total	14	18	14	8	11	2	5
<i>Bucks</i>	2	2	1	3	3	10	3
<i>Chester</i>	0	2	2	1	3	7	1
<i>Delaware</i>	0	1	3	0	0	1	2
<i>Montgomery</i>	2	8	8	9	3	1	9
<i>Philadelphia</i>	6	0	6	1	4	3	0
Pennsylvania Total	10	13	20	14	13	22	15
Regional Total	24	31	34	22	24	24	20
<i>Fatalities</i>	7	11	14	5	10	9	2
<i>Serious Injuries</i>	17	20	20	17	14	15	18

Sources: PennDOT, NJDOT, DVRPC

Table 3.39 shows the strategies identified by the RSTF to promote work zone safety in the region. These strategies were drawn from the 2017 Pennsylvania SHSP, the 2015 New Jersey SHSP, DVRPC’s 2015 TSAP, and input from participants in the RSTF during a special strategies session held in the summer of 2017. Note that legislative strategies recommended by safety partners do not constitute endorsement by specific agencies. Priority strategies are bolded.

Table 3.40 identifies a sample of the existing programs and policies in the Greater Philadelphia region to promote safety in work zones. Although programs and policies are confined to a single category for the purposes of this document, they may have benefits in multiple categories.

Table 3.39: RSTF Key Strategies to Address Safety in Work Zones in the Greater Philadelphia Region

Key Strategies	<i>Education</i>	<i>Engineering</i>	<i>Enforcement</i>	<i>Policy</i>
Improve speed management and enforcement in work zones.			✓	
Support legislation in New Jersey for automated traffic enforcement, including pervasive automated speed enforcement and applications for work zones.			✓	✓
Educate workers on safety practices in work zones and promote campaigns like National Work Zone Awareness Week and Operation Orange Squeeze.	✓			
Accommodate non-motorized users in design of traffic control plans for work zones.				✓
Provide work zone training to law enforcement and first responders.	✓			
Participate in and promote work zone safety public awareness initiatives.	✓			

Source: DVRPC

Table 3.40: Programs and Policies in the Greater Philadelphia Region That Promote Work Zone Safety

Enforcement
Operation Orange Squeeze (Pennsylvania Turnpike Commission and Pennsylvania State Police)
License suspension and increased fines and jail time for active work zone violations (PennDOT)
Automated Speed Enforcement in Work Zones (PennDOT and Pennsylvania Turnpike Commission)
Education
Work Zone Safety Awareness Workshop (Rutgers Center for Advanced Infrastructure and Transportation—New Jersey)

Sources: PennDOT, NJDOT, DVRPC

Train and Trolley

Seven fatalities and serious injuries resulted from a crash between a vehicle and a train or trolley between 2013 and 2015 in the region. While crashes between a vehicle and a train are rare—given that train traffic is often separated from automobile traffic, with very few at-grade crossings—crashes between a vehicle and a trolley are more likely, given that trolleys operate on the street alongside automobiles. There are exceptions, including SEPTA’s regional rail service, which is a legacy system built at grade with many at-grade crossings.

In southeastern Pennsylvania, SEPTA operates eight trolley lines within Philadelphia and Delaware

counties. Because trolleys operate in automobile traffic, but are still fixed to a track, they are often unable to avoid dangerous situations, such as a driver making an illegal U-turn in front of them, as they lack the maneuverability of an automobile. Additionally, because trolleys transport large numbers of people, there is potential for a large number of people to be injured or killed in a trolley-vehicle crash, despite these crashes occurring relatively infrequently compared to vehicle-vehicle crashes.

Table 3.41 shows the year-over-year trend in KSI by county that involved a train or trolley. The regional trend in train and trolley KSI has fluctuated since

Table 3.41: Trend in KSI That Involved a Train or Trolley

County	2010	2011	2012	2013	2014	2015	2016
<i>Burlington</i>	0	0	0	0	0	1	1
<i>Camden</i>	2	1	0	0	0	0	0
<i>Gloucester</i>	0	0	0	0	0	0	0
<i>Mercer</i>	0	0	0	1	0	0	0
New Jersey Total	2	1	0	1	0	1	1
<i>Bucks</i>	0	0	0	0	0	0	0
<i>Chester</i>	0	0	0	0	0	0	0
<i>Delaware</i>	0	0	0	0	0	1	0
<i>Montgomery</i>	0	0	0	0	1	0	4
<i>Philadelphia</i>	2	0	1	0	1	2	0
Pennsylvania Total	2	0	1	0	2	3	4
Regional Total	4	1	1	1	2	4	5
<i>Fatalities</i>	2	1	0	2	2	3	2
<i>Serious Injuries</i>	2	0	1	0	0	1	3

Sources: PennDOT, NJDOT, DVRPC

2010. Between 2013 and 2016, the number of KSI crashes increased from one to five.

Table 3.42 shows the strategies identified by the RSTF to reduce train and trolley crashes in the region. These strategies were drawn from the 2017 Pennsylvania SHSP, the 2015 New Jersey SHSP, DVRPC’s 2015 TSAP, and input from participants in the RSTF during a special strategies session held in the summer of 2017. Note that legislative strategies recommended by safety partners do not constitute endorsement by specific agencies. Priority strategies are bolded.

Table 3.43 identifies a sample of the existing programs and policies in the Greater Philadelphia region to reduce train and trolley crashes. Although programs and policies are confined to a single category for the purposes of this document, they may have benefits in multiple categories.

Table 3.42: RSTF Key Strategies to Address Safety for Trains and Trolleys in the Greater Philadelphia Region

Key Strategies	<i>Education</i>	<i>Engineering</i>	<i>Enforcement</i>	<i>Policy</i>
Use crash and violation data to target problematic intersections.			✓	
Implement safety countermeasures at crossings with high pedestrian traffic.		✓		
Identify high crash potential crossings for improvements or enforcement.		✓	✓	
Improve visibility at grade crossings by removing obstacles (e.g., trees, fences, and buildings) that prevent drivers from having a clear view of approaching trains.		✓		
Promote enforcement campaigns and increase their visibility.				✓
Partner with freight railroads and Amtrak to promote public awareness.	✓			

Source: DVRPC

Table 3.43: Programs and Policies in the Greater Philadelphia Region That Promote Safety for Trains and Trolleys

Education
Safety Awareness For Everyone (New Jersey Transit)

Sources: PennDOT, NJDOT, DVRPC

APPENDIX A: MUNICIPAL DATA

County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)									
					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive	
Burlington	Bass River Township	338	1,481	556,434,533	15	1	11	6	7	7	0	5	0	3
Burlington	Beverly City	25	2,573	10,275,988	2	1	0	2	0	0	1	0	0	1
Burlington	Bordentown City	25	3,912	21,842,329	1	1	0	0	0	0	0	1	0	0
Burlington	Bordentown Township	134	11,444	301,020,681	19	8	10	13	1	1	3	6	0	7
Burlington	Burlington City	83	9,865	223,545,534	11	5	6	4	3	3	3	2	0	1
Burlington	Burlington Township	240	22,613	569,316,293	11	2	4	4	1	1	1	1	2	5
Burlington	Chesterfield Township	105	7,725	134,393,993	8	3	4	5	0	0	0	1	0	4
Burlington	Cinnaminson Township	171	16,296	616,217,893	14	9	5	5	2	2	5	4	2	5
Burlington	Delanco Township	45	4,544	90,156,691	1	1	1	0	0	0	0	0	1	1
Burlington	Delran Township	148	16,856	439,767,651	17	9	3	4	4	4	9	2	1	4
Burlington	Eastampton Township	81	6,065	129,983,105	5	2	4	3	0	0	0	1	1	1
Burlington	Edgewater Park Township	74	8,854	277,286,338	8	2	3	1	0	0	5	2	1	3
Burlington	Evesham Township	483	45,669	1,372,624,511	42	13	19	19	4	4	7	14	4	12
Burlington	Fieldsboro Borough	6	603	2,184,696	0	0	0	0	0	0	0	0	0	0
Burlington	Florence Township	126	12,287	182,389,998	10	4	3	4	3	3	3	1	1	3
Burlington	Hainesport Township	97	6,118	360,382,232	12	3	2	1	1	1	5	2	3	5
Burlington	Lumberton Township	143	12,511	295,662,141	17	7	8	6	4	4	2	2	4	5
Burlington	Mansfield Township	131	8,554	334,898,739	10	0	6	8	2	2	1	3	0	1

