June 2023

Southeast Michigan Transportation Safety Plan

SEMCOG | SOUTHEAST MICHIGAN COUNCIL OF GOVERNMENTS

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Mission

SEMCOG, the Southeast Michigan Council of Governments, is the only organization in Southeast Michigan that brings together all governments to develop regional solutions for both now and in the future. SEMCOG:

- Promotes informed decision making to improve Southeast Michigan and its local governments by providing insightful data analysis and direct assistance to member governments;
- Promotes the efficient use of tax dollars for infrastructure investment and governmental effectiveness;
- Develops regional solutions that go beyond the boundaries of individual local governments; and
- Advocates on behalf of Southeast Michigan in Lansing and Washington

Southeast Michigan Transportation Safety Plan

Abstract

The *Southeast Michigan Transportation Safety Plan* is a framework to guide regional safety activities in Southeast Michigan. The plan benchmarks traffic crashes in Southeast Michigan and identifies problem areas and key issues, as well as a list of overall regional safety policies as part of a Safe System Approach to eliminating fatalities and serious injuries on Southeast Michigan roadways.

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Acknowledgements

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Remembering Tom Bruff

This plan is dedicated to our friend and colleague J. Thomas Bruff. Tom, in his 25th year as a SEMCOG staff member and most recently as Manager of Transportation Planning and Programming, died peacefully on December 10, 2021 at the age of 58 surrounded by the love of his family. Tom was a knowledgeable, dedicated, reliable, conscientious, and respected traffic engineer whose impact will be felt in Southeast Michigan for a long time in both the projects and the lives he touched. Tom is beloved among his peers and will be remembered for his seemingly endless capacity for service, easygoing attitude, love for his family, and his dedication to the Michigan State Spartans (Civil Engineering, Class of '86). In addition to his everyday responsibilities overseeing SEMCOG's administration of regional transportation planning, Tom was passionate about traffic safety and this issue was always central in his work as he guided SEMCOG's safety program over his 25 years of service to the organization. Tom volunteered his time over the years to various roles, including as chairperson of the Michigan Transportation Planning Association. Tom was the longest-serving treasurer of SEMCOG's employee "SPIRIT" group (thanks for making sure we always had enough funds for the holiday party, Tom!); and countless other forms of behind-the-scenes leadership. Tom loved to play horseshoes and was actively involved in many leagues. Tom is survived by his beloved wife Geralyn Berube, sons John and Andrew, sister Jeanne Walker (Jim), and many beloved nieces and nephews.

Table of Contents

List of Data Displays

Figures

Tables

Executive Summary

Safe arrival is the most important result of any trip. Southeast Michigan's transportation system connects people with each other as well as jobs, schools, recreation, and other amenities. Unfortunately, with over 100,000 crashes annually, there are too many people who do not complete a trip with their property, health, or life intact.

Improving the safety of people traveling in Southeast Michigan requires an ongoing commitment to reducing risks throughout the transportation system, especially for the most vulnerable road users. This commitment requires a comprehensive approach. Key activities include: expanding vehicle and roadway safety features; changing the design of high-crash areas; providing facilities dedicated for cyclists and pedestrians; adopting policies and technologies that reduce risky behavior; educating all road users on laws and best safety practices; and improving post-crash care to increase the survivability of crashes.

The purpose of the *Southeast Michigan Transportation Safety Plan* is to identify the region's key safety needs and guide investment decisions to reduce fatalities and serious injuries on our roadways for all road users, while promoting safe travel for all modes. This plan builds upon the 2015 *Southeast Michigan Traffic Safety Plan* and provides a comprehensive and aspirational framework for eliminating fatalities and serious injuries on Southeast Michigan roadways by 2050 using the Safe System Approach.

Call to Action

Historically, the number of traffic crashes and resulting injuries and fatalities have trended downward. However, progress has stagnated over the past decade, and fatalities and serious injuries are now on the rise. Since adoption of Southeast Michigan's first regional safety plan in 2015, the number of fatal

crashes has increased by 10%. On average, one person is killed each day in Southeast Michigan, while six more are seriously injured each.

Nearly every single community in Southeast Michigan (95%) has experienced at least one fatal or serious injury crash in the last five years. Maintaining the status quo is not good enough. This alarming trend is a public health crisis that can only be fixed by a change in our safety culture. Transportation safety must become a priority for everyone in the region – from road owners and operators to elected officials and the general public.

The safety of all road users, especially those most vulnerable, must be a priority at all levels of government – city, county, state, and federal. State-owned roads, for example, make up only 9% of the regional roadway network but account for a third of the region's fatal and serious injury crashes. Regardless of ownership, every road goes through and impacts at least one community. Roads with higher speeds and many travel lanes have greater risks. They impact the livability and opportunity for activity along a corridor, especially for people who walk, bike, and roll.

We must all work together to make our transportation corridors safer if we want to achieve our shared vision of zero fatalities and serious injuries.

Regional Safety Policies

Implementing the Safe System Approach and reaching the vision of zero fatalities and serious injuries is our shared responsibility, and we all have a role. The Transportation Safety Task Force identified five regional safety policies, in alignment with the National Roadway Safety Strategy's Safe System Approach. These policies will guide implementation of this plan.

1. **Safer People**: Encourage safe, responsible behavior by people who use our roads and create conditions that prioritize their ability to reach their destination unharmed.

2. **Safer Roads**: Design roadway environments to mitigate human mistakes and account for injury tolerances, to encourage safer behaviors, and to facilitate safe travel by the most vulnerable users.

3. **Safer Vehicles**: Expand the availability of vehicle systems and features that help to prevent crashes and minimize the impact of crashes on both occupants and non-occupants.

4. **Safer Speeds**: Promote safer speeds in all roadway environments through a combination of thoughtful, context-appropriate roadway design, targeted education and outreach campaigns, and enforcement.

5. **Post-Crash Care**: Enhance the survivability of crashes through expedient access to emergency medical care, while creating a safe working environment for vital first responders and preventing secondary crashes through robust traffic incident management practices.

Plan Implementation

The Safe System Approach focuses on reducing death and serious injury for all road users by accommodating human mistakes and keeping impacts on the human body at tolerable levels. Crashes will happen because people make mistakes, but the consequences of those collisions can be managed. This is the fundamental objective of the Safe System Approach.

While traditional road safety strives to modify human behavior and prevent all crashes, the Safe System Approach refocuses transportation system design and operation on anticipating human mistakes and lessening impact forces to reduce crash severity and save lives. What separates the Safe System Approach from the traditional approach to safety is the ethical imperative that not even one death is acceptable in our roadway system.

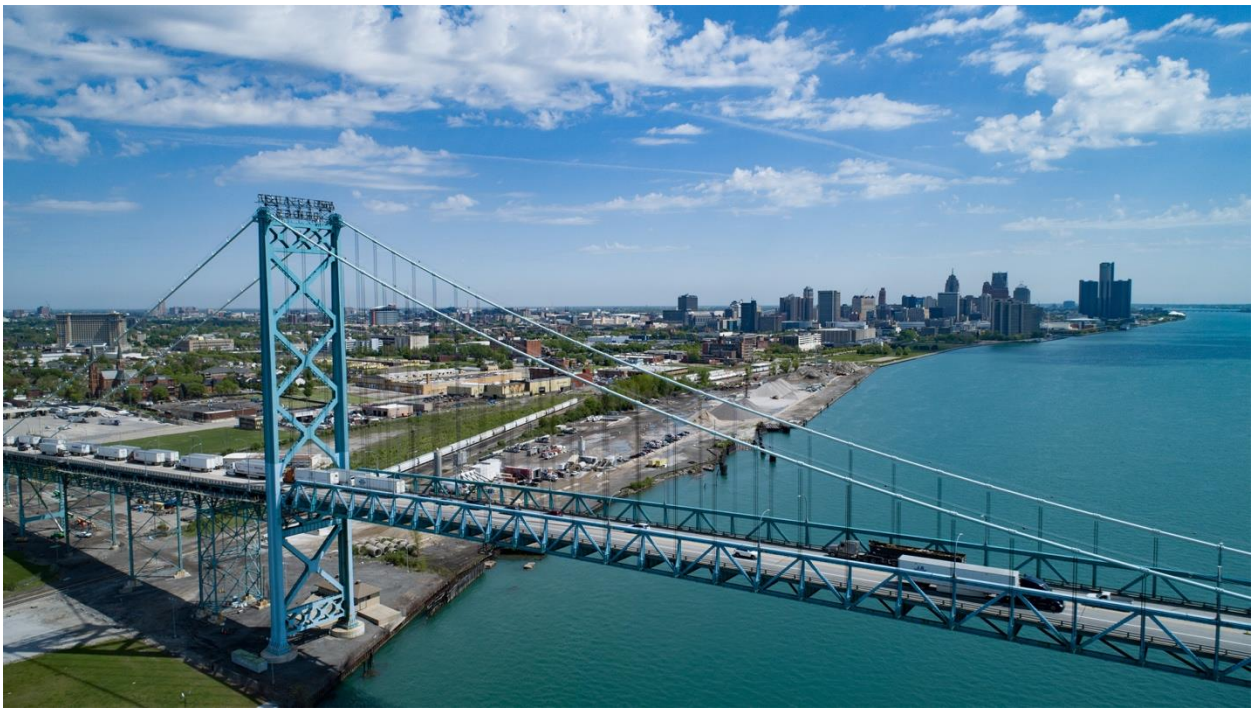
The most effective strategies for reducing fatalities and serious injuries are those that eliminate exposure to a crash before it can occur. If eliminating the source of crash exposure is not possible, the next best strategy is mitigating the impact of the crash to avoid severe consequences.

Engineering controls can drive safer design and operation of the road system and vehicles. Finally, administrative controls can change the way people use the system through education, legislation, and enforcement.

This plan analyzes crash data, identifies locations with the greatest potential to reduce fatalities and serious injuries, and prioritizes them for implementation through the High Injury Network and Focus Facilities analyses. The plan also identifies 18 key factors or emphasis areas that contribute to crashes. In Southeast Michigan 86% of all fatal and serious injury crashes in the region are associated with eight of these emphasis areas.

The plan provides comprehensive strategies for addressing these emphasis areas and the five regional policies using the 6 Es of Safety – Engineering, Education, Enforcement, Emergency Response, Equity, and Evaluation.

Chapter 1: Introduction



SEMCOG Vision

This vision for Southeast Michigan provides the foundation for developing regional plans approved by SEMCOG's elected leadership:

> *All people in Southeast Michigan benefit from a connected, thriving region of small towns, dynamic urban centers, active waterfronts, diverse neighborhoods, premier educational institutions, and abundant agricultural, recreational, and natural areas.*

To meet this vision, we must have:

- Unique places that offer various housing choices for a large and diverse population.
- An educated and trained workforce that supports a multi-sector economy and provides opportunities for all.
- Healthy, clean lakes, streams, air, and a connected system of trails, parks, and natural areas that support recreational and cultural amenities.
- Safe, efficient, and coordinated infrastructure systems that embrace advances in technology and focus on access for all.
- Effective local government and engaged citizenry.

A regional approach to transportation safety planning is central to achieving this vision. Planning and developing infrastructure to support safer travel creates a system where people of all ages and abilities can complete trips with their property, health, and lives intact.

Background

In 2015, SEMCOG adopted the *Southeast Michigan Traffic Safety Plan*, the first regional safety plan in the State of Michigan. The 2015 plan benchmarked regional traffic crash data, identified the region's unique traffic safety challenges, and developed strategies for addressing those challenges. It also began the process of regularly prioritizing locations in the region for the implementation of engineering strategies.

The *Southeast Michigan Transportation Safety Plan* builds on the 2015 plan and provides an aspirational framework for eliminating fatalities and serious injuries on Southeast Michigan roadways using the Safe System Approach. It takes a comprehensive approach to evaluating the entire transportation network and systems, and it prioritizes the most vulnerable road users with the highest fatality and injury risk.

Connections with Other Plans

This plan is supported by other plans that link to transportation safety and help implement the policies and actions it recommends, including:

2045 Regional Transpiration Plan for Southeast Michigan (RTP), adopted in March 2019, guides transportation investments in Southeast Michigan by working to make the system safe and more efficient, revitalizing communities, encouraging economic development, and improving the quality of the region's environmental resources through policies and actions. This safety plan is a component of the 2045 RTP. The 2050 RTP, currently in development and scheduled for adoption in 2024, will officially incorporate and enact the regional transportation safety policies contained within the Safety Plan.

Access to Core Services in Southeast Michigan, adopted in January 2016, measures and benchmarks accessibility for core services that residents need to access on a regular basis – jobs, health-care facilities, supermarkets, parks, schools, libraries, and fixed-route transit. This analysis measured accessibility across four modes of travel – automobile, transit, walking, and biking.

Bicycle and Pedestrian Mobility Plan for Southeast Michigan, adopted in March 2020, establishes a common vision for bicycling and walking in the region. It provides guidance on how to increase the connectivity, use, and safety of the system for all residents. The plan ensures that the region's nonmotorized system meets the transportation, quality of life, health, and accessibility needs of its residents and visitors, as well as the economic development priorities and goals of the region and local communities. This Safety Plan is aligned with the Bicycle and Pedestrian Mobility Plan for nonmotorized safety topics.

Congestion Management Process, adopted in October 2017, develops regional objectives and multi-modal alternative strategies used systemically to manage congestion and improve mobility for people and goods.

Green Infrastructure Vision for Southeast Michigan, adopted in May 2014, describes long-term goals for the green infrastructure network, along with policies to achieve an integrated regional framework. The vision highlights opportunities for roadway design to make critical contributions to improving regional water quality by reducing stormwater runoff.

Parks and Recreation Plan for Southeast Michigan, adopted in May 2019, ensures that the region's recreation system, parks, and trails meet the quality of life, health, and accessibility needs of its residents and visitors. The plan also includes a detailed accessibility analysis of all parks and trails in the region by walking, biking, driving, and public transit.

Increasing Shared Prosperity for a Resilient Economy, adopted in March 2021, employs a comprehensive approach to economic development and focuses on six main, interrelated strategies that underlie the three pillars of Place, Business, and Talent as well as supporting policies and actions for recovery and resiliency.

Regional Master Transit Plan, adopted in December 2021 by the Regional Transit Authority of Southeast Michigan (RTA) for Macomb, Oakland, Washtenaw, and Wayne Counties, envisions a region with sufficient and stable funding to support improved public transit options that will advance equity by increasing accessibility; satisfy the integrated mobility needs of Southeast Michigan communities; and promote livable, healthy, and sustainable growth.

Michigan Mobility 2045, adopted in November 2021 by the State Transportation Commission, presents the state's 25-year vision for Michigan's existing and future transportation systems and identifies goals and strategies to guide long-term, multimodal transportation investments.

Michigan Strategic Highway Safety Plan (SHSP), adopted in January 2023 by the Governor's Traffic Safety Advisory Commission, provides a comprehensive framework for reducing highway fatalities and serious injuries on public roads in Michigan. The SHSP is a data-driven, four-year comprehensive plan that establishes statewide goals and key emphasis areas, which correspond to the regional emphasis areas identified in this safety plan.

National Roadway Safety Strategy (NRSS), adopted in January 2022 by the United States Department of Transportation, outlines the Department's comprehensive approach to significantly reducing serious injuries and deaths on our Nation's highways, roads, and streets. This is the first step in working toward an ambitious long-term goal of reaching zero roadway fatalities using the Safe System Approach. Safety is U.S. DOT's top priority, and the NRSS represents a Department-wide approach to working with stakeholders across the country to achieve this goal.

Local safety action plans, adopted by cities, villages, townships, and counties, are comprehensive plans aimed at preventing roadway fatalities and serious injuries in a locality. These are formal documents that define key emphasis areas and strategies that impact local roads, building upon the regional safety plan to identify specific local action.

Plan Development

To guide development of this plan, SEMCOG established a Transportation Safety Task Force comprised of 84 elected officials, representatives from local governments, State and federal agencies, nonprofit organizations, and other safety stakeholders. Task force members are listed in the Acknowledgements section of this plan. The task force met six times over a 14-month planning process. Members of the task force established the

framework for this plan, deliberating on regional priorities, policies, and actions, and will help guide and assist in its implementation. To complement the work of the task force, other existing committees and stakeholder groups were engaged, including SEMCOG's Transportation Safety Action Committee, Transportation Coordinating Council, Executive Committee, and General Assembly.

The public – also known as Southeast Michigan's community of stakeholders impacted by the safety of our transportation system – was also engaged using multiple methods. The first was an online survey, completed by over 1,000 residents who shared their perceptions and experiences with transportation safety in the region. Of these, 800 participants were randomly selected from consumer research panels. Random sampling helps us to avoid the echo chamber and better understand the lived experiences of certain populations with greater social and economic needs that may impact their mobility options.

Populations of interest included minority communities; households in poverty; limited English speaking households; transit-dependent households; individuals with a disability; female-headed households; people aged 65 and over; and people aged 17 and under. The remaining responses were collected through SEMCOG's direct outreach to previously engaged stakeholders, along with second-degree sharing by these stakeholders.

Some participants in the online survey were asked to participate in a virtual focus group to continue the conversation. In total, 19 respondents participated in one of three groups. Group 1 was comprised of adults with mobility limitations, Group 2 was comprised of a general mix of residents, and Group 3 was comprised of parents of new drivers.

The third component of public engagement was the creation of a Transportation Safety Toolkit for task force members and other safety partners to be able to hold community conversations on transportation safety topics with their residents and report that input back to SEMCOG for incorporation into this plan. Findings from the public engagement, as well as a copy of the Transpiration Safety Toolkit, can be found in Appendix A. Information from all stakeholder and public engagement and collaboration activities was analyzed and incorporated into this plan.

Structure of the Transportation Safety Plan

This plan's five chapters provide policy guidance, data resources, and tools for planning and implementation to support transportation safety in Southeast Michigan:

- **Chapter 1: Introduction** provides background for SEMCOG's role in transportation safety planning, outlines the outreach and engagement process for developing this plan, and shows connections to other SEMCOG plans that impact transportation safety.
- **Chapter 2: Regional Priorities** adopts the Safe System Approach, sets a regional vision and targets for transportation safety, and establishes regional policies that guide implementation efforts.
- **Chapter 3: Benchmarking Data** provides context for the region's mobility and safety trends with a multi-layered analysis of regional data. This chapter analyzes traffic crash patterns, the transportation network, and impacts of the COVID-19 pandemic. This chapter also identifies locations with the greatest potential to reduce fatalities and serious injuries and prioritizes them for implementation.

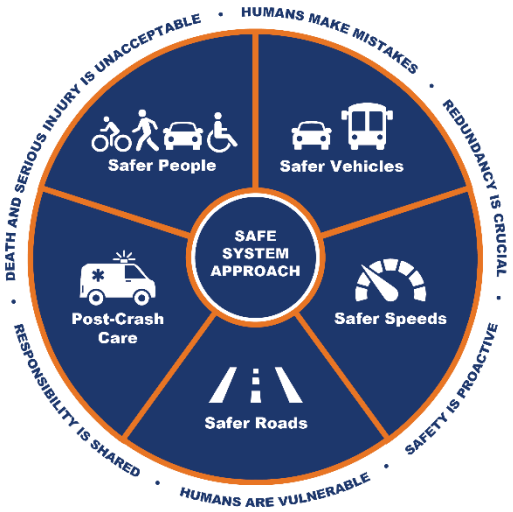
- **Chapter 4: Emphasis Areas** identifies key factors that contribute to crashes in the region and provides comprehensive strategies using multiple approaches for addressing these emphasis areas.
- **Chapter 5: Implementing the Plan** recommends actions that guide implementation efforts for regional policies and describes way to measure progress as improvements are made over time.

Six appendices supplement the information in the chapters described above. They are:

- Appendix A: Public Input Results and Toolkit
- Appendix B: Performance Measure Target Methodology
- Appendix C: County Profiles
- Appendix D: Additional Emphasis Area Analyses
- Appendix E: Engineering Countermeasures
- Appendix F: Additional Resources

Chapter 2: Regional Priorities

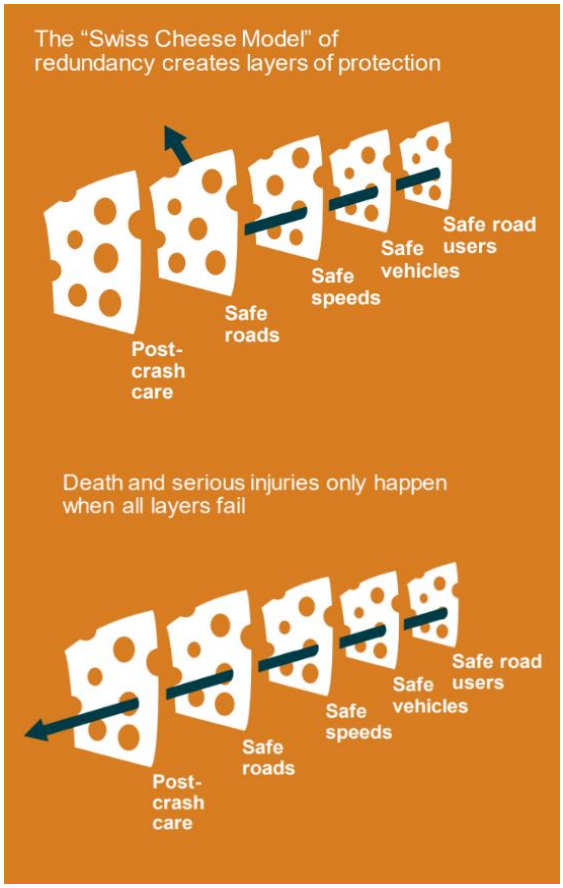
Safe System Approach



The Safe System Approach is a comprehensive approach to significantly reducing serious injuries and deaths on our roadways and is part of the U.S. Department of Transportation National Roadway Safety Strategy. It refocuses efforts on reducing death and serious injury for all road users by accommodating human mistakes and keeping impacts on the human body at tolerable levels. Crashes will happen because people make mistakes, but the consequences of those collisions can be managed. This is the fundamental objective of the Safe System Approach.

Traditional road safety strives to modify human behavior and prevent all crashes, whereas the Safe System Approach refocuses transportation system design and operation on anticipating human mistakes and lessening impact forces to reduce crash severity and save lives. What separates the Safe System Approach from the traditional approach to safety is the ethical imperative that not even one death is acceptable in our roadway system.

There are five elements to the Safe System: safer people, safer roads, safer vehicles, safer speeds, and post-crash care. All five elements are necessary to implement the Safe System Approach. They provide layers of protection, as illustrated by the "Swiss Cheese Model" of redundancy. Deaths and serious injuries occur only when all the layers fail.



Source: FHWA

Implementing the Safe System Approach requires moving away from several traditional safety paradigms. Rather than simply and indiscriminately attempting to prevent crashes, the Safe System Approach seeks to target and prevent deaths and serious injuries. In addition to trying to improve human behavior, the Safe System Approach allows for human mistakes and limitations.

While the traditional safety approach focuses on controlling unsafe travel speeds with signage and enforcement, the Safe System Approach attempts to reduce system kinetic energy through traffic calming designs and reducing speeds. Rather than asserting that only individuals are responsible, the Safe System Approach aims to share responsibility among

system users, designers, managers, and others. Instead of reacting based on crash history, the Safe System Approach proactively identifies and addresses risks.

The Safe System Approach encompasses both the Toward Zero Deaths vision and the traditional 4-Es approach to safety (Engineering, Education, Enforcement, and Emergency Response). This Safety Plan adds two additional Es (equity and evaluation) to create a comprehensive framework for implementing the Safe System Approach and supporting a safe transportation system for all road users.

The Six Es of Safety:

- Engineering – improving roadway operations and physical aspects to increase safety.
- Education – increasing public awareness of transportation safety laws and infrastructure.
- Enforcement – ensuring road users follow traffic laws and practice safe behaviors.
- Emergency Response – providing post-crash care to minimize injuries and fatalities.
- Equity – ensuring the transportation system is safe for all users and initiatives benefit all demographic groups, with particular attention to transportation-disadvantaged groups and other groups with unique mobility considerations.
- Evaluation – tracking progress and assessing impacts of implemented strategies.

Vision and Targets

The plan's vision is zero traffic fatalities and serious injuries by 2050. This vision is consistent with the Michigan Strategic Highway Safety Plan and the National Roadway Safety Strategy.

ZERO by 2050

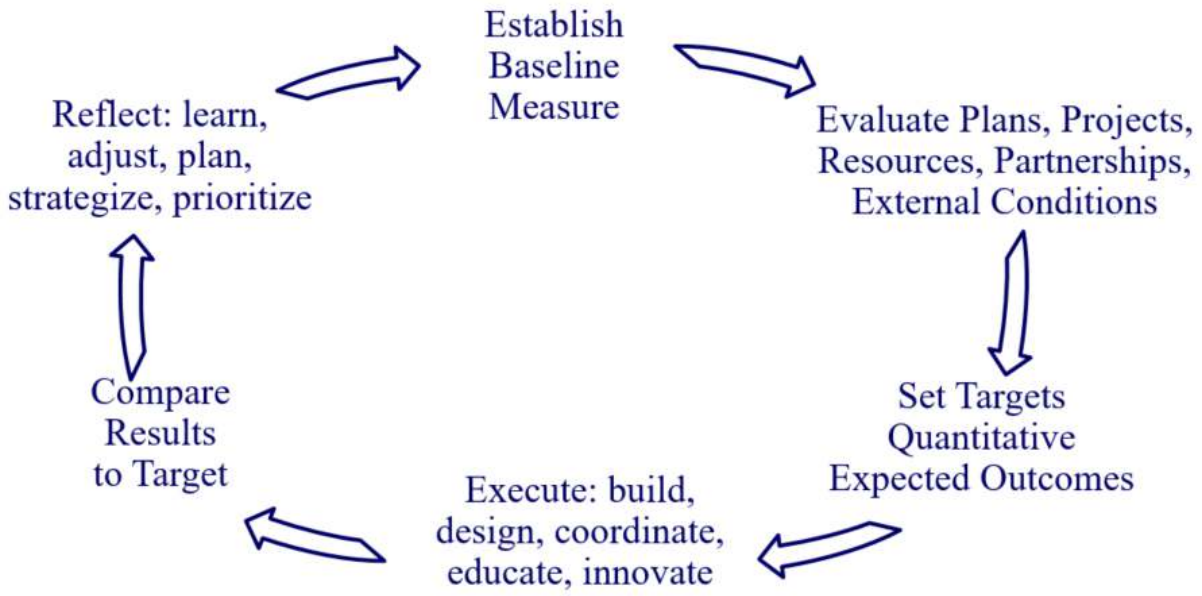
In order to achieve the vision, local agencies and stakeholders must aggressively work toward intermediate targets specific to Southeast Michigan. Target setting improves safety performance by increasing an agency's focus on safety and encouraging agencies to consider how investment and policy decisions impact future safety performance.

Establishing targets is part of SEMCOG's performance-based planning process and required by federal transportation regulations. Transportation performance management (TPM) is a strategic approach that uses system information to make investment and policy decisions to achieve performance goals. The TPM cycle (Figure 1) generally follows this pattern:

- A baseline measure is set using various state and national datasets.
- The measure is evaluated to assess the anticipated effects of plans, projects, resources, partnerships, and external conditions.
- Future performance targets are set. These targets should be based on a realistic evaluation of anticipated performance, based in data, and reflect the expected outcomes.
- Transportation agencies execute their programs that are designed to meet the future performance targets.
- Reflection on what happened: learn, adjust, plan, strategize, and prioritize before repeating the cycle.

Figure 1

Transportation Performance Measure Cycle



The Moving Ahead for Progress in the 21st Century (MAP-21) Act and the Fixing America's Surface Transportation (FAST) Act established rules for States and Metropolitan Planning Organizations to set annual targets for five safety-related performance measures. The Michigan Department of Transportation (MDOT) establishes annual statewide safety targets after consultation and coordination with regional planning organizations throughout the State. In the past, SEMCOG's elected leadership has adopted the State's annual targets while also encouraging MDOT to establish more aspirational targets.

In January 2023, SEMCOG's Executive Committee adopted regional safety targets (Table 1) for the first time, which were developed in coordination with SEMCOG's Transportation Safety Task Force, Transportation Safety Action Committee, Transportation Coordinating Council, and other regional stakeholders. Details regarding the establishment of the safety targets can be found in Appendix B.

Table 1
SEMCOG Safety Targets for Calendar Year 2023

Measures	2021 Baseline	2023 Target
Fatalities	394.2	390.2
Fatality Rate Per 100 Million vehicle miles traveled (VMT)	0.925	0.905
Serious Injuries	2,136.0	2,106.0
Serious Injury Rate Per 100 Million VMT	4.972	4.812
Non-motorized Fatalities and Serious Injuries	375.4	365.4

Safety performance measures and targets are evaluated and updated on an annual basis. SEMCOG's website provides direct access to the latest performance measure data and target setting.

Achieving regional targets and the long-term vision of zero fatalities and serious injuries will require meaningful action by all road agencies and safety partners in Southeast Michigan. This includes actions and decisions made using the 6-Es of Safety framework for all five elements of the Safe System Approach.

As the Metropolitan Planning Organization (MPO) responsible for regional transportation planning in Southeast Michigan, one particular action for SEMCOG is to incorporate the safety targets into the Transportation Improvement Program (TIP) project selection process with the Federal Aid Committees. The TIP is a schedule of road and transit projects selected as priorities for funding by cities, villages, county road commissions, transit agencies, and MDOT. The TIP is an implementation tool of the Regional Transportation Plan. SEMCOG and transportation stakeholders should also seek opportunities to implement transportation safety actions outlined in this plan to accomplish the regional safety performance measure targets.

Regional Safety Policies

Implementing the Safe System Approach and reaching the vision of zero fatalities and serious injuries is our shared responsibility, and we all have a role. The Transportation Safety Task Force identified five regional safety policies in alignment with the National Roadway Safety Strategy's Safe System Approach. These policies will guide implementation of this plan.

1. **Safer People**: Encourage safe, responsible behavior by people who use our roads and create conditions that prioritize their ability to reach their destination unharmed.

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4. **Safer Speeds**: Promote safer speeds in all roadway environments through a combination of thoughtful, context-appropriate roadway design, targeted education and outreach campaigns, and enforcement.

5. **Post-Crash Care**: Enhance the survivability of crashes through expedient access to emergency medical care, while creating a safe working environment for vital first responders and preventing secondary crashes through robust traffic incident management practices.

Chapter 3: Benchmarking Data

Benchmarking traffic crash and other related data is essential, as it allows for understanding transportation safety trends and factors that impact those trends. It also allows for efficient use of limited resources for implementing strategies and tracking of progress in implementing safety measures.

Crash Trends

The crash data within this plan was obtained from the Michigan State Police, Criminal Justice Information Center (MSP CJIC). All law enforcement agencies in Michigan submit crash data to the MSP CJIC on standardized traffic crash report forms (UD-10). The UD-10 is used to report all traffic related motor vehicle crashes. The criteria for a reportable traffic crash involves:

- a motor vehicle that was in transport and on the roadway
- a result of death, injury, and/or property damage of $1,000 or more

Limitations of this data include underreporting of factors that are difficult to observe and measure, such as driver behavior, and exclusion of incidents not involving a motor vehicle, especially those including vulnerable road users who walk or bike.

Frequency

Crash frequency is the sum of all traffic crashes in an area or at a specific location. Figure 2 illustrates the severity of the region's traffic crashes. Between 2017 and 2021, over 132,000 traffic crashes occurred each year on average in Southeast Michigan, a 4% increase from the 2015 safety plan benchmark. Of these crashes, less 2% percent result in a fatality or serious injury each year. While the share of crashes that result in a fatality or serious injury is nearly identical to the last plan, the number of fatal crashes increased by 10%, up to 364 fatal crashes per year or approximately one per day.

Figure 2

Traffic Crash Severity in Southeast Michigan, 2017-2021

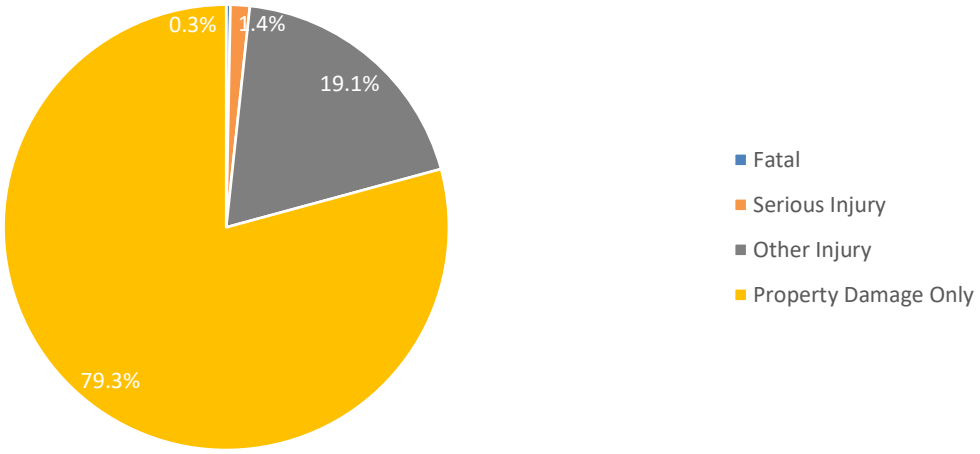


Figure 3 shows the frequency of severe crashes, those that resulted in fatalities and serious injuries, over the past five years, while Figure 4 outlines the historical five-year moving average for the frequency of people killed and seriously injured in traffic crashes. The five-year average for fatalities has increased or stayed stagnant since the Great Recession in 2009, despite advancements in vehicle technology and road design. This could be due to a variety of reasons, including vehicles getting larger and heavier, drivers having a false sense of security due to confidence in vehicle features, or even drivers turning off new features that they do not understand or want to use. Risky behavior could also play a role in these trends. The proliferation of smart phones and other mobile devices, for example, has also worsened the issue of distracted driving.

Figure 3

Fatalities and Serious Injuries in Southeast Michigan, 2017-2021

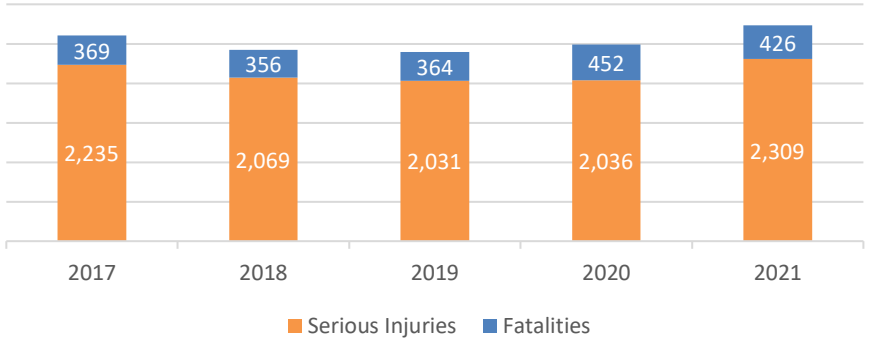
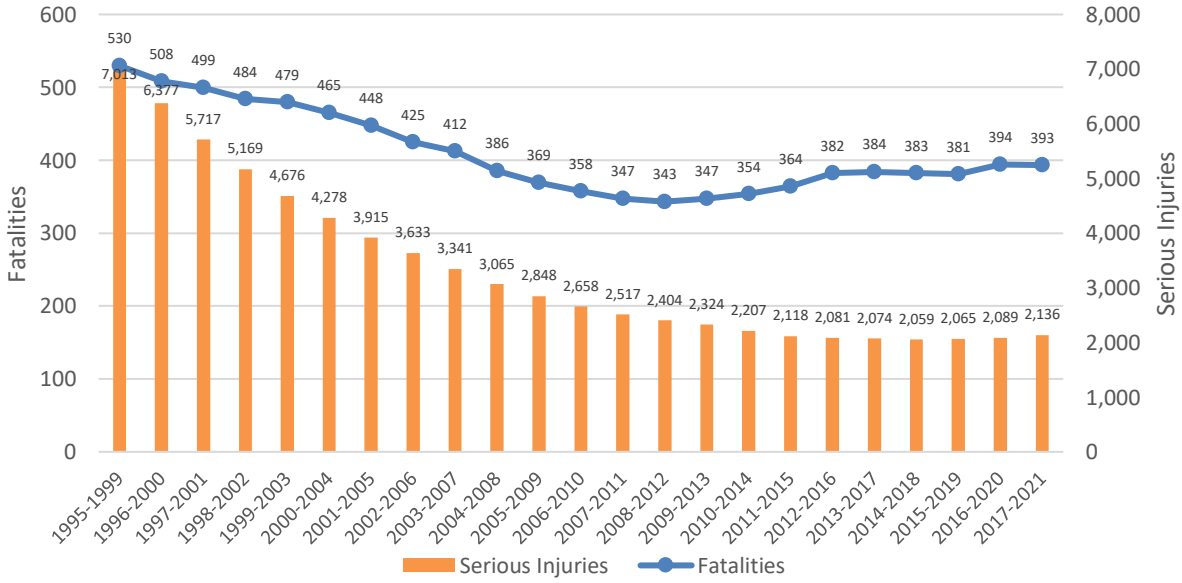


Figure 4

Fatalities and Serious Injuries Five-Year Moving Averages in Southeast Michigan, 1995-2021



Southeast Michigan accounts for 45% of severe crashes in the State. Table 2 illustrates the percentage distribution of total crashes and fatal and serious injury crashes in each county. Wayne County's share of crashes increased from the 2015 plan, while the other county shares remained the same or decreased.

Table 2

Percentage Distribution of Crashes by County, 2017-2021 (& change from 2010-2014)

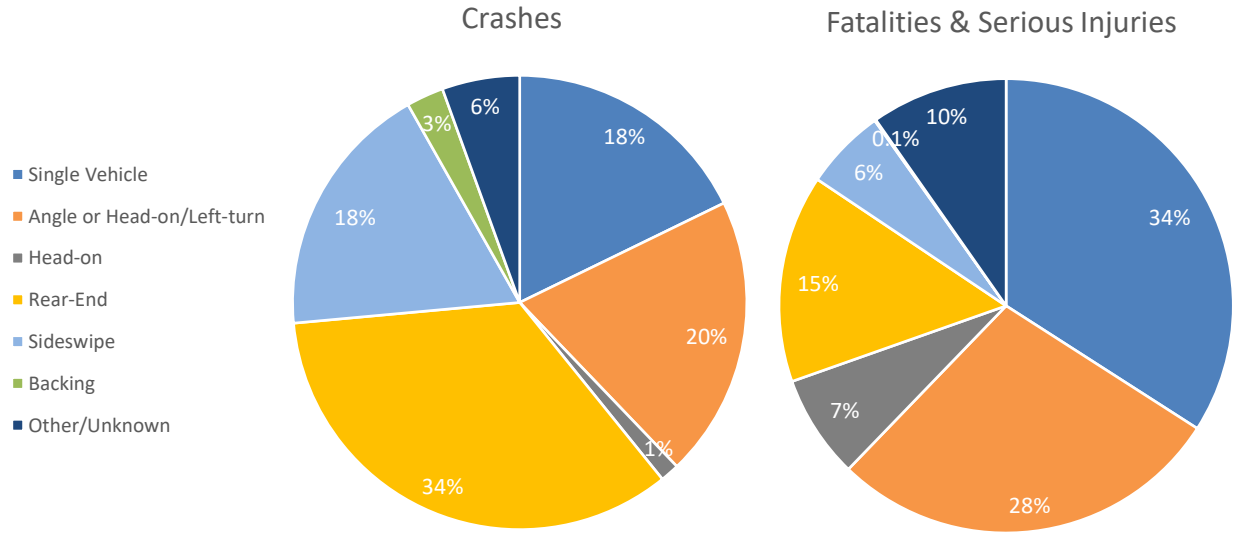
County	Total Crashes	Fatal & Serious Injury Crashes
Livingston	3% (-0.1%)	4% (0.0%)
Macomb	17% (-0.5%)	14% (-1.3%)
Monroe	3% (-0.3%)	4% (-0.7%)
Oakland	27% (-1.0%)	19% (-2.9%)
St. Clair	3% (-0.3%)	4% (-0.5%)
Washtenaw	7% (-0.6%)	7% (-0.2%)
Wayne	39% (+2.8%)	47% (+5.4%)
SEMCOG (Compared to Michigan)	**45% (+0.5%)**	**38% (-2.3%)**

Type

Crash type describes how the vehicles involved in a crash contacted the other unit(s) in the crash, based on the direction of travel prior to impact. As shown in Figure 5, rear-end crashes continue to be the most common, while single-vehicle and angle or head-on/left-turn crashes result in the most fatalities and serious injuries.