County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)									
					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive	
Burlington	Maple Shade Township	135	19,075	784,924,086	16	1	8	6	7	7	6	2	3	4
Burlington	Medford Lakes Borough	59	4,138	43,457,728	1	0	0	1	0	0	0	0	0	0
Burlington	Medford Township	417	23,215	739,403,294	13	3	9	8	2	2	1	2	2	6
Burlington	Moorestown Township	271	20,686	794,367,534	15	3	11	5	5	5	1	6	0	5
Burlington	Mount Holly Township	80	9,448	183,511,290	14	5	4	4	8	8	7	1	1	6
Burlington	Mount Laurel Township	424	41,813	1,381,004,129	48	11	19	15	11	11	10	11	3	17
Burlington	New Hanover Township	202	7,674	151,292,560	3	0	1	1	1	1	2	1	1	1
Burlington	North Hanover Township	135	7,655	130,292,000	4	2	1	3	0	0	1	2	1	2
Burlington	Palmyra Borough	64	7,372	210,753,753	2	0	0	1	0	0	0	1	0	0
Burlington	Pemberton Borough	11	1,467	38,353,556	5	1	2	5	0	0	0	0	2	2
Burlington	Pemberton Township	551	27,925	526,660,333	37	8	25	23	8	8	3	8	5	11
Burlington	Riverside Township	54	8,051	37,235,766	2	2	1	1	1	1	0	0	0	1
Burlington	Riverton Borough	26	2,766	15,396,384	1	1	0	0	0	0	0	1	0	1
Burlington	Shamong Township	240	6,461	234,078,260	9	2	6	3	2	2	0	1	3	5
Burlington	Southampton Township	315	10,420	562,000,180	26	5	8	11	3	3	5	8	7	7

County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)							
					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver
Burlington	Springfield Township	173	3,412	366,933,699	11	0	5	2	0	3	0	3
Burlington	Tabernacle Township	246	6,983	134,483,830	16	2	7	5	3	2	3	10
Burlington	Washington Township	443	827	45,432,149	8	2	8	3	1	0	2	0
Burlington	Westampton Township	111	8,792	326,154,306	30	9	13	17	5	4	10	16
Burlington	Willingboro Township	257	31,735	277,056,489	29	10	11	9	2	8	6	12
Burlington	Woodland Township	380	1,386	162,419,288	17	4	12	10	5	1	5	4
Burlington	Wrightstown Borough	30	884	30,281,355	0	0	0	0	0	0	0	0
Camden	Audubon Borough	71	8,763	187,197,167	4	2	0	2	2	1	1	2
Camden	Audubon Park Borough	7	1,051	34,959,102	1	1	0	0	0	0	1	1
Camden	Barrington Borough	50	6,904	159,312,818	2	0	0	0	0	0	1	2
Camden	Bellmawr Borough	88	11,538	162,053,058	5	1	2	2	2	1	1	3
Camden	Berlin Borough	100	7,587	284,929,414	11	6	3	3	4	2	4	5
Camden	Berlin Township	85	5,360	327,878,264	5	4	1	1	2	0	3	3
Camden	Brooklawn Borough	18	1,879	114,152,803	2	0	1	0	0	1	2	1

County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)								
					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive
Camden	Camden City	389	77,294	933,065,465	76	33	26	33	9	25	9	10	30
Camden	Cherry Hill Township	715	71,152	2,708,073,971	66	33	14	21	8	21	18	14	29
Camden	Chesilhurst Borough	47	1,675	36,877,561	1	0	0	1	0	0	1	0	0
Camden	Clementon Borough	60	4,972	165,458,405	6	5	2	5	1	1	0	1	2
Camden	Collingswood Borough	87	13,929	234,089,180	9	6	5	2	0	2	2	2	3
Camden	Gibbsboro Borough	42	2,324	143,722,145	1	0	1	1	0	0	0	0	0
Camden	Gloucester City	86	11,392	179,223,256	8	4	3	3	4	2	0	1	2
Camden	Gloucester Township	543	64,356	1,184,350,357	40	13	14	12	9	15	9	6	13
Camden	Haddon Heights Borough	57	7,425	115,264,241	9	1	0	1	2	4	1	0	4
Camden	Haddon Township	103	14,611	218,067,464	9	3	3	7	2	3	4	0	1
Camden	Haddonfield Borough	97	11,521	244,843,063	4	2	1	0	0	2	2	1	1
Camden	Hi-Nella Borough	7	817	12,752,963	0	0	0	0	0	0	0	0	0
Camden	Laurel Springs Borough	19	1,910	14,031,108	1	1	0	0	0	1	0	0	0
Camden	Lawnside Borough	39	2,919	167,770,709	4	3	0	1	0	3	0	0	2
Camden	Lindenwold Borough	139	17,512	321,567,074	17	8	4	9	3	8	3	1	4

APPENDIX A: MUNICIPAL DATA

County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)							
					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver
Camden	Magnolia Borough	38	4,329	134,249,244	17	10	1	8	2	7	2	2
Camden	Merchantville Borough	22	3,803	43,903,232	3	2	1	0	1	2	0	1
Camden	Mount Ephraim Borough	33	4,669	77,770,991	5	1	0	1	0	3	0	1
Camden	Oaklyn Borough	26	4,022	53,632,206	1	0	0	1	0	1	0	0
Camden	Pennsauken Township	338	35,757	1,550,566,270	40	22	12	16	13	18	5	7
Camden	Pine Hill Borough	81	10,383	98,033,963	10	4	4	4	1	3	2	0
Camden	Pine Valley Borough	4	2	424,159	0	0	0	0	0	0	0	0
Camden	Runnemede Borough	66	8,435	153,762,323	7	3	4	2	1	2	1	1
Camden	Somerdale Borough	55	5,246	188,079,820	6	3	0	3	1	2	2	0
Camden	Stratford Borough	57	6,997	115,133,885	4	1	1	2	0	1	3	1
Camden	Tavistock Borough	2	9	3,296,058	0	0	0	0	0	0	0	0
Camden	Voorhees Township	293	29,227	723,326,519	47	23	13	11	2	5	13	5
Camden	Waterford Township	325	10,683	278,552,981	7	2	5	7	1	0	2	1
Camden	Winslow Township	575	39,207	1,274,140,312	53	17	30	23	5	7	16	10
Camden	Woodlyne Borough	11	2,972	46,427,489	2	1	1	1	2	1	1	0

County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)								
					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive
Gloucester	Clayton Borough	107	8,225	131,815,719	3	1	2	1	1	0	0	1	3
Gloucester	Deptford Township	366	30,568	929,848,012	21	3	8	8	4	5	4	1	7
Gloucester	East Greenwich Township	110	10,018	218,199,600	5	2	3	5	1	0	3	1	1
Gloucester	Elk Township	146	4,243	192,800,429	15	7	11	9	3	0	2	3	4
Gloucester	Franklin Township	352	16,754	539,015,019	75	31	54	43	9	9	16	16	28
Gloucester	Glassboro Borough	190	18,798	318,177,555	13	5	4	5	5	5	3	4	5
Gloucester	Greenwich Township	87	4,874	62,322,909	6	4	4	4	3	0	1	0	2
Gloucester	Harrison Township	181	12,616	461,372,602	14	7	7	7	1	2	1	3	4
Gloucester	Logan Township	144	6,000	419,575,899	9	1	7	5	1	1	2	0	2
Gloucester	Mantua Township	205	15,170	475,669,229	19	5	8	8	3	2	3	1	9
Gloucester	Monroe Township	425	36,700	959,411,933	84	32	47	31	11	15	19	17	38
Gloucester	National Park Borough	35	3,018	17,600,047	0	0	0	0	0	0	0	0	0
Gloucester	Newfield Borough	27	1,681	12,176,382	1	1	1	1	0	0	0	0	1
Gloucester	Paulsboro Borough	54	6,041	34,476,553	2	0	1	0	1	0	1	0	1

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County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)								
					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive
Gloucester	Pitman Borough	77	8,959	110,804,593	7	3	2	4	3	1	1	2	3
Gloucester	South Harrison Township	108	3,195	125,509,738	2	2	2	1	1	0	0	0	2
Gloucester	Swedesboro Borough	24	2,627	44,675,659	0	0	0	0	0	0	0	0	0
Gloucester	Washington Township	434	48,216	1,066,245,255	42	11	14	15	9	9	6	6	11
Gloucester	Wenonah Borough	29	2,115	21,715,235	1	0	1	1	0	0	0	1	0
Gloucester	West Deptford Township	220	21,537	357,266,880	8	2	2	3	4	3	0	0	4
Gloucester	Westville Borough	36	4,263	146,583,421	1	1	0	1	0	0	0	1	1
Gloucester	Woodbury City	78	10,098	235,020,709	1	1	0	1	0	0	0	0	0
Gloucester	Woodbury Heights Borough	37	3,028	42,016,142	0	0	0	0	0	0	0	0	0
Gloucester	Woolwich Township	173	10,961	303,206,165	4	1	2	2	1	0	2	0	0
Mercer	East Windsor Township	210	27,389	513,970,321	21	8	5	6	3	8	10	4	8
Mercer	Ewing Township	327	36,270	651,529,890	15	5	4	0	1	7	4	1	9
Mercer	Hamilton Township	769	88,809	1,895,013,466	52	20	22	22	6	16	17	5	17
Mercer	Hightstown Borough	39	5,557	73,589,961	1	0	0	1	1	0	0	0	0

County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)								
					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive
Mercer	Hopewell Borough	19	1,891	33,482,839	2	2	0	0	0	2	0	0	2
Mercer	Hopewell Township	434	18,311	1,207,190,761	26	6	21	9	5	2	7	3	6
Mercer	Lawrence Township	330	33,252	1,274,500,122	22	9	5	9	2	8	7	1	4
Mercer	Pennington Borough	26	2,588	51,155,023	1	0	0	0	0	0	0	0	0
Mercer	Princeton	299	28,940	831,912,656	13	3	8	6	0	4	5	0	0
Mercer	Robbinsville Township	210	13,952	581,171,003	11	3	6	5	5	2	3	3	2
Mercer	Trenton City	370	84,459	820,461,832	30	23	8	12	3	14	2	3	11
Mercer	West Windsor Township	356	28,108	1,772,471,040	22	7	11	13	7	4	6	2	5
Bucks	Bedminster Township	301	6,847	209,313,821	21	7	13	2	6	2	5	3	3
Bucks	Bensalem Township	508	60,425	1,124,006,880	71	24	26	5	23	32	14	12	6
Bucks	Bridgeton Township	73	1,296	23,941,666	3	0	1	0	0	0	0	0	0
Bucks	Bristol Borough	66	9,657	114,652,440	12	5	6	0	5	4	1	3	1
Bucks	Bristol Township	483	54,431	852,459,658	68	39	27	7	25	16	13	5	9
Bucks	Buckingham Township	372	20,268	734,062,046	28	10	18	6	13	3	7	2	3

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County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)								
					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive
Bucks	Chalfont Borough	39	4,052	71,884,725	2	2	1	0	0	0	1	0	0
Bucks	Doylestown Borough	67	8,353	56,371,876	8	6	3	1	1	4	2	0	0
Bucks	Doylestown Township	265	17,603	631,476,652	32	10	17	2	10	4	9	4	1
Bucks	Dublin Borough	17	2,158	37,749,029	0	0	0	0	0	0	0	0	0
Bucks	Durham Township	109	1,147	62,985,111	4	0	2	1	2	0	0	1	0
Bucks	East Rockhill Township	124	5,719	160,087,328	13	3	7	0	3	1	2	3	1
Bucks	Falls Township	443	34,172	423,158,474	27	12	12	2	7	3	2	1	4
Bucks	Haycock Township	148	1,999	50,122,151	5	0	5	0	2	0	0	2	0
Bucks	Hilltown Township	275	15,122	468,035,802	43	14	21	8	13	3	5	10	4
Bucks	Huimeville Borough	12	966	35,915,419	0	0	0	0	0	0	0	0	0
Bucks	Ivyland Borough	7	1,016	10,996,287	1	1	1	0	0	0	0	0	0
Bucks	Langhorne Borough	17	1,503	51,974,287	4	2	1	0	1	2	0	0	0
Bucks	Langhorne Manor Borough	17	1,446	22,016,025	1	0	1	0	0	0	0	0	0
Bucks	Lower Makefield Township	402	32,622	569,221,744	12	4	9	2	2	1	5	2	2
Bucks	Lower Southampton Township	194	18,960	420,125,274	24	10	7	0	7	5	6	2	2

County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)								
					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive
Bucks	Middletown Township	464	45,438	950,656,605	37	13	20	5	7	6	8	7	2
Bucks	Milford Township	262	9,928	457,385,453	21	6	16	2	11	0	2	5	2
Bucks	Morrisville Borough	72	8,689	72,681,879	4	4	2	0	2	0	0	0	1
Bucks	New Britain Borough	28	3,028	73,370,691	0	0	0	0	0	0	0	0	0
Bucks	New Britain Township	190	11,095	259,519,549	20	8	12	1	6	0	7	4	2
Bucks	New Hope Borough	32	2,526	54,567,126	3	1	3	0	1	2	0	1	0
Bucks	Newtown Borough	22	2,240	30,934,783	0	0	0	0	0	0	0	0	0
Bucks	Newtown Township	210	19,459	478,495,075	8	4	6	0	2	1	2	1	0
Bucks	Nockamixon Township	230	3,425	177,723,135	8	0	2	1	1	0	3	2	0
Bucks	Northampton Township	474	39,675	941,900,346	28	7	18	4	9	1	4	9	2
Bucks	Pennel Borough	16	2,700	45,647,661	0	0	0	0	0	0	0	0	0
Bucks	Perkasie Borough	78	8,511	89,506,169	4	2	1	0	0	1	2	1	0
Bucks	Plumstead Township	294	12,730	472,359,205	38	15	25	1	11	3	8	5	3
Bucks	Quakertown Borough	69	8,939	169,110,568	10	3	2	0	3	4	2	1	1
Bucks	Richland Township	208	13,081	537,333,128	24	11	7	2	2	2	11	4	3