Figure 5

Crash Frequency and Injury Severity by Crash Type, 2017-2021



Temporal Factors

Distribution of crashes varies by time of year, day of week, and time of day. While crashes are more common during periods with higher traffic, including weekdays and afternoon peak congestion time, fatalities and serious injuries are more likely to occur on weekends, in the evenings, and in the summer months. When there are fewer cars on the road, drivers are more likely to speed and engage in other risky behaviors that can increase the severity of crashes when they do occur. Figures 6-8 show the

distribution of total crashes and fatalities and serious injuries in Southeast Michigan over the course of a day, a week, and a year.

Figure 6

Crash Distribution by Time of Day, 2017-2021

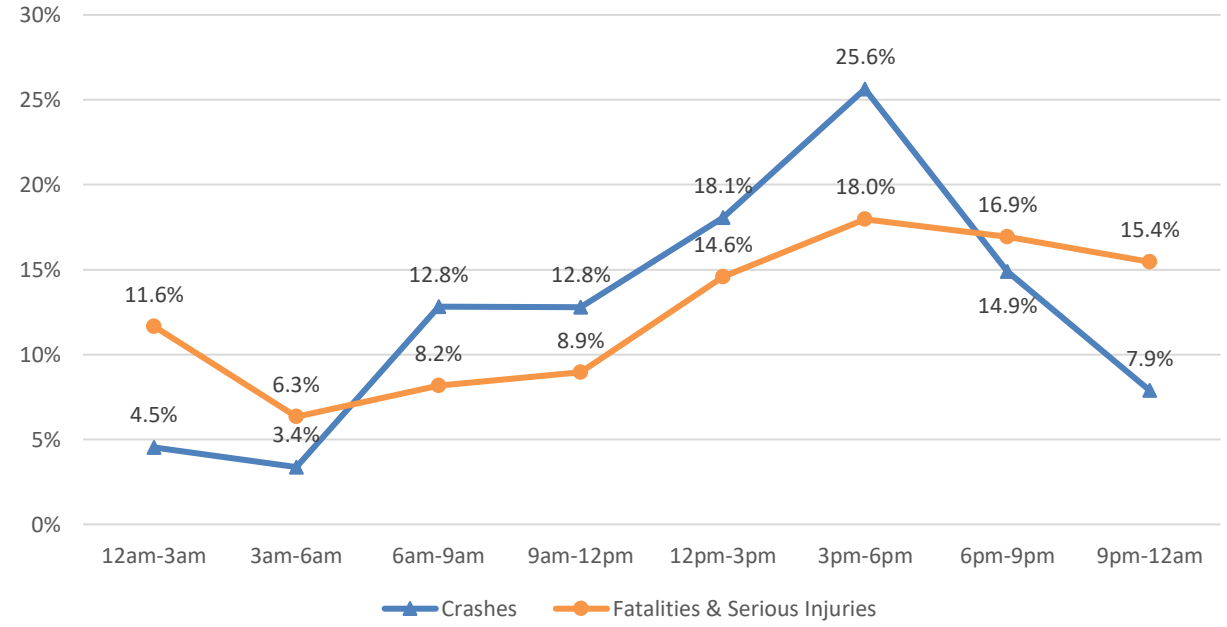


Figure 7

Crash Distribution by Day of Week, 2017-2021

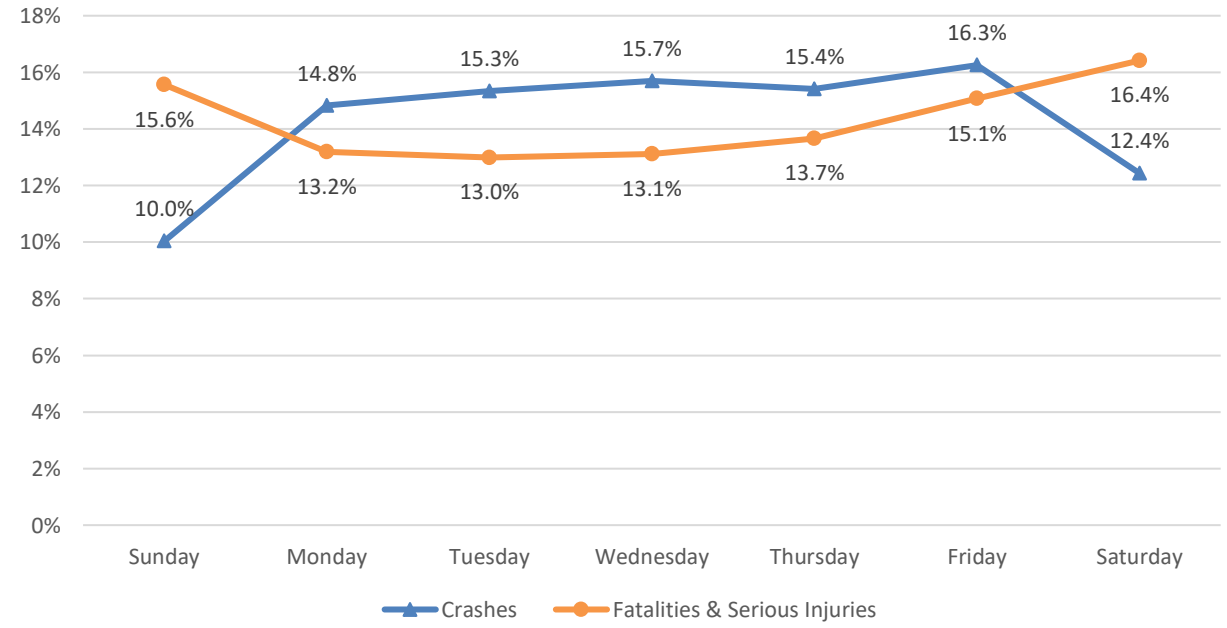
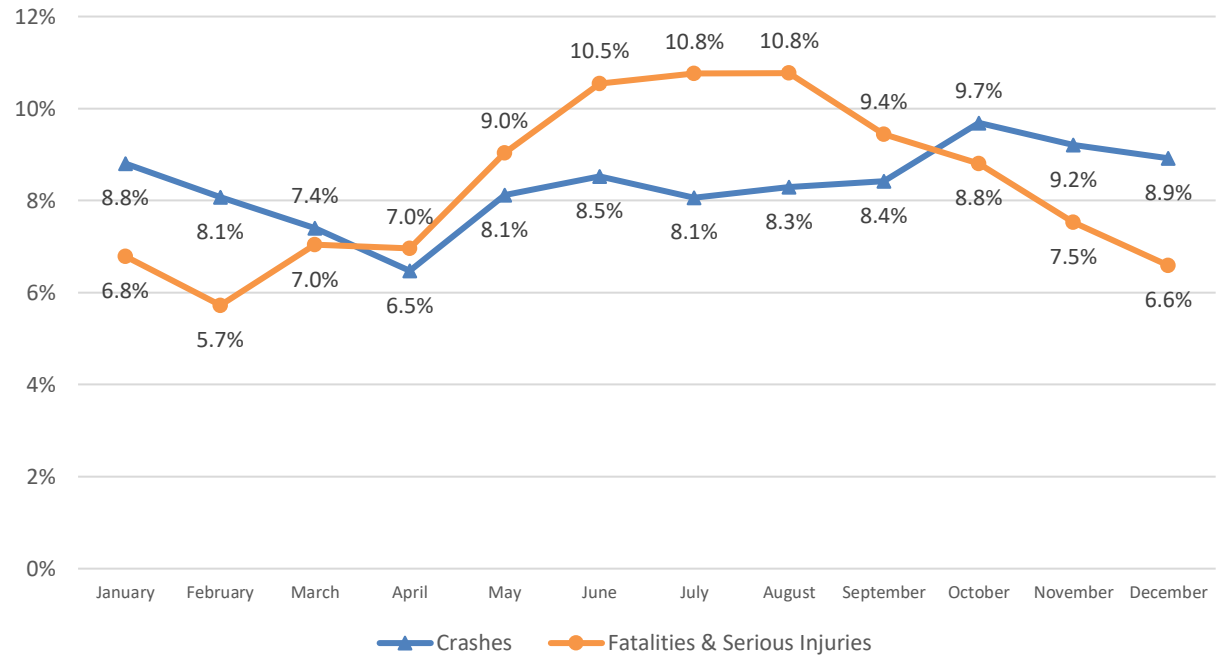


Figure 8

Crash Distribution by Month, 2017-2021



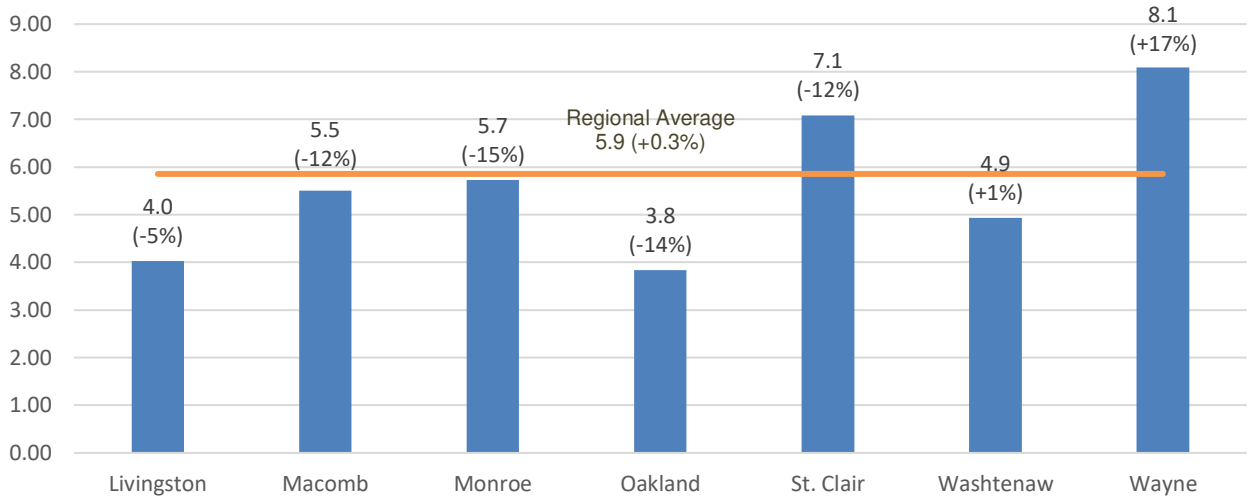
Rates

Crash rate is a measure of safety which takes into consideration exposure data, typically in the form of traffic volume. Other data such as roadway mileage or population can also be used to determine crash rates. This section examines the regional crash rate using all three methods. A summary of the crash rates is below in Table 3.

Figure 9 illustrates the combined rate of fatalities and serious injuries by county per 100 million vehicle miles travelled (VMT). These rates are calculated based on Michigan's Highway Performance Management System (HPMS) traffic volume data. The orange line indicates the SEMCOG average (5.9) from the last five years. While the regional fatality and serious injury rate is roughly unchanged from the 2015 plan benchmark, most of the counties are now below the regional average except St. Clair and Wayne. Wayne's fatality and serious injury rate increased 17%, overtaking St. Clair as the highest county rate. The fatality and serious injury rate in the rest of the counties decreased, with Monroe seeing the greatest improvement.

Figure 9

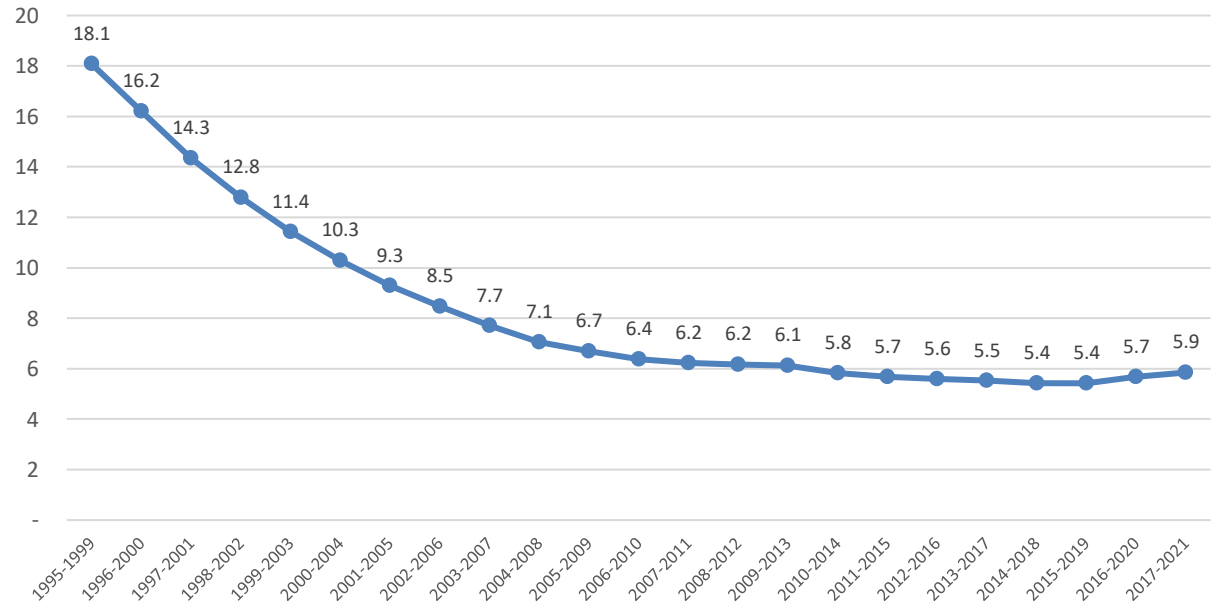
Fatality and Serious Injury Rate Per 100 Million VMT by County, 2017-2021 (& change from 2010-2014)



Historically, the region's fatality and serious injury rate has decreased over time. However, over the last decade the rate has plateaued. Figure 10 shows the five-year moving average for the fatality and serious injury rate per 100 million VMT in Southeast Michigan.

Figure 10

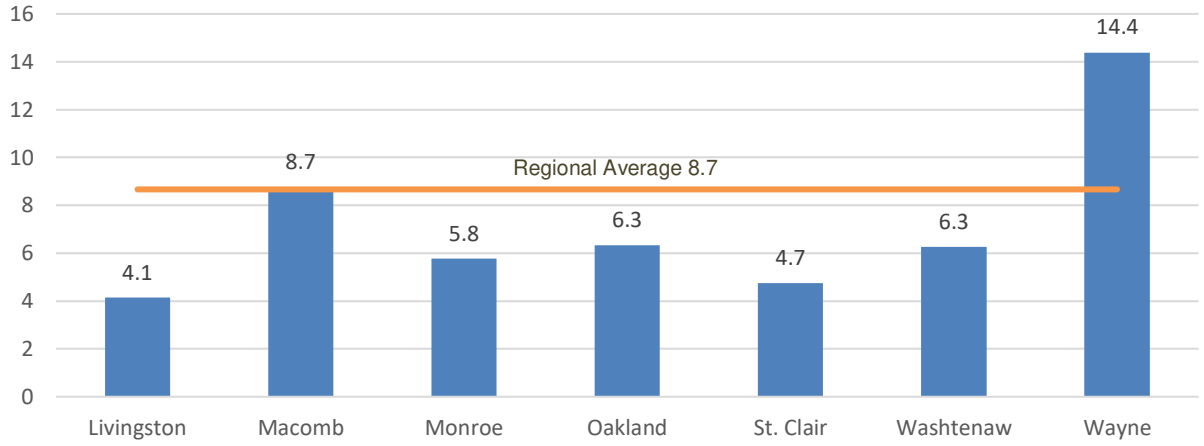
Fatality and Serious Injury Rate Per 100 Million VMT Five-Year Moving Averages, 1995-2021



Crash rates can also be determined using metrics other than VMT. Figure 11 illustrates the average annual fatality and serious injury rate per 100 centerline miles of roadway. All but two counties were below the regional average of 8.7 fatalities and serious injuries per 100 miles of roadway. Macomb was 1% over the region average, while Wayne was one and two-thirds times the region average.

Figure 11

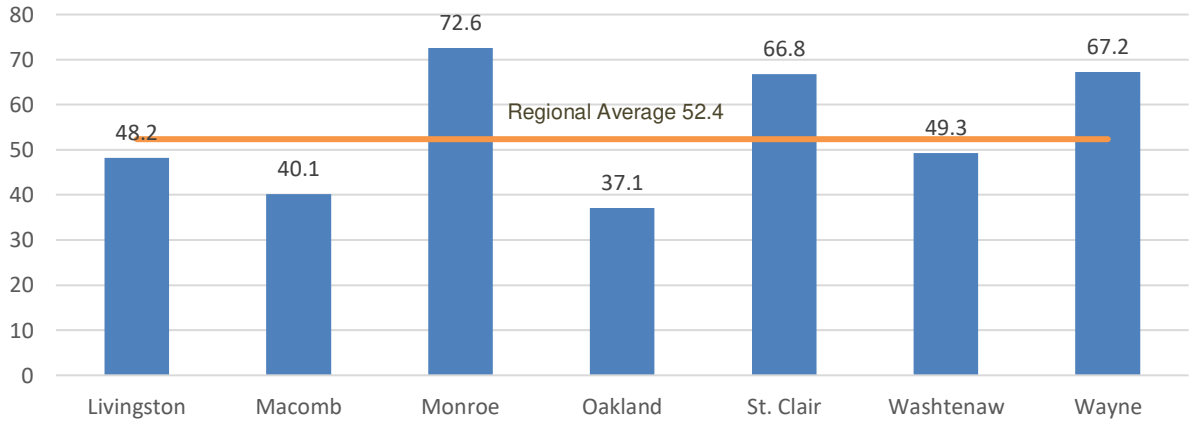
Annual Average Fatality and Serious Injury Rate Per 100 Centerline Miles of Roadway by County, 2017-2021



Data from the 2020 Decennial Census were used to determine the annual average fatality and serious injury rate per 100,000 population. As shown in Figure 12, approximately 52 out of every 100,000 people were killed or seriously injured in Southeast Michigan each year between 2017 and 2021. The rates in the counties of Monroe, St. Clair, and Wayne were all above the region average.

Figure 12

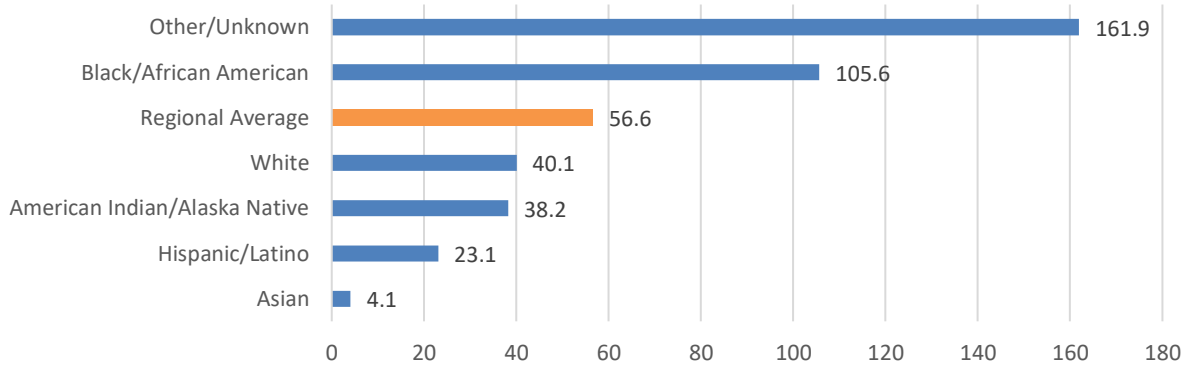
Annual Average Fatality and Serious Injury Rate Per 100,000 Population by County, 2017-2021



The 2020 Decennial Census data were also used to determine the fatality and serious injury rate per 100,000 population by race and ethnicity, shown in Figure 13. Since this data was only added to the UD-10 crash report forms in 2021, only one year of crash data was used for this analysis. Of the people with known race or ethnicity, Black/African American people were nearly twice as likely to be killed or seriously injured in traffic crashes compared to the regional average for all races and ethnicities.

Figure 13

Fatalities and Serious Injuries per 100,000 Population by Race/Ethnicity, 2021



The 2016-2020 American Community Survey 5-Year Estimates were used to further investigate average crash rates by age and sex, shown in Figure 14. Males in Southeast Michigan are killed or seriously injured at nearly twice the rate of females. Males in age groups from 20 to 34 had the highest fatality and serious injury rate, with rate of over 100 killed or seriously injured per 100,000 population.

Figure 14

Annual Average Fatalities and Serious Injuries by Age and Sex per 100,000 Population, 2017-2021

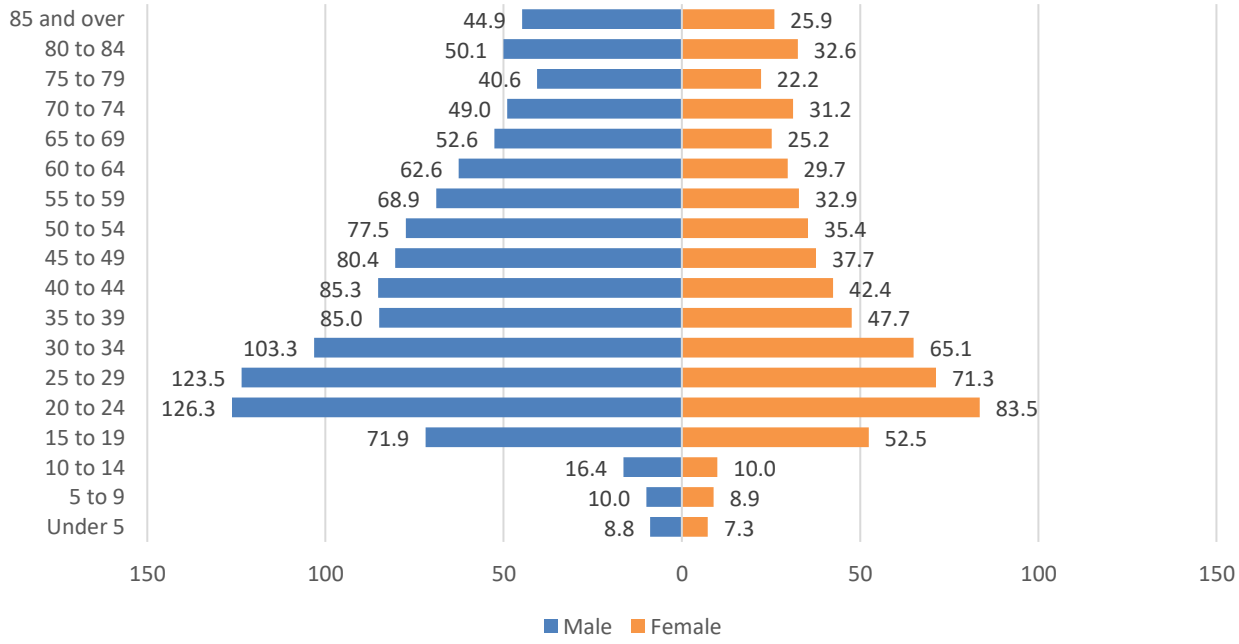


Table 3

Five-Year Average Fatality (K) and Serious Injury (A)/ (KA) Rates per County, 2017-2021

County	KA rate per 100,000,000 VMT	KA rate per 100 miles of roadway	KA rate per 100,000 people
Livingston	4.0	4.1	48.2
Macomb	5.5	8.8	40.1
Monroe	5.7	5.8	72.6
Oakland	3.8	6.3	37.2
St. Clair	7.1	4.7	66.8
Washtenaw	4.9	6.3	49.3
Wayne	8.1	14.4	67.2
SEMCOG Region	**5.9**	**8.7**	**52.4**

COVID-19 Impacts

It is evident that the COVID-19 pandemic was a significant event that affected regional travel in 2020 and into 2021. The State of Michigan's stay-at-home order, concurrent with personal choice to reduce potential exposure (e.g., working from home, canceling social gatherings), contributed to an exponential reduction in travel. It is unclear at this time if these years will be data outliers or permanent trends toward a reduction in the employment trips made within the region. This section provides insight into what we know currently about how the regional transportation system has changed.

Statewide Impacts

The University of Michigan Transportation Research Institute (UMTRI) conducted a statewide analytical pandemic report in December 2021, and key takeaways are as follows[1]:

- Crashes were substantially more deadly in 2020 than in 2019. The crash rate per vehicle miles traveled (VMT) was down by 8% but the fatal crash rate per VMT was up by 33% in 2020.
- Month-to-month patterns for all crash categories show a large reduction from March into May, followed by below-normal crashes but above-normal fatalities for the remainder of 2020. VMT was down 60% in April and then rose in May and June to a flat ~12% below normal for the remainder of the year.
- Alcohol-involved crashes were down 8%, but alcohol-involved fatalities were up 14% in 2020.
- Speeding fatalities were up in 2020 and showed a large spike (more than double normal levels) in July.
- Pedestrian crashes were down 10%, but fatalities were up 18% in 2020.
- Motorcycle fatalities were 40% above normal during the summer months and up 22% for all of 2020 combined.

UMTRI proposes three possible causes:

- The reduced miles were generally low-risk miles (e.g., commuting to work);
- Drivers who did choose to drive during the pandemic exhibited more risky behavior than usual; and/or
- Crashes that did occur were generally worse than normal because a lack of congestion may have led to more crashes at higher speeds, which result in worse injury levels.

The report states, "In Michigan, vehicle miles traveled (VMT) was down by 26% in March, and 56% in April, then started to rise again, settling at ~12% below normal until November and December, when a COVID surge combined with significant reductions in holiday activity resulted in travel being about 20% lower than normal. The overall reduction in VMT in 2020 compared to 2019 was 16%." The change in VMT and crashes throughout 2020 is shown in Figure 15.

[1] https://s3.amazonaws.com/content.michigantrafficcrashfacts.org/Michigan+2020+Pandemic+Crash+Report.pdf

Figure 15
Statewide Crash and VMT Change, UMTRI 2021 Pandemic Report

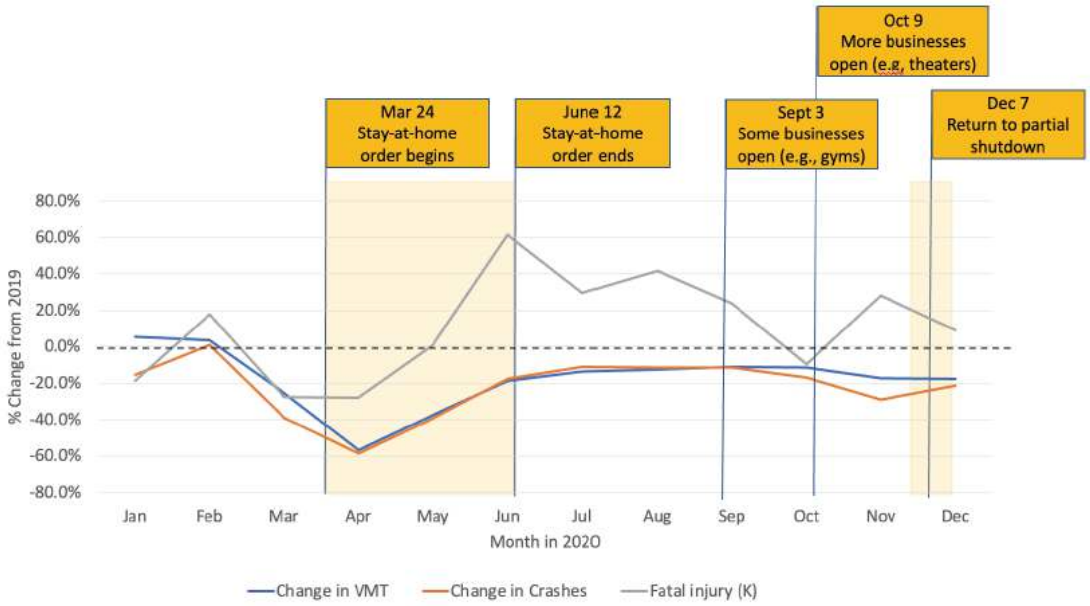


Figure 8 Change in VMT, police-reported crashes, and fatal injuries, relative to 2019, by month in 2020 with key executive order timeframes overlaid

Regional Impacts

Crash Impacts

Figures 16-17 show the changes in the region's crashes during the pandemic. While there were fewer reported traffic crashes in the region in 2020, more of those crashes resulted in serious injuries or fatalities compared to prior years, similar to statewide and national trends. Total crashes dropped by 25% from 2019 to 2020, a decade low for the region, but fatal crashes increased 24% in the same period, a decade high. In 2021, the number of crashes started to increase again, up to 88% of the 2019 total.

Bicyclist, motorcyclist, and pedestrian fatalities each increased 83%, 39%, and 27%, respectively, from 2019 to 2020. Total fatalities and serious injuries increased 4% from 2019 to 2020. As traffic recovered in 2021, fatalities and serious injuries still continued to increase, up 14% from 2019 to 2021. It is reasonable to expect that causes for this increase in the regional data mirror the causes for the statewide increase.

Figure 16

Southeast Michigan Traffic Crashes by Month and Year, 2017-2021

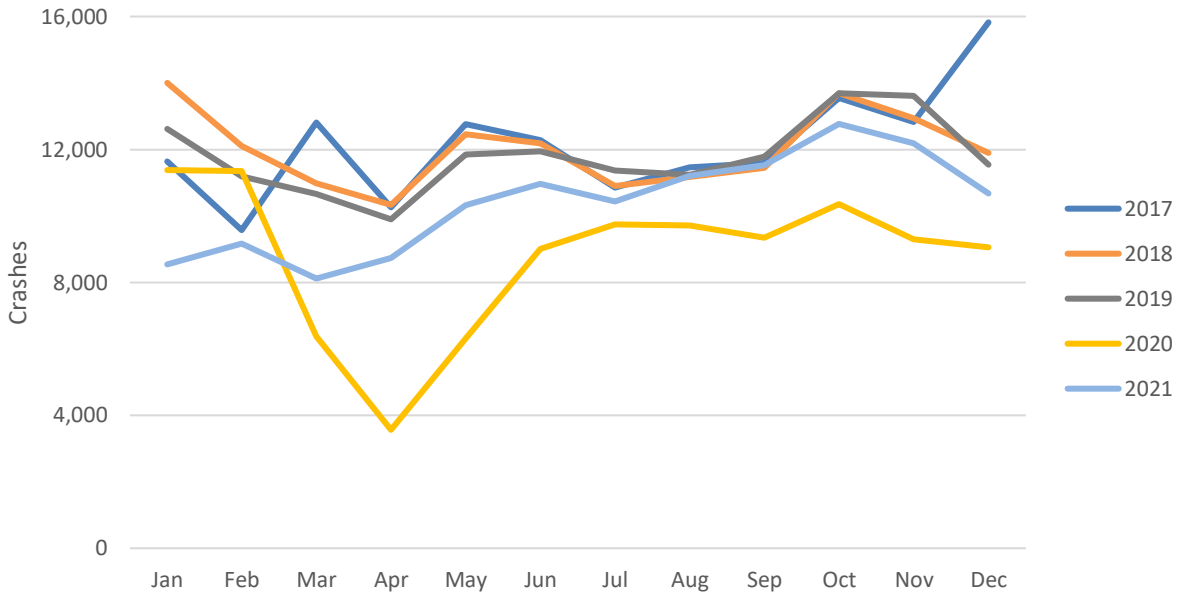
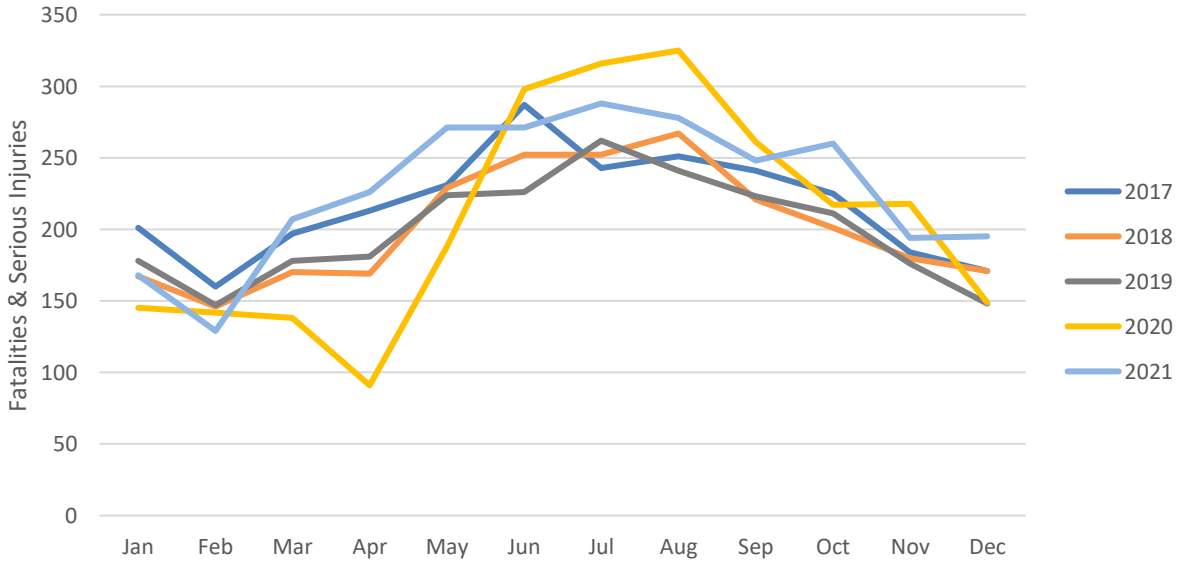


Figure 17

Southeast Michigan Fatalities & Serious Injuries by Month and Year, 2017-2021



Travel Impacts

In addition to crash data, SEMCOG analyzed four sources of transportation data to assess pandemic impacts on regional travel:

- Federal Highway Administration (FHWA) Highway Performance Monitoring System (HPMS) for regional VMT assessment: 2019-21;

- Cambridge Systematics Location-based Services Data and Big Data Analytics (LOCUS) for person travel: 2019-21;
- Federal Transit Administration (FTA) National Transit Database (NTD) for transit services: 2019-21; and
- Bridge and Tunnel Operators Association (BTOA) for international crossing traffic and commercial vehicle movement changes: 2019-22.

With the data from 2022 available in the BTOA data source, more travel recovery can be observed. In general, the biggest COVID-19 impacts on the regional transportation system were during 2020-21, and the system started to recover in 2021-22. However, some of the 2022 data are not yet available at the time of writing this plan, and this analysis will be updated for the forthcoming 2050 Regional Transportation Plan.

The Highway Performance Monitoring System (HPMS) is a national highway information system that includes data on the extent, condition, performance, use, and operating characteristics of the nation's highways. SEMCOG uses HPMS to assess the relationship between level of travel and safety measures, to calibrate the regional travel demand forecast model, and other traffic analyses. VMT is one of the performance measures HPMS provides on overall regional travel. Table 4 displays both VMT estimates for all regional travel and truck travel between 2019-2021. Overall, VMT dropped about 22 million in 2020, while truck movement remained stable.

Table 4

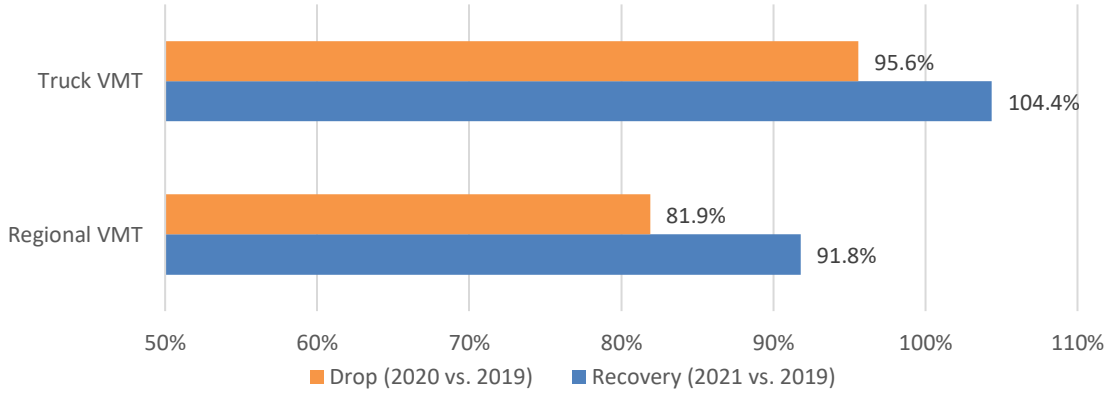
Daily VMT in Millions, 2019 - 2021

Year	Regional VMT	Truck VMT
2019	125.20	6.94
2020	102.55	6.63
2021	114.94	7.24

Figure 18 provides another angle from which to view the impact. Regional VMT dropped 18% in 2020, while truck VMT dropped less than 5%. COVID impacted passenger vehicle travel much more than commercial vehicle travel. On the recovery side, truck movement has already exceeded pre-COVID levels, while overall VMT in 2021 was still about 8% less than the 2019 peak.

Figure 18

VMT Drop and Recovery from 2019 to 2021



Person Travel

SEMCOG has long used big data to augment traditional data sources in order to provide a more complete understanding of travel characteristics to system deficiencies, such as high crash locations. To get a better understanding of the impacts of the pandemic on travel, SEMCOG purchased a time series set of data (LOCUS platform) for 2019 through 2022. LOCUS has a rich set of information from mobile device data that provides insight into how the region's travel behavior changed during the height of the pandemic and as we have emerged out of it. SEMCOG will continue to analyze and use these data in the coming months as part of 2050 Regional Transportation Plan development.

The LOCUS trip data used here has four variables:

- Total person trips
- Walk mode trips
- Motorized person trips
- Home-based (HB) regular trips, including trips to work, school, etc.

Figure 19 shows changes in LOCUS trip, in millions, from 2019 to 2021. In general, all travel modes show the same pattern. 2020 had the lowest travel while 2021 recovered to the level between 2019 and 2020.

Figure 19

Person Trips, 2019-2021

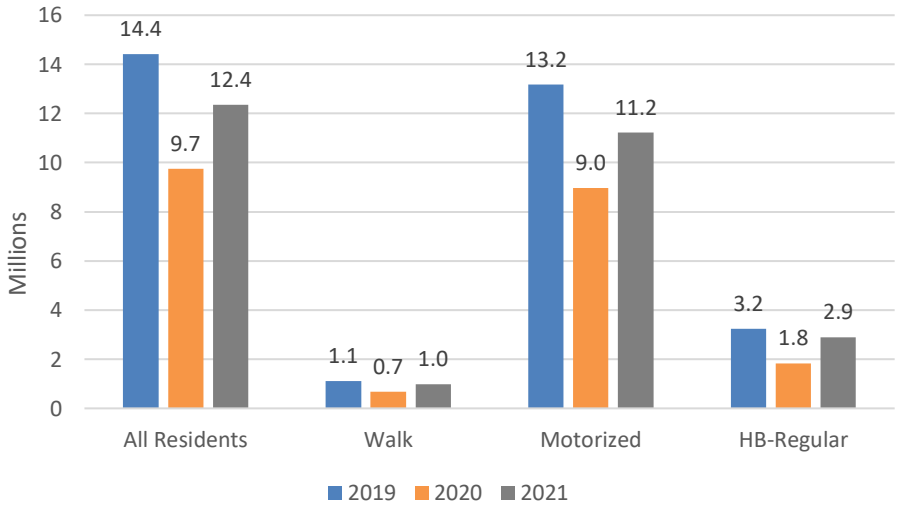
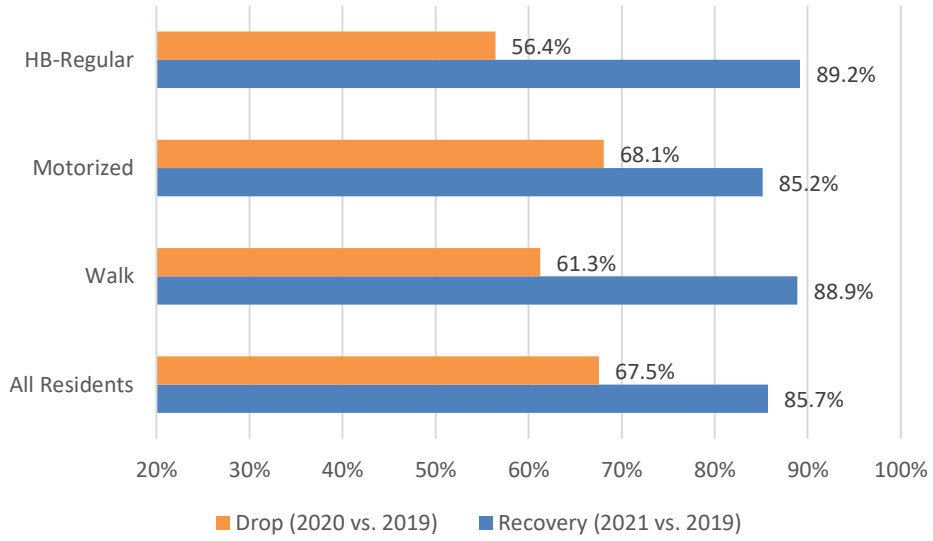


Figure 20 shows the drop and recovery in person trips from 2019. Due to COVID's nature and the shift to work at home, HB-Regular trips dropped the most in 2020 (44%), to 56% of the 2019 level, followed by Walk trips, which were down to 61% of 2019 levels. In terms of recovery, HB-regular and walk trips both recovered to 89% of 2019 levels in 2021. Motorized travel recovered to 85% of the 2019 level, which is close to the HPMS estimate of 92% VMT recovery.

Figure 20

Person Trips Drop and Recovery from 2019 to 2021



Transit Services

Transit is a vital component of our transportation system; providing safe and reliable access is critical. During the pandemic many of the most critical service workers – such as health care – remained reliant on transit to get to their jobs.

The source for transit service data is primarily from the Federal Transit Administration's (FTA) National Transit Database (NTD). Figure 21 displays weekday transit ridership, in thousands, for the region's three largest transit providers:

- Detroit Department of Transportation (DDOT)
- Suburban Mobility Authority for Regional Transit (SMART)
- Ann Arbor Area Transit Authority (AAATA)

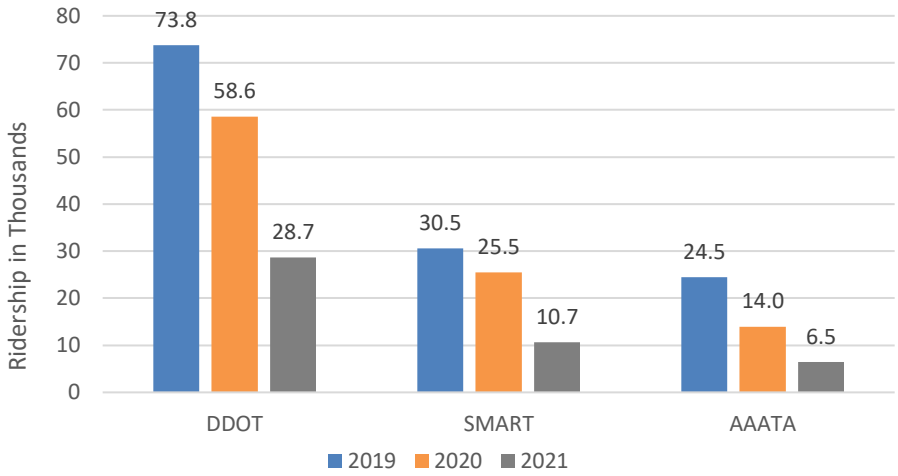
The drops in ridership percentage from 2019 to 2021 ranged from 61% to 73%. AAATA dropped the greatest portion of its ridership. In terms of recovery, none of the transit services recovered in 2021. In fact, 2021 is the worst year for all transit services in the region. This is a big contrast to other transportation systems in the region.

The region's transit ridership has been on a downward trend for decades largely due to a reduction of funds and, thus, service levels. According to FTA, Detroit Metro region carried 128.6 million riders in 1980, and it reduced to 75.4 million in 1989. In 2019, the system carried 44 million riders. Public health concerns during the pandemic led to 2021 system ridership dropping to about 15 million. The region's transit operators are not alone as operators across the country are working to re-establish ridership by carefully balancing service levels with demand. Re-establishing transit service and ridership is also important from a transportation safety perspective, as traveling by transit is ten times safer than traveling by car in terms of risk of injury or death.[2]

[2] https://www.apta.com/research-technical-resources/research-reports/public-transit-is-key-strategy-in-advancing-vision-zero/

Figure 21

Weekday Transit Ridership, 2019-2021



International Crossing Traffic

Southeast Michigan and Southwest Ontario are tightly linked, economically and socially. Whether for work or social visits or just passing through, safety is an important factor. As with VMT, changes in international crossing traffic can impact the safety near border crossings by providing more space and opportunity for risky driver behavior. Data from the U.S.-Canada Bridge and Tunnel Operators Association (BTOA) were used to analyze international crossings between Southeast Michigan and Canada. The datasets contained traffic volumes from years 2019-2022, and the traffic recovery is better observed.

For the SEMCOG region, there are three primary international crossings:

- Bluewater Bridge (BWB) in Port Huron
- Detroit-Windsor Tunnel (DWT) in Detroit
- Ambassador Bridge (AMB) in Detroit

Figures 22-23 display both international passenger and truck traffic changes during the pandemic in the region. Among three crossings, BWB dropped the most on passenger traffic, while DWT dropped the most on bus/truck volumes. However, DWT has a very low bus/truck volume. On average, truck volume only dropped about 10%.

During the COVID period, passenger traffic reduced more than truck traffic. For traffic recovery, passenger traffic is also slower than the commercial vehicle traffic recovery.

Figure 22

International Passenger Traffic, 2019-2022

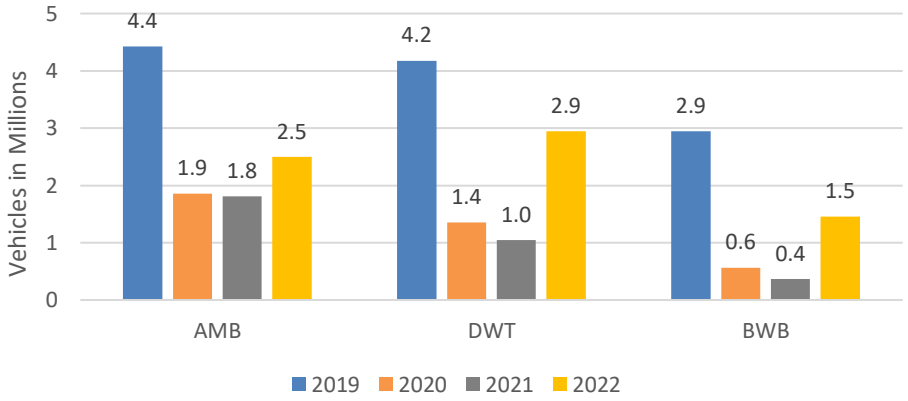
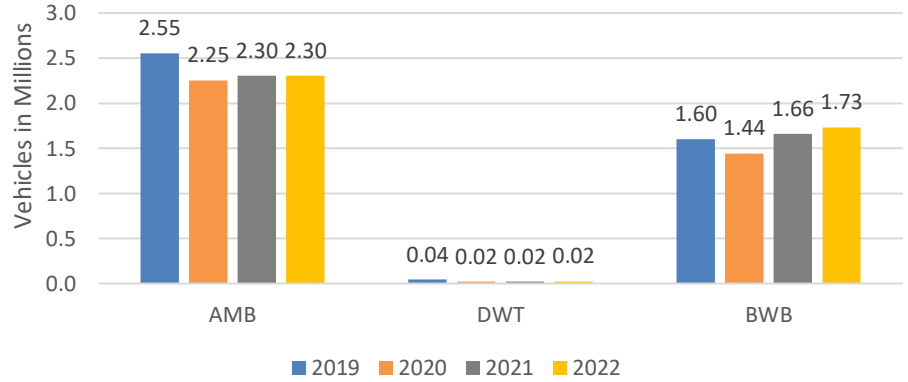


Figure 23

International Truck Traffic, 2019-2022



As shown in Tables 5 and 6, international passenger and truck traffic responded to COVID very differently. For passenger travel, DWT recovered 71% of the traffic by 2022, while BWB, on the other hand, recovered or exceeded pre-pandemic year 2019's truck movement. For all crossings, truck traffic reached almost 97% of pre-pandemic levels, while passenger traffic was lagging and only reached 60% of 2019 level by 2022. For the first few months of 2023, passenger traffic has sharply risen at all crossings, especially AMB and BWB.

Table 5

Passenger Traffic Drop and Recovery from 2019 to 2022

	Total IBC	AMB	DWT	BWB
% Dropped to (2020 or 2021)	27.9%	41.0%	25.0%	12.3%
% Recovered to (2022)	59.8%	56.5%	70.6%	49.4%

Table 6

Truck Traffic Drop and Recovery from 2019 to 2022

	Total IBC	AMB	DWT	BWB
% Dropped to (2020 or 2021)	88.5%	88.4%	43.9%	90.0%
% Recovered to (2022)	96.7%	90.3%	53.8%	108.0%

High Injury Network

Fatal and serious injury crashes occur in all seven counties of Southeast Michigan. Knowing where these severe crashes are concentrated helps to prioritize locations for implementing the safety strategies outlined in this plan. The High Injury Network (HIN) analysis identifies road segments where fatal or serious injury (KA) crashes have occurred over the previous five years of data (2017-2021).

All segments that had a KA crash were included in the HIN, since even one fatality or serious injury is too many. Segments were further classified by the frequency of KA crashes. Segments with one KA crash were classified as Low, two as Medium, and three or more as High. While this data-driven method resulted in some short, discontinuous street segments, patterns of KA crashes along longer corridors can be identified for project selection.

Less than 7% of the Southeast Michigan road network is on the HIN. Only 0.1% of HIN road segments comprise the High category, yet nearly 9% of all KA crashes occur on those segments. Table 7 summarizes the HIN analysis and Figure 24 shows the locations of segments on the HIN. Appendix C – County Profiles shows the HIN by county.

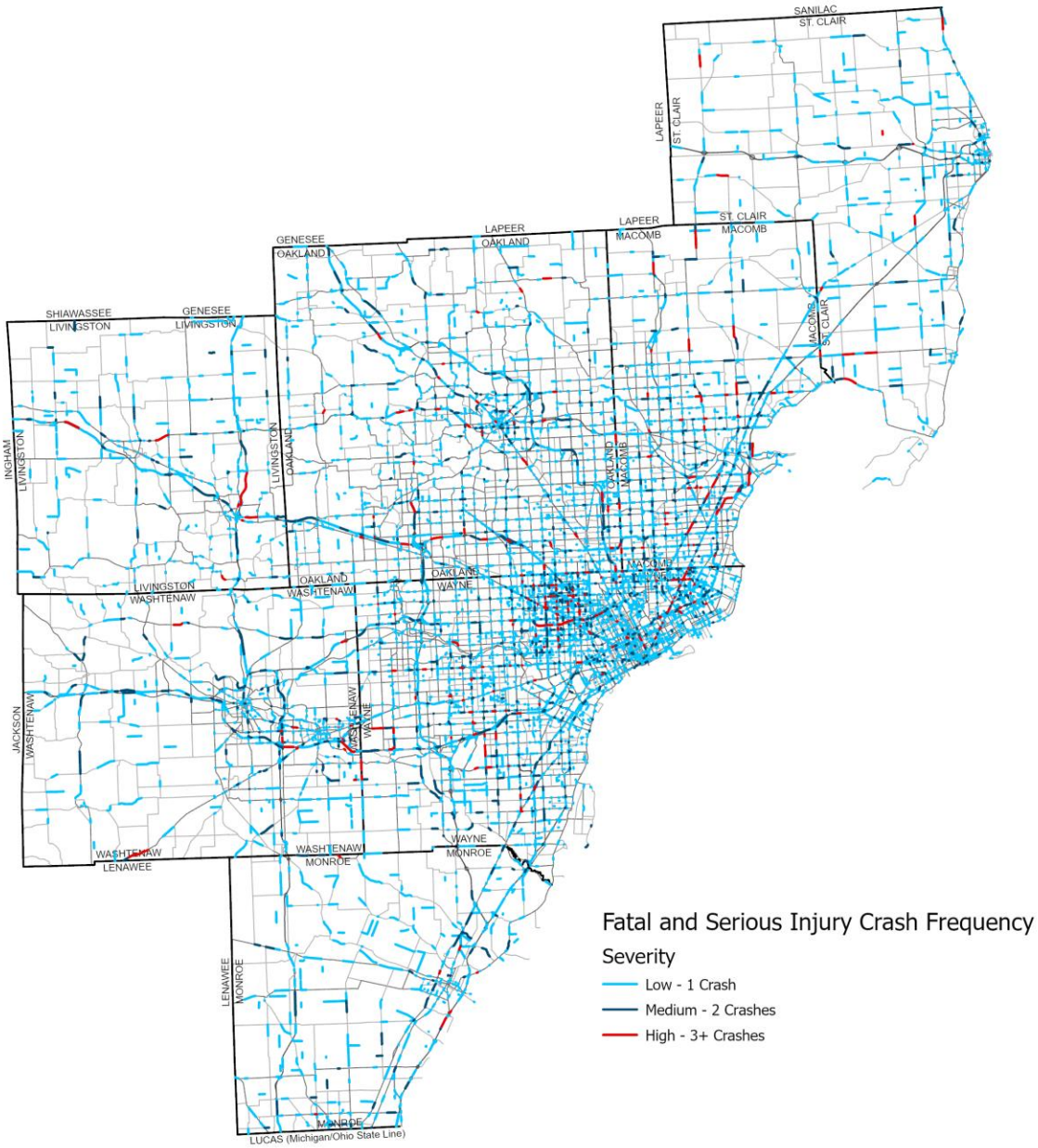
Table 7

High Injury Network Analysis Summary

High Injury Network Segments	% of KA Crashes	% of HIN Segments	% of Road Network Segments	% of Road Network Centerline Miles
Low – 1 KA crash	71.7%	85.3%	3.2%	5.1%
Medium – 2 KA crashes	19.7%	11.7%	0.4%	0.9%
High – 3+ KA crashes	8.6%	3.0%	0.1%	0.3%
Total HIN	100.0%	100.0%	3.8%	6.3%

Figure 24

High Injury Network, Southeast Michigan, 2017-2021



Focus Facilities

Knowing the types of roadways where fatal and serious injury (KA) crashes occur helps to identify risk factors that can be addressed proactively and systemically across the region. The crash tree diagrams in Figures 25-27 show the distribution of all KA crashes from 2017-2021 in the region by road ownership (state, county, or local) and facility type. Facilities are broken down by area type (urban or rural) and roadway attributes (number of lanes and speed limit). This breakdown allows for the quick identification of roadway types with a disproportionate amount of KA crashes and where safety countermeasures are needed.

Table 8 summarized the distribution of the region's road miles and KA crashes by road ownership – State, County, City, and private or other/unknown. While the State owns the smallest share of roads in Southeast Michigan (9%), its roads account for the same share of KA crashes as County roads (36%). State- and County-owned roads tend to have higher speed limits, and crashes that occur tend to be more severe.

Most of the region's KA crashes occur on urban roadways. Only 7% of the region's KA crashes occur on rural roads, and 89% of the rural KA crashes occur on 2 lane roads with speed limits of 45 MPH or greater.

State KA crashes are nearly evenly split between urban roads with three, four, and five or more lanes. 25% of State KA crashes occur on urban, three-lane roads with speed limits of 45 Miles per Hour (MPH) or higher.

22% of County KA crashes occur on urban, two-lane roads with speed limits of 45 MPH or higher.

Of the three public jurisdictions, City roads account for the smallest share of the region's KA crashes (27%). On City roads, 34% of all KA crashes occur on urban, two-lane roads with a posted speed of 25 MPH or lower.

Table 8

Road Mile and KA Crash Distribution by Jurisdiction

Jurisdiction	State	County	City	Private/Other
Road Miles	9%	41%	36%	14%
KA Crashes	36%	36%	27%	1%

Figure 25
Fatal and Serious Injury Crash Tree Diagram – State Owned Roadways, 2017-2021

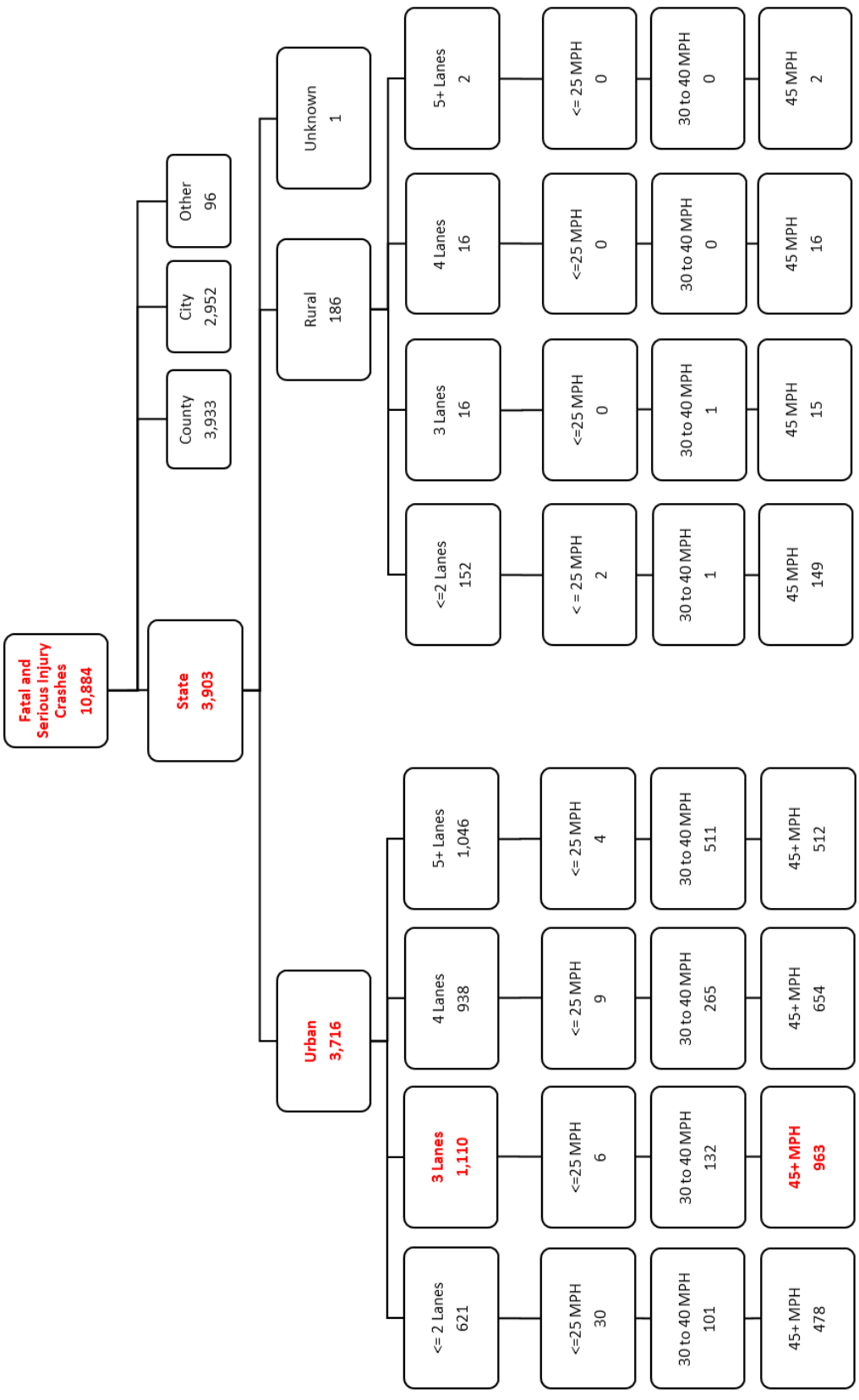


Figure 26
Fatal and Serious Injury Crash Tree Diagram – County Owned Roadways, 2017-2021

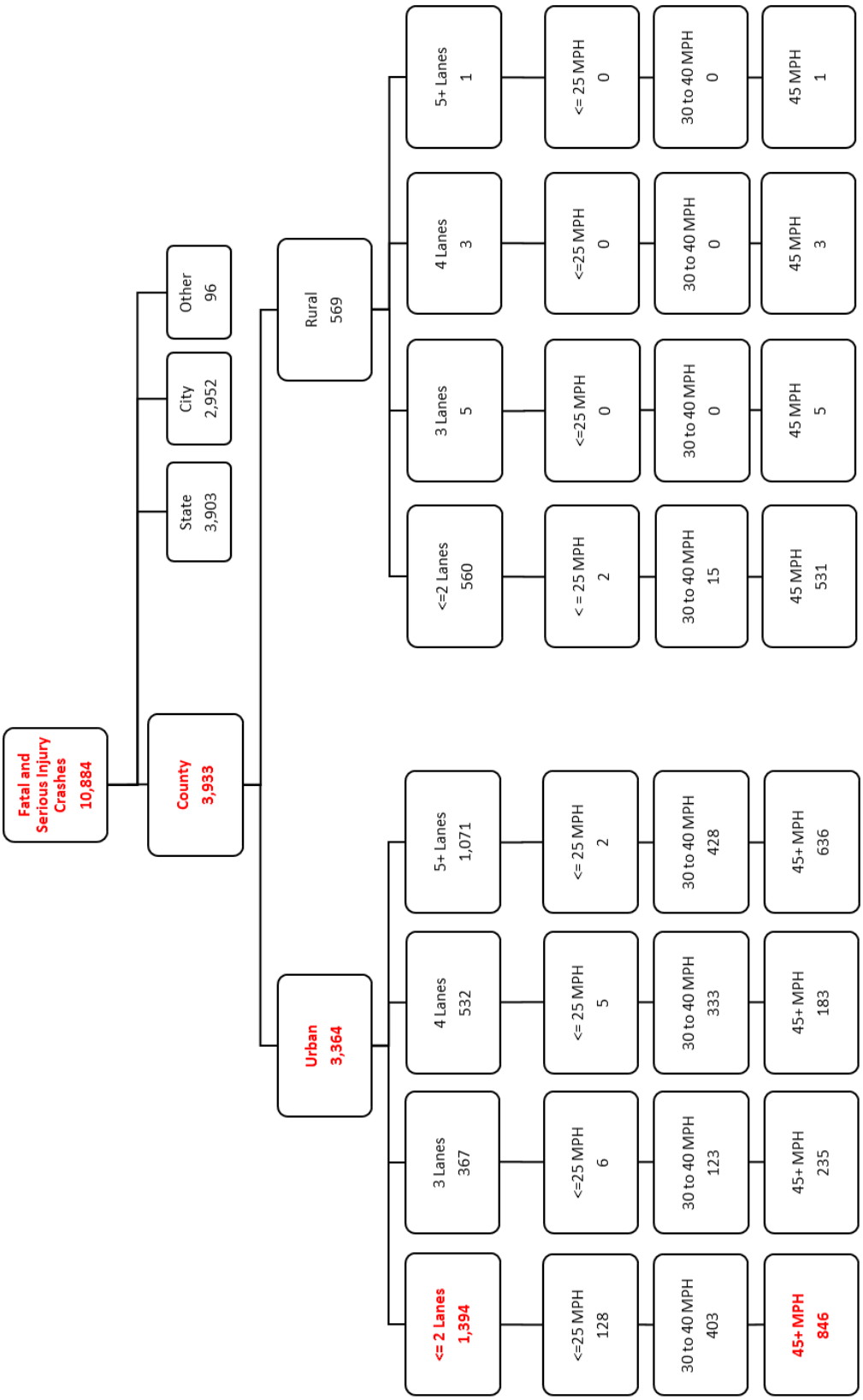
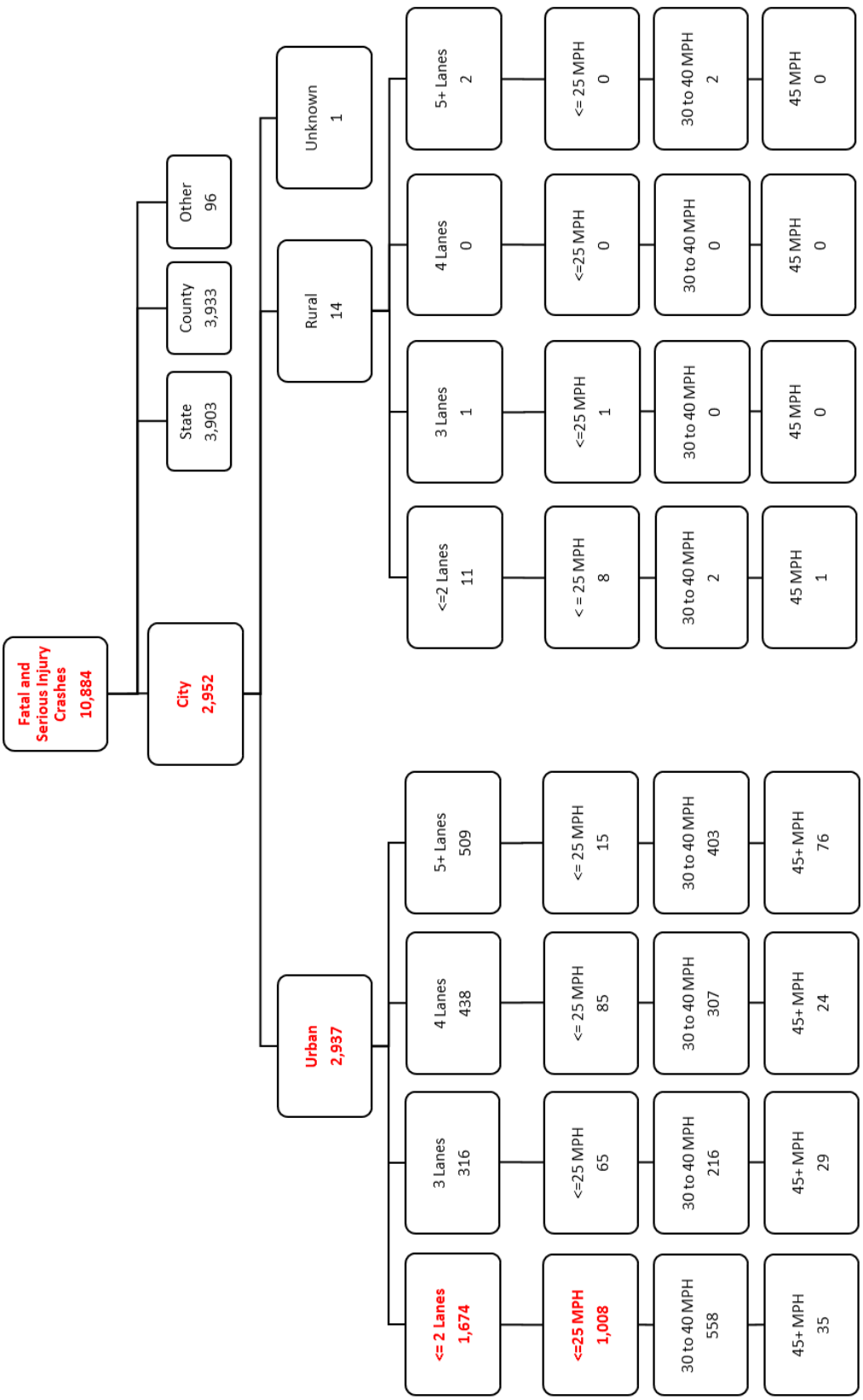


Figure 27

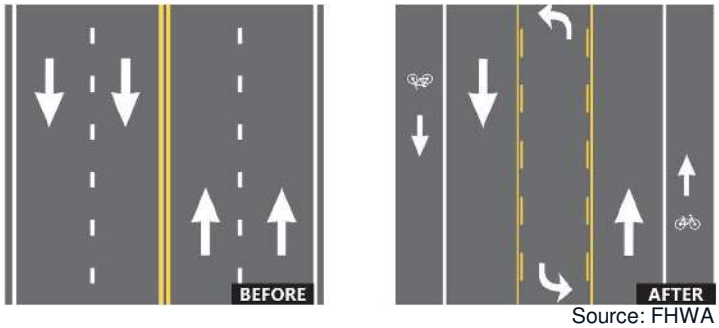
Fatal and Serious Injury Crash Tree Diagram – City Owned Roadways, 2017-2021



Excess Capacity

Road diets or lane reconfigurations were identified by FHWA Highway Safety Programs as a proven safety countermeasure – an effective strategy to reduce fatalities and serious injuries. Road diets (Figure 28) can improve safety, calm traffic, and provide better mobility and access for all road users by narrowing or eliminating vehicle travel lanes to make more room for additional road users and uses within the right of way.

Figure 28
Road Diet Example: before and after



Source: FHWA

A typical four-lane to three-lane road diet conversion can lead to a 19-47% reduction in crashes.[3] This type of road diet can reduce rear-end and left-turn crashes due to the addition of a dedicated left-turn lane. It can also reduce right-angle crashes as drivers turning from side streets need to cross fewer lanes. People who walk and roll have fewer lanes to cross. Road diets also create opportunities to install pedestrian refuge islands, bicycle lanes, on-street parking, or dedicated transit stops. The narrowing of the roadway also supports traffic calming and more consistent driver speeds.

The Excess Capacity Analysis is a high-level screening of the Southeast Michigan roadway network to identify locations where daily traffic demand is lower than the available roadway capacity. These locations have potential for a lane reconfiguration or road diet. These locations may also be good candidates for green infrastructure projects. This is an initial screening to find locations for further in-depth study for road diet potential.

The analysis uses data from SEMCOG's travel demand forecast model version E8, developed for the 2050 Regional Transportation Plan. The model estimates and forecasts daily traffic volumes based on regional demographics, employment, travel, and roadway characteristics. The travel model road network contains all federal-aid roads in the region including freeways, major and minor arterials, major and minor collectors, and few local roads. For the purpose of this analysis, regional freeways and ramps were excluded. Two-way roads with four or more total lanes, or one-way roads with two or more travel lanes were considered.

Segments with up to 6,000 vehicles per lane per day were considered to have road diet investigation potential in this analysis, with varying degrees of potential. A volume of 2,500 vehicles per lane per day was considered as having the best potential for a road diet. Roadway segments with per-lane volumes higher than 6,000 or those that did not meet the other screening criteria based on roadway classification or number of lanes were identified as not likely candidates for a road diet.

Table 9 summarizes the results of the analysis, showing that 21% of the model road network has some excess capacity and road diet investigation potential. The map in Figure 29 shows the candidate road diet locations in Southeast Michigan. Appendix C shows the High Injury Network in relation to the candidate road diet locations by county.

[3] https://highways.dot.gov/safety/proven-safety-countermeasures/road-diets-roadway-configuration

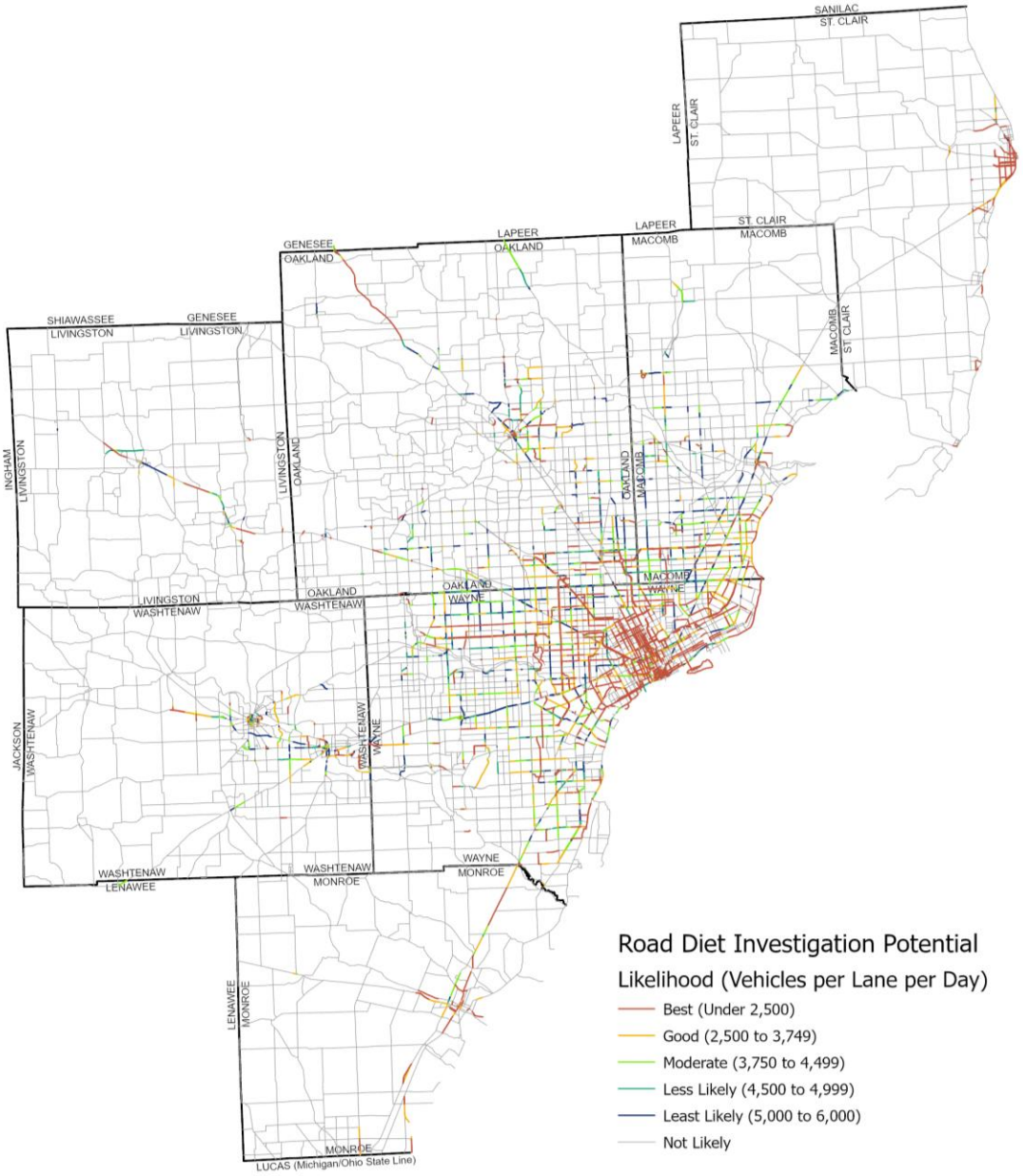
Table 9

Excess Capacity Analysis Summary

Road Diet Investigation Potential	Model Network Centerline Miles	% of Model Network
Best: Under 2,500 vehicles per lane per day	613.3	8.4%
Good: 2,500 to 3,749 vehicles per lane per day	315.9	4.3%
Moderate: 3,750 to 4,499 vehicles per lane per day	208.6	2.9%
Less likely: 4,500 to 4,999 vehicles per lane per day	130.7	1.8%
Least likely: 5,000 to 6,000 vehicles per lane per day	260.4	3.6%
Total potential roadway segments	1,528.8	21.0%

Figure 29

Excess Capacity Analysis, Southeast Michigan



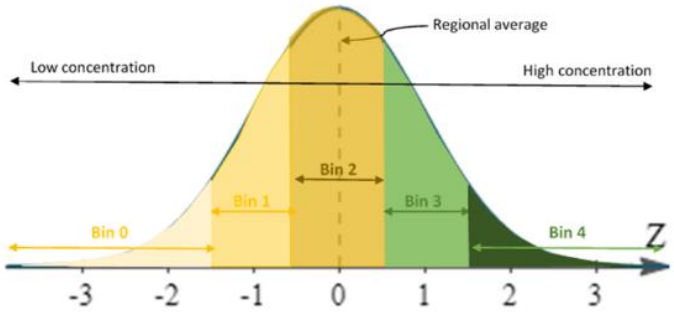
Transportation Equity

Southeast Michigan is home to a diverse population. Residents of all ages and abilities represent various races and ethnicities and speak a number of languages. This diversity makes our region strong, with thousands of neighborhoods, each geographically, demographically, and economically unique. Each of these neighborhoods presents both challenges and opportunities.

The goal of transportation equity is to facilitate access to opportunities by providing safe, affordable, and reliable transportation options based on the needs of the people they serve. There are certain populations with greater social and economic needs that may impact their mobility options. SEMCOG conducted a transportation equity analysis to identify the concentration of key demographic variables across the region in order to have a data-driven understanding of community needs to assist in effective planning.

SEMCOG's transportation equity analysis uses a score-based analysis to depict and symbolize the concentrations of various vulnerable groups in the region. The score calculation based on Standard Deviation measures the dispersion of an indicator relative to the regional average. This standard deviation-based score classifies the concentration of the equity populations in relation to the region's mean for every census tract.

The data for each of the criteria in the analysis are split into five "bins" based on the relative concentration across the region, ranging from 0 (low concentration) to 4 (high concentration). Bin 2 for each indicator contains the census tracts at or near (within a half standard deviation from) the regional average (mean) for that indicator. Bins 4, 3, 1, and 0 are then built out from the regional average; Bins 1 and 3 go one full standard deviation out from Bin 2, and Bins 0 and 4 contain any remaining tracts further out from 1 or 3, respectively. Standard deviation reflects the amount of variability in a given dataset and is useful in identifying extreme values.