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County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)								
					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive
Bucks	Richlandtown Borough	8	1,246	5,603,954	1	0	0	0	1	1	0	0	0
Bucks	Riegelsville Borough	19	842	14,733,311	1	1	1	0	1	0	0	0	0
Bucks	Sellersville Borough	32	4,232	38,179,293	1	1	0	0	0	0	0	0	0
Bucks	Silverdale Borough	11	963	21,244,993	4	1	2	1	2	2	0	0	2
Bucks	Solebury Township	307	8,674	367,916,023	19	3	10	2	5	0	6	2	1
Bucks	Springfield Township	285	5,040	243,805,053	11	2	8	2	3	0	1	2	0
Bucks	Telford Borough	20	2,243	20,663,114	3	3	0	0	1	0	2	0	0
Bucks	Tinicum Township	323	3,993	157,470,943	17	3	13	0	8	1	2	2	2
Bucks	Trumbauersville Borough	10	1,081	20,983,998	0	0	0	0	0	0	0	0	0
Bucks	Tullytown Borough	28	1,781	42,321,832	3	0	1	0	2	1	1	0	0
Bucks	Upper Makefield Township	229	8,222	295,055,168	11	3	7	0	3	0	1	4	1
Bucks	Upper Southampton Township	147	15,171	351,057,562	25	10	8	2	5	4	6	4	3
Bucks	Warminster Township	253	32,716	659,341,248	42	28	12	5	13	9	11	7	6
Bucks	Warrington Township	221	23,541	717,155,239	35	19	17	1	11	3	14	6	2
Bucks	Warwick Township	144	14,579	373,603,784	8	2	5	1	3	0	2	3	2

County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)								
					All	Intersection	Lane Departure	Distractions	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive
Bucks	West Rockhill Township	171	5,275	496,690,982	13	4	7	0	3	0	5	1	2
Bucks	Wrightstown Township	97	3,056	284,523,102	9	4	9	0	0	0	4	1	0
Bucks	Yardley Borough	24	2,324	45,676,461	4	2	2	3	2	2	1	1	1
Chester	Atglen Borough	18	1,507	26,355,917	2	0	2	0	2	0	0	1	0
Chester	Avondale Borough	13	1,587	31,599,786	1	0	0	1	0	0	0	1	0
Chester	Birmingham Township	77	4,242	158,934,637	8	4	5	1	1	1	2	1	0
Chester	Cain Township	154	14,025	270,408,616	14	3	7	0	3	7	0	2	0
Chester	Charlestown Township	135	5,659	303,490,622	7	1	5	0	1	0	1	2	0
Chester	Coatesville City	87	13,130	135,621,666	16	9	4	1	1	3	1	2	2
Chester	Downingtown Borough	59	7,921	145,082,864	4	3	2	0	0	2	0	0	0
Chester	East Bradford Township	186	9,996	261,101,943	19	2	17	2	5	1	1	1	3
Chester	East Brandywine Township	115	7,328	176,744,890	8	3	3	0	3	2	1	2	1
Chester	East Cain Township	42	4,860	118,311,233	4	2	2	0	2	0	1	2	1
Chester	East Coventry Township	126	6,734	154,346,135	9	4	8	1	2	0	2	2	0



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					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive	
Chester	East Fallowfield Township	137	7,522	142,644,319	7	2	4	0	2	0	0	1	1	1
Chester	East Goshen Township	199	18,139	350,609,728	12	4	4	0	3	2	5	1	1	3
Chester	East Marlborough Township	149	7,152	278,737,049	13	0	7	1	4	3	2	2	2	3
Chester	East Nantmeal Township	111	1,779	98,232,755	7	1	6	0	1	0	3	3	1	1
Chester	East Nottingham Township	177	8,777	84,597,790	8	1	7	1	5	0	0	0	0	2
Chester	East Pikeland Township	129	7,230	253,430,413	10	3	5	0	6	1	2	0	0	0
Chester	East Vincent Township	155	6,849	177,713,215	12	4	8	0	3	0	3	2	2	2
Chester	East Whiteland Township	185	10,681	605,083,500	9	2	4	1	3	2	2	0	0	0
Chester	Easttown Township	135	10,562	239,142,302	4	1	1	1	0	0	3	1	1	2
Chester	Elk Township	67	1,682	29,874,590	2	0	2	0	1	0	0	0	0	0
Chester	Elverson Borough	20	1,332	15,742,532	2	0	2	0	2	0	0	1	1	1
Chester	Franklin Township	124	4,415	84,233,715	5	1	3	0	2	0	0	3	0	0
Chester	Highland Township	105	1,272	109,196,849	12	2	9	0	3	0	3	0	0	3
Chester	Honey Brook Borough	14	1,681	21,494,835	2	0	1	0	0	0	1	0	0	0
Chester	Honey Brook Township	169	7,858	198,503,368	21	8	16	2	9	1	4	4	4	2

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					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive
Chester	Kennett Square Borough	41	6,123	40,316,320	2	1	0	0	1	1	0	2	0
Chester	Kennett Township	177	7,754	331,018,609	7	2	3	1	4	0	2	2	3
Chester	London Britain Township	92	3,199	51,091,647	3	0	2	0	1	0	0	2	0
Chester	London Grove Township	162	7,945	192,212,387	16	4	8	2	5	1	0	2	0
Chester	Londonderry Township	70	2,339	134,164,012	6	4	2	1	2	0	2	1	2
Chester	Lower Oxford Township	120	5,095	92,325,967	13	5	9	1	5	2	1	2	0
Chester	Malvern Borough	34	3,179	61,661,621	0	0	0	0	0	0	0	0	0
Chester	Modena Borough	6	496	1,226,751	2	1	1	0	2	0	1	0	1
Chester	New Garden Township	169	12,079	259,862,376	24	9	11	2	12	1	5	7	5
Chester	New London Township	112	5,776	93,424,384	7	3	4	0	3	1	4	1	2
Chester	Newlin Township	74	1,317	84,716,056	2	0	2	2	0	0	0	0	0
Chester	North Coventry Township	137	7,935	237,520,324	9	4	6	1	4	1	2	0	0
Chester	Oxford Borough	49	5,100	41,354,709	4	2	1	0	0	1	0	1	0
Chester	Parkesburg Borough	36	3,636	24,721,303	4	2	3	0	2	1	0	1	1
Chester	Penn Township	89	5,441	79,276,924	9	2	5	0	0	1	0	1	1



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					All	Intersec- tion	Lane Departure	Dis- tracted	Impaired	Pedes- trian & Bicycle	Older Driver	Younger Driver	Aggres- sive
Chester	Pennsbury Township	96	3,621	237,657,493	9	3	6	2	2	0	2	1	0
Chester	Phoenixville Borough	127	16,530	203,035,658	10	3	6	2	4	5	0	0	0
Chester	Pocopson Township	82	4,713	129,518,926	2	0	2	0	0	0	0	1	0
Chester	Sadsbury Township	73	3,674	134,508,804	15	5	9	0	9	2	4	2	4
Chester	Schuylkill Township	137	8,545	287,122,701	4	1	3	1	1	1	1	2	0
Chester	South Coatesville Borough	20	1,581	22,633,707	4	1	0	2	1	0	3	1	1
Chester	South Coventry Township	68	2,612	158,204,150	4	1	2	0	0	0	1	0	0
Chester	Spring City Borough	23	3,337	23,256,995	1	0	0	0	0	1	0	0	0
Chester	Thornbury Township	59	3,310	129,569,539	9	3	5	1	5	1	4	3	1
Chester	Tredyffrin Township	388	29,455	893,573,928	12	4	6	0	3	3	7	0	1
Chester	Upper Oxford Township	104	2,493	125,983,282	8	4	6	2	1	0	2	0	0
Chester	Upper Uwchlan Township	143	11,419	239,382,106	2	1	1	0	1	0	0	0	0
Chester	Uwchlan Township	212	18,325	522,523,723	6	4	2	1	1	2	1	0	0
Chester	Valley Township	86	7,163	83,227,642	10	1	7	0	5	1	0	0	4
Chester	Wallace Township	83	3,581	71,398,693	6	0	2	2	1	1	0	3	0