The composite score is calculated by averaging the scores of eight socioeconomic indicators that are likely to include populations that require additional mobility considerations, such as greater reliance on the bicycle and pedestrian network or increased need for safety and security considerations. The composite score shows the complexity of equity issues in a geographic area. The higher the composite score for a project location, the higher the concentration of multiple equity indicators and need for additional mobility considerations for the project. Data from the Census Bureau's American Community Survey 2016-2020 5-Year Estimates were used for this analysis. The eight indicators are:

1. **Disability:** Disability includes persons with any of the following disabilities: hearing, vision, cognitive, ambulatory, self-care, or independent living difficulty. People with a disability may have trouble operating a motor vehicle, taking transit, or may have other mobility difficulties.

2. **Female-Headed Households:** A female maintaining a household with no husband of the householder present. Female heads of households may have real or perceived mobility issues related to personal safety.
3. **Households in Poverty:** If a household's total income is less than the federal poverty threshold, then that household (and every individual in it) is considered in poverty. Households in poverty may not be able to afford to own and/or operate a private automobile.
4. **Limited English Proficiency:** A "limited English speaking household" is one in which (1) no member 14 years old and over speaks only English or (2) speaks a non-English language and speaks English "very well." In other words, all members 14 years old and over have at least some difficulty with English. People with limited English proficiency may have difficulty reading signs or instructions while driving or using transit.
5. **Minority:** Includes people that are of "Black or African American," "American Indian or Alaska Native," "Asian," and "Native Hawaiian or Other Pacific Islander" race categories. Persons reporting as multiracial, mixed, interracial, or a Hispanic, Latino, or Spanish group are also included in this category. Any person who is not a "Non-Hispanic White" is considered as a Minority. Minorities have historically been negatively impacted by transportation projects and may rely on alternative transportation.
6. **Older Adults:** Population aged 65 years or older. Older adults may not be able operate a private automobile and may have other mobility difficulties.
7. **Transit-Dependent Households:** Households with no vehicle or number of vehicles less than the number of workers in the household. People reliant on transit generally have more mobility difficulties and may rely on walking and biking options.
8. **Youth:** Population aged 0 to 17 years. Younger people may not be able to own and/or operate an automobile and may be more reliant on walking and biking options.

The Federal Government's Justice40 Initiative has made it a goal that 40% of overall benefits of certain Federal investments flow to disadvantaged communities that are marginalized, underserved, and overburdened by pollution. Through the Justice40 Initiative, the U.S. Department of Transportation (USDOT) is working to identify and prioritize projects that benefit communities facing barriers to affordable, equitable, reliable, and safe transportation. The USDOT has updated the Disadvantaged Community Index and developed the Equitable Transportation Community Explorer (ETCE), an equity screening and mapping tool to highlight communities experiencing higher burdens and disadvantage rates. The updated index includes the following five components: (1) Climate and Disaster Risk Burden; (2) Environmental Burden; (3) Health Vulnerability; (4) Social Vulnerability; and (5) Transportation Insecurity. More information is available on the ETCE website.

Figure 30 shows SEMCOG's transportation equity analysis overlaid with the USDOT's disadvantaged census tracts. This analysis can be explored in more detail on SEMCOG's Equity Emphasis Areas Application. Table 10 summarizes the results of the transportation equity analysis. 23.5% of the region's census tracts fall into the medium-high or high composite categories. Approximately a quarter of the region's census tracts are also designated as UDOT Disadvantaged Tracts. 17.5% of the High Injury Network is within medium-high or high transportation equity areas. This analysis is another useful tool for prioritizing transportation projects that will not only reduce fatalities and serious injuries but also positively impact disadvantaged communities and those with additional mobility needs. Appendix C shows the High Injury Network in relation to the transportation equity emphasis areas by county.

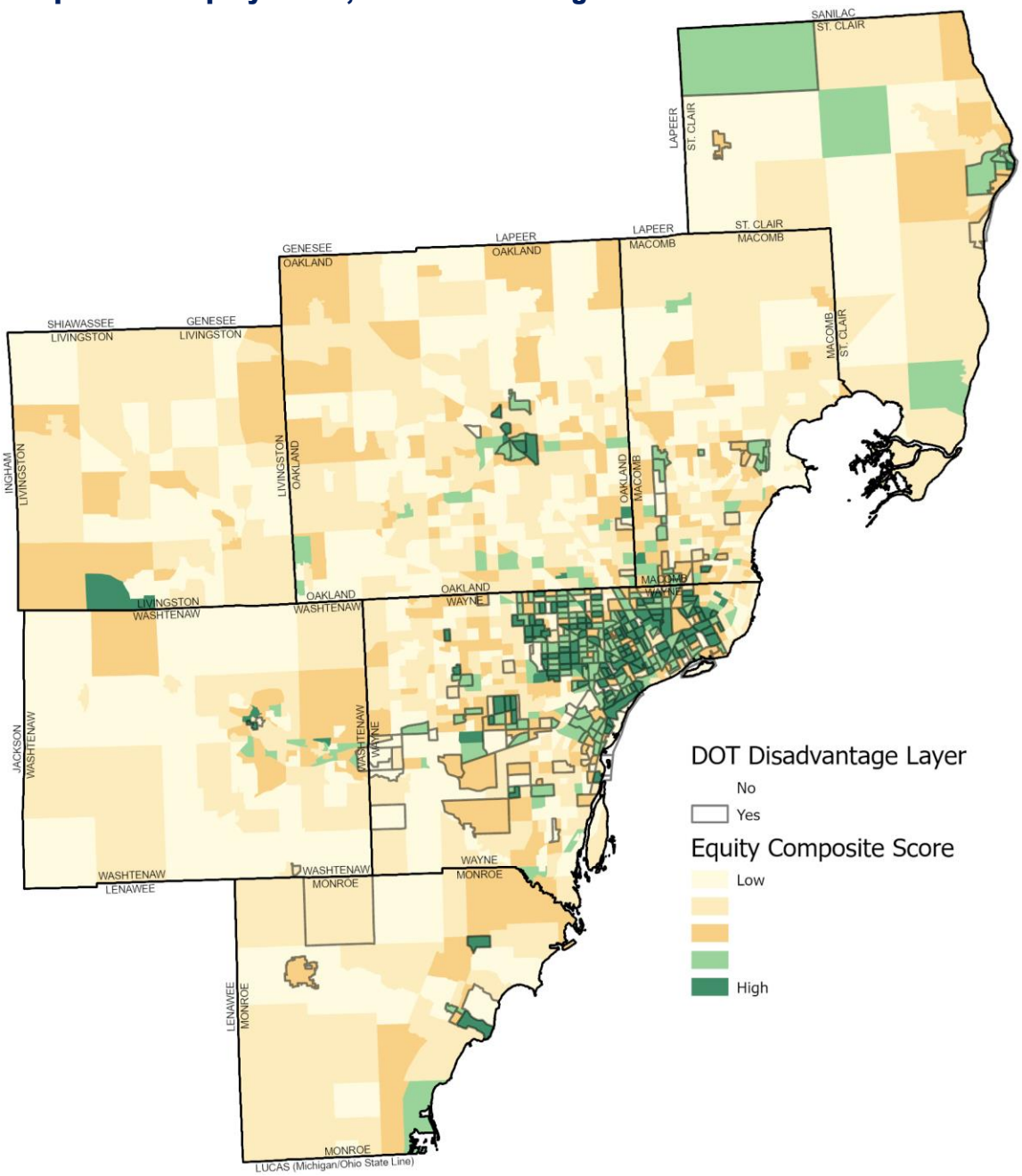
Table 10

Transportation Equity Areas Analysis Summary

Transportation Equity Areas Composite Category	% of Census Tracts	USDOT Disadvantaged Tracts	% of HIN (Miles)
Low	25.6%	14.1%	27.0%
Medium Low	31.7%	10.9%	34.8%
Medium	19.3%	17.5%	20.7%
Medium High	14.2%	53.1%	10.8%
High	9.3%	65.7%	6.7%
Total	100%	24.1%	100%

Figure 30

Transportation Equity Areas, Southeast Michigan



Additional Analyses and Tools

The regional safety performance measure targets, described in Chapter 2 and Appendix B, provide another meaningful benchmark for the region's overall safety performance. This analysis of fatalities, fatality rate per 100 million VMT, serious injuries, serious injury rate per 100 million VMT, and non-motorized fatalities and serious injuries will be used to monitor the region's progress and updated on an annual basis as part of SEMCOG's performance-based planning process.

Appendix C provides a more detailed review, including data analysis and maps, of the safety performance for each of the region's seven counties. SEMCOG's safety webpage includes additional safety data resources and maps, which can be used to search region-wide crash data and filter for a specific community or location.

The Traffic Safety Manual, available from SEMCOG's safety webpage, has assisted traffic engineers, public works personnel, and others in analysis of roadway-related safety problems since 1997. This manual describes a comprehensive approach to traffic safety analysis, from collecting potentially useful information to ranking tentative solutions. The SEMCOG traffic safety manual includes great detail on data collection and maintenance, identification of high-crash locations, determination of countermeasures, crash reduction factors and costs, and benefit/cost analysis.

SEMCOG's High-Priority Safety Locations analysis, also on the safety webpage, is a system-wide safety analysis of the region's segments, intersections, and roundabouts based on peer group classifications for roads that function similarly from a safety performance perspective. Methods from the AASHTO Highway Safety Manual are used to evaluate facilities using the critical crash rate and number of excess crashes compared to the average expected value based on each peer group's average crash rate. This analysis is updated annually and is another tool for identifying locations with safety deficiencies for potential projects.

SEMCOG's Bicycle and Pedestrian Demand Areas analysis identifies areas with demand for bicycle and pedestrian trips. It is based on concentrations of people and destinations, and may be used to understand which areas already support a high level of bicycle and pedestrian mobility, along with where more trips are likely to occur if infrastructure, policies, and programs were in place. The Demand Areas analysis and other relevant maps can be found on the Bicycle and Pedestrian Mobility Hub.

SEMCOG and MDOT jointly developed a Multimodal Tool that helps effectively accommodate the growing competition for space in the limited right-of-way and lets users plan, design, and evaluate complete street performance for five travel modes: pedestrian, bike, transit, auto, and freight. The tool has two components. The modal prioritization webmap lets users view modal networks and tiers, identify a project corridor, review modal priorities, and determine land use contexts. The right-of-way allocation tool lets users design cross-sections to best serve the prioritized modes in the given land use context and provides a level of service by mode to help users evaluate how well the design serves all users.

SEMCOG's Flood Risk Tool was developed as part of a recent Climate Resiliency and Flooding Mitigation Study to further understand vulnerabilities in the transportation network, including roads, bridges, culverts, and pump stations. This tool may be used to guide planning and investment decisions in the continued safe and efficient operation of a resilient transportation network. With the increased frequency and severity of large storm events, it is important to connect transportation safety to climate work and minimize the crashes that occur during severe weather events and compound the state of emergency.

Chapter 4: Emphasis Areas

A key component of this Transportation Safety Plan is to identify key emphasis areas, or factors, that contributed to crashes in Southeast Michigan. An emphasis area is an area of opportunity to improve safety through developing comprehensive strategies using multiple approaches for a specific crash factor.

Emphasis areas were developed through analysis of Southeast Michigan crash trends and prioritization by the Transportation Safety Task Force. Each emphasis area is listed below. Eight of the emphasis areas were prioritized by the task force as high-priority for the region. These high-priority emphasis areas (bolded below) were selected due to high rates of involvement in fatal and serious injury (KA) crashes, as shown in Figure 31. Vulnerable road users were also prioritized by the task force. 86% of all fatal and serious injury crashes in the region involve at least one of the eight high priority emphasis areas, with many crashes involving multiple emphasis areas.

The emphasis areas fall under four broad categories: Infrastructure, Behavior, Road User, and System Administration. The emphasis areas are also consistent with the Michigan Strategic Highway Safety Plan.

Infrastructure

- **Intersection**
- **Lane departure**
- Access management
- Rail
- Work zone

Behavior

- **Speeding**
- **Impairment**
- **Unbelted occupant**
- Distracted driving

Road User

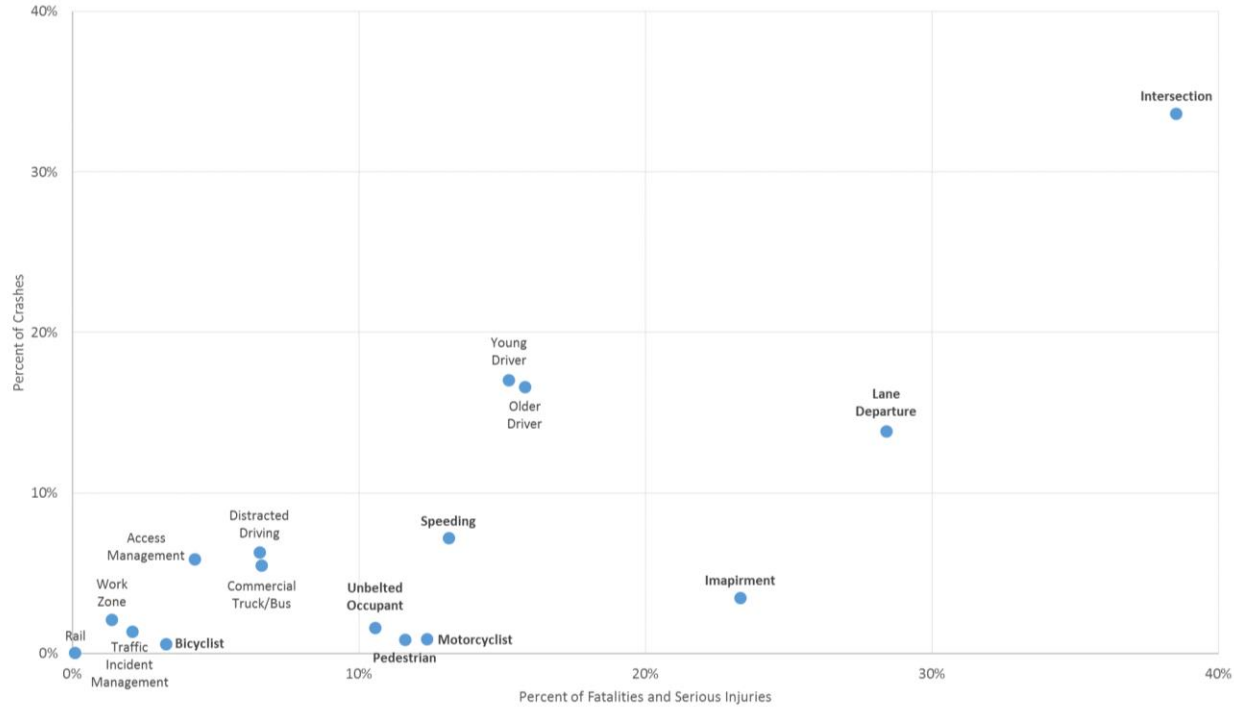
- **Pedestrian**
- **Bicyclist**
- **Motorcyclist**
- Commercial truck/bus
- Older driver
- Young driver

Systems

- Emerging technology
- Traffic incident management
- Traffic records and information systems

Figure 31

Crash and KA Injury Incidence by Emphasis Area, 2017-2021



Identifying overlapping emphasis areas, and the degree to which they overlap, helps to prioritize strategies and countermeasures that are most effective at addressing safety risk across the regional transportation network. The higher the overlap, the higher the risk of both emphasis areas being involved in the crash when one is involved. A higher overlap also increases the potential for common solutions to address multiple areas. Tables 11-12 summarize the overlapping emphasis areas analysis for Southeast Michigan. This analysis was based on a similar analysis conducted by Delaware Valley Regional Planning Commission for their 2018 Transportation Safety Analysis and Plan.

First, the number of KA crashes from 2017 to 2021 that fell into any two emphasis areas was calculated. Next, the percentage that these coinciding crashes made up of the total number of KA crashes in each primary emphasis area was calculated. These results are shown in Table 11. The emphasis areas that most commonly overlap with other emphasis areas are intersection and lane departure, followed by impairment (alcohol or drug involvement). The highest overlap is with intersection and access management (driveway involvement). 62.9% of all KA access management crashes also involved intersections. The next highest overlap is with intersection and bicyclist crashes, with 57.2% of all KA crashes involving bicyclists also involving intersections.

The overlapping emphasis area percentages were then divided by the percent of all KA crashes that the primary emphasis area makes up, to create a “coincidence ratio.” These results are shown in Table 12. A coincidence ratio above 1 means that two emphasis areas coincided more frequently than the primary emphasis area’s percentage of all KA crashes. Traffic incident management involvement (secondary crashes) and work zone crashes had the highest coincidence ratio. While secondary crashes account for only 1.9% of all KA crashes, they are involved in 7.1% of KA work zone crashes, or 3.7 times higher than their involvement in overall KA crashes. The next highest coincidence ratios were 2.6, for access management (driveway involved crashes) and work zone crashes, and 2.0 for speeding and lane departure emphasis areas and also for bicyclist and access management.

Table 11

Overlapping Fatal and Serious Injury Crashes by Emphasis Areas, 2017-2021

Primary Emphasis Area	Secondary Emphasis Area															
Emphasis Area	Intersection	Lane Departure	Access Management	Rail	Work Zone	Speeding	Impairment	Unbelted Occupant	Distracted Driving	Pedestrian	Bicyclist	Motorcyclist	Commercial Truck/Bus	Older Driver	Young Driver	Traffic Incident Management
Intersection	-	0.0%	7.5%	0.0%	0.8%	6.9%	16.5%	8.2%	5.5%	11.5%	5.7%	13.3%	5.7%	19.5%	16.4%	1.1%
Lane Departure	0.0%	-	1.0%	0.1%	1.1%	26.5%	35.1%	18.4%	5.9%	3.3%	0.8%	14.7%	3.5%	10.1%	12.4%	1.4%
Access Management	62.9%	6.3%	-	0.0%	1.0%	6.1%	14.7%	6.1%	6.9%	11.4%	7.7%	20.4%	6.1%	24.2%	17.7%	0.8%
Rail	0.0%	27.3%	0.0%	-	0.0%	18.2%	36.4%	18.2%	0.0%	0.0%	0.0%	9.1%	0.0%	9.1%	27.3%	0.0%
Work Zone	21.8%	22.4%	3.2%	0.0%	-	10.3%	21.2%	10.3%	10.3%	12.8%	1.9%	18.6%	16.7%	20.5%	17.9%	7.1%
Speeding	20.0%	57.1%	2.1%	0.1%	1.1%	-	26.6%	16.4%	3.6%	4.5%	0.4%	20.4%	5.7%	7.4%	14.2%	2.7%
Impairment	28.1%	44.8%	3.0%	0.2%	1.4%	15.7%	-	19.0%	5.9%	12.9%	2.2%	11.9%	4.6%	8.3%	10.6%	2.0%
Unbelted Occupant	28.2%	47.6%	2.5%	0.2%	1.3%	19.7%	38.6%	-	8.1%	0.4%	0.0%	0.3%	0.2%	11.9%	15.3%	1.5%
Distracted Driving	33.3%	26.9%	5.1%	0.0%	2.4%	7.6%	21.1%	14.3%	-	10.5%	1.2%	10.1%	7.9%	17.2%	18.4%	2.1%
Pedestrian	32.6%	7.1%	3.9%	0.0%	1.4%	4.4%	21.6%	0.3%	4.9%	-	0.0%	0.8%	3.7%	8.8%	8.3%	2.9%
Bicyclist	57.2%	5.8%	9.2%	0.0%	0.7%	1.2%	12.7%	0.0%	1.9%	0.0%	-	0.0%	2.4%	10.7%	9.0%	0.0%
Motorcyclist	36.9%	30.4%	6.7%	0.1%	2.0%	19.7%	19.3%	0.2%	4.6%	0.7%	0.0%	-	1.4%	13.8%	12.7%	1.3%
Commercial Truck/Bus	32.9%	15.5%	4.3%	0.0%	3.7%	11.6%	15.6%	0.3%	7.5%	7.5%	1.4%	3.0%	-	16.6%	8.5%	2.4%
Older Driver	47.1%	18.2%	7.0%	0.1%	1.9%	6.2%	11.8%	8.3%	6.8%	7.5%	2.6%	12.0%	6.9%	-	9.8%	1.3%
Young Driver	42.8%	24.1%	5.5%	0.2%	1.8%	12.9%	16.2%	11.5%	7.9%	7.6%	2.3%	11.9%	3.8%	10.6%	-	2.1%
Traffic Incident Management	22.4%	21.0%	1.9%	0.0%	5.2%	18.1%	23.3%	8.6%	6.7%	20.0%	0.0%	9.5%	8.1%	10.5%	15.7%	-

Table 12

Coincidence Ratios by Emphasis Area, 2017-2021

Secondary Emphasis Area

Primary Emphasis Area	Intersection	Lane Departure	Access Management	Rail	Work Zone	Speeding	Impairment	Unbelted Occupant	Distracted Driving	Pedestrian	Bicyclist	Motorcyclist	Commercial Truck/Bus	Older Driver	Young Driver	Traffic Incident Management
Intersection	-	0.0	1.7	0.0	0.6	0.5	0.7	0.7	0.9	0.9	1.5	1.0	0.9	1.3	1.1	0.6
Lane Departure	0.0	-	0.2	1.0	0.8	2.0	1.6	1.7	1.0	0.3	0.2	1.1	0.5	0.6	0.9	0.7
Access Management	1.7	0.2	-	0.0	0.7	0.5	0.7	0.6	1.1	0.9	2.0	1.5	0.9	1.6	1.2	0.4
Rail	0.0	1.0	0.0	-	0.0	1.4	1.6	1.7	0.0	0.0	0.0	0.7	0.0	0.6	1.9	0.0
Work Zone	0.6	0.8	0.7	0.0	-	0.8	1.0	0.9	1.7	1.0	0.5	1.4	2.6	1.3	1.2	3.7
Speeding	0.5	2.0	0.5	1.4	0.8	-	1.2	1.5	0.6	0.3	0.1	1.5	0.9	0.5	1.0	1.4
Impairment	0.7	1.6	0.7	1.6	1.0	1.2	-	1.7	1.0	1.0	0.6	0.9	0.7	0.5	0.7	1.1
Unbelted Occupant	0.7	1.7	0.6	1.7	0.9	1.5	1.7	-	1.3	0.0	0.0	0.0	0.0	0.8	1.1	0.8
Distracted Driving	0.9	1.0	1.1	0.0	1.7	0.6	1.0	1.3	-	0.8	0.3	0.7	1.2	1.1	1.3	1.1
Pedestrian	0.9	0.3	0.9	0.0	1.0	0.3	1.0	0.0	0.8	-	0.0	0.1	0.6	0.6	0.6	1.5
Bicyclist	1.5	0.2	2.0	0.0	0.5	0.1	0.6	0.0	0.3	0.0	-	0.0	0.4	0.7	0.6	0.0
Motorcyclist	1.0	1.1	1.5	0.7	1.4	1.5	0.9	0.0	0.7	0.1	0.0	-	0.2	0.9	0.9	0.7
Commercial Truck/Bus	0.9	0.5	0.9	0.0	2.6	0.9	0.7	0.0	1.2	0.6	0.4	0.2	-	1.1	0.6	1.2
Older Driver	1.3	0.6	1.6	0.6	1.3	0.5	0.5	0.8	1.1	0.6	0.7	0.9	1.1	-	0.7	0.7
Young Driver	1.1	0.9	1.2	1.9	1.2	1.0	0.7	1.1	1.3	0.6	0.6	0.9	0.6	0.7	-	1.1
Traffic Incident Management	0.6	0.7	0.4	0.0	3.7	1.4	1.1	0.8	1.1	1.5	0.0	0.7	1.2	0.7	1.1	-

Emphasis areas can provide guidance and context for program and project prioritization. Each emphasis area in this plan includes observations from relevant crash data from 2017-2021 and specific strategies that, if implemented, can have measureable impacts on achieving the performance targets outlined in this plan. Appendix D includes high injury network maps and crash tree diagrams for the eight priority emphasis areas to help identify locations for targeted implementation activities. Engineering countermeasures for the priority emphasis areas, if applicable, can be found in Appendix E. A list of additional resources for each emphasis area is included in Appendix F.

Priority Infrastructure Emphasis Areas

Intersections

Intersections are places where two or more roads cross each other. These are planned points of conflict within the roadway network where motorized and non-motorized road users cross paths as they travel or turn from one route to another. Intersections make up an extremely small portion of the overall roadway network, yet more than a third of all fatalities and serious injuries occur at these locations.

Intersection design and traffic control presence vary by a location's traffic patterns and land use context. Intersections may have traffic signals, stop signs, flashing beacons, yield signs, or no control device. Most intersections have three or four legs, or approaches. Intersections with more than four legs can be found in Southeast Michigan but require additional safety considerations due to increased movements and conflict points. Alternative intersection designs include roundabouts, diverging diamond interchanges, restricted crossing U-turns, and median U-turns. These designs eliminate some of the conflict points found at traditional intersections, such as left turn conflicts that often result in more fatalities and serious injuries.

Safe intersection designs include features that anticipate human errors and reduce risk of severe crashes. These include minimizing conflict points, reducing speeds, improving visibility, and providing protected space and time for people who walk and bike through the intersection.

Figures 32-33 summarize the recent five-year fatality and serious injury data for this emphasis area.

Figure 32

Intersection-Involved Fatalities and Serious Injuries

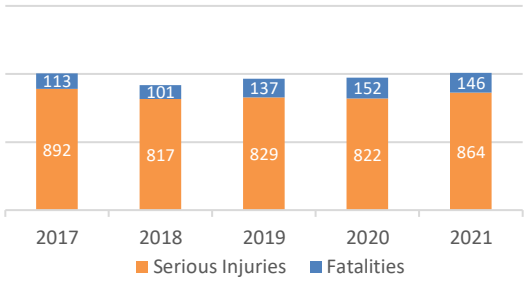
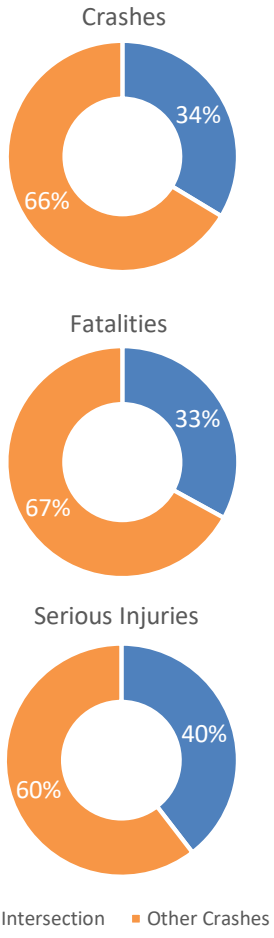


Figure 33

Share of Crashes, Fatalities, and Serious Injuries Involving Intersections



Quick Observations

- Intersection-involved crashes account for 39% of fatalities and serious injuries in Southeast Michigan, the highest combined share of any emphasis area.
- Approximately half (49%) of intersection-involved fatalities and serious injuries occur at signalized intersections, while a quarter (25%) occur at intersections with no traffic control device.
- Red-light-running crashes account for 16% of intersection fatalities and serious injuries.
- 45% of pedestrian crashes and 62% of bicycle crashes occur at intersections.
- 96% of intersection crashes occur in urban areas.

Actions

Maintain and update a region-wide intersection inventory
Limited roadway attribute data is available related to intersections. Data such as presence of a traffic signal, number of legs, and traffic volume are available for the federal-aid system. In order to support more detailed analysis of intersections crashes and risk, the regional intersection database should be expanded. Additional data could be collected, including presence of: median; lighting; "no-turn-on-red;" left- or right-turn lanes; signal or sign placement; reflective backplates or sheeting; pedestrian signals; pedestrian islands; or corner islands.

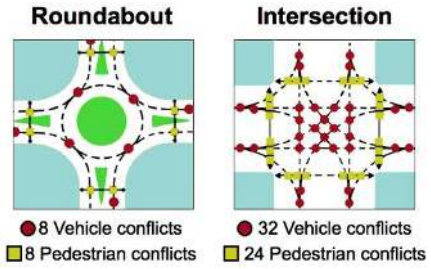
Rank and prioritize high-risk intersections
To complement the HIN analysis, a regional ranking of signalized and unsignalized intersections should continue to be conducted on a periodic basis to identify locations with disproportionately high numbers of fatal and serious injury crashes for potential projects. This ranking should continue to be conducted as part of SEMCOG's annual High-Priority Safety Locations analysis, utilizing methods outlined in the AASHTO Highway Safety Manual.

Conduct road safety audits of high-risk intersections
Locations on the HIN and those demonstrating disproportionately high numbers of fatal and serious injury intersection crashes during the annual prioritization are good potential candidates for road safety audits (RSA). A RSA is a formal safety performance examination of an existing road or intersection by an independent and multi-disciplinary team. SEMCOG should work with local agencies across Southeast Michigan to develop a process and funding strategy for conducting RSAs focused on priority intersections. This effort should be coordinated with similar strategies for lane departure and pedestrian/bicycle emphasis areas.

Implement intersection safety-focused engineering countermeasures
Appendix E outlines several engineering countermeasures to target intersection crashes. These should be considered for application across Southeast Michigan. Example countermeasures include enhancing the standard traffic signal layout with the box span configuration; improved signage visibility; advanced warning flashers; protected

intersections with pedestrian islands or corner islands for bicyclists; diverging-diamond interchanges; or converting standard intersections to roundabouts.

Figure 34
Roundabout vs. Intersection Conflicts



Source: NEXT STL

Roundabouts offer plentiful benefits to the transportation system. They are able to move traffic more efficiently than traditional intersections while reducing the number of KA crashes. Roundabouts are also environmentally compatible and provide pleasing aesthetics. Roundabouts make navigation easier for pedestrians and bicyclists, when designed correctly, due to lower vehicle speeds and fewer conflict points. Roundabouts also have fewer conflict points than traditional intersections, as shown in Figure 34, and result in lower severity crashes.

Develop intersection outreach materials for county and local officials
An outreach program to highlight the issue of intersection safety and the effectiveness of proven countermeasure should be undertaken. This may include training programs such as a SEMCOG University for county and local agency officials. Educational materials describing new countermeasures and how to use them should be developed as part of SEMCOG's *Walk.Bike.Drive. Safe* education campaign for local agency use with the general public.

Evaluate the potential to use red light cameras
Red light cameras have been found to be an effective method of reducing severe angle crashes at signalized intersections. While automated enforcement systems are in use across the county, photo enforcement of red light running at intersections is currently prohibited in Michigan. A study should be conducted to identify potential impacts of authorizing the use of red light cameras, and subsequent policy recommendations to State legislators should be considered for inclusion in SEMCOG's *Legislative Policy Platform*.

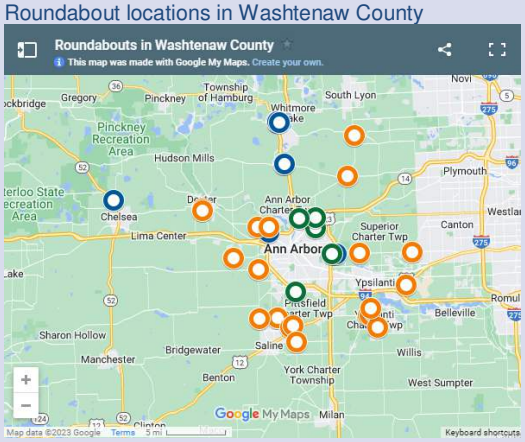
Evaluate the potential to use advanced technologies
Use of smart traffic cameras at intersections can provide additional data and information on risks beyond what is available through traditional traffic crash data, such as near miss data. Additionally, MDOT is conducting model deployments of Advanced Transportation and Congestion Management Technologies (ATCMTD) programs along select trunklines and expressways in Southeast Michigan. The ATCMTD programs create intelligent transportation networks with capabilities such as: pedestrian detection, prioritization, and alerts; traffic intersection preemption and signal priority for authorized vehicles; vehicle-to-vehicle and vehicle-to-infrastructure communications; transportation system optimization through data analytics and edge computing; and wrong way driver detection and alerts. The results of the ATCMTD model deployments should be used to determine the feasibility and identify additional locations where these technologies should be considered.

Support additional statewide efforts in Southeast Michigan
As part of the Michigan Strategic Highway Safety Plan (SHSP), a Traffic Safety Engineering Action Plan was developed to promote strategies to reduce the rate and severity of crashes involving intersections. SEMCOG and local agencies should continue to support and champion these efforts in Southeast Michigan.

Regional Case Study: Washtenaw County Road Commission

Washtenaw County Road Commission (WCRC) conducts annual monitoring of intersections, primarily on two-lane high-speed county roads. This monitoring program includes evaluation of potential candidates for roundabouts or traffic signals based on crash history and delay at each location. There are now over 30 roundabouts in Washtenaw County (locations shown in Figure 40). The first roundabout in Washtenaw County was installed in 2003. Since then, the number of intersection crashes resulting in any injury has decreased by nearly 40% across the county. WCRC found that roundabouts with a diameter of 100 to 110 feet have the best performance in terms of safety and operations. WCRC continues to monitor locations with field visits and crash reports. More information on roundabouts in Washtenaw County can be found on the WCRC website.

Roundabout locations in Washtenaw County



Roundabout at Baker Rd and Shield Rd in Dexter, MI

Source: WCRC

Lane Departure

Lane departure crashes, sometimes called roadway departure crashes, are non-intersection crashes occurring when a driver either crosses the center line, edge line, or otherwise leaves their travel lane. Many factors can contribute to lane departure, including roadway characteristics like pavement condition and horizontal curvature, environmental factors and conditions with decreased visibility, or behavioral issues like driver impairment, speeding, or distraction. Lane departure can result in rollovers, crashes with fixed objects such as trees and utility poles, or head-on collisions with oncoming traffic.

While lane departure crashes represent a relatively modest portion of all traffic crashes, they result in a greatly disproportionate percentage of fatal and serious injury crashes. Lane departure crashes tend to be distributed across large areas of the highway network, especially on rural roads. As a result, in many cases the systemic application of strategies that reduce unintentional lane departure, alert the driver when a lane departure occurs, and assist the driver in returning to the travel lane is an extremely effective approach to targeting lane departure crashes.

Figures 35-36 summarize the recent five-year fatality and serious injury data for this emphasis area.

Figure 35

Lane Departure-Involved Fatalities and Serious Injuries

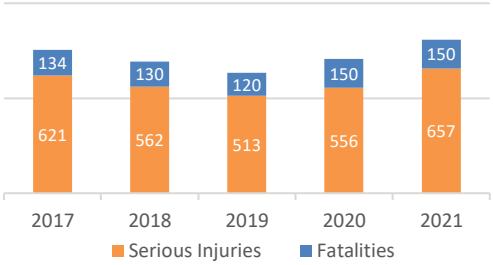
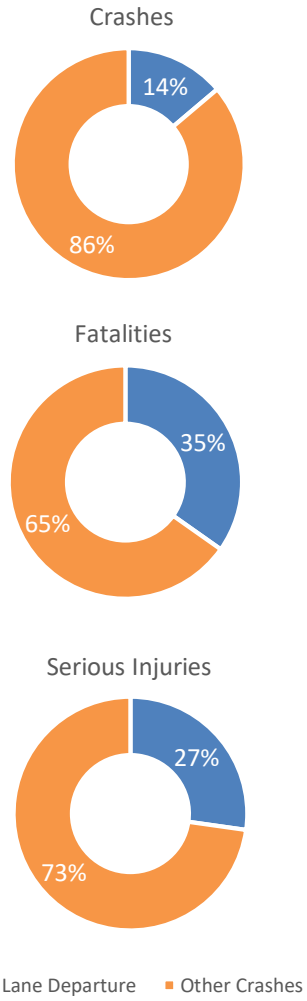


Figure 36

Share of Crashes, Fatalities, and Serious Injuries Involving Lane Departure



Quick Observations

- Crashes involving lane departure account for 28% of fatalities and serious injuries in Southeast Michigan, the second-highest combined share of any emphasis area after intersection-involved crashes.
- Most lane departure-involved fatalities and serious injuries are a result of single vehicle crashes (73%). Crashes involving multiple vehicles heading in opposite directions or parked vehicles account for the remaining fatalities and serious injuries (23% and 4%, respectively).
- While nearly half (42%) of lane departure crashes occur in wet, icy, or snowy road conditions, the majority (74%) of fatal and serious injury lane departure crashes occur in dry road conditions.
- 70% of fatal and serious injury lane departure crashes occur on roads with speed limits higher than 35 mph.
- Risky behavior accounts for the most common emphasis area overlap with lane departure. 26.5% of fatal and serious injury lane departure crashes involve speeding, and 35.1% involve alcohol or drug impairment.

Actions

Maintain and update a region-wide roadway segment inventory
Limited roadway attribute data is available related to roadway segments. For the federal-aid system, data such as traffic volume, functional classification, and number of lanes are available within the FHWA Highway Performance Management System (HPMS). In order to support more detailed analysis of lane departure crashes and risk, the regional roadway segment inventory should be expanded. Additional data could be collected, including presence of: median, curve, pavement marking, rumble strip, guardrail or barrier, sign placement, and sheeting.

Rank and prioritize high-risk lane departure segments
To complement the HIN analysis, a regional ranking of roadway segments should continue to be conducted on a periodic basis to identify locations with disproportionate numbers of fatal and serious injury lane departure crashes for potential projects. This ranking should continue to be conducted as part of SEMCOG's annual High-Priority Safety Locations analysis, utilizing methods outlined in the AASHTO Highway Safety Manual.

Conduct road safety audits of high-risk segments
Segments on the HIN and those with disproportionately high numbers of KA lane departure crashes during the annual prioritization are good potential candidates for road safety audits (RSA). A RSA is a formal safety performance examination of an existing road or intersection by an independent and multi-disciplinary team. SEMCOG should work with local agencies across Southeast Michigan to develop a process and funding strategy for conducting RSAs focused on priority segments. This effort should be coordinated with similar strategies for intersection- and pedestrian/bicycle emphasis areas.

Implement lane departure safety-focused engineering countermeasures
Appendix E outlines several engineering countermeasures, which should be considered for application across Southeast Michigan, to target lane departure crashes. Some examples of countermeasures include pavement friction, rumble strips, enhanced delineation for horizontal curves, and nighttime visibility enhancements to keep drivers in their travel lane. A safety edge and clear zones can also provide for safe recovery and assist drivers with returning to their travel lane.

Develop lane departure outreach materials for county and local officials
An outreach program to highlight the issue of lane departure on Southeast Michigan's roadways as well as effectiveness of proven countermeasures should be undertaken, including training programs such as a SEMCOG University for county and local agency officials. Additionally, educational materials describing new countermeasures and how to use them should be developed as part of SEMCOG's *Walk.Bike.Drive. Safe* education campaign for local agency use with the general public.

Support use of advanced technologies that reduce lane departures
Encourage use and understanding of new in-vehicle technologies such as lane departure warning and lane-keeping assist, which alert the driver when they are drifting out of the lane or steer the driver back into the lane. Resources like MyCarDoesWhat?, developed by the National Safety Council, should be included in public education and outreach campaigns. Additionally, continued coordination with ITS Michigan and the Regional Transportation Operations Coordinating Committee will be vital for preparing road agencies for the emergence of automated vehicles and identifying best practices for implementing intelligent transportation systems, such as dynamic warning signs, to reduce lane departures at locations with a history of these crashes.