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					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive
Chester	Warwick Township	129	2,516	116,333,150	4	1	3	2	2	0	1	0	0
Chester	West Bradford Township	206	12,426	348,478,016	20	3	12	0	6	0	1	4	1
Chester	West Brandywine Township	128	7,420	213,156,915	11	2	6	2	3	0	3	2	4
Chester	West Cain Township	195	9,055	151,846,305	18	2	15	0	11	3	1	4	0
Chester	West Chester Borough	96	18,860	132,511,935	15	7	0	0	4	11	6	0	3
Chester	West Fallowfield Township	131	2,576	203,062,150	9	2	5	0	3	1	4	0	0
Chester	West Goshen Township	261	22,598	588,821,406	19	5	11	2	8	6	4	2	6
Chester	West Grove Borough	19	2,856	16,564,856	2	1	0	0	1	1	1	0	0
Chester	West Marlborough Township	103	798	103,445,115	11	2	10	1	5	0	1	1	2
Chester	West Nantmeal Township	104	1,939	97,244,450	4	1	3	0	1	0	0	0	1
Chester	West Nottingham Township	82	2,720	51,218,308	2	1	0	0	1	1	1	0	0
Chester	West Pikeland Township	95	4,047	156,412,812	5	1	3	0	0	0	1	2	1
Chester	West Sadsbury Township	94	2,238	202,562,781	17	7	7	0	3	2	8	0	4
Chester	West Vincent Township	160	4,787	192,136,138	7	2	4	1	2	1	1	2	1
Chester	West Whiteland Township	223	18,397	613,248,285	16	8	6	1	5	2	5	1	5



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					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive
Chester	Westtown Township	141	10,874	294,426,408	13	6	3	1	5	1	5	1	5
Chester	Willistown Township	200	10,622	427,988,792	8	3	6	1	3	1	3	1	0
Delaware	Aldan Borough	29	4,164	60,566,429	2	1	2	0	0	0	0	1	0
Delaware	Aston Township	138	16,787	220,765,456	13	6	5	0	5	2	4	1	1
Delaware	Bethel Township	92	8,986	215,824,721	11	6	5	1	4	2	2	6	2
Delaware	Brookhaven Borough	55	8,045	101,035,649	12	2	7	1	3	1	2	3	2
Delaware	Chadds Ford Township	93	3,705	461,208,281	24	12	9	3	3	3	7	2	3
Delaware	Chester City	213	34,007	383,070,849	52	28	23	2	18	16	6	5	7
Delaware	Chester Heights Borough	32	2,568	121,827,511	4	0	3	0	1	0	1	0	1
Delaware	Chester Township	27	4,069	33,347,378	5	3	5	2	1	0	1	0	1
Delaware	Clifton Heights Borough	28	6,656	101,762,098	4	1	1	0	1	3	1	0	0
Delaware	Collingdale Borough	32	8,778	64,430,501	13	8	6	1	4	2	2	0	0
Delaware	Colwyn Borough	12	2,542	8,900,488	0	0	0	0	0	0	0	0	0
Delaware	Concord Township	185	17,372	615,912,536	35	16	14	1	13	5	6	4	3

APPENDIX A: MUNICIPAL DATA

County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)									
					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive	
Delaware	Darby Borough	34	10,689	97,242,841	8	2	2	0	0	0	4	1	1	1
Delaware	Darby Township	35	9,293	88,146,827	10	5	5	0	2	2	2	3	0	0
Delaware	East Lansdowne Borough	12	2,670	31,296,000	1	0	0	0	0	0	1	0	0	0
Delaware	Eddystone Borough	16	2,572	21,011,621	2	1	0	0	2	2	0	0	1	0
Delaware	Edgmont Township	97	4,011	247,884,174	3	0	2	0	2	2	1	0	1	1
Delaware	Folcroft Borough	28	6,615	61,735,348	5	3	3	0	0	0	2	0	1	0
Delaware	Glenolden Borough	34	7,150	125,003,314	23	15	4	0	6	6	7	5	2	1
Delaware	Haverford Township	313	48,698	926,624,834	14	5	3	2	4	4	4	3	0	2
Delaware	Lansdowne Borough	56	10,618	133,050,181	9	4	2	1	1	1	5	1	0	1
Delaware	Lower Chichester Township	24	3,466	30,706,623	2	2	2	0	1	1	0	1	0	0
Delaware	Marcus Hook Borough	20	2,430	20,999,380	4	0	3	1	2	2	0	1	0	0
Delaware	Marple Township	220	23,551	583,071,470	15	6	4	2	1	1	4	5	0	0
Delaware	Media Borough	38	5,341	98,948,458	2	1	0	0	0	0	1	2	0	0
Delaware	Middletown Township	183	15,855	580,043,393	20	11	10	0	6	5	5	3	3	2
Delaware	Millbourne Borough	3	1,291	37,078,406	2	1	1	0	1	1	1	0	1	0



County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)								
					All	Intersec- tion	Lane Departure	Dis- tracted	Impaired	Pedes- trian & Bicycle	Older Driver	Younger Driver	Aggres- sive
Delaware	Morton Borough	14	2,670	20,551,506	3	2	1	1	1	1	0	0	1
Delaware	Nether Providence Township	136	13,757	274,360,963	8	3	5	0	4	0	5	0	1
Delaware	Newtown Township	165	12,294	470,382,882	11	5	7	3	3	2	1	1	0
Delaware	Norwood Borough	29	5,897	56,653,020	3	1	2	0	1	0	0	0	0
Delaware	Parkside Borough	9	2,192	9,441,450	0	0	0	0	0	0	0	0	0
Delaware	Prospect Park Borough	30	6,464	62,643,125	4	2	1	1	1	1	0	0	0
Delaware	Radnor Township	297	31,474	644,856,395	22	4	14	2	8	6	3	2	1
Delaware	Ridley Park Borough	39	7,021	63,423,204	3	1	0	1	2	2	0	0	0
Delaware	Ridley Township	184	30,921	437,919,326	29	16	6	1	5	12	6	3	2
Delaware	Rose Valley Borough	12	885	9,673,529	0	0	0	0	0	0	0	0	0
Delaware	Rutledge Borough	5	753	1,374,472	1	1	0	0	0	0	1	0	0
Delaware	Sharon Hill Borough	29	5,685	74,480,810	3	1	3	0	1	1	0	0	0
Delaware	Springfield Township	190	24,276	696,941,948	14	6	5	2	5	3	1	3	1
Delaware	Swarthmore Borough	42	6,198	83,035,796	0	0	0	0	0	0	0	0	0
Delaware	Thornbury Township	113	7,833	171,150,704	10	1	9	0	1	0	2	3	1

County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)								
					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive
Delaware	Tinicum Township	57	4,103	156,037,168	8	3	4	1	1	1	1	0	1
Delaware	Trainer Borough	18	1,752	19,794,440	0	0	0	0	0	0	0	0	0
Delaware	Upland Borough	19	3,248	23,185,491	4	1	2	2	0	0	0	0	0
Delaware	Upper Chichester Township	134	16,867	330,613,950	24	7	12	5	8	6	8	2	5
Delaware	Upper Darby Township	307	82,804	786,867,191	64	33	29	2	14	23	12	7	8
Delaware	Upper Providence Township	115	10,246	241,988,822	6	0	4	0	4	1	2	1	1
Delaware	Yeadon Borough	50	11,506	157,288,611	14	8	7	0	2	2	4	1	2
Montgomery	Abington Township	443	55,559	1,171,558,457	33	22	8	2	5	10	7	7	4
Montgomery	Ambler Borough	33	6,481	33,070,183	1	1	0	0	0	0	0	0	0
Montgomery	Bridgeport Borough	33	4,573	107,928,935	4	2	2	0	1	3	1	1	0
Montgomery	Bryn Athyn Borough	16	1,348	21,615,286	1	0	0	0	0	1	0	0	0
Montgomery	Cheltenham Township	285	36,912	1,181,951,619	48	22	12	4	9	21	5	6	2
Montgomery	Collegeville Borough	38	5,263	55,666,449	4	1	0	0	1	1	1	0	0
Montgomery	Conshohocken Borough	49	7,864	96,518,318	4	1	2	1	0	2	1	0	0



County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)								
					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive
Montgomery	Douglas Township	165	10,313	390,746,845	18	8	7	3	7	2	5	2	2
Montgomery	East Greenville Borough	19	2,957	15,783,849	1	0	0	0	0	1	0	0	0
Montgomery	East Norriton Township	144	13,941	401,787,151	13	6	2	1	3	3	6	0	3
Montgomery	Franconia Township	179	13,193	347,952,050	21	7	16	2	5	0	6	4	0
Montgomery	Green Lane Borough	9	431	19,135,535	1	0	0	0	1	1	1	0	0
Montgomery	Hatboro Borough	52	7,403	207,644,363	12	7	3	2	7	4	3	2	2
Montgomery	Hatfield Borough	20	3,299	42,841,698	2	0	2	0	1	0	1	0	0
Montgomery	Hatfield Township	159	17,460	727,827,984	22	10	8	3	7	3	5	3	4
Montgomery	Horsham Township	282	26,353	939,854,870	57	21	21	7	20	13	9	6	5
Montgomery	Jenkintown Borough	22	4,441	58,131,510	6	3	1	1	1	4	1	1	1
Montgomery	Lansdale Borough	131	16,382	227,588,814	5	3	1	0	1	2	1	0	0
Montgomery	Limerick Township	267	18,474	529,379,508	32	16	17	4	11	4	2	6	2
Montgomery	Lower Merion Township	80	4,880	125,400,303	6	1	6	0	2	0	0	0	0
Montgomery	Lower Gwynedd Township	153	11,500	527,742,955	10	4	2	1	4	1	3	1	0
Montgomery	Lower Merion Township	534	58,114	1,316,990,980	67	32	28	2	11	15	20	7	4

County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)								
					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive
Montgomery	Lower Moreland Township	162	13,133	476,900,894	21	13	7	3	6	1	5	3	3
Montgomery	Lower Pottsgrove Township	129	12,145	203,450,367	19	7	9	0	3	6	5	1	1
Montgomery	Lower Providence Township	247	25,603	490,656,106	25	11	13	2	8	1	1	8	4
Montgomery	Lower Salford Township	204	15,201	376,628,873	10	5	7	1	2	2	2	2	1
Montgomery	Marlborough Township	93	3,256	112,981,269	3	2	2	0	0	0	1	0	0
Montgomery	Montgomery Township	239	25,397	967,416,489	27	20	11	2	6	3	10	6	4
Montgomery	Narberth Borough	26	4,295	74,732,213	3	2	0	0	0	2	1	1	0
Montgomery	New Hanover Township	196	11,684	320,047,983	21	6	16	6	7	2	6	2	3
Montgomery	Norristown Borough	143	34,454	367,307,946	32	19	4	1	7	14	4	2	0
Montgomery	North Wales Borough	30	3,227	39,635,810	1	0	0	0	0	1	0	0	0
Montgomery	Pennsburg Borough	26	3,870	29,351,059	2	2	0	0	0	2	1	0	0
Montgomery	Perkiomen Township	84	9,196	145,867,162	12	4	8	1	2	1	2	3	1
Montgomery	Plymouth Township	148	16,637	543,579,871	28	11	14	3	6	1	9	4	2
Montgomery	Pottstown Borough	175	22,519	264,619,117	27	15	10	1	8	6	5	2	1
Montgomery	Red Hill Borough	21	2,499	14,186,164	2	0	2	0	1	0	0	0	1



County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)								
					All	Intersec- tion	Lane Departure	Dis- tracted	Impaired	Pedes- trian & Bicycle	Older Driver	Younger Driver	Aggres- sive
Montgomery	Rockledge Borough	16	2,553	44,182,362	1	0	1	0	1	0	0	0	0
Montgomery	Royersford Borough	31	4,774	42,554,195	1	0	0	0	1	1	0	0	0
Montgomery	Salford Township	68	2,673	67,018,726	7	0	6	0	3	0	2	0	0
Montgomery	Schwenksville Borough	13	1,415	39,479,427	2	0	1	0	1	1	0	0	0
Montgomery	Skippack Township	160	14,433	349,705,768	6	1	5	0	4	0	1	1	0
Montgomery	Souderton Borough	56	6,668	67,896,890	12	4	5	2	2	3	3	1	3
Montgomery	Springfield Township	161	19,510	366,340,206	17	8	8	2	6	3	4	2	6
Montgomery	Telford Borough	17	2,667	9,817,163	3	2	1	0	1	0	1	1	0
Montgomery	Towamencin Township	171	17,943	426,211,565	15	8	8	1	3	1	4	3	4
Montgomery	Trappe Borough	37	3,533	82,599,939	1	1	0	0	0	0	1	1	0
Montgomery	Upper Dublin Township	299	26,042	764,823,386	23	11	10	2	7	3	6	1	3
Montgomery	Upper Frederick Township	75	3,550	117,690,846	4	1	3	0	1	1	0	0	1
Montgomery	Upper Gwynedd Township	136	15,784	287,623,451	9	4	3	0	4	1	2	2	1
Montgomery	Upper Hanover Township	182	6,750	254,196,572	9	4	4	1	3	1	3	3	0
Montgomery	Upper Merion Township	297	28,569	1,001,203,196	25	6	9	4	7	8	4	2	1

County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)								
					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive
Montgomery	Upper Moreland Township	177	24,167	620,005,528	37	18	10	4	11	8	3	4	4
Montgomery	Upper Pottsgrove Township	70	5,382	195,307,697	19	9	12	0	8	1	1	3	0
Montgomery	Upper Providence Township	262	21,802	382,596,099	20	9	12	4	8	3	3	4	1
Montgomery	Upper Salford Township	83	3,347	149,828,771	11	5	5	0	4	0	2	0	0
Montgomery	West Conshohocken Borough	20	1,322	69,747,554	2	1	0	0	1	2	0	0	0
Montgomery	West Norriton Township	135	15,751	342,640,174	21	9	6	1	5	6	3	1	2
Montgomery	West Pottsgrove Township	40	3,886	47,813,473	5	2	3	0	2	1	1	0	0
Montgomery	Whitemarsh Township	203	17,496	671,674,366	26	6	13	0	7	2	6	2	4
Montgomery	Whitpain Township	238	19,064	654,003,272	16	9	4	1	4	2	9	1	0
Montgomery	Worcester Township	176	10,034	570,608,453	13	3	8	3	6	2	3	2	0
Philadelphia	Central	252	118,227	1,794,588,882	120	75	18	6	23	72	4	2	3
Philadelphia	Central Northeast	254	84,010	1,092,596,090	72	43	15	2	10	31	16	4	7
Philadelphia	Lower Far Northeast	245	71,267	1,125,805,064	67	25	26	2	10	13	10	14	4