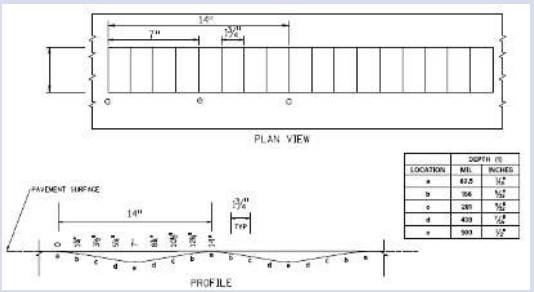
Enforce laws that reduce lane departure crashes
Support National Highway Traffic Safety Administration and Michigan Office of Highway Safety Planning mobilization campaigns that target behaviors which contribute to lane departure crashes, including impaired driving, speeding, and distracted driving.

Support additional Statewide efforts in Southeast Michigan
As part of the Michigan SHSP, a Traffic Safety Engineering Action Plan was developed to promote strategies to reduce the rate and severity of crashes involving lane departure. SEMCOG and local agencies should continue to support and champion these efforts in Southeast Michigan.

Regional Case Study: Macomb County Department of Roads

Since 2019, Macomb County Department of Roads (MCDR) has installed nearly 100 miles of sinusoidal rumble stripes, also known as "mumble stripes," on two-lane rural roads throughout the county. These were the first mumble strips or stripes (when an edge line or centerline pavement marking is placed on the strip) in the SEMCOG region. The outside noise created by mumble stripes is almost half as loud as traditional rumble stripes while maintaining similar noise levels inside the vehicle. This new design is an effective systemic treatment for preventing lane-departure crashes while reducing noise complaints.

Mumble Stripe



Source: MCDR

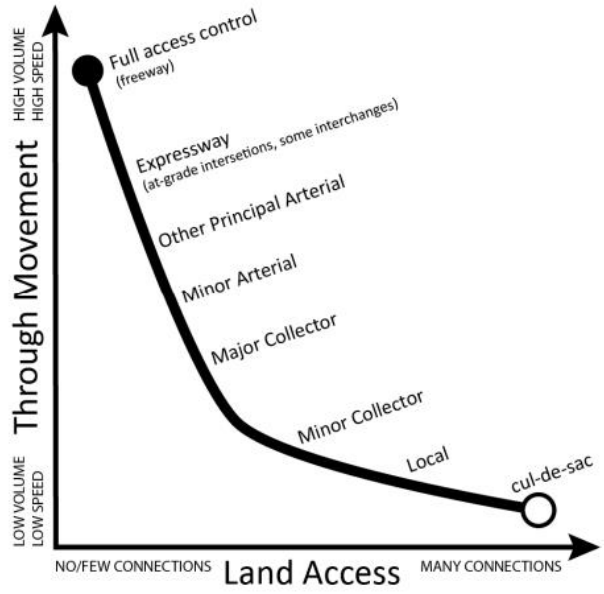
Additional Infrastructure Emphasis Areas

Access Management

The Transportation Research Board (TRB) describes access management as the coordinated planning, regulation, and design of access between roadways and land development. Safety benefits of controlling entry and exit points along a roadway include improved access design, fewer traffic conflict locations, and higher driver response time to potential conflicts. Specifically, as the number of driveways increases, crash rates increase. In addition, roadways with non-traversable medians are safer at higher speeds and at higher traffic volumes than undivided roadways or those with continuous two-way left-turn lanes (TWLTL). This section provides graphic examples of access management strategies and suggested strategies for implementation in Southeast Michigan. Access management data analysis in this plan is specific to only the crashes involving driveways. It is challenging to acquire accurate information for crashes that occurred in TWLTLs and therefore those crashes are excluded from the data and figures in this chapter. Figures 37-38 summarize the recent five-year fatality and serious injury data for this emphasis area.

Figure 39

Roadway Functional Hierarchy



Source: Florida LTAP Center

Figure 37

Driveway-Involved Fatalities and Serious Injuries

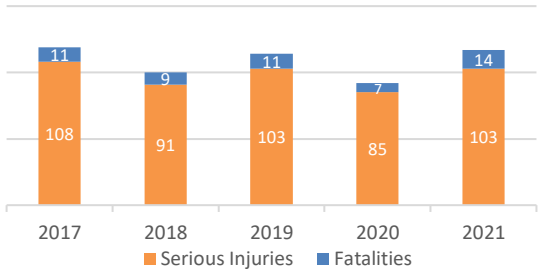


Figure 38

Share of Crashes, Fatalities, and Serious Injuries Involving Driveways

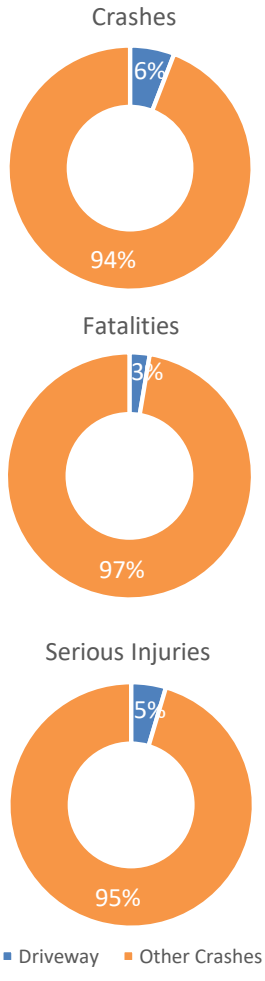
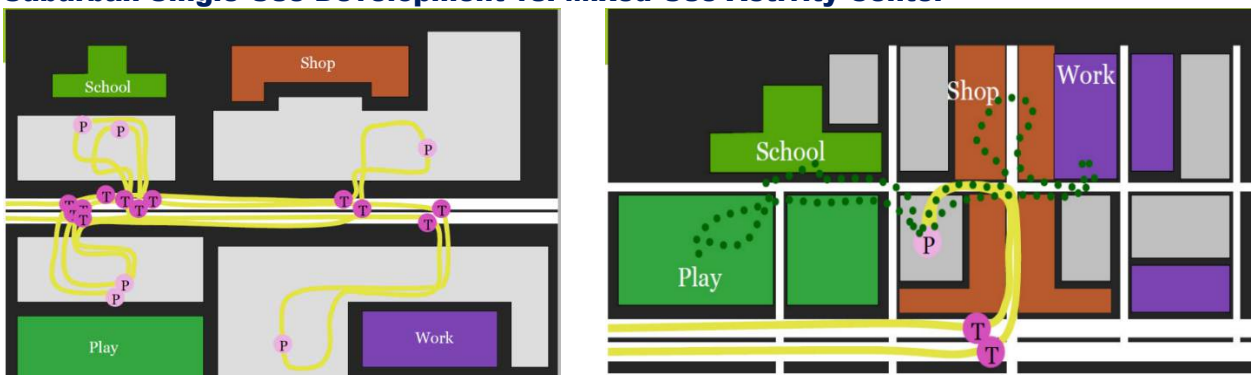


Figure 39 displays a Roadway Functional Hierarchy that compares road volume and speeds with connectivity. Access management is an efficient safety strategy to reduce speed-related crashes. Implementing engineering countermeasures for speed reduction, such as complete streets (shown in Figure 40), will improve safety alongside local coordination and connectivity. In addition to speed reduction, access management limits points of conflict between road users by consolidating development, as shown in Figure 41. The example mixed-use development in Figure 46 includes half the parking, half the land area, half the arterial trips, fewer arterial turning movements, and a quarter of the vehicle miles to travel.

Figure 40
Complete Streets

Figure 41
Suburban Single-Use Development vs. Mixed-Use Activity Center



Source: Nelson/Nygaard Consulting Associates

Quick Observations

- While driveways are involved in less than 5% of the region's KA crashes, they pose a greater risk for bicyclists. Driveways are involved in twice as many KA bicycle crashes compared to overall KA crashes.
- Over 60% of KA crashes at driveways also involve intersections.
- Nearly a quarter of the KA driveway crashes also involve drivers age 65 and older.

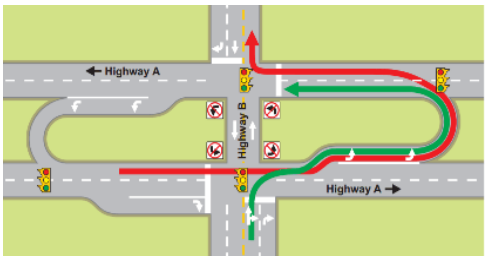
Actions

Educate local officials on access management
A key attribute of success in an effective access management program is the training of local public officials on the safety benefits of good access management and how it can be accomplished through local zoning initiatives. As there is regular turnover within local governments, it is proposed that these courses be held on a regular basis. The target audiences would be city councils, county road commissioners, local planning commissioners, developers, planners, and engineers.

Promote median U-turns

One of the reasons access management is a safety issue in Southeast Michigan is due to the significant use of two-way left-turn lanes on arterials. Median U-turns, or Michigan Lefts, as shown in Figure 42, have proven to mitigate safety risks by limiting conflict points at traditional signalized intersections by restricting traditional left turns. Median U-turns have shown a 30% reduction in intersection-related injury crash rates.[4] Raised medians with U-turns are also beneficial for reducing conflicts along busy corridors with many across-roadway movements.

Figure 42
Median U-Turn



Develop a coordination program for road agencies and municipalities to improve corridor access management

These improvements would be authorized during the local plan approval process and quantified utilizing the Highway Safety Manual. Funding incentives in high-priority areas will assist in implementation.

Partner with ICSC Michigan

Partner with MDOT, local agencies and the International Council of Shopping Centers (ICSC) Michigan to discuss issues such as how the public and private sector can collaborate to address this significant safety issue with new developments and redevelopments.

Implement access management-focused engineering countermeasures

Engineering countermeasures to target access management related crashes should be considered for application across Southeast Michigan. Example countermeasures include reducing driveway density, managing spacing of intersections and access points, and limiting driveway movements to right-in/right-out only.

4 Synthesis of the Median U-Turn Treatment, Safety, and Operational Benefits, FHWA-HRT-07-033, (2007).

Rail

The Southeast Michigan rail system is operated by both public and private owners with railroads operating on international, national, regional, and local scales. Both freight and passenger rail utilize the region's 800 miles of main rail line, contributing to the economy and providing transportation to users.

The primary rail concern for this plan is grade crossing safety. Other rail safety issues (such as illegal crossings of rail lines and derailing trains) are addressed in SEMCOG's Regional Transportation Plan freight work and MDOT's statewide rail plan. Highway-rail grade crossings are intersections where a highway crosses a railroad at-grade, or at street level. These intersections create a safety concern for both motorized and nonmotorized users. Train-involved crashes make up a small portion of overall KA crashes in the region; however, these incidents can be prevented. Crashes that occur at highway-rail grade crossings can also create traffic backups. Blocked crossings can represent a safety hazard by inhibiting emergency vehicles from responding to calls and creating the potential for secondary crashes. As the region continues work towards the goal of increased passenger rail with speeds up to 110 mph, there is an even greater need to account for safety at highway-rail grade crossings.

Since the Michigan traffic crash database only includes crashes that occur on public roads and involve at least one motor vehicle, many incidents with non-motorized users are not reported in the regional crash data. Data from the Federal Railroad Administration (FRA) was used to supplement this section. The primary groups of crashes and incidents reported monthly by railroads at the national level are: Highway-rail grade crossing crashes/incidents, rail equipment crashes/incidents, and casualties to persons (i.e., death and non-fatal injuries to all types of persons, and occupational illnesses involving railroad employees).[5] The FRA collects highway-rail grade crossing incidents at the county level. Table 13 shows all FRA-reported incidents, deaths, and injuries at highway-rail crossings from 2017-2022 by county.[6]

Figure 43
Train-Involved Fatalities and Serious Injuries

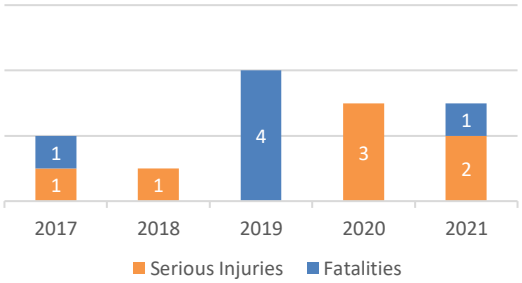
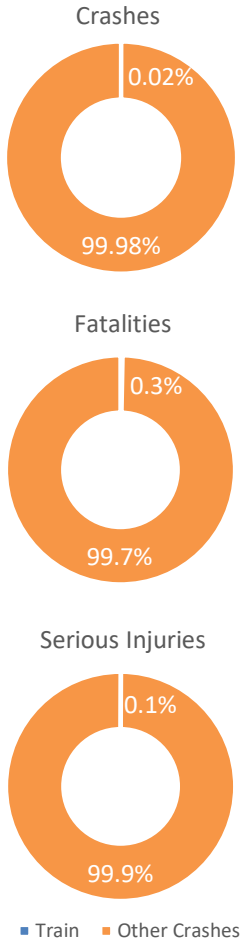


Figure 44
Share of Crashes, Fatalities, and Serious Injuries Involving Trains



[5] https://railroads.dot.gov/railroad-safety/accident-data-reporting-and-investigations

[6] https://railroads.dot.gov/accident-and-incident-reporting/highwayrail-grade-crossing-incidents/incidents-county

Table 13

FRA Highway-Rail Incidents by County, 2017-2022

County	Incidents	Deaths	Injuries
Livingston	2	0	2
Macomb	6	0	0
Monroe	21	0	11
Oakland	15	1	7
St. Clair	8	0	2
Washtenaw	1	0	0
Wayne	69	4	25
Total	**122**	**5**	**47**

Figures 43-44 summarize the recent five-year fatality and serious injury data from the Michigan crash database for this emphasis area.

Quick Observations

- Trains were a factor in only 0.1% of all reported traffic fatalities and serious injuries in Southeast Michigan.
- 36% of reported KA train crashes also involved alcohol or drug impairment.
- Nationally, 94% of all rail-related fatalities and injuries that occur at railroad crossings are due to trespassing. Trespassing along railroad rights-of-way is the leading cause of rail-related deaths in America.[7]

[7] https://railroads.dot.gov/highway-rail-crossing-and-trespasser-programs/railroad-crossing-safety-trespass

Actions

Update and analyze region-wide inventory of at-grade rail crossings
The regional at-grade rail crossing database should be reviewed and updated to support a more detailed analysis of at-grade rail crossing risks and crashes. The inventory documents the presence of warning and control devices such as crossbucks, signs, bells, flashing lights, and gates.

Identify high-risk at-grade rail crossings
At-grade rail crossings demonstrating disproportionately high numbers of incidents should be identified through analysis. SEMCOG should work with the MDOT Office of Rail, which has the regulatory responsibilities to assess the physical condition and safety needs of the public at-grade crossings in the State. FRA develops tools to assist agencies, analysts, and policymakers in assessing safety risks and potential changes to highway-rail grade crossings. The FRA is working on a risk assessment methodology for high-speed grade crossings that can be used for the regional analysis.[8]

Consider additional rail safety risks
Additional rail safety risks include Hazardous Materials, Motive Power and Equipment, Operating Practices, Signal and Train Control, and Track Conditions. The FRA's Office of Railroad Safety regulates these safety issues throughout the nation's railroad industry.[9] SEMCOG should work with the FRA and the regions rail industries to promote the safety of both freight and passenger rail transportation.

Pursue closures of at-grade crossings
Identify locations of at-grade crossings that are good candidates for closure due to safety risk. Work with stakeholders to confirm the need and implement the closure(s). Also work with the MDOT Office of Rail to pursue Local Grade Crossing Program (LGCP) and Trunkline Grade Crossing Program (TGCP) funds for closures and other safety projects at highway-railroad crossings.

8 https://railroads.dot.gov/sites/fra.dot.gov/files/fra_net/1820/Grade%20Crossing%20Evaluation%20Tools%20and%20Risk%20Assessment.pdf

9 https://railroads.dot.gov/railroad-safety

Work Zone

Maintaining an efficient and safe transportation experience in Southeast Michigan requires consistent maintenance and construction on the network. This requires necessary alterations of roadways during the construction period, creating potentially unsafe environments – particularly for construction workers. A work zone is an area of a roadway with highway construction, maintenance, or utility-work activities.

Controlling traffic in work zones through design can mitigate crashes and construction worker injuries and deaths. Traffic in work zones is typically controlled by marked signs, channeling devices, barriers, pavement markings, and/or work vehicles.[10] Safe work zone design includes adequate response time for drivers to reduce speeds, improving visibility, and providing protected space for construction workers. Issues of aggressive and distracted driving behavior puts road users and construction workers at risk.

Figures 45-46 summarize the recent five-year fatality and serious injury data for this emphasis area.

Figure 45

Work Zone-Involved Fatalities and Serious Injuries

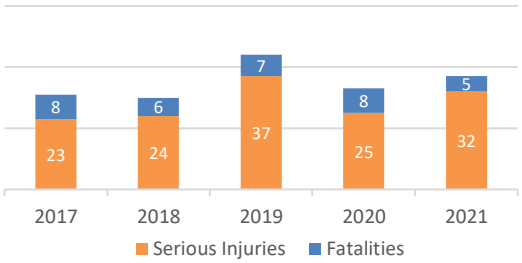
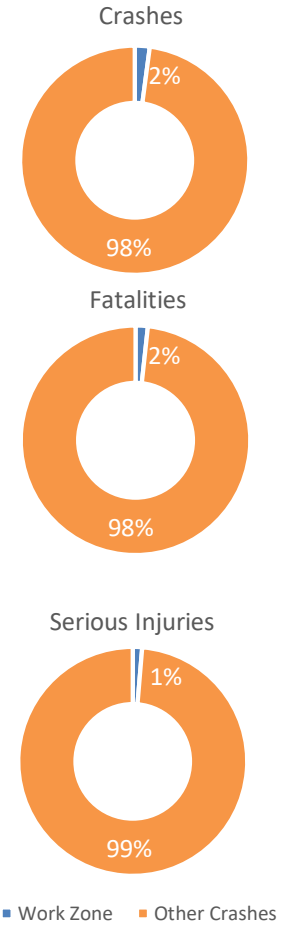


Figure 46

Share of Crashes, Fatalities, and Serious Injuries Involving Work Zones



[10] https://highways.dot.gov/public-roads/mayjune-1999/whats-work-zone

Quick Observations

- In Southeast Michigan, 13,949 total crashes occurred in work zones between 2017-2021, resulting in 141 serious injuries and 34 deaths.
- 6,734 (48%) of the total work zone crashes were rear-end crashes, and 3,046 (22%) were sideswipe/same direction crashes.
- Secondary crashes (traffic incident management) are involved in 7.1% of fatal and serious injury work zone crashes, or 3.7 times higher than their involvement in overall fatal and serious injury crashes.
- Commercial vehicles are involved in 16.7% of fatal and serious injury work zone crashes; this is 2.6 times higher than their involvement in overall KA crashes.
- Michigan penalties include doubled fines for speeding in work zones, increasing the number of points assessed for speeding in a work zone, and Public Acts 296 and 297 of 2008 impose fines of up to $7,500 and 15 years in jail for motorists who injure or kill anyone on a road construction work zone.[11]

Actions

Educate local officials and the public on work zone safety
Promote work zone safety education along with MDOT media and outreach campaigns such as National Work Zone Awareness Week. This can be done through SEMCOG webinars, blogs, outreach, the *Walk.Bike.Drive. Safe* public education campaign, events, etc.

Research smart work zone technology applications
Explore the potential impact and use of ITS device deployment and radio alert systems to alert truck drivers and patrol vehicles of work zone queues and traffic crashes.

Support legislative efforts to improve work zone safety
Support statewide efforts to improve safety for road workers in construction zones. Current efforts include requiring mobile speed readers and allowing for use of automated (camera) speed enforcement systems in work zones. Policy recommendations to State legislators should be added to SEMCOG's *Legislative Policy Platform*.

[11] https://www.michigan.gov/mdot/travel/safety/road-users/work-zone-safety/laws

Priority Behavior Emphasis Areas

Speeding

Driving over the posted speed limit or driving too fast for current road conditions – also known as speeding – is a serious safety issue that increases both the rate and severity of crashes. Additional consequences of speeding include greater potential for losing control of the vehicle, increased stopping distance, reduced effectiveness of seat belts, and increased fuel consumption and cost. According to the National Highway Traffic Safety Administration (NHTSA), speeding accounts for nearly one third of all fatalities in motor vehicle crashes nationally.[12]

Survivability of a crash depends on the circumstances of the crash. The Safe System Approach involves matching vehicular operating speeds to the appropriate conditions of the road and the road users. This approach inherently prioritizes nonmotorized road users due to their vulnerable nature when compared to their counterparts traveling in motor vehicles. As shown in Figures 49-50, fatality risk for pedestrians increases greatly starting at an impact speed of 20 miles per hour, while for various auto crashes the fatality risk is much lower at the same speed.

In Southeast Michigan, fatalities and serious injuries related to speeding are trending upward. Figures 47-48 summarize the recent five-year fatality and serious injury data for this emphasis area. Roadway design, vehicle technologies, and context-appropriate speed limits are effective strategies to reduce the safety detriments of speeding.

Figure 47
Speeding-Involved Fatalities and Serious Injuries

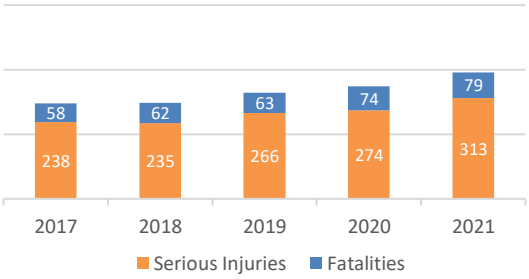
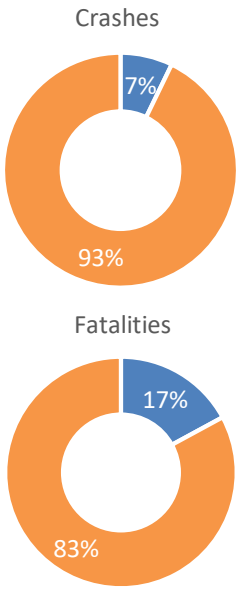


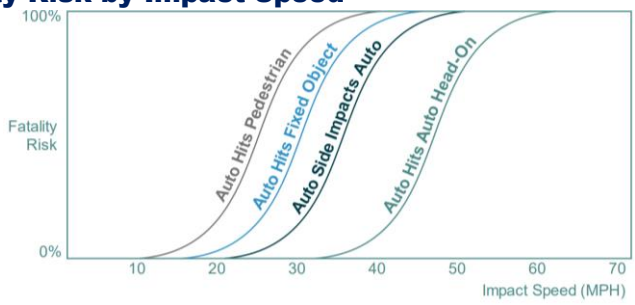
Figure 48
Share of Crashes, Fatalities, and Serious Injuries Involving Speeding

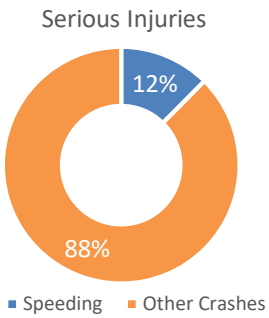


[12] https://www.nhtsa.gov/risky-driving/speeding

Figure 49

Fatality Risk by Impact Speed

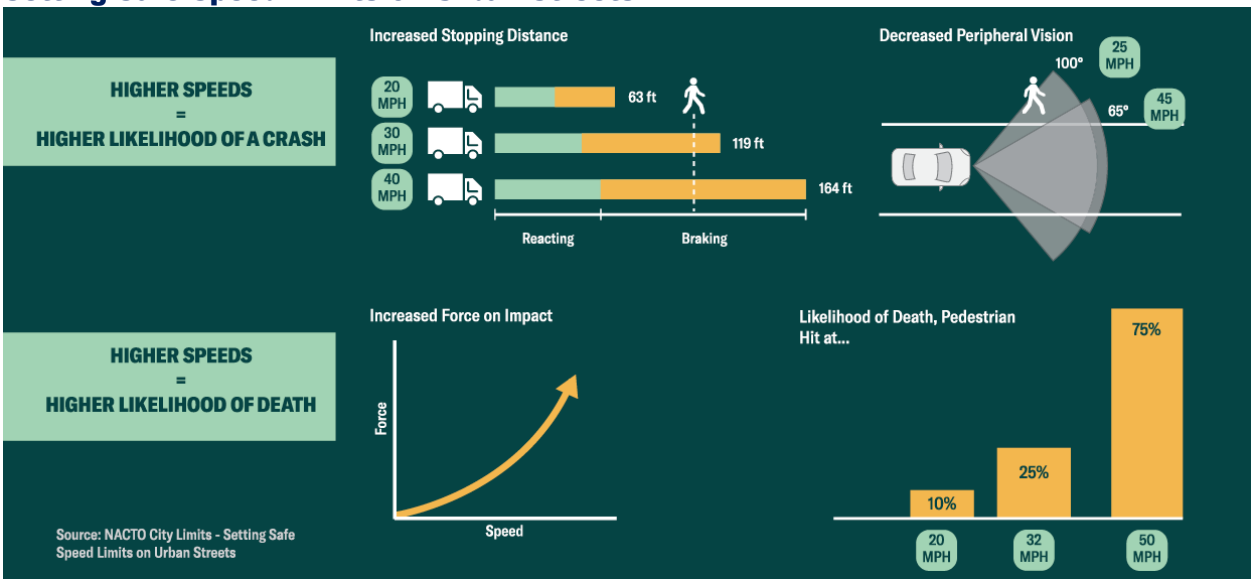




Source: FHWA

Figure 50

Setting Safe Speed Limits on Urban Streets



Source: NACTO, City of Detroit

Quick Observations

- Crashes involving drivers whose speed was too fast for the road condition accounted for 13% of the region's fatalities and serious injuries.
- 57% of fatal and serious injury speeding crashes involved lane departure, while 20% involved intersections.
- 27% of fatal and serious injury speeding crashes also involved driver impairment.

Actions

Continue coordination with road agencies on speed reduction strategies
SEMCOG will continue to facilitate coordination to investigate the strategies discussed in this chapter to continue applying the most effective methods of engineering countermeasures on high- frequency crash intersections and corridors.

Implement traffic calming engineering countermeasures
Traffic calming is the combination of measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for nonmotorized users.[13] Traffic calming devices have been proven to help reduce traffic speed, reduce motor vehicle collisions, and improve safety for pedestrians and cyclists. These measures can also increase pedestrian and bicycling activity. It is important to design for the land use context to achieve appropriate speeds, especially on State-owned roads that function as main streets or traditional downtowns but have higher speed limits.

[13] Lockwood, I. (1997, July). The Institute of Transportation Engineers Traffic Calming Definition. The Institute of Transportation Engineers Journal, 22.

Examples of traffic calming devices include horizontal deflection (e.g., chicane curb extensions, gateway curb extensions or "bump-outs", roadway narrowing, traffic circles, and median barriers) and vertical deflection (e.g., speed humps, raised crosswalks, and raised intersections). Some of these examples are displayed in Figure 51. Appendix E outlines additional traffic calming measures, which should be considered for application across Southeast Michigan, to target speeding crashes.

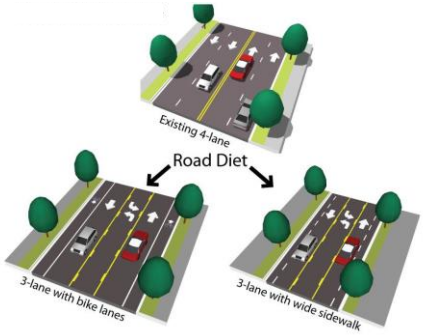
Figure 51
Example Traffic Calming Devices

Source: NACTO

Implement road diets on segments with excess capacity
Road diets have proven to be an effective traffic calming initiative. According to US DOT, "Road diets involve a reduction in the width or number of vehicular travel lanes and reallocate that space for other uses such as bicycle lanes, pedestrian crossing islands, left-turn lanes, or parking," as shown in Figure 52. Safety and operational benefits for vehicles and pedestrians include:

- Decreasing vehicle travel lanes for pedestrians to cross;
- Providing room for a pedestrian crossing median;
- Improving safety for bicyclists when bicycle lanes are added;
- Providing an opportunity for on-street parking (which also serves as a buffer between pedestrians and vehicles);
- Reducing rear-end and side-swipe crashes;
- Improving speed limit compliance; and
- Decreasing crash severity when crashes do occur.

Figure 52
Example Road Diets



Source: LandArch

SEMCOG's excess capacity analysis in Chapter 3 of this plan can be used to identify potential locations for road diets.

Conduct a regional speed analysis
Use a data-driven platform to monitor and analyze travel patterns, including identifying corridors with unsafe travel speeds in excess of the posted speed limit. Potential data sources include the Regional Integrated Transportation Information System's (RITIS) tool catalog and Iteris's ClearGuide Speeding Analytics platform. This data could be used to identify locations for implementing traffic calming countermeasures. Working with law enforcement can also help to gather accurate data on speeding and crashes.

Educate about new vehicle technologies

Vehicle technologies are becoming more advanced each year. Speed reduction elements include adaptive cruise control (ACC) and intelligent speed adaptation (ISA). Both of these vehicle technologies assist in the driver's awareness of their speed and allow for correction to alleviate risks. Further advancements are expected for this technology.

ACC works similarly to standard cruise control, except in addition to maintaining a speed set by the driver, a radar system in the front of the vehicle detects and responds to other vehicles in the lane ahead to maintain a safe following distance. However, in 2021 the Insurance Institute for Highway Safety (IIHS) conducted a study that shows drivers using ACC to speed, contradicting the feature's safety benefits.[14]

ISA involves in-vehicle devices that "know" the speed limit through accurate speed limit mapping and vehicle location data, and provide a warning or active controls to help prevent speeding above limits. There are currently 3 tiers of control: provide alerts to drivers; introduce resistance to gas pedals, making it harder but still possible to speed; and limit gas flow to engines so drivers can accelerate up to but not over the speed limit. Another option is to incentivize slower speed through auto insurance discounts. According to IIHS, field assessments conducted over the past 25 years have shown that driving with ISA has a significant reductions in speeding. IIHS also states, "The largest technical barriers to ISA are the accuracy and breadth of coverage of digital maps with speed limits for GPS-based systems and the need for frequent speed limit signs for the camera-based systems. Digital maps may not include local roads and aren't always updated with speed limit changes in a timely fashion, and the camera-based systems will not know the speed limit until the vehicle passes a speed limit sign."

Developing outreach materials about new vehicle technologies can help build public acceptance and proper use of the new safety features in vehicles. Additionally, promoting education about new technology for new drivers during drivers' training and for current drivers during license and plate renewal would increase new technology familiarity and improve use of these technologies.

Set context-appropriate speed limits

Setting speed limits in Michigan is currently accomplished using the "85th percentile speed." The 85th percentile speed refers to the speed at or below which 85% of drivers are currently driving a given section of road. For example, if 85% of drivers on a section of road are driving 55 mph or less, the 85th percentile speed would be 55. FHWA and National Association of City Transportation Officials (NACTO) recommend designating slow zones in sensitive areas, setting default speed limits on many streets at one time, and conducting Safe Speed Studies on major high-priority arterials. Setting appropriate speed limits takes into account factors like land use context and the pedestrian and bicyclist activity in the area. SEMCOG should support legislation that updates the statewide speed limit-setting procedure to one that emphasizes safety for all road users.

An additional proven safety countermeasure recommended by FHWA is the use of variable speed limits (VSLs). VSLs most commonly refer to electronic signage that is capable of adapting to changing circumstances. VSLs have potential to reduce KA on freeways by up to 51%.[15]

[14] https://www.iihs.org/news/detail/adaptive-cruise-control-spurs-drivers-to-speed

[15] https://highways.dot.gov/safety/proven-safety-countermeasures/variable-speed-limits

Develop and promote education materials on speeding

SEMCOG will continue to host trainings, publish articles, and produce other resources to promote speed safety and the effectiveness of proven countermeasures. Courses like NHTSA's Speed Management Program should also be promoted to local officials. SEMCOG will continue to assist members and stakeholders in educating local residents on the consequences of speeding with materials developed as part of the *Walk.Bike.Drive. Safe* education campaign.

Identify opportunities for targeted and equitable enforcement

SEMCOG will continue to research speed enforcement measures and investigate feasible options applicable to Southeast Michigan.

Speed enforcement is among the most common traffic enforcement conducted by law enforcement across the country. Sustained enforcement of all traffic laws is strongly encouraged, including speeding violations. From December 1, 2022, to February 28, 2023, many law enforcement agencies – including municipal, county, and Michigan State Police (MSP) – participated in overtime speed enforcement. As of writing this Plan, it is unknown how this overtime enforcement has impacted safety data trends.

Automated enforcement options have continued to show effective reduction in speeds. According to FHWA, there are three types of Speed Safety Cameras (described in Tables 14-15).[16]

Presently, State of Michigan law states that photo enforcement is only authorized for use at highway rail grade crossings. As a result, a change to the Michigan Vehicle Code would be required to use this approach. SEMCOG should support legislative efforts to allow for automated speed enforcement due to the safety benefits of speed cameras, which are a FHWA-proven safety countermeasure. With proper controls in place and community input, camera enforcement can also offer more equitable enforcement of speeding regardless of driver demographics.

Table 14

Speed Safety Camera Types

Type	Description	FHWA Fact
Fixed	A single, stationary camera targeting one location.	Fixed units can reduce crashes on urban principal arterials up to 54% for all crashes and 47% for injury crashes.
Point-to-Point (P2P)	Multiple cameras to capture average speed over a certain distance.	P2P units can reduce crashes on urban expressways, freeways, and principal arterials up to 37% for fatal and injury crashes.
Mobile	A portable camera, generally in a vehicle or trailer.	Mobile units can reduce crashes on urban principal arterials up to 20% for fatal and injury crashes.

Table 15

Speed Safety Camera Considerations

Considerations for Selection	Fixed	P2P	Mobile
Problems are long-term and site-specific.	X	X	
Problems are network-wide, and shift based on enforcement efforts.			X
Speeds at enforcement site vary largely from downstream sites.		X	X
Overt enforcement is legally required.	X	X	X
Sight distance for the enforcement unit is limited.	X	X	
Enforcement sites are multilane facilities.	X	X	

Source: FHWA

Support additional statewide efforts in Southeast Michigan

The Michigan SHSP includes strategies to create safer speeds. SEMCOG and local agencies should continue to support and champion these statewide efforts in Southeast Michigan. Additionally, recommendations for speeding and speed management from the NHTSA report *Countermeasures That Work* should also be supported in the region.

16 https://highways.dot.gov/safety/proven-safety-countermeasures/speed-safety-cameras

Regional Case Study: City of Detroit

From 2017-2021, the City of Detroit experienced a city fatality rate 2.5 times the SEMCOG region's and twice that of the entire State of Michigan. To combat this, Detroit has developed a Comprehensive Safety Action Plan (CSAP) in coordination with its Streets for People Master Plan. The CSAP incorporates the Safe System Approach. The city used this approach to develop a Traffic Calming Program. At this time, the program includes systemic implementation of speed humps to slow traffic speeds, address speeding and reckless driving, and create a safe neighborhood environment throughout the city. Since 2018, the city has received over 20,000 requests for neighborhood speed humps and installed them at nearly 10,000 locations.

The program includes an annual request and opt-out process. Locations are selected based on this process. When there are more requests than available funding, predetermined criteria are used to select the locations, including residential streets with a speed limit of 25 mph, and whether residents support the effort and have made a request. Additional program selection criteria is provided below.

City of Detroit Speed Hump Selection Criteria

Criteria	Definition	Max Points
Density of Children	Census data showing high volumes of children residing in the area (by area, not block)	75
History of bike and pedestrian crashes	Crash reports showing frequent crashes involving pedestrians and bikes (10 pts/ incident)	75
History of Crashes	High density of vehicular crashes (2 pts/ incident)	50
Block Density Factor	Density of buildings and residents per block	75
Cut-Through	Parallel residential streets within 600 ft of a commercial corridor (ex. Warrington/ Livernois or Albion/ Hoover)	50
Near and Park or School	Streets within a .5 mile radius of a park or school as a traffic generator	50

Source: City of Detroit

The city plans to expand the traffic calming program to include additional treatments, such as traffic circles, curb extensions, raised crosswalks and intersections, safety islands, and chicanes. More information is available on the city's website.

Impairment

Crashes involving alcohol or drug impairment are disproportionately more severe than other crashes. Despite continuous efforts, impaired driving remains a devastating transportation safety and public health problem. In the last decade, alcohol and drug-involved crashes have been the number one cause of traffic fatalities in the SEMCOG region.

In the State of Michigan, alcohol impairment is defined as a bodily alcohol content (BAC) of 0.08 or greater if over the age of 21 or a BAC of 0.02 or greater if under the age of 21, as measured with a breathalyzer device. However, drivers can be arrested at any BAC level if they show signs of impairment.[17] Any level of BAC can affect driving ability, as shown in Table 16 from the National Highway Traffic Safety Administration (NHTSA).

There has been less research on impacts of drug impairment on driving. In 2018, recreational marijuana was legalized in Michigan, yet a THC threshold or test for determining impairment has not been established. It is also difficult to test for controlled substances during the preliminary testing process during a traffic stop. That is because presence of a drug in a driver's system does not necessarily mean they are still actively impaired. However it is still important to raise awareness about the dangers of drug-impaired driving.

Impairment is also not limited to motor vehicle drivers. Riding a bicycle or walking while intoxicated can also be dangerous due to decline in visual functions and ability to react to emergency situations. While great strides have been made in reducing impaired crashes, continued implementation of multiple strategies is needed to prevent further fatalities and serious injuries due to alcohol and drug impairment.

Figures 53-54 summarize the recent five-year fatality and serious injury data for this emphasis area.

Figure 53

Impairment-Involved Fatalities and Serious Injuries

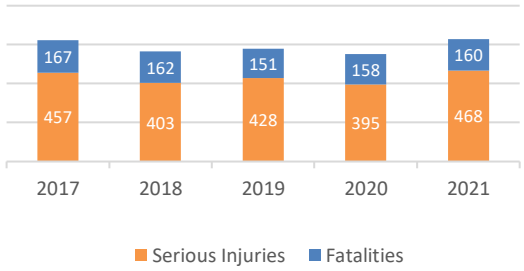
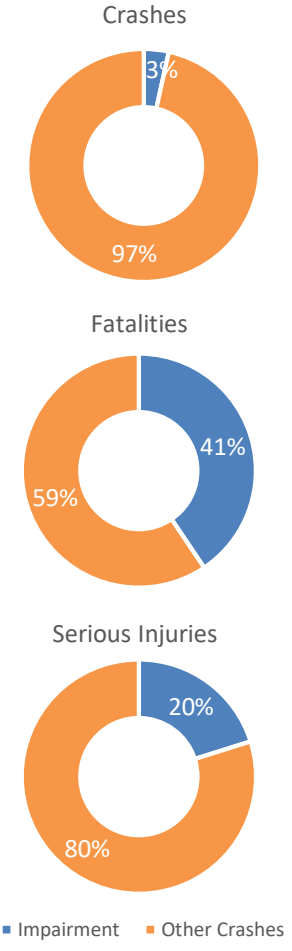


Figure 54

Share of Crashes, Fatalities, and Serious Injuries Involving Impairment



[17] https://www.michigan.gov/msp/divisions/ohsp/safety-programs/impaired-driving/impaired-driving-law

Table 16

Effects of Blood Alcohol Concentration

BLOOD ALCOHOL CONCENTRATION (BAC) IN G/DL	TYPICAL EFFECTS	PREDICTABLE EFFECTS ON DRIVING
.02	Some loss of judgment; relaxation, slight body warmth, altered mood	Decline in visual functions (rapid tracking of a moving target), decline in ability to perform two tasks at the same time (divided attention)
.05	Exaggerated behavior, may have loss of small-muscle control (e.g., focusing your eyes), impaired judgment, usually good feeling, lowered alertness, release of inhibition	Reduced coordination, reduced ability to track moving objects, difficulty steering, reduced response to emergency driving situations
.08	Muscle coordination becomes poor (e.g., balance, speech, vision, reaction time, and hearing), harder to detect danger; judgment, self-control, reasoning, and memory are impaired	Concentration, short-term memory loss, speed control, reduced information processing capability (e.g., signal detection, visual search), impaired perception
.10	Clear deterioration of reaction time and control, slurred speech, poor coordination, and slowed thinking	Reduced ability to maintain lane position and brake appropriately
.15	Far less muscle control than normal, vomiting may occur (unless this level is reached slowly or a person has developed a tolerance for alcohol), major loss of balance	Substantial impairment in vehicle control, attention to driving task, and in necessary visual and auditory information processing

Source: NHTSA

Quick Observations

- Crashes involving alcohol or drugs account for 23% of the region's combined traffic fatalities and serious injuries.
- Alcohol is involved in one third of fatalities, while drugs are involved in a fifth. A quarter of impairment fatalities involve both alcohol and drugs.
- Alcohol and drug impairment is the most commonly reported risky behavior involved in Southeast Michigan traffic crashes.
- Impairment was a factor in over 30% of the fatal and serious injury crashes involving lane departure, rail, and unbelted occupants, and over 20% of the fatal and serious injury crashes involving work zones, speeding, distracted driving, and pedestrians.