APPENDIX A: MUNICIPAL DATA



County	Municipality (or Philadelphia Planning District)	Road Miles (2016)	Population (2011-2015 5-Year Estimate)	Average Annual Daily Travel ^a	Killed & Serious Injury Crashes, 2012-2016 (Non-interstate)								
					All	Intersection	Lane Departure	Dis-tracted	Impaired	Pedestrian & Bicycle	Older Driver	Younger Driver	Aggressive
Philadelphia	Lower North	226	91,472	996,463,413	124	75	19	1	21	59	8	10	5
Philadelphia	Lower Northeast	223	99,708	1,200,222,025	110	59	26	3	17	44	12	9	8
Philadelphia	Lower Northwest	224	53,034	1,117,697,892	46	13	17	1	9	13	9	3	2
Philadelphia	Lower South	89	5,165	510,115,943	17	7	8	1	4	3	2	2	0
Philadelphia	Lower Southwest	159	40,857	696,455,728	64	27	22	2	9	21	4	6	2
Philadelphia	North	307	142,835	1,549,688,688	242	127	68	5	49	101	10	16	16
Philadelphia	North Delaware	259	92,824	1,160,752,630	98	48	25	4	21	41	12	9	7
Philadelphia	River Wards	203	67,413	753,177,025	84	47	23	2	19	33	3	4	7
Philadelphia	South	222	136,894	894,957,387	73	30	16	3	10	39	8	3	1
Philadelphia	University Southwest	172	80,876	948,218,908	97	52	17	3	7	49	10	10	6
Philadelphia	Upper Far Northeast	271	65,909	1,039,938,509	57	18	20	1	9	13	10	11	4
Philadelphia	Upper North	350	156,757	1,700,057,777	140	82	38	7	28	55	12	12	12
Philadelphia	Upper Northwest	320	85,868	1,196,706,697	56	33	16	1	8	21	9	2	5
Philadelphia	West	226	109,451	806,753,326	110	64	23	3	13	45	11	8	6
Philadelphia	West Park	156	44,353	1,322,335,630	72	34	23	0	11	20	11	10	4
Philadelphia	Philadelphia City	4,129	1,546,920	19,542,931,916	1,468	765	364	42	246	598	146	120	91

^a Average Annual Daily Traffic is based on data from TIM 2 traffic simulation model developed by DVRPC. The traffic model produces estimates of 24-hour, weekday traffic volume for every road segment in the region. This value can be converted to vehicle miles traveled using the road segment length and an annual average daily traffic conversion factor based on the road functional class of each segment. The vehicle miles traveled estimates were aggregated to the municipality (or planning districts for Philadelphia) by joining the road segment polylines in ArcGIS to the corresponding municipality polygons. Similar to the crash data, only non-interstate road segments were joined and a 100-foot buffer was employed to ensure that the traffic volume assigned to a road segment bordering a municipality was assigned to that municipality even if the polyline associated with the road segment fell just outside the polygon associated with the corresponding municipality.

APPENDIX B: RSTF MEMBERSHIP

Agency

AAA Mid-Atlantic

AECOM

Atlas Flasher

AutoBase

Bicycle Access Council

Bicycle Coalition of Greater Philadelphia

Bucks County Planning Commission

Burlington County

Burlington County Sheriff's Department

Camden County

Camden County Department of Health and Human Services

Camden County Highway Traffic Safety Task Force

Camden County Office of Emergency Management

Cherry Hill Township Police Department

Chester County Highway Safety

Chester County Planning Commission

City of Philadelphia

City of Philadelphia Office of Innovation and Technology

City of Philadelphia Streets Department

Cross County Connection Transportation Management Association

DAG Complete Streets Sub-Committee

Delaware County Planning Department

Delaware County Transportation Management Association

Delaware River Port Authority/Port Authority Transit Corporation

Delaware Valley Goods Movement Task Force

Delaware Valley Regional Planning Commission

Department of Behavioral Health and Intellectual disAbility Services

Division of Highway Traffic Safety

Families for Safe Streets

Gloucester County Prosecutor's Office

Gloucester Township Police Department

Greater Mercer Transportation Management Association

Greenman-Pedersen, Inc.

Agency

MBO Engineering

Mercer County

Michael Baker, International

Montgomery County

Montgomery County Planning Commission

National Highway Traffic Safety Administration

National Safety Council

New Jersey Department of Transportation

New Jersey Division of Highway Traffic Safety

New Jersey State Police

NJM Insurance Group

Partnership Transportation Management Association of Montgomery County

Pennsylvania Department of Transportation

Pennsylvania DUI Association

Philadelphia City Planning Commission

Philadelphia Department of Public Health

Philadelphia Office of Transportation, Infrastructure, and Sustainability

Philadelphia Police Department

Princeton Municipality

Public Health Management Corporation

Rutgers Center for Advanced Infrastructure and Transportation

SAFE Highway Engineering, LLC

Safety Engineering Consultant

South Jersey Transportation Planning Organization

South of South Neighborhood Association

Temple University

Transportation Management Association of Chester County

Township of Burlington Police

Transportation Management Association of Chester County

Urban Engineers, Inc.

Westtown-Goshen Rotary

WSP

APPENDIX C: EMPHASIS AREA OVERLAPS



TRANSPORTATION SAFETY ANALYSIS AND PLAN

Collision Type	Intersection Safety	Lane Departure	Older Drivers	Young Drivers	Pedestrian & Bicyclist Safety	Impaired Driving	Distracted Driving	Aggressive Driving
Intersection Safety	-	4680	8002	6283	6031	1966	9056	6946
Work Zone	341	389	279	227	90	117	361	527
Lane Departure	4680	-	2157	3013	437	2909	4622	3644
Older Drivers	8002	2157	-	1443	1137	442	4306	3166
Young Drivers	6283	3013	1443	-	458	495	4056	3004
Truck-Related	1243	689	609	311	171	121	1005	880
Motorcycle	1362	1285	356	313	71	198	434	518
Train/Trolley	56	7	11	4	8	5	12	5
Pedestrian	4324	349	838	346	-	446	832	269
Bicycle	1707	88	281	106	-	91	335	114
Impaired Driving	1966	2909	442	495	553	-	1379	884
Unbelted	3701	2648	1122	1284	771	1118	1502	953
Distracted Driving	9056	4622	4306	4056	1167	1379	-	3060
Aggressive Driving	6946	3644	3166	3004	392	884	3060	-

APPENDIX D: EMPHASIS AREA QUERY FORMATS

Table D.1: Query Formats for Pennsylvania Crash Data

AASHTO #	Emphasis Area	Criteria	Pennsylvania Database Query	Notes
1	Instituting Graduated Licensing for Young Drivers	Drivers Aged 16-17	(FLAG.DRIVER_16YR=1 OR FLAG.DRIVER_17YR=1)	Query out all drivers who are aged between 16 and 20; exclude drivers who are driving a bicycle or pedalcycle.
		Drivers Aged 16-20	Person. Age between 16 and 20 and Person.PersonType = "driver" and Vehicle. VEH_TYPE <> 20 or 21	
2	Ensuring Drivers Are Fully Licensed and Competent	Unlicensed Driver	FLAG.UNLICENSED=1	
3	Sustaining Proficiency in Older Drivers	Drivers Aged >65	(FLAG.DRIVER_65_74YR=1 OR FLAG.DRIVER_75_PLUS=1)	
4	Curbing Aggressive Driving	See notes following this table	FLAG.NHTSA_AGGRESSIVE DRIVING=1	
5	Reducing Impaired Driving	Impairment Due to Alcohol	FLAG.ALCOHOL_RELATED=1	Drinking Driver is a subset of Alcohol Related.
		Drinking Driver Only	FLAG.DRINKING_DRIVER=1	
6	Keeping Drivers Alert (Reduce Distracted Driving)	Driver Inattention	FLAG.DISTRACTED=1	
8	Increasing Seat Belt Use and Improving Air Bag Effectiveness	Unbelted	FLAG.UNBELTED=1	
9	Making Walking and Street Crossing Safer	Pedestrian	FLAG.PEDESTRIAN=1	
10	Ensuring Safer Bicycle Travel	Bicycle	FLAG.BICYCLE=1	
11	Improving Motorcycle Safety and Increasing Motorcycle Awareness	Motorcyclist	FLAG.MOTORCYCLE=1	
12	Making Truck Travel Safer	Heavy Truck Related	FLAG.HEV_TRUCK_RELATED=1	
14	Reducing Vehicle/Train Crashes	Train and Trolley Crashes	FLAG.TRAIN_TROLLEY=1	
15	Keeping Vehicles on the Roadway	Run Off Road	FLAG.SV_RUN_OFF_RD=1	
16	Minimizing the Consequences of Leaving the Road	Fixed Object	FLAG.HIT_FIXED_OBJECT=1	
		Overturn	FLAG.OVERTURNED=1	
17	Improving the Design and Operation of Highway Intersections	Crash at Intersection	FLAG.INTERSECTION=1	
		Head-On	CRASH.COLLISION_TYPE="2"	
18	Reducing Head-On and Across-Median Crashes	Across-Median Collision	FLAG.CROSS_MEDIAN=1	
		Head-On and Across-Median Collision	FLAG.CROSS_MEDIAN=1 Or CRASH.COLLISION_TYPE="2"	
19	Designing Safer Work Zones	Work Zone	FLAG.WORK_ZONE=1	