Actions

Continue educational and outreach programs
Continue to educate the public on the harms impaired driving can cause through SEMCOG's *Walk.Bike.Drive. Safe* public education campaign. Promote safer alternatives like designating a sober driver, using other modes of transportation, or staying overnight.

Promote OHSP mobilization and enforcement efforts
Michigan Office of Highway Safety Planning (OHSP) conducts annual mobilization and enforcement campaigns such as Drive Sober or Get Pulled Over. SEMCOG, along with its partner agencies, should promote OHSP rant opportunities for local communities to conduct education and enforcement activities as part of these statewide campaigns.

Promote training opportunities for law enforcement
Encourage law enforcement officers to complete trainings offered by the Michigan State Police, including the Advanced Roadside Impaired Driver Enforcement (ARIDE) training program and the Drug Recognition Expert (DRE) program. These program would help with officers' ability to observe and identify the signs of driver impairment related to drugs, alcohol, or a combination of both.[18]

Support additional statewide efforts in Southeast Michigan
As part of the Michigan SHSP, an Impaired Driving Action Plan was developed to promote prevention, enforcement, judicial, regulatory, and treatment countermeasures to combat impaired driving. SEMCOG and local agencies should continue to support and champion these statewide efforts in Southeast Michigan. Additionally, recommendations for alcohol- and drug-impaired driving from the NHTSA report *Countermeasures That Work* also be supported in the region.

[18] https://www.michigan.gov/msp/divisions/ohsp/law-enforcement-programs

Unbelted Occupant

Proper use of seat belts is the single most effective and immediate means of reducing death and injury in traffic crashes. Studies show that motor vehicle occupant survival rates increase by 45% if a seat belt is used.[19]

Michigan has a primary seat belt law for drivers and front-seat passengers, which allows law enforcement to stop and ticket motorists solely for not wearing a seat belt. This has led to a consistent seat belt use rate of drivers and front passengers well over 90 percent and above the nationwide use rate.[20] However, back seat passenger seat belt use is unknown, and current law only requires passengers age 15 and under to buckle up in the back seat. According to NHTSA's review of national data, use rates are generally higher in jurisdictions with stronger seat belt enforcement laws.

Children in Michigan are required by law to be properly restrained in a car seat or booster seat until they are eight years old or 4-feet-9-inches tall, but less than 55% of children ages four to seven years old are riding in booster seats. The vast majority of children from birth to three years old ride in car seats, yet car seat misuse occurs more than 81% of the time.[21]

Increasing proper restraint use for vehicle drivers and passengers in all seating positions is key to reducing fatalities and serious injuries. Encouragement of proper restraint use – through education, enforcement, and policy enhancements – will help reduce unsafe behavior.

Data in this section includes crashes in which: vehicle occupants did not use seat belts; there were no belts available; or a child restraint was not used, unavailable, or improperly used.

Figures 55-56 summarize the recent five-year fatality and serious injury data for this emphasis area.

Figure 55
Unbelted Occupant-Involved Fatalities and Serious Injuries

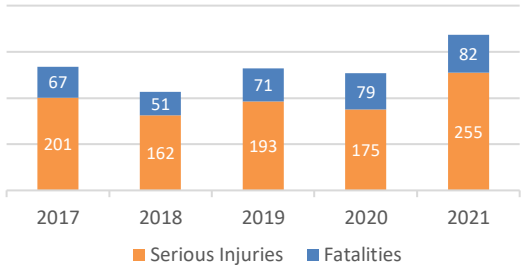
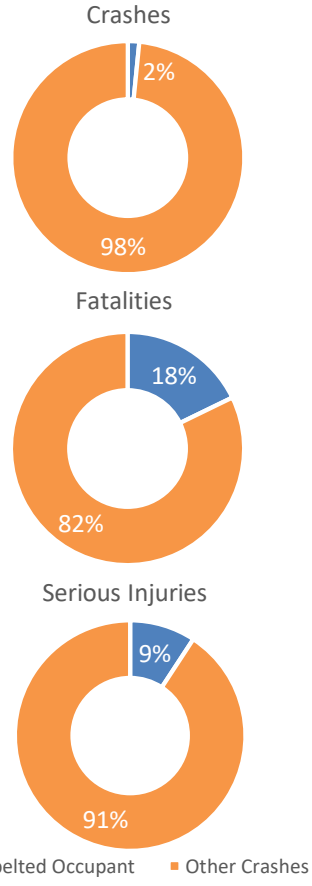


Figure 56
Share of Crashes, Fatalities, and Serious Injuries Involving Unbelted Occupants



[19] https://www.michigan.gov/msp/-/media/Project/Websites/msp/ohsp/pdfs6/shsp_2019-2022_25_web.pdf?rev=5d76f9f64a3f47dfb63d5b6e06de71ef
[20] https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813307
[21] https://www.michigan.gov/msp/-/media/Project/Websites/msp/ohsp/pdfs5/occupant_protection_action_plan_updated_with_acheivements.pdf?rev=5666c05bcc1e486599772369197d0a9e&hash=D868D416D09C2A1AE410667953A213E6

Quick Observations

- While less than 2% of crashes involve unrestrained occupants, those occupants account for 11% of all traffic fatalities and serious injuries in the region.
- Among those killed or seriously injured in crashes, unrestrained occupants were nearly 30 times more likely to be ejected from their vehicle during a crash compared to those who were buckled.
- Of those who were ejected out of their vehicle during a crash, 50% were either killed or seriously injured, compared to less than 1% of people who were not ejected.

Actions

Develop occupant protection outreach materials
Educational materials encouraging proper restraint use should be developed as part of SEMCOG's *Walk.Bike.Drive. Safe* education campaign for local agency use with the general public.

Support efforts to enhance occupant protection legislation
Support GTSAC Occupant Protection Action Team's policy efforts on passing a law requiring seat belt use in all seating positions and enhancing child passenger safety laws to reflect best practices.

Support additional statewide efforts in Southeast Michigan
As part of the Michigan SHSP, an Occupant Protection Action Plan was developed to promote strategies to reduce the rate and severity of crashes involving unrestrained vehicle occupants. This plan outlines education, enforcement, and policy strategies to increase the use of restraints such as seat belts, car seats, or boosters. SEMCOG and local agencies should continue to support and champion these statewide efforts in Southeast Michigan. Additionally, recommendations for seat belts and child restraints from the NHTSA report *Countermeasures That Work* should also be supported in the region.

Additional Behavior Emphasis Areas

Distracted Driving

Safe driving requires visual, manual, and cognitive attention. Anything that diverts a person's attention from the primary task of driving endangers drivers, passengers, and other road users. Distractions include, but are not limited to:

- Texting or messaging
- Checking social media
- Talking on the phone, even hands-free
- Watching videos
- Eating, drinking, or smoking
- Looking after children or pets
- Chatting with passengers
- Searching or reaching for an item
- Looking at crashes or roadside sights
- Checking a navigation system
- Reading anything, including maps
- Adjusting climate or music controls
- Listening to loud music

The proliferation of mobile devices has worsened the issue of distracted driving. According to NHTSA, the most alarming distraction is texting. Sending or reading a text takes your eyes off the road, hands off the wheel, and mind off the drive for 5 seconds. At 55 mph, that's like driving the length of an entire football field with your eyes closed.[22]

Distracted driving information has been collected on Michigan UD-10 crash report forms since 2016. While Michigan law has prohibited texting while

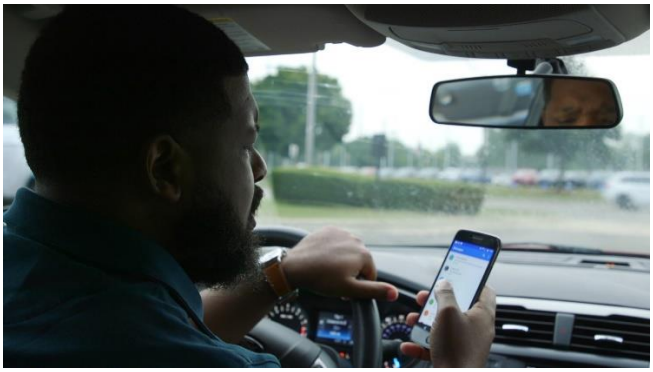


Figure 57

Distracted Driving-Involved Fatalities and Serious Injuries

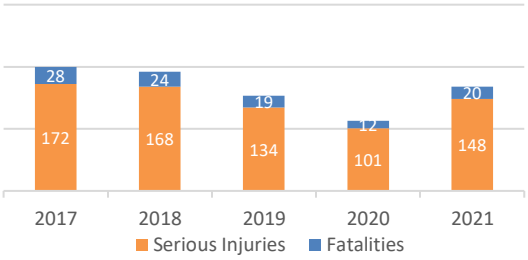
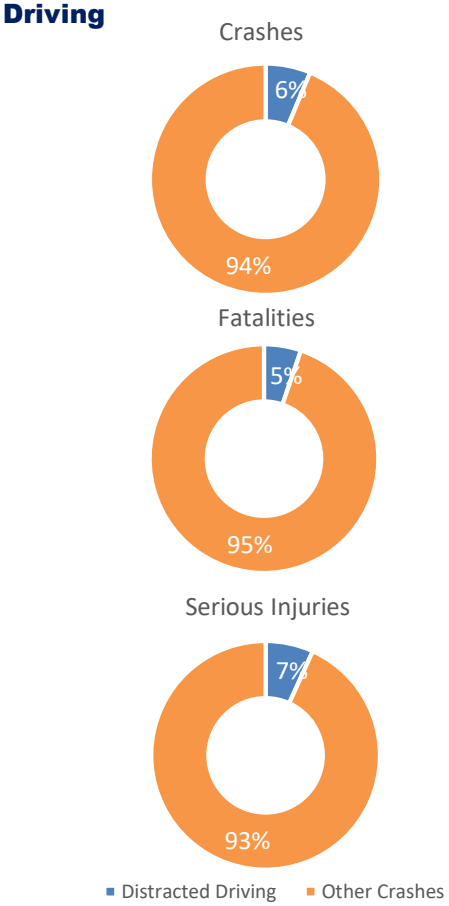


Figure 58

Share of Crashes, Fatalities, and Serious Injuries Involving Distracted Driving



22 https://www.nhtsa.gov/risky-driving/distracted-driving

driving since 2010, communication device use like texting or typing is still reported in over 10% of distracted driving crashes in the region. Furthermore, talking on a phone or other device use is still permitted in Michigan even with the known impacts of manual and cognitive distractions (except for new drivers with a Level 1 learner's license or a Level 2 probationary license). The true role of distraction in crashes may be even higher than what is reported because pre-crash distractions often leave no evidence to observe, and drivers are understandably reluctant to admit to being distracted.

Figures 57-58 summarize the recent five-year fatality and serious injury data for this emphasis area.

Quick Observations

- Distracted driving accounts for 7% of fatalities and serious injuries.
- 1/3 of distracted driving crashes occur at intersections.
- 1/4 of known distractions involve electronic device usage.

Actions

Continue education on the risk of distracted driving
Continue public education on the dangers of distracted driving as part of SEMCOG's *Walk.Bike.Drive. Safe* campaign, local agency outreach programs, and school programs targeted at new drivers. Promote use of cell phone blocking technology – apps that block calls or texts while a vehicle is in motion. Also promote statewide outreach efforts from OHSP and the GTSAC distracted driving action team.

Support efforts to enhance and implement distracted driving legislation
Continue supporting statewide efforts, including education on pending legislation (expected to go into effect summer 2023) that will ban almost all handheld device use (not just texting) while driving.

Implement engineering countermeasures to reduce the frequency and severity of distracted driving crashes
Several engineering countermeasures described in earlier sections of this chapter could be used to reduce the frequency and severity of distracted driving crashes. Lane departure countermeasures such as rumble strips can alert distracted drivers that they are about to run off the road or cross the centerline into oncoming traffic. Traffic calming countermeasures can reduce driving speeds through vertical or horizontal deflection, lowering the severity of a distracted driving crash if one were to occur.

Support additional statewide efforts in Southeast Michigan
SEMCOG and local agencies should continue to support and champion the Distracted Driving Action Plan, a part of the Michigan SHSP developed to promote strategies to reduce the rate and severity of crashes involving distracted driving. Additionally, recommendations for distracted driving from the NHTSA report *Countermeasures That Work* should also be supported in the region.

Priority Road User Emphasis Areas

In this section, background information and data analysis for Pedestrian and Bicyclist emphasis areas are kept separate because of the nuances in safety issues for each type of road user. However, issues related to pedestrians and bicyclists can often be addressed concurrently with similar strategies, so the actions for these two emphasis areas are combined.

Pedestrian

Safe pedestrian travel is a vital part of a healthy and successful region. Nearly every trip – including those made by car, transit, or bike – requires some amount of walking. Pedestrian travel is also essential for building dynamic thriving town centers, healthy neighborhoods, and preserving the environment. For these reasons and more, most communities in our region are making plans to become more walkable. Some communities have mode shift goals, looking to decrease the number of people driving single-occupant vehicles and increasing the percentage of people walking, rolling, biking, and taking transit. Many communities are increasing development density, installing new sidewalks, paths, and crosswalks to connect people to core services and other destinations. Stakeholders are engaged in multi-community efforts to create regional trails that link parks, neighborhoods and other environmental assets. Town centers are holding more outdoor events, temporarily closing streets and establishing social districts that bring more people to our streets.

Figure 59
Pedestrian Fatalities and Serious Injuries

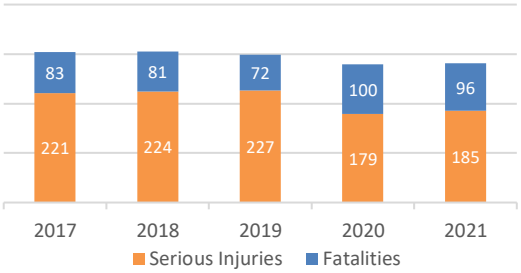
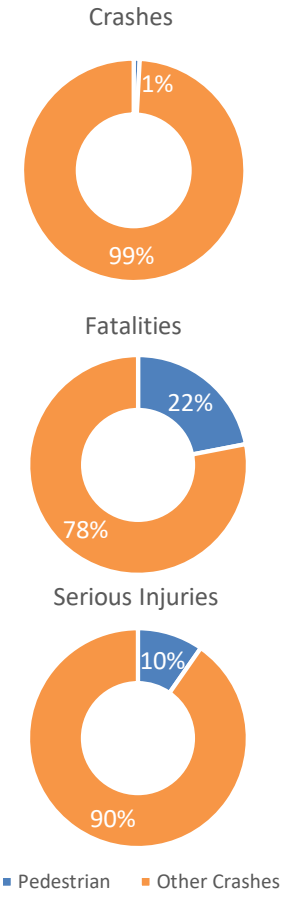


Figure 60
Share of Crashes, Fatalities, and Serious Injuries Involving Pedestrians



These efforts are paying off as more people are walking. Per StravaMetro data for Southeast Michigan:

- Between 2017 and 2022, the number of running, walking and hiking trips increased by 265%.
- Between 2017 and 2022, the number of people making these trips grew by 165%.
- While 2020 saw the largest increases for both trips and people making them, subsequent years prove that 2020 was not a blip.

The number of pedestrian trips grew by 28% between 2005 and 2015, according to SEMCOG's Household Travel Survey.

You can learn more about the state of our pedestrian network in SEMCOG and MDOT's joint Bicycle and Pedestrian Mobility Plan for Southeast Michigan.

While the region is seeing successes with both additional infrastructure and more people walking, these efforts are for naught if we fail to keep people safe. Pedestrians are vulnerable road users without physical protection between themselves and vehicles. While pedestrian crashes represent a small percentage of overall crashes, they represent a disproportionate amount of fatalities and serious injuries. Furthermore, some populations are more reliant on walking than others, which leads to equity challenges.

Many people will continue to walk in environments with little or no pedestrian accommodations, as they often have no other choice. People need to get to jobs, core services, and transit lines regardless of the season, weather, or road safety. Many times people will walk in the street due to insufficient maintenance on sidewalks; consistently clearing snow and fixing ADA hazards are opportunities to improve sidewalk usability.

While connected and automated vehicles (CAVs) may hold promise to decrease vehicular traffic crashes and fatalities by minimizing opportunities for human error, how they are programed could be problematic for people walking. If programmed without walkable, livable, complete streets in mind, CAVS could potentially exacerbate the dominance of auto-centric streets, minimizing safe locations for people to cross roads. CAVS need to be able to detect people and yield and stop when necessary, without the need of people walking to wear additional technology or rely on cell phones for crash avoidance. CAVs could cut through neighborhoods to find the shortest route to a destination, increasing traffic on local residential roads that have been safe havens of community space, where many people walk and bike and children play.

To move forward as a safer region, improved pedestrian mobility and safety are of paramount importance. This change will require a change in our transportation culture; putting safety means first means putting an end to the victim-blaming of vulnerable road users. Instead of finding excuses for preventable vehicular violence, we must examine all underlying factors and focus energy and resources on a safe system approach.

Figures 59-60 summarize the recent five-year fatality and serious injury data for this emphasis area.

Quick Observations

- Pedestrians are involved in 1% of traffic crashes but make up 12% of fatalities and serious injuries in Southeast Michigan.
- Southeast Michigan accounts for 52% of statewide pedestrian fatalities and serious injuries, compared to only 37% of overall traffic fatalities and serious injuries.
- 1/3 of pedestrians involved in a crash were struck by hit-and-run drivers.
- 1/3 of pedestrians killed or seriously injured were struck in an intersection.
- 1/4 of pedestrian crashes result in a fatality or serious injury.
- People in the City of Detroit suffer a disproportionate amount of our region's pedestrian fatalities and serious injuries (39%).
- A crash analysis performed as part of the Bicycle and Pedestrian Mobility Plan showed 80% of all bicycle and pedestrian crashes and 74% of fatalities were within SEMCOG's identified High and Moderate Demand areas (areas with greater demand for walking and biking).

Regional Case Study: City of Farmington

In 2021, the City of Farmington updated a 2019 local law requiring motorists to yield to pedestrians who stepped into a crosswalk. The local law now requires motorists to stop for a pedestrian in the approach to an unsignalized crosswalk. Motorists must remain stopped until the pedestrian reaches the other side of the street. New signs at crosswalks serve as reminders of the ordinance. Police officers focused on educating both motorists and pedestrians, with officers initially giving warnings.

Bicyclist

Bicycling is an integral part of active transportation, especially for people who cannot drive or who do not have access to a private automobile. Often, bicycles are used for trips that are too long from a walking perspective but too short from a transit perspective. These trips are typically between 0.25 and 3 miles. For longer trips, bicycles may be used to access fixed route transit. Biking is also popular among adult vehicular-bicycling enthusiasts, who often prefer the comfort and safety of "taking the lane," operating a bicycle as a driver would a motor vehicle.

Prior to the 2000s, most people in the region thought bicycling was mainly for recreation trips in parks or for kids on sidewalks. As a result, few transportation professionals routinely considered bicyclist safety and mobility when constructing roads.

But interest in transportation-related bicycling has proliferated over the past two decades, going from a topic a small portion of the population cared about to something that interests people of all ages and abilities. As such, governments have responded with new biking infrastructure: bike routes, rural wide paved shoulders, shared lane markings, conventional bike lanes, buffered bike lanes, protected bike lanes, and shared use paths. Within the same time period, bicycling usage increased.

Figure 61

Bicyclist Fatalities and Serious Injuries

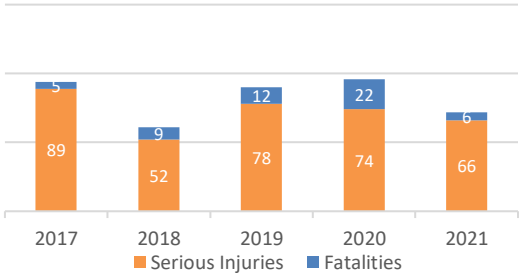
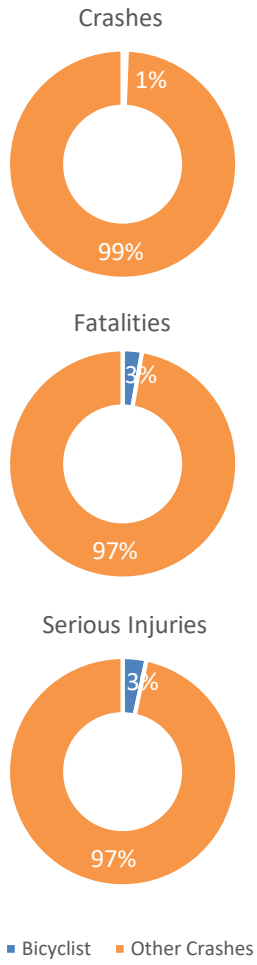


Figure 62

Share of Crashes, Fatalities, and Serious Injuries Involving Bicyclists



Between 2014 and 2020, there was a 33% increase in bikeway infrastructure. Between 2005 and 2015 there was 100% increase in the number of bicycling trips per SEMCOG's Household Travel Survey. Per StravaMetro data, our region experienced another 100% increase between 2018 and 2020. You can learn more about the state of our bicycle network in SEMCOG and MDOT's joint Bicycle and Pedestrian Mobility Plan for Southeast Michigan. In short, SEMCOG anticipates that more communities will continue to build additional biking infrastructure that will likely also allow the continued growth of people biking in our region.

While the region is seeing successes with both additional infrastructure and more people biking, these efforts are for naught if we fail to keep people safe. Bicyclists, like pedestrians, are vulnerable road users with no protection between their bodies and motor vehicles. While bicyclist crashes represent a small percentage of overall crashes, they represent a disproportionate amount of fatalities and serious injuries. Furthermore, some people are more reliant on biking than others, leading to potential equity issues. More people biking could lead to more biking-related crashes, which would likely result in more serious injuries and fatalities.

For us to move forward as region, bicyclist mobility and safety must be taken seriously—it needs to be a traffic safety emphasis area. We must address the complexity of bicycle operations and safety and account for the multiple ways a person can cycle—they can ride on shared-use paths (and sometimes sidewalks) like pedestrians. They can ride in their own dedicated infrastructure like bike lanes. Or they can also ride in the road like any other vehicle. We must provide systemic education on how to safely bicycle in these environments and navigate the transitions between them.

We must educate motorists to understand their legal responsibility to safely share the road with bicyclists. We must adequately account for new technology like electric-assist bicycles (e-bikes) and e-scooters, which increase the speed of people biking and complicate transportation safety. We must also properly address connected and automated vehicle programing so they better compliment a complete streets environment, rather than degrade it. Finally, we need to better analyze bicyclist crash data so we can build a more comprehensive safe systems approach to bicycling safety.

Figures 61-62 summarize the recent five-year fatality and serious injury data for this emphasis area.

Quick Observations

- Bicyclists account for 3% of the region's fatalities and serious injuries but are involved in only 1% of crashes.
- 1 in 10 bicyclist crashes result in a fatality or serious injury.
- 57% of bicyclists killed or seriously injured were struck in an intersection.
- A crash analysis performed as part of the Bicycle and Pedestrian Mobility Plan showed 80% of all bicycle and pedestrian crashes and 74% of fatalities were within SEMCOG's identified High and Moderate Demand areas (areas with greater demand for walking and biking).

Actions

Teach and model safe behavior for road users of all ages, abilities, and backgrounds
Coordinate with the State of Michigan and other stakeholders to review the Michigan Driver Education Curriculum to determine if it adequately addresses pedestrian and bicyclist safety. Potential actions and revisions include:

- Increasing the number of classroom hours for driver education to align with the current Novice Teen Driver Education and Training Administrative Standards, allowing time for more pedestrian and bicycle safety topics.
- Revising the Michigan Driver and Traffic Safety Education Association student worksheet to include additional questions specific to pedestrians and bicyclists.
- Ensuring that the knowledge exams for both Graduated Driver Licenses and Temporary Instruction Permits include questions on pedestrian and bicycle safety for each applicant. The pool of questions for both exams should be periodically reviewed for validity and updated with new questions as necessary.
- Requiring drivers to take a test on pedestrian and bicycle safety as part of their driver's license renewal.
- Work with local school districts and the Michigan Fitness Foundation to better promote Safe Routes to School Education programs – including both learning and encouragement opportunities, like walking school buses.
- Expand or create additional travel training programs – such as Leader Dogs for the Blind or Program to Educate All Cyclists (PEAC) – that help people with physical and cognitive disabilities to other communities and counties.
- Ensure outreach materials and programs are equitable in their distribution and meet the needs of equity populations. This includes people with limited English proficiency, racial minorities, transit-dependent households, low-income households, female-headed households, people with physical and cognitive disabilities, senior citizens, and youth.
- Ensure the proliferation of analog-equivalent outreach materials and programs to reach people who have less access to broadband and social media. Examples include mailers as part of vehicle registration renewal, utility bills/statements, and community newsletters, pamphlets that can be placed on vehicles in town centers, posters in prominent locations, and workshop-in-a-box materials for local organizations, religious centers, and neighborhood groups
- Promote and grow SEMCOG's *Walk.Bike.Drive. Safe* and local public education campaigns to encourage safe behaviors.
- Encourage use of specialized or supplemental community enforcement teams for traffic issues, separate from other police units. Implement an education-first enforcement policy for some traffic offense, focusing on written warning option and/or a citation diversion program.

Educate decision makers and public safety officials at the State, county, and local level on pedestrian and bicycle safety issues

Educate on topics such as: proven countermeasures like rectangular rapid flashing beacons, HAWK beacons, leading pedestrian intervals, scrambles phasing, bicycle signals, traffic signal accessories such as pedestrian count-down signals, pedestrian call buttons (actuated signal phasing), audible pedestrian signals (APS), and bicycle-activated signal phasing; pedestrian construction zone safety; Americans with Disabilities Act; national guidelines such as AASHTO and NACTO; enforcing pedestrian and bicycle laws; and precision in filling out pedestrian- and bicycle-related UD-10 crash forms.

Coordinate with statewide partners on education opportunities

Partner with the Michigan Office of Highway Safety Planning (OHSP), MDOT, the Michigan Fitness Foundation, and the Governor's Traffic Safety Advisory Commission's Communications Committee on their efforts to develop and implement a statewide Pedestrian Safety Toolkit and a branded pedestrian and bicyclist safety campaign that allows for customization to accommodate local needs. NHTSA has also recommended reinstituting the Law Enforcement Liaison program to promote transportation safety initiatives with emphasis on pedestrian and bicyclist safety.

Identify funding opportunities to support equitable education, encouragement, and targeted enforcement activities

This includes publicizing best practices in using OHSP's 405(h) Nonmotorized Safety grant funds and other resources (for meeting the 20% match), and identifying cities and villages with yield/stop-for-pedestrian-in-crosswalks ordinances or safe passing ordinances and inviting them to apply for 405(h) funds. Also consider training prerequisite prior to applying for pedestrian- and bicyclist-centric educational and enforcement grants.

Evaluate pedestrian safety measures

To better assess our initiatives, we need to measure our effectiveness through actions like: conducting region-wide surveys to gauge the knowledge, attitudes, and behaviors of road users to advocate for new infrastructure, stronger pedestrian and bicyclist safety law, and measure the success of education and enforcement programs; conducting pre- and post-surveys in communities where engineering changes related to pedestrian and bicyclist safety have been made to help educate the public and evaluate the effectiveness of the implemented change; and routinely conducting pedestrian and bicyclist counts as part of traffic studies and before and after installing new infrastructure.

Support state legislation and local policies and ordinances to eliminate risky behavior

Encourage more "No right turn on red" intersection policies where it negatively impacts pedestrian safety. Support efforts to adopt legislation that would improve pedestrian and bicyclist safety, such as:

- Requiring drivers to stop for pedestrians who are legally crossing the roadway at other non-signalized intersections;
- Incorporating the full pedestrian-and-bicyclist-safety-guidance of the Uniform Vehicle Code into the Michigan Vehicle Code and determine the best course of action for conflicting local pedestrian safety ordinances to the Michigan Vehicle Code; and
- Prohibiting the manipulation of hand-held cellular devices while driving a motor vehicle.

Target high pedestrian and bicyclist crash locations and activity centers for implementation

Engineering, education, and enforcement activities should be targeted to locations with a documented pedestrian-and-bicyclist crash history or activity centers with greater risk for pedestrian and bicyclist crashes, including local schools, bars and entertainment districts, and college and university campuses.

Engage meaningfully with people who will use the road or are impacted by it

Engage with stakeholders and residents throughout the planning stages, design, and all decision-making processes of a project, including but not limited to: law enforcement personnel; transit agencies; and equity populations such as people with cognitive and physical disabilities, limited English proficiency, women-headed households, senior citizens, youth, transit-dependent households, and racial and ethnic minorities.

Build complete networks for all travel modes and stop building unsafe roads

Promote design that is safe and comfortable for all roadway users based on land use context. Promote use of the Multimodal Tool to evaluate performance of roadways for all users. Use temporary pilots and low-cost options to test new designs and evaluate outcomes prior to street reconstruction. Rebuild roads with continuous infrastructure for all travel modes, particularly in areas with new developments.

Encourage community adoption of NACTO guidelines. Also work with FHWA, MDOT, County, and Local officials to properly communicate design flexibility found in current national guidelines (AASHTO Green Book, NACTO, etc.) to allow for projects that calm traffic and promote safety.

Implement FHWA-proven safety countermeasures. Prioritize vulnerable road users and traffic calming treatments, including at intersections. Prioritize arterials and other roadways with highest risk and crash incidence, particularly high-speed roads in locations with pedestrian and bicyclist activity.

Prioritize pedestrian and bicyclist fatality and serious injury reduction in project selection, including for the TIP. Rank and prioritize high-risk intersections and segments, including those locations identified in this plan as focus facilities or on the High Injury Network. Also conduct Road Safety Audits at high-risk locations for pedestrian and bicyclist crashes to identify potential solutions.

Ensure roads, bike lanes, sidewalks, paths and other nonmotorized facilities are properly maintained to promote proper and safe use

Utilize asset management best practices to obtain better information on where capital preventive maintenance and full rebuilds need to be performed and quantify maintenance costs for a full nonmotorized system. Conduct regular ADA inspections and develop ADA transition plans. Ensure sidewalks, bike lanes, and other nonmotorized facilities are cleared of snow, ice, and other weather related hazards, as well as dirt, vegetation, and other debris by conducting regular routine maintenance such as sweeping and vegetation removal. Also identify consistent State and regional funding for nonmotorized facility maintenance.

Advocate for vehicle features that decrease the likelihood and severity of vehicular crashes with pedestrians and bicyclists

Promote deployment, use, and understanding of vehicle features such as vulnerable road user detection, auto-braking, front end design, and pedestrian airbags. Coordinate with

transit agencies on deployment of transit vehicle technology and other best practices that decrease the likelihood and severity of crashes with pedestrians and bicyclists.

Ensure emerging technology works to advance pedestrian and bicyclist safety and mobility rather than creating a potential hindrance

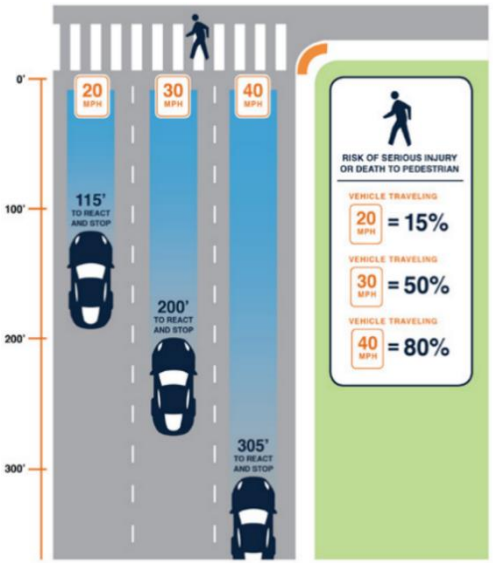
Ensure connected and automated vehicle (CAV) code and roadway deployment of Advanced Transportation and Congestion Management Technologies (ATCMTD) prioritizes crash avoidance with vulnerable road users. People walking and biking should not have to wear additional technology or rely on cell phones for crash avoidance. Advocate for CAV technology that self-enforces traffic safety laws, especially speed limits, and prioritizes human life. Advocate for CAV technology that maximizes crossing opportunities, especially in pedestrian and bicycle demand areas. People should be able to cross where convenient and timely rather than only where traffic signals and beacons are located. Also, identify best practices for safe deployment of micromobility devices including e-bikes, e-scooters, and CAV micro-transit.

Ensure drivers and bicyclists obey posted speed limits on all roads to decrease the number of pedestrian-related crashes and maximize survivability

Risk of serious injury or death increases drastically when a pedestrian is hit at speeds over 20 MPH, as shown in Figure 63. To help local agencies ensure drivers obey posted speed limits, SEMCOG should use quantitative tools to identify and investigate areas with unsafe speeds and explore big data sets for locations of speeding and/or hard braking. Working with law enforcement would also help to gather more accurate data on speeding and crashes. Develop and promote public education materials on speeding, especially as it relates to vulnerable road users. Ensure bicyclists know how to properly operate a bicycle in environments shared with pedestrians such as sidewalks and shared-use paths.

Figure 63

Pedestrian Risk by Driver Speed



Promote with roadway decision-makers the need to prioritize local vulnerable road user safety and mobility over motorized vehicle delay

Promote maximizing pedestrian and bicyclist safety over maximizing speed to free-flow conditions, especially in bicycle and pedestrian demand areas. Support state legislation to improve speed management, including: efforts to update the statewide speed limit setting standard (85th percentile) to allow more flexibility and use of engineering judgement to design for target speeds; legislation to implement speed regulators on vehicles; and legislation to allow for automated camera speed enforcement. Also promote designing for and setting context appropriate speed limits on State- and county-owned roads, especially on surface streets that function as main streets or traditional downtowns.

Develop educational materials for county and local officials on uses and benefits of traffic-calming countermeasures. Topics could include the inverse relationship between speed and crash survivability, lane width implications and risks, and rural vs. urban best practices.

Work with the State of Michigan and local police departments on UD-10 crash form enhancements and ensure officers complete the form

Support efforts to revise the UD-10 to reflect the current Model Minimum Uniform Crash Criteria data elements related to nonmotorists. Expand the routine use of other traffic records data systems to support problem identification and program evaluation efforts. Stress the importance of collection and documentation of pedestrian and bicyclist information during law enforcement officer training on crash investigation and UD-10 documentation. Integrate available traffic records data to support problem identification, strategic planning, resource deployment, public education and injury prevention efforts related to pedestrian and bicyclist injuries. Integrate Emergency Medical Services and Trauma Registry information with crash data and hospital discharge data to support problem identification, strategic planning, resource deployment, public education and injury prevention efforts related to pedestrian and bicyclist injuries.

Support additional statewide efforts in Southeast Michigan

As part of the Michigan SHSP, a Pedestrian and Bicycle Safety Action Plan was developed to promote strategies to reduce the rate and severity of crashes involving pedestrians and bicyclists. SEMCOG and local agencies should continue to support and champion these statewide efforts in Southeast Michigan. Additionally, recommendations for pedestrian and bicycle safety from the NHTSA report *Countermeasures That Work* should also be supported in the region.

Regional Case Study: City of Detroit

In 2018, the City of Detroit conducted a pilot road diet on Jefferson Avenue from Downtown to the City limits in Grosse Pointe Park, removing two lanes (one in each direction of travel) and shrinking the width of the remaining travel lanes, which freed up space for a pair of one-way separated bike lanes and pedestrian refuge areas. The resulting project not only provided continuous connectivity for bicyclist from neighborhoods to Belle Isle and Downtown, but calmed vehicular traffic to posted speed limits. Benefits for road users:

Drivers

- Separation of space for road users
- Orderly flow of traffic
- Easy to see bicyclists
- Clearly marked parking
- Buffer for drivers to get out of their car

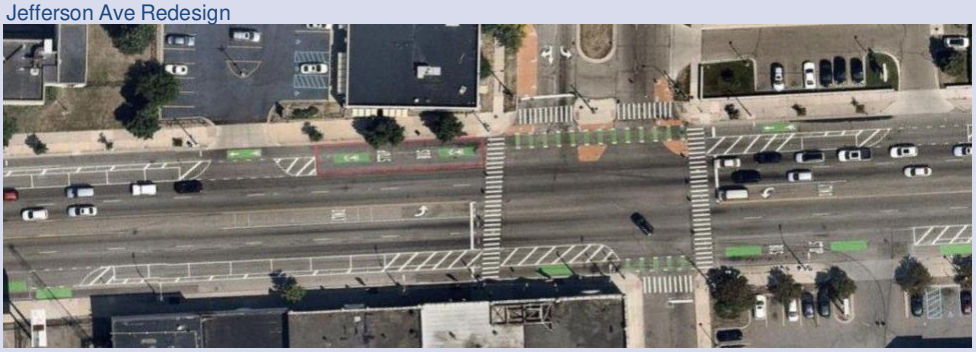
Pedestrians

- Bicycles off the sidewalks
- Additional protections for pedestrians from traffic
- Shorter crossing distance
- Better visibility
- Refuge areas for crossing the street.
- “Traffic calming" effect

Bicyclists

- Increased comfort level for bicyclists of all ages
- Protected space.
- Reduces fear & risk of collisions with vehicles.
- “Traffic calming” effect
- Reduces the risk of “dooring.”

Jefferson Ave Redesign



Source: Nearmap

Motorcyclist

When a crash occurs, motorcycle riders are much more vulnerable than passengers of any other vehicle. Nationally, motorcyclists, per vehicle mile traveled, are about 28 times more likely than passenger vehicle occupants are to die in a crash.[23] Various factors, such as impairment and excessive speeds, have been identified as contributing factors to the occurrence of motorcycle crashes. The lack of proper licensing and training are also areas of major concern.

Lack of protective equipment use by motorcyclists further exacerbates risks. In 2012, the State of Michigan changed its motorcycle helmet law, allowing operators 21-years-of-age-and-older to ride without a helmet; contingent on having at least $20,000 in first-party medical benefits insurance in effect and having held motorcycle endorsements for at least two years or having passed an approved motorcycle safety course. According to a study by the Insurance Institute for Highway Safety (IIHS) and the University of Michigan, there was a 14% increase in head injuries in Michigan for crash-involved motorcyclists, as the percentage of riders without helmets rose from almost zero to 25%.[24]

Figures 64-65 summarize the recent five-year fatality and serious injury data for this emphasis area.

Figure 64

Motorcyclist Fatalities and Serious Injuries

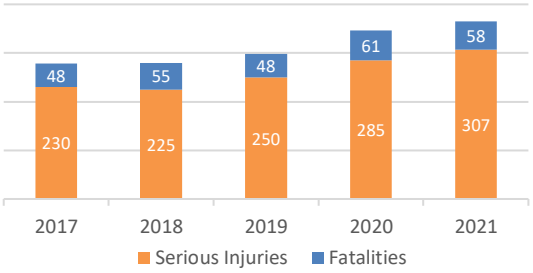
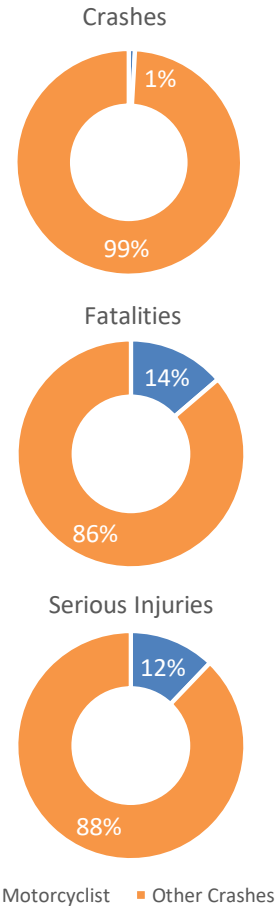


Figure 65

Share of Crashes, Fatalities, and Serious Injuries Involving Motorcyclists



[23] https://www.nhtsa.gov/road-safety/motorcycles#:~:text=But%20motorcycling%20also%20can%20be,%2C%20coordination%2C%20and%20good%20judgment

[24] https://www.iihs.org/media/0d9cc50f-7edc-4ce4-990e-c5e88dbfcde5/4PyfCA/HLDI%20Research/Bulletins/hldi_bulletin_34.36.pdf

Quick Observations

- Motorcyclists are involved in 1% of crashes but account for 12% of fatalities and serious injuries.
- 48% of motorcyclists killed in a crash did not have a motorcycle license endorsement.
- 46% of motorcyclists killed in a crash did not wear a helmet.
- 1/5 of KA motorcycle crashes involve speeding.
- 1/5 of KA motorcycle crashes involves impairment (86% of which involve alcohol).

Actions

Promote motorcycle safety education
Develop materials to promote the benefits and encourage the use of helmets and other protective gear as part of SEMCOG's *Walk.Bike.Drive. Safe* education campaign. It is also crucial to educate motorcyclists on the risks of riding while impaired by developing outreach materials and ensuring they are presented at different settings (i.e., motorcyclist clubs and organizations, schools, workplace, and training programs). Promotion of motorcycle safety courses like the Michigan Rider Education Program (MI-REP) will also help improve safety among motorcyclists.

Promote motorcycle endorsement and reduce "shadow riders"
Shadow riders are motorcyclists that are riding without a motorcycle license endorsement, similar to a car driver without a license. Obtaining a motorcycle endorsement is not only State law, but it creates safer riders who have either completed an approved MI-REP safety training course or passed a rider skills test. Increasing public awareness of endorsement requirements will help reduce unsafe riding behavior.

Implement engineering countermeasures to improve motorcycle safety
Appendix E outlines several engineering countermeasures to target motorcycle crashes, which should be considered for application across Southeast Michigan. Example countermeasures include improvements in pothole maintenance, leveling manhole covers, correcting uneven pavement conditions, and use of low friction joint sealants, crack fillers, and pavement markings.

Support efforts to enhance motorcycle safety legislation
Support statewide efforts to enact laws and regulations promoted by the GTSAC motorcycle safety action team. These include requiring motorcyclists to wear protective gear including helmets and imposing strict fines and penalties on motorcycle owners who allow unendorsed operators to use operate their motorcycle illegally.

Promote first responder training for motorcycle crashes
Collaborate with the GTSAC motorcycle safety action team to promote training opportunities for emergency medical response services personnel to specifically address the types of crash trauma caused by motorcycle crashes and how to provide optimal on-scene care to those injured. Also promote traffic incident management training for motorcycle crashes.

Support additional statewide efforts in Southeast Michigan

As part of the Michigan SHSP, a Motorcycle Safety Action Plan was developed to promote strategies to reduce the rate and severity of crashes involving motorcyclists. SEMCOG and local agencies should continue to support and champion these statewide efforts in Southeast Michigan. Additionally, recommendations for motorcycle safety from the NHTSA report *Countermeasures That Work* should also be supported in the region.

Additional Road User Emphasis Areas

Commercial Truck/Bus

Crashes involving commercial vehicles often result in more severe injury outcomes because these vehicles are often larger, heavier, and stiffer. Commercial vehicles are defined as any of the following:

- A commercial truck or truck/trailer having a Gross Vehicle Weight Rating (GVWR) or Gross Combined Weight Rating (GCWR) of 10,001 pounds or more, whichever is greater.
- Any vehicle designed or used to transport more than 8 passengers, including the driver. This can include city buses, school buses, limousines, and courtesy vans.
- Any vehicle displaying or requiring a hazardous material placard, regardless of weight. This can include automobiles, vans, and pick-up trucks.

Other road users involved in a crash with a commercial vehicle bear most of the cost. While commercial vehicle drivers need to understand and manage the dynamics of their vehicles, other drivers must not underestimate a truck's stopping distance, acceleration, and maneuverability. Special consideration for pedestrian and bicyclist safety must also be given at potential points of conflict, like bus stops and crosswalks.

Efforts from both public and private sectors are required to improve commercial vehicle safety and reduce fatal and serious injury crashes. The public sector is responsible for improving regulations and enforcement, as well as initiating engineering and educational advancements. At the same time, the private sector should make sure their operations are in compliance with current regulations and procedures to ensure the safety of the operators and other road users.[25]

Figures 66-67 summarize the recent five-year fatality and serious injury data for this emphasis area.

Figure 66

Commercial Truck/Bus-Involved Fatalities and Serious Injuries

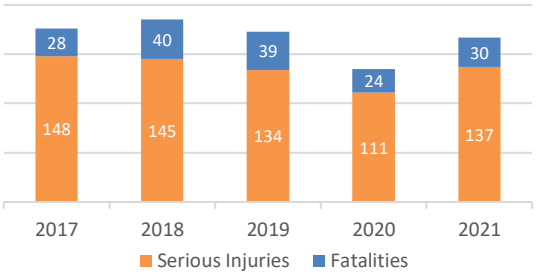
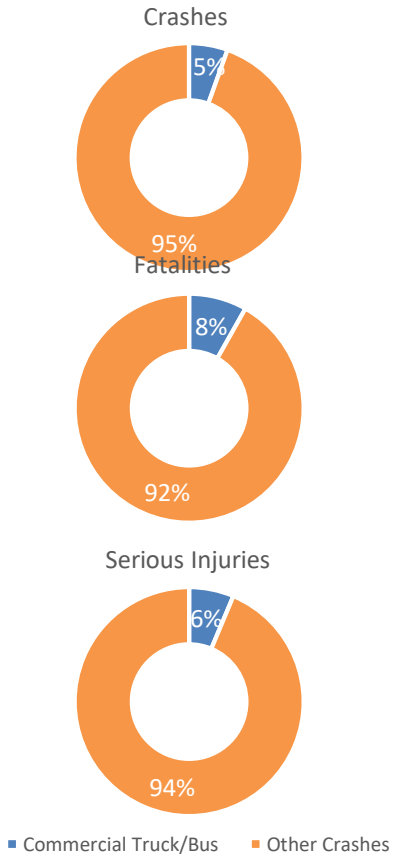


Figure 67

Share of Crashes, Fatalities, and Serious Injuries Involving Commercial Trucks/Buses



[25] https://www.michigan.gov/-/media/Project/Websites/msp/ohsp/pdfs3/Michigan_Truck_Strategic_Plan_20202024.pdf?rev=019d48899da5485e892c6051853c3e1b

Quick Observations

- Commercial vehicle crashes account for 7% of the region's fatalities and serious injuries.
- 85% of commercial vehicle-involved fatalities are occupants of other vehicles.
- The most common driver hazardous action in commercial vehicle-involved crashes is "unable to stop within assured clear distance."

Actions

Promote education programs to improve commercial vehicle safety
Promote Michigan Truck Safety Commission (MTSC) education and awareness campaigns, like the Share the Road program, that educate the public as well as truck and bus drivers how to safely share the road. Educational materials for the public should also be created and promoted as part of SEMCOG's *Walk.Bike.Drive. Safe* campaign. Additional efforts include commercial vehicle driver education on seatbelt use, fatigue, and being distracted while operating a vehicle.

Support commercial vehicle driver training programs
Support MTSC efforts to promote commercial vehicle driver training and licensing programs to increase the number of qualified and safe drivers. Also support MTSC efforts to promote regular maintenance and inspection of commercial vehicles to minimize vehicle defects that cause crashes. Additionally, promote training opportunities for transit staff on transportation safety and vehicle emergency response procedures.

Support use of technologies that reduce commercial vehicle crashes
Encourage use of new technologies that improve the safety and efficiency of trucks and buses, such as lane departure warnings, blind spot detections, and electronic braking systems. Continued coordination with ITS Michigan and the Regional Transportation Operations Coordinating Committee will be vital for preparing road agencies for automated vehicles and identifying best practices for implementing intelligent transportation systems, such as dynamic warning signs, to reduce risk of commercial vehicle crashes. Coordination should also include considerations for the deployment of microtransit—IT-enabled private passenger transportation services like vans and shuttle buses that use dynamically generated routes and provide transit-like service but on a smaller, more flexible scale.[26]

Implement and update Public Transportation Agency Safety Plans
Public transit operators across the region have developed safety plans and targets as part of the Federal Transit Administration's (FTA) performance-based planning requirements. SEMCOG should continue to coordinate with transit agencies on annual targets and support efforts to implement the PTASPs. Additionally, recommendations from the FTA report *Effective Practices in Bus Transit Safety: Emergency Response* should also be supported in the region.

Support additional statewide efforts in Southeast Michigan
As part of the Michigan SHSP, a Michigan Truck Safety Strategic Plan was developed to promote engineering, enforcement, and education strategies focus on improving truck safety. SEMCOG and local agencies should continue to support and champion these statewide efforts in Southeast Michigan.

[26] https://www.transit.dot.gov/regulations-and-guidance/shared-mobility-definitions

Older Driver

While people age 65 and older exhibit fewer risky driving behaviors, they may experience challenges with respect to declining vision, decreased flexibility and motor skills, and changes to perceptual and cognitive performance that put them at risk of crashing when driving. Older drivers are also more susceptible to chest injuries and other medical complications, resulting in a higher injury severity when a crash does occur.[27]

In 2021, there were more than 1.7 million older licensed drivers in Michigan, representing 23.4 percent of all licensed Michigan drivers. The number of older licensed drivers in Michigan has increased by nearly 35% in the past 10 years.[28] SEMCOG's Regional Forecast projects that the number of people in Southeast Michigan age 65 and older will grow by 37% from 2020 to 2050. The share of crashes involving older drivers is also likely to grow.

Figures 68-69 summarize the recent five-year fatality and serious injury data for this emphasis area.

Quick Observations

- The number of crashes involving older drivers had increased each year since 2009 until the COVID-19 pandemic led to fewer trips and crashes.
- Crashes involving older drivers account for 16% of the region's fatalities and serious injuries.
- Nearly half (47%) of fatal and serious injury crashes involving older drivers occur at intersections.

Figure 68

Older Driver-Involved Fatalities and Serious Injuries

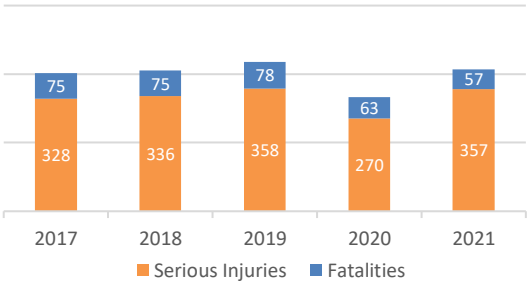
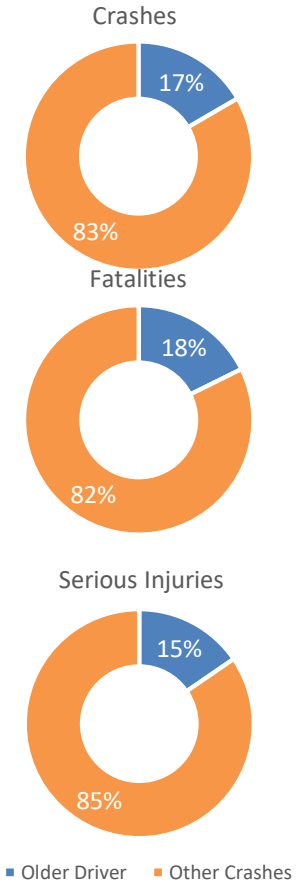


Figure 69

Share of Crashes, Fatalities, and Serious Injuries Involving Older Drivers



[27] https://www.iihs.org/topics/fatality-statistics/detail/older-people

[28] https://www.michigan.gov/msp/-/media/Project/Websites/msp/ohsp/1_Fall_2022_Teen/Action-Plan-SMS-2023-2026.pdf?rev=7f73edbc967e4685b6f9999eb503d9c3&hash=641FE004AA0BF32EA17BB3E8C072DFD7

Actions

Implement older-driver-focused engineering countermeasures
Several engineering countermeasures have shown to have specific benefits for reducing older-driver crashes by improving visibility of signs and signals on the roadway. These include: freeway signs with an arrow per lane, use of clearview font on guide signs, fluorescent yellow sheeting on warning signs, box span traffic signal configuration, and pedestrian countdown signals. Additional guidance is available in MDOT's *Evaluation of Michigan's Engineering Improvements for Older Drivers* report and FHWA's *Handbook for Designing Roadways for the Aging Population*.

Promote senior-friendly transportation options
Continue to promote resources that assist drivers and their families and caregivers in making decisions that use a variety of safe transportation options which sustain the individual's self-determination, dignity, mobility, and independence. Statewide resources like Safe Drivers Smart Options and Michigan's Guide for Aging Drivers and Their Families help older drivers maintain, limit, or retire from driving, and include information on senior transportation services focused on keeping Michigan's gaining population mobile.

Promote use of technology that improves older driver safety
Encourage understanding and use of new in-vehicle technologies to enhance driving safety and extend driving years for older drivers. Promote programs like AARP's *Smart DriverTek* that offer free online workshops and resources like the National Safety Council's *MyCarDoesWhat?* that explain new vehicle safety features. Adapting vehicles for the changing needs of seniors, such as swivel seats for more convenient access or hand controls, can broaden opportunities for older drivers.

Support legislative efforts to improve older driver safety
Support statewide policy efforts to keep drivers safe as they age. Regular driver testing during license renewal, for example, would help keep drivers up to date on the latest traffic laws, infrastructure, technology, and driving skills necessary to stay safe while on the road. License screening and testing can also help identify those who may need license restrictions. Reviewing other state licensing laws would help with identifying additional policies related to older driver safety.

Support additional statewide efforts in Southeast Michigan
As part of the Michigan SHSP, a Senior Mobility Action Plan was developed to promote strategies to reduce the rate and severity of crashes involving senior road users. SEMCOG and local agencies should continue to support and champion these statewide efforts in Southeast Michigan. Additionally, recommendations for older drivers from the NHTSA report *Countermeasures That Work* should also be supported in the region.

Young Driver

In order to align with NHTSA performance measures and the Michigan GTSAC, SEMCOG has redefined the younger driver emphasis area as drivers age 20 and younger (rather than age 24 and younger). Also, many safety issues related to drivers age 21-24 include alcohol use and seat belt use, which are addressed by other existing emphasis areas in this plan.

The main concern for younger drivers is the lack of sufficient experience to handle complex tasks of driving and emergency situations. Another concern is young drivers tend to engage in risky behaviors such as speeding and allowing shorter headways when operating a motor vehicle. Although such behaviors are sometimes intentional, young driver crashes generally result from errors in attention, failing to recognize hazards, and driving too fast for conditions. To reduce young-driver crashes, it is important to effectively address the lack of experience and youthful propensity to engage in risky behavior inherent to young drivers.

Figures 70-71 summarize the recent five-year fatality and serious injury data for this emphasis area.

Quick Observations

- Crashes involving young drivers account for 15% of fatalities and serious injuries.
- 43% of fatal and serious injury young driver crashes involve intersections.
- Crashes are the leading cause of death for people aged 15-20.[29]

Figure 70

Young Driver-Involved Fatalities and Serious Injuries

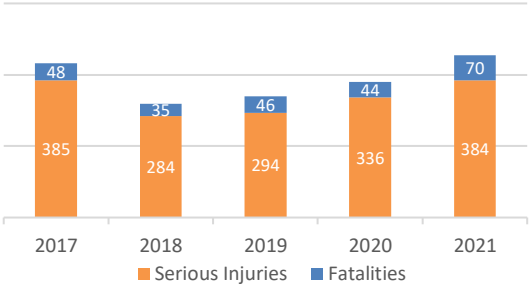
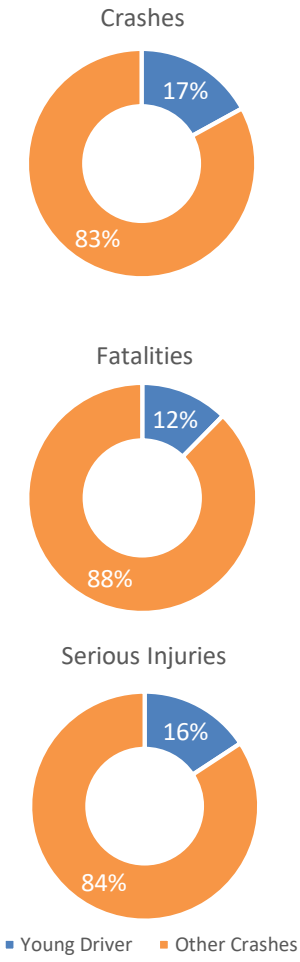


Figure 71

Share of Crashes, Fatalities, and Serious Injuries Involving Young Drivers



[29] https://www.michigan.gov/msp/-/media/Project/Websites/msp/ohsp/1_March-2023/2023_2026_MI_SHSP_v7.pdf?rev=29f5417d44484acbacb2e770c7ffa278

Actions

Promote and enforce laws pertaining to young drivers
Promote Michigan Office of Highway Safety Planning (OHSP) and Michigan Department of State (MDOS) young-driver-related resource materials and content at events/schools/public buildings and via other methods as appropriate (e.g., social media platforms) in partnership with SEMCOG's *Walk.Bike.Drive. Safe* education campaign. Encourage enforcement of laws pertaining to young drivers, including enforcement of Graduated Driver License (GDL) restrictions.

Promote parent awareness of teen driving risk
Promote the Michigan Graduated Driver Licensing Parent Checklist to parents. Continue support of developing and implementing Michigan orientation program for parents of teens beginning the GDL process. Promote effective resources for parents to help manage teen drivers, such as the STOPPED program to register vehicles operated by young drivers with the Michigan Sheriffs' Association so that the registered owner of the vehicle is notified if the young driver is stopped by law enforcement.

Improve young driver training
Continue supporting Michigan Department of State efforts to improve driver training programs. Potential improvements include enhancing training topics, such as new-and-emerging technology and infrastructure, and simulating driving challenges. Also promote trainings programs like the Michigan State Police Teen Defensive Driving Training Course.

Employ school-based strategies
The Michigan Department of Education has been working on efforts to promote a variety of school based teen driving initiatives. This includes programs such as Strive for a Safer Drive. These efforts have been implemented in partnership with Ford Driving Skills for Life and OHSP, student groups such as the Michigan Association of Student Councils, and the private sector. These efforts should continue to be promoted across Southeast Michigan.

Support additional statewide efforts in Southeast Michigan
As part of the Michigan SHSP, a Drivers Age 20 and Younger Action Plan was developed to promote strategies to reduce the rate and severity of crashes involving young drivers. SEMCOG and local agencies should continue to support and champion these statewide efforts in Southeast Michigan. Additionally, recommendations for young drivers from the NHTSA report *Countermeasures That Work* should also be supported in the region.

Additional Systems Emphasis Areas

Emerging Technology

Southeast Michigan has plenty of experience with emerging transportation technologies, and many are already at work on our roadways. However, the variety and frequency of emerging technologies being introduced have created a very dynamic environment. Vehicle technologies have been advancing exponentially over the past decade. These include new mobility options such as e-scooters, electric vehicles, smart features on vehicles, and full automation.

Integrated Vehicle-Based Safety Systems (IVBSS), such as the forward-crash warning and lane-departure warning, have become standard in nearly all new vehicles. These features have proven to reduce vehicle crashes and are a great first step, but emerging technologies will require infrastructure updates, user acceptance and training on its use, and coordination and support for local emergency response.

It is important to note that any new technology deployed into our transportation network will have potential safety impacts. The near future presents an exciting, yet challenging, transition period in which non-automated, partially automated, and fully automated vehicles are operating on the road simultaneously. As these technologies emerge, we must understand how they can be safely accommodated within our transportation system. Emerging technologies include, but are not limited to:

- Electric Vehicles (EV)
- Connected and Automated Vehicles (CAV)
- Micromobility

Electric Vehicles

EVs are an attractive emerging technology due to the inherent decrease in emissions from conventional fossil fuel burning vehicles. Electric vehicles provide a significant opportunity to reduce the carbon footprint of Southeast Michigan, and they are growing in popularity.

It is difficult to predict what infrastructure updates will be needed as demand for EVs grows and becomes a more prevalent part of the transition towards CAVs. Beginning steps for integrating electric vehicles into our transportation system safely involves continued roadway safety improvements and road-user safety education. Roadway safety improvements include FHWA-proven safety countermeasures referenced throughout this plan, while road-user safety education refers to webinars, outreach, campaigns, events, and more.

There are concurrent challenges for transportation users and the transportation system. EVs are heavier than non-electric vehicles due to the battery weight. Some batteries alone weigh as much as

entire non-electric vehicles.[30] In recent years, there has also been an influx of consumers purchasing larger vehicles such as SUVs.[31] It is reasonable to expect this trend in consumer preference to persist as more electric vehicles are developed. Heavier vehicles require longer stopping distances. The heavy weight of EVs poses an extra risk to any crash involving lower-mass road users such as conventional cars, bicyclists, and pedestrians.[32] Electric vehicles offer an additional risk to visually impaired pedestrians, as electric vehicles are much quieter and are difficult for the visually impaired to interact with at intersections.

Battery fires are another major safety concern regarding electric vehicle crashes. Battery fires are unpredictably re-ignitable.[33] NHTSA has established a "…Battery Safety Initiative for Electric Vehicles to coordinate research and other activities to address safety risks relating to batteries in electric vehicles." Figure 72 shows NHTSA's considerations regarding EV batteries.

30 https://www.ntsb.gov/Advocacy/Activities/Pages/Homendy-20230111.aspx

31 U.S. Bureau of Economic Analysis, 2023

32 Peter Valdes-Dapena, 2021

33 P. Sun, 2020

Figure 72

NHTSA Interim Guidance for Electric and Hybrid-Electric Vehicles Equipped with High Voltage Batteries

ELECTRIC AND HYBRID-ELECTRIC VEHICLE CONSIDERATIONS

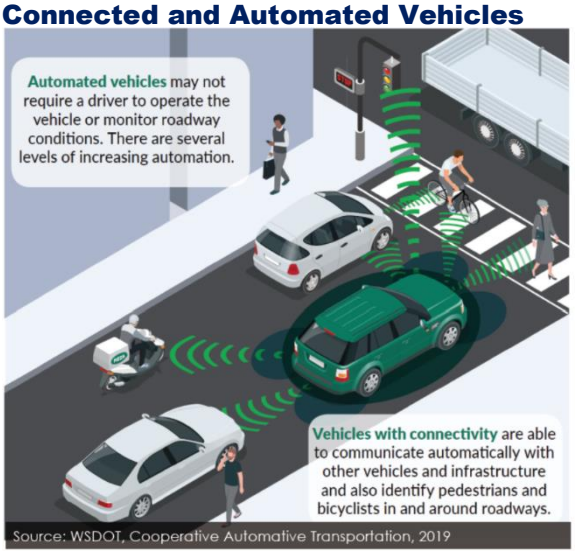
In the event of damage to or fire involving an electric vehicle (EV) or hybrid-electric vehicle (HEV):

- Always assume the high voltage (HV) battery and associated components are energized and fully charged.
- Exposed electrical components, wires, and HV batteries present potential HV shock hazards.
- Venting/off-gassing HV battery vapors are potentially toxic and flammable.
- Physical damage to the vehicle or HV battery may result in immediate or delayed release of toxic and/or flammable gases and fire.

Connected and Automated Vehicles

Figure 73

Connected and Automated Vehicles



Connected and Automated Vehicles (CAVs) are vehicles that have the capability to replace the driver for some or all of the driving tasks (see Figures 73-74) and therefore have the potential to greatly reduce crashes involving human error. However, CAV development is ongoing and expected to come with both positives and negatives regarding safety and system integration. Current human behavior while driving does not align with level 3 automation expectations, specifically regarding distracted driving. People associate hands-free with mind-free, but hands-free automation still requires the driver to intervene at times, which they may not be able to do in time if they are not actively paying attention.

There is also unforeseen potential for technical malfunctions as CAVs are integrated into the transportation system. New and variable environments, like construction zones or areas with vulnerable road users, are problematic for CAVs that cannot correctly detect new surroundings.[34] Implementation of CAVs will require more drastic infrastructure updates and adaptive road-user behavior.

[34] https://connect.ncdot.gov/projects/research/RNAProjDocs/RP2019-11%20Final%20Report%20Main.pdf

Figure 74

Vehicle Automation Levels

LEVEL	0 None	1 Assistance	2 Partial	3 Conditional	4 High	5 Full
What car does 	Nothing	Assists; Accelerate, brake or steer	Assists; Accelerate, brake and steer	Everything for short periods of time	Everything restricted operating environment	Everything
What driver does 	Everything	Everything with some assistance	Everything with more assistance	Remain alert ready to resume control	Nothing restricted operating environment	Nothing

Source: Texas A&M Transportation Institute

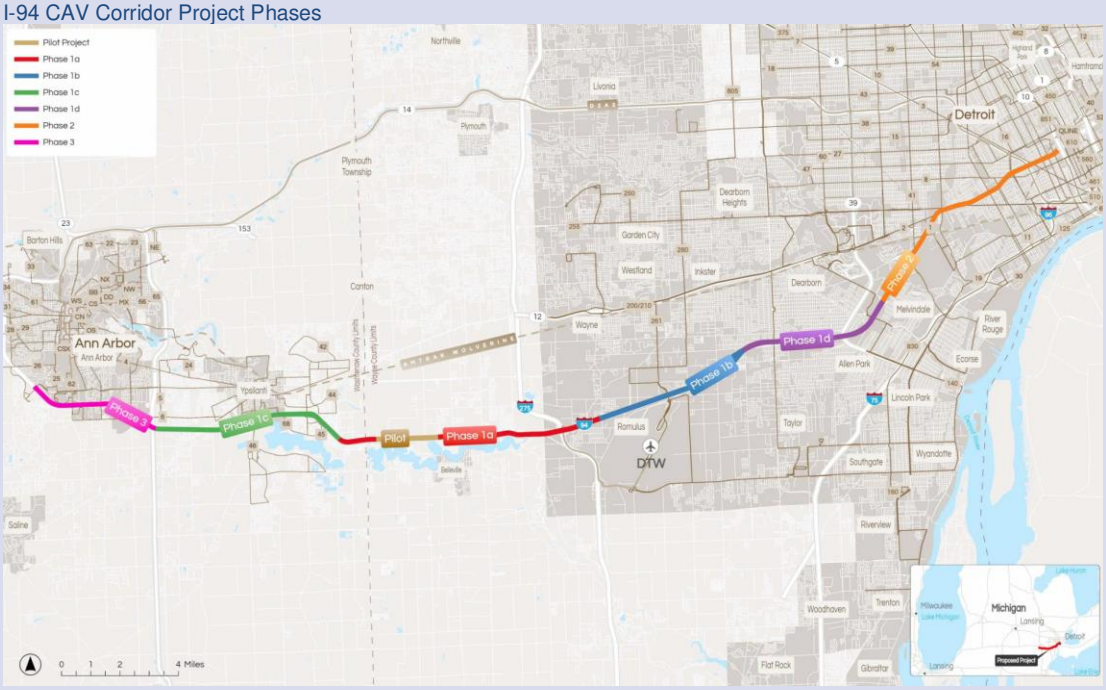
Potential future options for CAVs include:

- *Winter/Emergency coordination* could provide road-users with instantaneous road and weather conditions by sharing connected vehicle data from snow plows and other emergency vehicles.
- *Connected traffic signs and signals* have potential for increased communication with all road users to improve intersection safety and overall traffic flow.
- *Automated work zone vehicles* have potential to eliminate human error in some staging work vehicles.
- *Automated transit vehicles* can assist in detecting blind spots and reduce crashes with other road-users.
- CAVs have potential to offer increased demand and opportunity for developing *multimodal connection hubs*. This is a new infrastructure to support multimodal connections, provide a variety of transportation options and safe transitions between modes of transportation.
- *Delivery robots* are a smaller option for testing CAV system integration. Any implementation of small CAVs should be accompanied by policy that limits size and speed of vehicles that operate on sidewalks.

Regional Case Study: Cavnue

Cavnue, in a public-private partnership with MDOT, is developing the world's first CAV corridor on I-94 between Detroit and Ann Arbor. This project's intent is to bring together technology and infrastructure to improve safety, congestion, and accessibility in the local community by preparing the corridor for future vehicle technology, including personal vehicles, public transit, and freight. More information is available on the Cavnue website.

I-94 CAV Corridor Project Phases



Source: Cavnue

Micromobility

Micromobility services provide individual transportation with small, light vehicles such as shared bicycles, electric scooters, ebikes, or other emerging technologies shown in Figure 75. In many cases, fleets of micro-mobility devices are deployed for shared use, and may be implemented by local governments, nonprofits, or private companies.

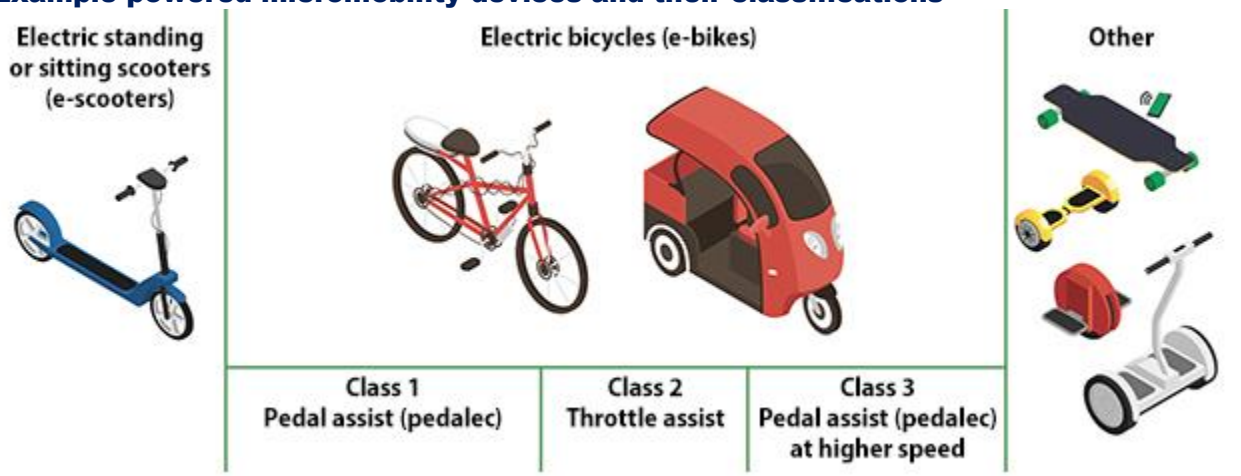
Bikeshare systems may include a fixed network of docking stations, or simply be a collection of dockless bicycles dispersed throughout an area that connect users directly to their destination. Some bikeshare systems include e-bikes and traditional bicycles. Electric scooter sharing systems are typically dockless with electric engines that can travel up to 15 mph.

While these mobility services may provide a convenient and faster alternative to traditional modes of travel for short trips, they also pose new safety risks. Using scooters on sidewalks, for example, is legal under electric scooter laws in Michigan. This poses a risk to pedestrians who have to share the limited sidewalk space with the higher-speed devices. Having a connected and protected network of

bike lanes, which can also be used by people on micromobility devices, can help make streets safer for all vulnerable road users by better matching users with appropriate facilities based on their speeds. To reduce conflicts and increase safety, communities can regulate and enforce the locations and speed at which micromobility devices can be operated.

Figure 75

Example powered micromobility devices and their classifications



Source: PBIC

Actions

Continue research on emerging technology and impacts on safety

There is limited data available regarding crashes involving emerging technologies. The Michigan UD-10 crash report form was updated in 2021 to include information on vehicle automation: when automation system(s) are present in the vehicle; the automation system level in the vehicle; and whether the automation system level was engaged at the time of the crash. Until more data becomes available, the primary goal for this emphasis area is to continue investigating potential goals, regional and local needs, system impacts, and policy frameworks. Analyzing future crash data by age of vehicle, presence of automation features, and vehicles size will be useful for evaluating the effectiveness of new vehicle technologies.

Support local emergency response

Establish partnerships with auto and other technology manufacturers and first responder agencies to ensure a safe, efficient, and coordinated emergency response. This can be done through promoting MI-TIME trainings and deploying technologies for emergency vehicles like signal preemption and priority and vehicle-to-vehicle and vehicle-to-infrastructure communications. Additional coordination with auto manufacturers could include notifying authorities when airbags are deployed to decrease response time, or use of EMS in-vehicle cameras to help emergency personnel at hospitals get information before injured crash victims arrive to improve injury outcomes.

Develop education materials for county and local officials and the public

An outreach program to highlight the issue of emerging technology safety should be undertaken, including training programs such as a SEMCOG University webinar for county and local agency officials, articles, and other events. Additionally, educational materials

describing the benefits of new technologies and how to use them should be developed as part of SEMCOG's *Walk.Bike.Drive. Safe* education campaign for local agency use with the general public to build public acceptance and use of new safety features in vehicles.

Promote additional education about new technology during driver training and renewals

Including information about new technologies for new drivers during drivers training and for current drivers during license and plate renewal will also help build public understanding and acceptance of the new technologies.

Develop standards for new technology

Identify best practices for safe deployment of micromobility devices, electric vehicles, and other technologies already in use. Promoting standardization for new technologies is also important so that use of those technologies is consistent across jurisdictions and manufacturers. Consistency among manufacturers makes it more likely for the public to understand, access, and use new vehicle features that can improve their safety. Additionally, consistency among jurisdictions in the deployment of connected and intelligent transportation systems is important for smart vehicles to be able to stay connected as they traverse the region.

Coordinate industry data and information sharing

Seek partnership and coordination opportunities with manufacturers to use in-vehicle data for predictive analysis of risk. Potential data include hard breaking events, lane departure warnings, and forward collision warnings. Smart signal data collection on near misses would also help inform proactive decision-making instead of relying on only crash data.

Traffic Incident Management

A self-sustaining, established traffic incident management (TIM) program promotes safety, improves mobility, and instills ownership of these benefits in incident responders. MDOT, local agencies and first responders in Southeast Michigan have been partnering for more than two decades to promote TIM. This partnership involves quarterly meetings of the Regional Transportation Operations Coordinating Committee and an annual partnering workshop gathering first responders from across the state to discuss best practices, new technologies, and developing strategies for responding to vehicles crashes and other incidents on Southeast Michigan roads. Traffic operations centers now operate across the region servicing most of Southeast Michigan to support TIM efforts. In addition, TIM programs such as the Freeway Courtesy Patrol continue to grow based on their success.

TIM is not only vital for clearing roadways and reducing traffic backups but is also important for increasing the likelihood of survival for those involved in a crash. Crash scene staging can also reduce risk to the responders on the scene and risk of secondary crashes, or crashes that occur as a result of another crash.

Figures 76-77 summarize the recent five-year fatality and serious injury data for secondary crashes.

Quick Observations

- 2% of the region's fatalities and serious injuries are from a secondary crash.
- The likelihood of a secondary crash increases by 2.8% for each minute the primary incident continues to be a hazard.[35]

Figure 76

Secondary Crash-Involved Fatalities and Serious Injuries

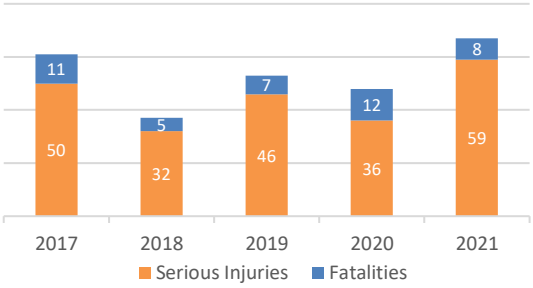
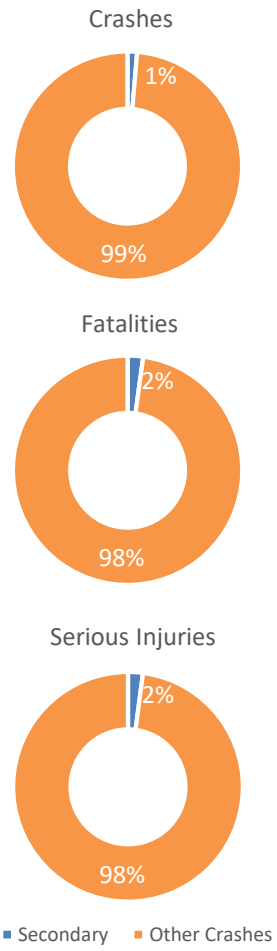


Figure 77

Share of Crashes, Fatalities, and Serious Injuries Involving Secondary Crashes



35 https://ops.fhwa.dot.gov/publications/fhwahop10009/tim_fsi.htm

Actions

Continue to promote the MI-TIME training

Michigan's Traffic Incident Management Effort (Mi-TIME) is a partnership between agencies – including MDOT, State and local law enforcement, fire, EMS, and towing services – to work together to safely and efficiently clear traffic incidents from Michigan's highways. A key focus of this effort has been to promote the national SHRP2 TIM training courses. Responder courses focus on providing these groups with strategies to reduce the risk to motorists involved in a traffic incident, first responders on scene at the incident, and other motorists passing by the incident who may become involved in a secondary crash.

Courses are developed for responders by responders, including topics such as fundamentals and terminology, notification and scene size-up, safe vehicle positioning, scene safety, command responsibilities, traffic management, special circumstances, and clearance and termination. The target audience for this course is all TIM disciplines, including: Communications, Emergency Management, Emergency Medical Services (EMS), Fire/Rescue, Law Enforcement, Towing and Recovery, and Transportation/Public Works. Approximately 32% of Michigan's first responders have completed this training. SEMCOG will continue to promote the benefits of this training.