Sources: AASHTO and PennDOT guidance, and PennDOT crash data.

Note: Not all AASHTO emphasis areas are able to be queried in current databases.

The definition of aggressive driving that PennDOT uses aligns with the National Highway Traffic Safety Administration (NHTSA) definition of aggressive driving: “the operation of a motor vehicle involving two or more moving violations as part of a single continuous sequence of driving acts, which is likely to endanger any person or property.” Driving acts may include:

- *making illegal U-turn;*
- *making improper or careless turn;*
- *turning from wrong lane;*
- *proceeding without clearance after stop;*
- *running stop sign;*
- *running red light*
- *failure to respond to traffic control device (TCD);*
- *tailgating;*
- *sudden slowing or stopping;*
- *careless passing or lane change;*
- *passing in no-passing zone;*
- *making improper entrance to highway;*
- *making improper exit from highway;*
- *speeding;*
- *driving too fast for conditions; and*
- *driver fleeing police (police chase).*

Table D.2: Query Formats for New Jersey Crash Data

AASHTO #	Emphasis Area	Criteria	Criteria Details	New Jersey Database Criteria	Notes
1	Instituting Graduated Licensing for Young Drivers	Drivers Aged 16–20	Occupants.Position In/On vehicle = "01" and Age between 16 and 20	Flag.YOUNG-DRIVER = Yes	Using age from Occupants table provides better data for young drivers.
2	Ensuring Drivers Are Fully Licensed and Competent	Unlicensed Driver or Suspended or Revoked License	Charge = 39:3-10 (unlicensed driver); 39:3-40 (suspended or revoked license)	Flag.UNLICENSED = Yes	
3	Sustaining Proficiency in Older Drivers	Drivers Aged 65+	Drivers.Driver DOB	Flag.OLDER-DRIVER = Yes	Using DOB from Driver table has better data for older drivers.
4	Curbing Aggressive Driving	Aggressive Driving (unsafe speed, failed to obey traffic control device, failed to yield right of way to vehicle/pedestrian, improper passing, improper lane change, following too closely)	Contributing circumstance = unsafe speed, failed to obey traffic control device, failed to yield right of way to vehicle/pedestrian, improper passing, improper lane change, following too closely	Flag.AGGRESSIVE_DRIVING = Yes	Any one of these contributing circumstances. See further notes at end of table.
5	Reducing Impaired Driving	Impairment Due to Alcohol	Alcohol Involved Crash = yes	Flag.ALCOHOL_RELATED = Yes	
6	Keeping Drivers Alert (Reduce Distracted Driving)	Driver Inattention	Contributing circumstance = driver inattention	Flag.DRIVER_INATTENTION = Yes	
7	Increasing Driver Safety Awareness	Increase Driver Safety Awareness	None		
8	Increasing Seat Belt Usage and Improving Air Bag Effectiveness	No Safety Equipment Used	Occupants.safety equipment used = none	Flag.NoSafeEqpt= Yes	This query checks all occupants for seat belt use.
9	Making Walking and Street Crossing Easier	Pedestrian	Collision w/MV code = Pedestrian	Flag.PEDESTRIAN = Yes	
10	Ensuring Safer Bicycle Travel	Bicyclist (pedalcycle)	Collision w/MV code = Pedalcycle	Flag.BICYCLE = Yes	
11	Improving Motorcycle Safety and Increasing Motorcycle Awareness	Motorcyclist	Vehicle Type = Motorcycle	Flag.MOTORCYCLE = Yes	
12	Making Truck Travel Safer	Truck-Related	Vehicle type = truck/trailer, truck/trailer (bobtail), tractor/semi-trailer, tractor/doubles, tractor/triples, heavy truck other	Flag.TRUCK_RELATED = Yes	
14	Reducing Vehicle/Train Crashes	Highway Rail incidents	Collision w/MV code = Railcar – Vehicle	Flag.Railcar_Vehicle= Yes	

AASHTO #	Emphasis Area	Criteria	Criteria Details	New Jersey Database Criteria	Notes
15	Keeping Vehicles on the Roadway	Run Off Road	Sequence of Events (1 = Run off Road, or 1 = MV in Transport and 2 = Run Off Road)	Flag.RUNOFFROAD = Yes	
16	Minimizing the Consequences of Leaving the Road	Hit Fixed Object	Collision w/MV code = Fixed Object	Flag.HIT_FIXED_OBJECT = Yes	
		Overtuned	Collision w/MV code = Overtuned	Flag.OVERTURNED = Yes	
17	Improving the Design and Operation of Highway Intersections	Crash at Intersection	Intersection = at intersection	Flag.INTERSECTION = Yes	
18	Reducing Head-On and Across-Median Crashes	Head-On Collision	Collision w/MV code = Head on	Flag.HEADON = Yes	
19	Designing Safer Work Zones	Work Zone	TemporaryTrafficControlZone = Construction Zone, Maintenance Zone, Utility Zone, Incident Zone	Flag.WORKZONE = Yes	

Sources: AASHTO and NJDOT guidance, and NJDOT crash data.

Note: Not all AASHTO emphasis areas are able to be queried in current databases. NJDOT does some additional analysis beyond the AASHTO emphasis areas; they are marked N/A in the AASHTO number field.

NJDOT has been using a definition of aggressive driving that involves any one of the list of contributing circumstances. They are investigating shifting to the newer NHTSA definition, which is “the operation of a motor vehicle involving two or more moving violations as part of a single continuous sequence of driving acts, which is likely to endanger any person or property.” This more stringent definition inherently results in a much lower number. Also, initial reviews indicate issues with the data for the second contributing circumstance, as of 2010.

Transportation Safety Analysis and Plan: An Analysis of Crash Data and Recommended Safety Strategies for the Greater Philadelphia Region

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GEOGRAPHIC AREA COVERED The nine-county Greater Philadelphia region, which includes the counties of Burlington, Camden, Gloucester, and Mercer in New Jersey; and Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania.

KEY WORDS Crash Data, Philadelphia, Vision Zero, Crash Analysis, Safety, Regional Safety Task Force

ABSTRACT

This is the fifth edition of the Transportation Safety Analysis and Plan (“the Plan”), formerly the Transportation Safety Action Plan. The Plan is a product of the Delaware Valley Regional Planning Commission (DVRPC) and the Regional Safety Task Force. The Plan analyzes the most recently available crash data for the nine-county Greater Philadelphia region in order to inform planners and roadway owners about the greatest contributing factors in severe traffic crashes. The Plan puts this information into different contexts, including geographic hot spots, year-over-year trends, and safety planning processes across the region. The Plan also presents recommended strategies to address the factors that contribute most to severe crashes in the region.

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