Continue promotion and education of the use of high-visibility apparel to first responders

The use of high-visibility apparel by first responders during incidents has been found to significantly reduce the risk that they may be involved in a traffic crash. The Regional Transportation Operations Coordinating Committee should continue to work in partnership with the Governor's Traffic Safety Advisory Commission (GTSAC) TIM Action Team to promote the use of high visibility apparel in Southeast Michigan.

Continue promotion of laws pertaining to TIM

The quick clearance of incidents has been found to be an effective strategy to reduce the risk of secondary crashes. MDOT, in partnership with the GTSAC TIM Action Team, developed a public information and education campaign to promote the Steer It, Clear It law. SEMCOG and the Regional Transportation Operations Coordinating Committee in partnership with the GTSAC TIM Action Team should continue to promote the Steer It Clear It law through public education in Southeast Michigan. Continued promotion of the Slow Down and Move Over law as well as education on secondary crashes would also help improve safety during traffic incidents.

Pilot test various engineering countermeasures to assist with TIM

Engineering solutions have been found effective for supporting TIM efforts. The use of signs and gates at interchanges, crash investigation sites, and other real-time traveler information focused countermeasures have been found to be effective in improving safety. SEMCOG will continue to promote inter-agency partnership with the Regional Transportation Operations Coordinating Committee to pilot test various countermeasures, such as quick clearance, to determine their effectiveness for potential deployment on a systemic basis. Identifying best practices for freeway versus local mitigation strategies would also better support TIM efforts.

Further develop the use of data solutions to enhance TIM

The Southeast Michigan Traffic Operations Center (SEMTOC) has begun focusing more on roadway performance reporting. This requires collection of many different datasets such as crash location, lanes affected, and clearance times. Similar data are needed for other unplanned incidents and planned work such as construction and moving work crews. These data are used to understand how speed data can indicate corridor performance.

SEMTOC is currently increasing the use of probe data through the INRIX and RITIS platforms. Probe data are now being used in real-time for incident detection by looking for speed drops that have not yet been reported through traditional means such as a 911 call or visual detection on the roadway. SEMTOC is also using probe data to classify incidents they are managing. Severity levels of Low, Medium, and High are now used to indicate the length of backups created by a crash, which is measured using the probe speed data. They also extensively use the probe data in performance reporting on roadway conditions and after action analysis.

It is proposed that SEMCOG and SEMTOC work to match the “Event ID” field found in the SEMCOG Traffic Crash dataset (https://semcog.org/traffic-crash-data) with the “Event ID” field in the SEMTOC datasets. This would allow for further analysis, such as:

- More detailed analytics between road conditions and severity of crashes.
- Ability to group by crash type and determine the impact on clearance time after the crashes.
- Based on the crash type, traffic delays can be estimated. Also, further analysis can be conducted on the relationship between crash type and traffic delays.
- Data (2012 – 2021) from the last three years can be displayed with a year over-year comparison.

Beyond crash analysis, further study is needed of Michigan’s auto insurance law change regarding medical coverage and its impacts on post-crash care and outcomes. Michigan Department of Health and Human Services vital records data could also be studied to gather further outcomes data beyond what is available in the crash database.

Support additional statewide efforts in Southeast Michigan

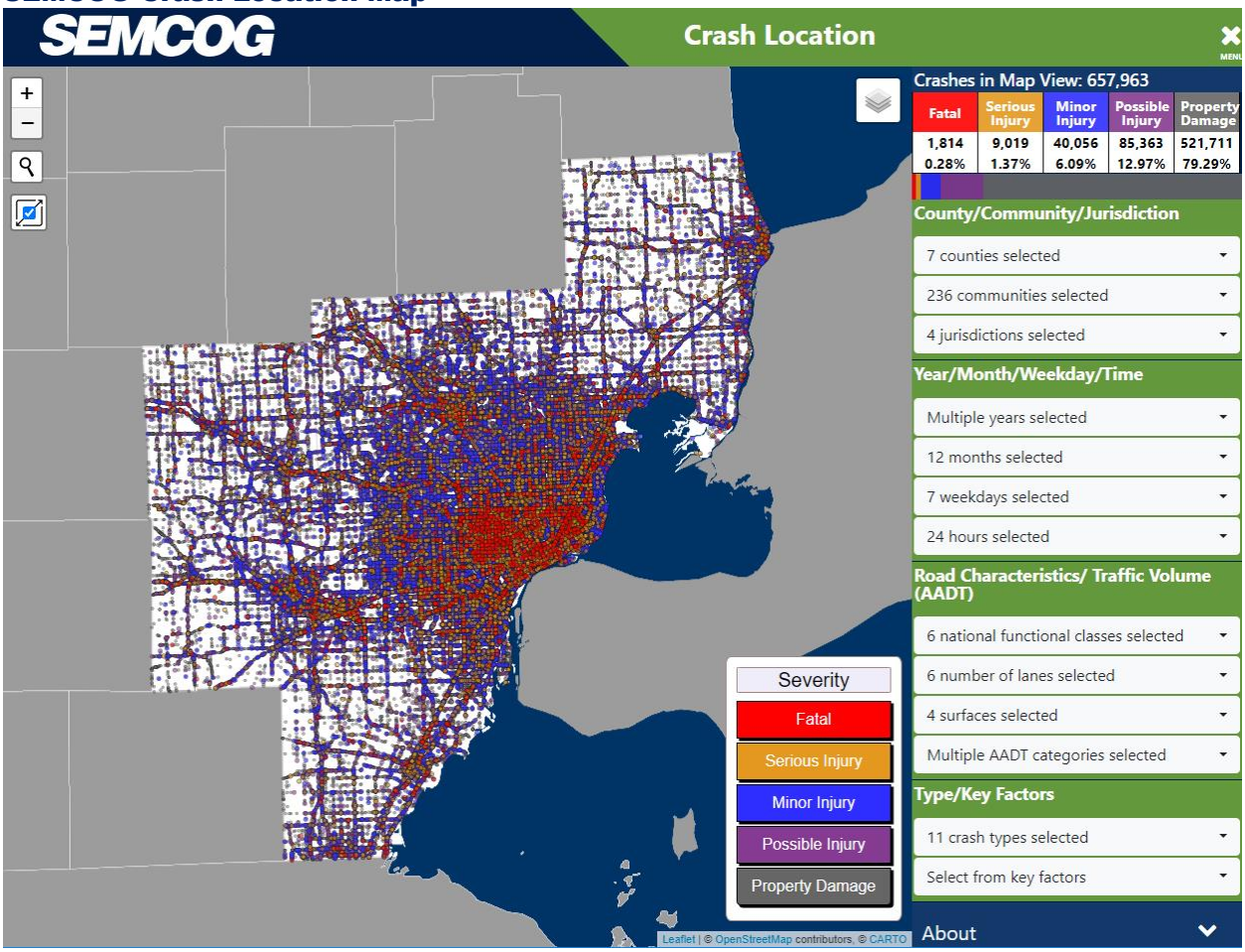
As part of the Michigan SHSP, a Traffic Incident Management Action Plan was developed to promote strategies to improve TIM. SEMCOG and local agencies should continue to support and champion these statewide efforts in Southeast Michigan.

Traffic Records and Information Systems

Good traffic records – which include databases on crashes, traffic volume, and roadway attributes – are the foundation to implementing most of the above-listed strategies. SEMCOG has several systems to manage a variety of traffic and safety related data, including traffic crash (Figure 78), traffic counts, and various roadway attributes. Each year, SEMCOG receives traffic crash data from MSP for the previous year to analyze and publish on its website for local agencies and the public to use. Additional data for the roadway network are accessible on SEMCOG's website.

As big data solutions grow in popularity, there are many new data sources which agencies in Southeast Michigan should also consider. Below is a list of data enhancements along with innovative data analytics solutions, which will enhance the ability to effectively identify and address safety issues. To cost-effectively implement many of these solutions will involve collaboration between multiple agencies.

Figure 78
SEMCOG Crash Location Map



Actions

Collect and maintain traffic volume data for non-federal aid roads
Currently, SEMCOG manages a database of traffic count data for the region. Although there are some non-federal aid roads in the database, the focus of SEMCOG's traffic count program is federal-aid roadways. Currently there is not a region-wide traffic count database dedicated to counts on non-federal aid roads, although some local data are collected. SEMCOG should continue to collaborate with local road agencies to collect and maintain non-federal aid, multimodal traffic count data. Expanded use of smart traffic cameras at intersections can help with this data collection. SEMCOG and its partners should also look to big data sources as possible alternative sources for augmenting the data.

Collect bicycle and pedestrian volume data
Pedestrian and bicycle volume data will help agencies more effectively target improvements targeted at vulnerable road users. SEMCOG's multimodal count program assists local agencies with collecting short-duration counts at requested locations. Collecting complete bicycle and pedestrian volume data for all road segments would enable the analysis of nonmotorized risk and exposure analyses. SEMCOG should partner with local and statewide agencies to collect this data.

Collect connected vehicle data
Connected vehicles are likely going to be a large source of traffic safety related data. As agencies in Southeast Michigan continue to deploy connected vehicle equipment, it is vital that traffic safety-related data be identified. SEMCOG and local agencies should support and work with MDOT on advancing this effort. Additionally, SEMCOG and its partners should also partner with the auto industry to provide access to this data for public safety use.

Support effort in utilizing speed data
Vehicle speed is a primary indicator of severity of traffic crashes. SEMCOG analyzes speed data in the region using the INRIX and RITIS platforms. New platforms, like Iteris's ClearGuide Speeding Analytics, should be considered for better access and utilization of speed data. Agencies should partner with SEMCOG and MDOT to leverage resources for accessing and utilizing speed data to make informed transportation safety decisions.

Support additional statewide efforts in Southeast Michigan
As part of the Michigan SHSP, a Traffic Records Coordinating Committee Strategic Plan was developed to define a system, organization, and process for managing the data and attributes of the roadway, drivers, passengers, and vehicles to support safety programs across the State. SEMCOG and local agencies should continue to support and champion recommendations of this plan in Southeast Michigan.

Chapter 5: Implementing the Plan

Crosscutting action items

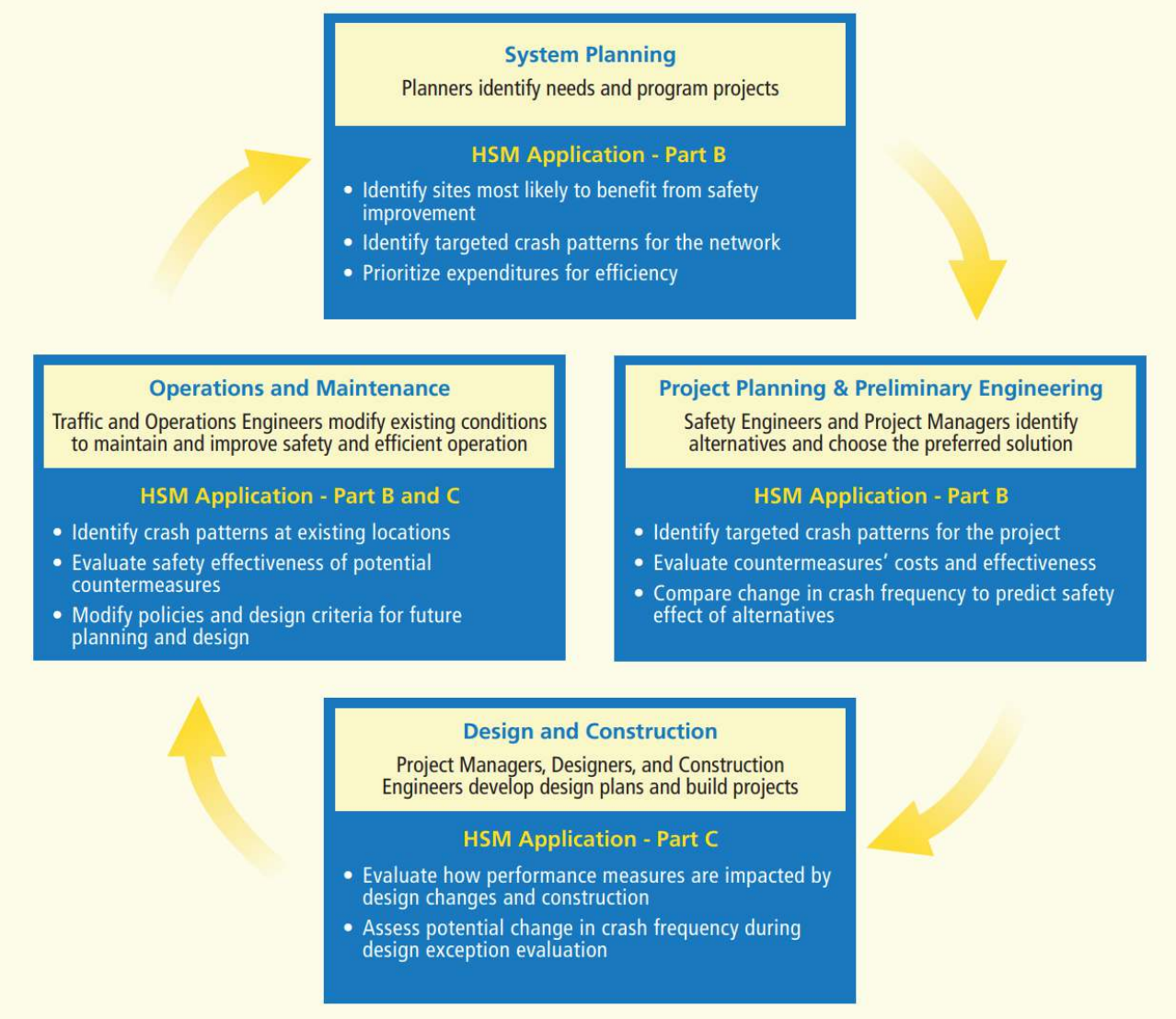
In addition to the action items already described in this plan, there are multiple actions that SEMCOG and its partners can take to implement the Safe System Approach that apply to all regional safety issues, not just a specific emphasis area. These include:

Prioritize safety projects in the TIP
Incorporate the safety performance measure targets into the Transportation Improvement Program (TIP) project selection process with the Federal Aid Committees, prioritizing fatality and serious injury reduction. The TIP is a schedule of road and transit projects selected as priorities for funding by cities, villages, county road commissions, transit agencies, and MDOT. It is an implementation tool of the Regional Transportation Plan.

Promote use of the Highway Safety Manual (HSM) to measure the safety impacts of engineering countermeasures
The HSM, developed by American Association of State Highway and Transportation Officials, provides guidance for incorporating quantitative safety analysis in the highway transportation project planning and development processes. The use of the HSM should be promoted as a tool for use within the local plan review process to document the safety impacts of proposed engineering strategies. In addition, local agencies could require a HSM analysis as part of their traffic impact study submittal requirements. Figure 79 shows how the HSM can be applied to the project development process.

Figure 79

How the HSM applies to the Project Development Process



Source: AASHTO

Identify and promote funding opportunities for safety projects
Prioritize safety in all Federal-aid investments and in all appropriate projects, using not only HSIP funding but also other Federal-aid funding and other funding opportunities as they arise. Also promote economies of scale through joint grants and applications of new facilities.

Target engineering, education, and enforcement efforts in priority locations
Engineering, education, and enforcement activities should be targeted to locations with a document crash history for hot spot treatment or known risk factors for system treatment.

Prioritize vulnerable road users and traffic calming treatments, including at intersections. Prioritize arterials and other roadways with highest risk and crash incidence, including those locations identified in this plan as focus facilities or on the High Injury Network.

Engage meaningfully with stakeholders and people who use the road or are impacted by it throughout the planning, design, and all decision-making processes of a project. This is especially important with people in equity demographics who are not always represented in the process but may have greater mobility considerations and therefore be more impacted by a project.

Encourage use of specialized or supplemental community enforcement teams for traffic issues, separate from other police units. Implement an education-first enforcement policy for some traffic offense, focusing on written warning option and/or a citation diversion program.

Identify and recognize proactive communities
Develop a community guide of best practices for project evaluation and prioritization, policies and ordinances, and guidelines for new development that promote transportation safety and the reduction of fatalities and serious injuries on Southeast Michigan roadways. Identify and recognize communities that adopt the best practices and strategies outlined in this plan.

Continue coordination of a regional Transportation Safety Action Committee
Continue to meet on a quarterly basis with safety stakeholders across the region to exchange information and monitor the implementation of this plan. Additional actions, performance measures, and goals may be introduced after adoption of this plan.

Implementing the Safe System Approach

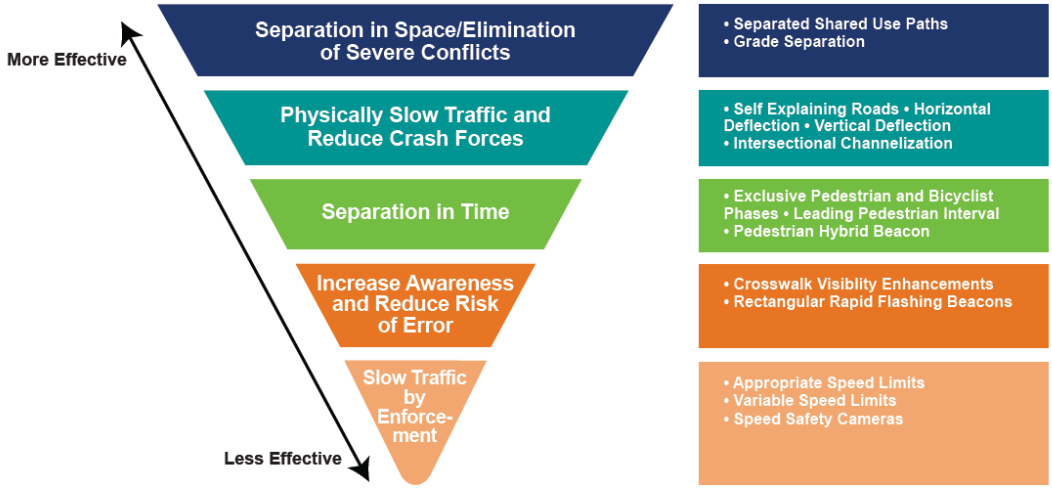
Survivability of a crash depends on the circumstances of the crash. The Safe System Approach involves matching vehicular operating speeds to the appropriate conditions of the road and the road users. This approach inherently prioritizes nonmotorized road users due to their vulnerable nature and higher fatality risk when compared to their counterparts traveling in motor vehicles.

A safe system makes it easier for people not to make mistakes in the first place. Therefore, the most effective strategies for reducing fatalities and serious injuries are those that eliminate exposure to a crash before it can occur. If eliminating the source of crash exposure is not possible, the next best strategy is mitigating the impact of the crash to avoid severe consequences. Next are engineering controls that change how we design and operate the road system and vehicles. And finally are the administrative controls that change the way people use the system through education, legislation, and enforcement.

This safety hierarchy of controls was adapted from the field of workplace safety by the *Washington State Strategic Highway Safety Plan 2019*.[36] It was adapted further by FHWA to identify the most effective and efficient safe system solutions. Figure 80 illustrates the safe system solutions hierarchy and example treatments that fall under each category of solutions. This hierarchy should be followed when selecting solutions in order to create the safest system of roadways in Southeast Michigan.

Figure 80

Safe System Solution Hierarchy with Example Strategies for Implementation



Source: FHWA

Using this hierarchy to address vulnerable road user safety, for example, the most effective strategies would be those that physically separate people who walk and bike from vehicle traffic. If physical separation is not possible, the next best option is physically slowing traffic down or separating road users in time by providing exclusive phasing at signals. Finally, increasing awareness of other road users through crosswalk visibility enhancements and improving user behavior through education and enforcement can also reduce risk. These final strategies are important but arguably not as effective as removing the hazard or physically slowing traffic down in the first place and therefore are at the bottom of the solutions hierarchy.

36 http://targetzero.com/wp-content/uploads/2020/03/TargetZero2019_Lo-Res.pdf

Creating a safe system – who has a role?

The region's transportation network consists of many pieces, and many people have different roles in moving this regional plan forward. As a result, integrating transportation safety planning into a local community requires collaboration across multiple municipal departments and agencies. Successful implementation incorporates elements from local government planning, engineering and public works, public safety, public outreach, and finance departments, in addition to numerous outside agencies. The following list of roles provides a sense of how these different pieces can begin to come together.

- SEMCOG's Transportation Safety Action Committee – coordinate with regional safety stakeholders to exchange information and monitor the implementation of this plan.
- County and local government
  - Governing bodies/councils – adopt policies that promote transportation safety and communicate benefits and importance to the public.
  - Planning and engineering – implement safety strategies and infrastructure projects on local roads, prioritizing the needs of all users and the land use context.
  - Public safety – provide first response for crashes and participate in education and enforcement initiatives.
  - Federal-Aid Committees – recommend projects for federal funding that meet regional transportation safety goals.
- State government – consider regional safety prioritieis when allocating grant resources, prioritize safety infrastructure implementation when making investments in state property, convene statewide forums on safety, and adopt legislation that promotes safety.
- Federal government – allocate funding to safety infrastructure, promote national best practices, and implement the National Roadway Safety Strategy.
- Transportation safety groups – regional groups as well as national and state associations; identify and advocate for opportunities to impelement safety projects and programs.
- Academia – increase research on safety performance and benefits of new safety strategies, infrastructure, and technology.
- Mobility companies – including auto manufacturers, micromobility providers, and transit operators; expand availability of vehicle safety features and coordinate with state and local government on information and data sharing.
- Public – engage local government on transportation safety issues, learn about new infrastructure and policies, and practice safe behavior regardless of travel mode.

Action Summary

The following is a summary of actions to implement the Southeast Michigan Transportation Safety Plan. It includes specific action items for each regional policy with recommended timelines to help guide the implementation process. Performance measures are outlined for each action item to help monitor the effectiveness of each item. The action items for each policy are listed in order of effectiveness based on the safe system solutions hierarchy described earlier in this chapter.

Action	Action Type	Emphasis Area	Lead(s)	Performance Measure	Timeline
Description of strategy/action item	Engineering, Education, Enforcement, EMS, Equity, Evaluation	Priority and additional emphasis areas from the plan	The organization(s) that will coordinate on implementation of the action item	Quantifiable measure of action impact	Short: <2 years Medium: 2-5 years Long: 5+ years Ongoing: action is already being implemented

Safer People: Encourage safe, responsible behavior by people who use our roads and create conditions that prioritize their ability to reach their destination unharmed.

Action	Action Type	Emphasis Area	Lead(s)	Performance Measure	Timeline
Support legislative efforts to improve behavior (e.g., speed and red light camera enforcement, rear seatbelt use, handheld device ban, motorcycle helmet use, license screening and testing)	Enforcement, Equity	Intersection, Work Zone, Speeding, Occupant Protection, Distracted Driving, Pedestrian, Bicyclist, Motorcycle, Older Driver	Local agencies, SEMCOG, GTSAC	Policies in SEMCOG's *Legislative Policy Platform*, adopted legislation	Long
Educate the public about new vehicle technologies (e.g., lane keeping assist, adaptive cruise control)	Education	Lane Departure, Speeding, Emerging Technology	MDOS, Local agencies, Private sector, SEMCOG	# of materials developed and distributed	Medium
Promote senior-friendly transportation options	Education, Equity	Older Driver	MDOS, MSP, Local agencies, SEMCOG	# of materials distributed	Ongoing
Develop and promote safety outreach materials for county and local officials and the public	Education	All	SEMCOG, MDOT, OHSP, MDOS	# of materials developed and distributed	Ongoing
Promote motorcycle endorsement and reduce "shadow riders"	Education, Enforcement	Motorcycle	MDOS, MSP, Local agencies, SEMCOG	Endorsement rate	Ongoing
Improve young driver training	Education	Young Driver	MDOS, MSP, GTSAC, Local agencies	Changes to training programs, local participation in training courses	Ongoing
Employ school-based strategies (e.g., Strive for a Safer Drive)	Education	Young Driver	MDOS, OHSP, Schools, Local agencies	# of schools participating in safety education programs	Ongoing
Target education and enforcement efforts in priority locations	Education, Enforcement, Equity, Evaluation	All	Local agencies, MSP, MDOT, SEMCOG	# of high visibility education and enforcement campaigns	Ongoing

Action	Action Type	Emphasis Area	Lead(s)	Performance Measure	Timeline
Promote training opportunities for law enforcement	Education, Enforcement	Impairment	MSP, Local agencies, SEMCOG	Local participation in statewide training programs	Ongoing
Identify funding opportunities to support equitable education, encouragement, and targeted enforcement activities	Education, Enforcement, Equity	Pedestrian, Bicyclist	OHSP, Local agencies, SEMCOG	# of projects funded	Ongoing
Support additional statewide efforts (e.g., Michigan SHSP and GTSAC Action Plans)	Engineering, Education, Enforcement, EMS, Equity, Evaluation	All	Local agencies, SEMCOG	Local and regional participation in GTSAC action teams	Ongoing

Safer Roads: Design roadway environments to mitigate human mistakes and account for injury tolerances, to encourage safer behaviors, and to facilitate safe travel by the most vulnerable users.

Action	Action Type	Emphasis Area	Lead(s)	Performance Measure	Timeline
Build complete networks for all travel modes and stop building unsafe roads	Engineering, Equity	Pedestrian, Bicyclist	MDOT, Local agencies	# of completed projects	Ongoing
Ensure nonmotorized facilities are properly maintained	Engineering, Equity	Pedestrian, Bicyclist	MDOT, Local agencies	Nonmotorized asset management programs developed	Medium
Prioritize safety projects in the TIP	Engineering, Equity, Evaluation	All	MDOT, Local agencies, SEMCOG	Established TIP prioritization process	Short
Target engineering efforts in priority locations	Engineering, Equity, Evaluation	All	MDOT, Local agencies, SEMCOG	# of projects	Ongoing
Implement safety focused engineering countermeasures	Engineering	Intersection, Lane Departure, Access Management, Distracted Driving, Pedestrian, Bicyclist, Motorcycle, Older Driver	Local agencies, MDOT	# of completed projects	Ongoing
Evaluate the potential to use advanced technologies like ATCMTD	Engineering, EMS, Evaluation	Intersection, Pedestrian, Bicyclist	Local agencies, MDOT	Report of findings from current pilots	Ongoing
Develop a coordination program for road agencies and municipalities to partner with private sector and improve corridor access management	Engineering, Evaluation	Access Management	SEMCOG, Local agencies, Private sector	Coordination program	Medium
Conduct road safety audits of high risk locations	Engineering	Intersection, Lane Departure, Pedestrian, Bicyclist	Local agencies, SEMCOG	# of RSAs	Short
Promote use of the Highway Safety Manual to measure the safety impacts of design decisions	Engineering, Evaluation	All	MDOT, SEMCOG, Local agencies	Completed analyses	Ongoing
Rank and prioritize high-risk locations	Evaluation	Intersection, Lane Departure, Rail, Pedestrian, Bicyclist	SEMCOG	Priority locations analysis	Ongoing
Maintain and update a region-wide intersection and segment inventory	Evaluation	Intersection, Lane Departure	SEMCOG	Updated database	Ongoing

Action	Action Type	Emphasis Area	Lead(s)	Performance Measure	Timeline
Educate local officials on safety best practices	Education, Engineering	Intersection, Lane Departure, Access Management; Pedestrian, Bicyclist	SEMCOG, MDOT	# of trainings held, materials distributed	Ongoing
Create a region-wide at-grade rail crossing inventory	Evaluation	Rail	SEMCOG	Updated database	Short
Consider additional rail safety risks	Evaluation	Rail	SEMCOG	Coordination program with FRA	Medium
Identify and promote funding opportunities for safety projects	Engineering, Equity, Evaluation	All	MDOT, SEMCOG	# of funded projects	Ongoing
Support additional statewide efforts (e.g., Michigan SHSP and GTSAC Action Plans)	Engineering, Education, Enforcement, EMS, Equity, Evaluation	All	Local agencies, SEMCOG	Local and regional participation in GTSAC action teams	Ongoing

Safer Vehicles: Expand the availability of vehicle systems and features that help to prevent crashes and minimize the impact of crashes on both occupants and non-occupants.

Action	Action Type	Emphasis Area	Lead(s)	Performance Measure	Timeline
Support use of advanced vehicle technologies (e.g., lane keep assist, radio alert systems, ITS device deployment, intelligent speed adaptation, electronic braking systems)	Education, Engineering	Lane Departure, Work Zone, Speeding, Pedestrian, Bicyclist, Commercial Truck/Bus, Older Driver	Private sector, Local agencies, SEMCOG, Regional Transportation Operations Coordinating Committee	# of projects, coordination meetings	Medium
Develop standards for new technology	Engineering, Equity, Evaluation	Emerging Technology, Pedestrian, Bicyclist	Private sector, MDOT, SEMCOG, Local agencies	# of projects, coordination meetings	Long
Implement and update Public Transportation Agency Safety Plans	EMS, Equity, Evaluation	Commercial Truck/Bus	Transit agencies, SEMCOG	PTSAPs, transit safety targets	Ongoing
Promote commercial vehicle training programs (e.g., driver training and licensing, maintenance and inspection)	Education	Commercial Truck/Bus	GTSAC, Transit agencies, SEMCOG	Participation in training programs, licensing rate	Medium
Continue research on emerging technology and impacts on safety	Evaluation	Emerging Technology	Private sector, MDOT, SEMCOG	Crash analysis, report of research findings	Long
Support additional statewide efforts (e.g., Michigan SHSP and GTSAC Action Plans)	Engineering, Education, Enforcement, EMS, Equity, Evaluation	All	Local agencies, SEMCOG	Local and regional participation in GTSAC action teams	Ongoing

Safer Speeds: Promote safer speeds in all roadway environments through a combination of thoughtful, context-appropriate roadway design, targeted education and outreach campaigns, and enforcement.

Action	Action Type	Emphasis Area	Lead(s)	Performance Measure	Timeline
Implement traffic calming engineering countermeasures	Engineering	Speeding; Pedestrian, Bicyclist	Local agencies, MDOT	# of completed projects	Ongoing
Implement road diets on segments with excess capacity	Engineering	Speeding; Pedestrian, Bicyclist	Local agencies, MDOT	# of completed projects	Ongoing

Action	Action Type	Emphasis Area	Lead(s)	Performance Measure	Timeline
Conduct a regional speed analysis	Evaluation	Speeding, Pedestrian, Bicyclist, Traffic Records and Information Systems	SEMCOG, MDOT	Data acquisition, Completed analysis	Short
Set context-appropriate speed limits	Engineering	Speeding; Pedestrian, Bicyclist	Local agencies, MDOT, MSP	Updated statewide speed limit setting standard	Long
Ensure drivers obey posted speed limits	Education, Enforcement, Evaluation	Speeding, Pedestrian, Bicyclist	Local agencies, MDOT, MSP, SEMCOG	Completed analyses, education programs, and enforcement campaigns	Ongoing
Continue coordination with road agencies on speed reduction strategies	Evaluation	Speeding; Pedestrian, Bicyclist	SEMCOG, Local agencies, MDOT	# of projects, coordination meetings	Ongoing
Support additional statewide efforts	Engineering, Education, Enforcement, EMS, Equity, Evaluation	All	Local agencies, SEMCOG	Local and regional participation in GTSAC action teams	Ongoing

Post-Crash Care: Enhance the survivability of crashes through expedient access to emergency medical care, while creating a safe working environment for vital first responders and preventing secondary crashes through robust traffic incident management practices.

Action	Action Type	Emphasis Area	Lead(s)	Performance Measure	Timeline
Support local emergency response through technology deployment	EMS	Emerging Technology	Local agencies, MDOT, Regional Transportation Operations Coordinating Committee	# of completed projects	Long
Pilot test various engineering countermeasures to assist with TIM	Engineering, EMS	Traffic Incident Management	Local agencies, SEMCOG, Regional Transportation Operations Coordinating Committee	# of projects	Medium
Further develop the use of data solutions to enhance TIM	EMS, Evaluation	Traffic Incident Management	MDOT, Local agencies, SEMCOG	Completed analysis	Ongoing
Promote first responder training for motorcycle crashes	Education, EMS	Motorcycle	GTSAC, Local agencies, SEMCOG	Local participation in trainings	Ongoing
Promote training of vehicle emergency response procedures for transit staff	Education, EMS	Commercial Truck/Bus	Transit agencies	Local participation in trainings	Short
Continue to promote the MI-TIME training	Education, EMS	Traffic Incident Management	GTSAC, Local agencies, SEMCOG	Local participation in trainings	Ongoing
Continued promotion and education of the use of high-visibility apparel to first responders	Education, EMS	Traffic Incident Management	GTSAC, Local agencies, SEMCOG, Regional Transportation Operations Coordinating Committee	Local participation in trainings	Ongoing

Action	Action Type	Emphasis Area	Lead(s)	Performance Measure	Timeline
Collect bicycle and pedestrian volume data	Evaluation	Pedestrian, Bicyclist, Traffic Records and Information Systems	MDOT, Local agencies, SEMCOG	Updated database	Ongoing
Collect and maintain traffic volume data for non-federal aid roads	Evaluation	Traffic Records and Information Systems	Local agencies, SEMCOG	Updated database	Ongoing
Coordinate industry data and information sharing	Evaluation	Emerging Technology, Traffic Records and Information Systems	Private sector, MDOT, Local agencies, SEMCOG	Updated database	Ongoing
Evaluate effectiveness of safety measures	Evaluation	Pedestrian, Bicyclist	SEMCOG, MDOT, Local agencies	Completed analysis	Long
Work with State of Michigan and local police departments on UD-10 crash form enhancements and ensure officers complete the form	Enforcement, Evaluation	Pedestrian, Bicyclist	SEMCOG, Local agencies, MSP	Updates to the UD-10 form	Long
Identify and recognize proactive communities	Evaluation	All	SEMCOG, Local agencies	Recognition program developed	Medium
Continue coordination of a regional Transportation Safety Action Committee	Engineering, Education, Enforcement, EMS, Equity, Evaluation	All	SEMCOG, Local agencies, MDOT	Quarterly meetings	Ongoing
Support additional statewide efforts (e.g., Michigan SHSP and GTSAC Action Plans)	Engineering, Education, Enforcement, EMS, Equity, Evaluation	All	Local agencies, SEMCOG	Local and regional participation in GTSAC action teams	Ongoing

Funding Opportunities

Having sufficient funds for safety infrastructure and related programs is critical to achieving a safe transportation network in Southeast Michigan. Unfortunately, funding is often limited. The funding that is available is often highly competitive and reliant on additional resources. Communities that successfully develop safe systems often need to be creative in leveraging funds from a variety of sources and aligning projects with other, often larger, infrastructure projects.

FHWA recognizes that the funding available through HSIP alone will not achieve the goal of zero fatalities on the Nation's roads. The Safe System Approach addresses the safety of all road users, including those who walk, bike, drive, ride transit, and travel by other modes. It involves a paradigm shift to improve safety culture, increase collaboration across all safety stakeholders, and refocus transportation system design and operation on anticipating human mistakes and lessening impact forces to reduce crash severity and save lives.

FHWA encourages States to prioritize safety in all Federal-aid investments and in all appropriate projects, using not only HSIP funding but also other Federal-aid funding. The following is a summary of funding mechanisms at the local, state, and federal level for safety projects.

Federal Funding Sources:

- **Highway Safety Improvement Program (HSIP):** Administered by FHWA and MDOT, HSIP is a core federal-aid program with the purpose of achieving a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned roads and roads on tribal land. HSIP requires a data-driven, strategic approach to improving highway safety on all public roads with a focus on performance. This competitive grant program can be used for intersection, lane departure, and other treatments that improve safety for drivers, pedestrians, and bicyclists. MDOT also makes funds available for streamlined systemic and high-risk rural road projects.
- **Safe Streets and Roads for All (SS4A):** Administered by FHWA, SS4A is a new competitive grant program that funds comprehensive safety action planning, conducting planning, design, and development activities in support of a safety action plan, and carrying out projects and strategies identified in a safety action plan.
- **Office of Highway Safety Planning Grants:** Administered by the National Highway Traffic Safety Administration (NHTSA) and Michigan State Police Office of Highway Safety Planning (OHSP), these grants are awarded for safety programs related to emphasis areas in the Michigan Strategic Highway Safety Plan. This funding aims to increase safety awareness and skills among all road users. Items eligible for funding are public awareness, education, enforcement, and training for professionals involved with safety.
- **Surface Transportation Block Grant Program (STBG):** Administered by FHWA and MDOT, STBG is a flexible funding program that allocates funds to states and localities for projects to preserve and improve the conditions and performance on any public road, including safety infrastructure. STBG is the most flexible of all Federal-aid highway programs, allowing wide discretion for recipients to use funds as needed to meet state and local transportation priorities.
- **Transportation Alternatives Program (TAP):** Administered by FHWA and MDOT, TAP funds are split between the state and various larger urban areas based on population. MDOT administers an estimated $17.6 million in TAP funding each year, which includes funds for Safe Routes to School programs and projects. The SEMCOG region has received approximately $5 million annually, distributing funds on a competitive basis. TAP funds can be used to expand transportation choices and enhance the transportation experience through implementing a

number of improvements – pedestrian and bicycle infrastructure and safety paths, environmental mitigation through green infrastructure, and projects to improve walking and biking to school.

- **Safe Routes to School (SRTS) Major Grants:** MDOT administers major grants for SRTS with funding through TAP. This grant program focuses on helping communities build sidewalks, crosswalks, and any other infrastructure improvements that may be needed to make it possible for students to walk, bike, and roll safely to school. They are supplemented by Safe Routes to School Mini Grants, which are administered by the Michigan Fitness Foundation and more focused on education and encouragement.
- **Air Quality Programs:** Administered by MDOT and SEMCOG, competitive air quality programs like the Congestion Mitigation and Air Quality Improvement (CMAQ) program and the Carbon Reduction Program (CRP) provide funding for select safety items that meet program criteria, such as roundabouts and turn lanes.
- **Rail Programs:** The FRA Railway-Highway Crossings Program provides funds for the elimination of hazards at railway-highway crossings. The MDOT Office of Rail administers those funds through two programs: the Local Grade Crossing Program (LGCP) and the Trunkline Grade Crossing Program (TGCP). These programs work with local road authorities and railroad companies to improve safety at highway-railroad crossings. The LGCP also provides cash incentives to road authorities closing streets at crossings, and both programs provide funding toward track realignment projects that eliminate public grade crossings. MDOT also dedicates $3 million per year of state road funding toward highway-rail grade crossing safety issues. In addition, the Infrastructure Investment and Jobs Act, also known as the Bipartisan Infrastructure Law, continues the annual set-aside for railway-highway crossing improvements. The funds are set-aside from the Highway Safety Improvement Program (HSIP) apportionment.

Plan Maintenance

SEMCOG will provide assistance with regional coordination and general oversight of the overall implementation process. SEMCOG will also report on progress toward achieving the plan's actions and policies and reducing roadway fatalities and serious during the annual safety target setting process with the Transportation Coordinating Committee and Executive Committee.

This is intended to be a living document that will be monitored and adjusted over time by the Transportation Safety Action Committee (TSAC). As the plan is implemented and progress is evaluated, there will be a need to update the plan based on barriers to implementation or new safety issues or opportunities that arise. Any updates to regional policies and priorities will be included in the *2050 Regional Transportation Plan for Southeast Michigan*. Updates to the list of actions, data analysis, and any annual reporting will be posted to SEMCOG's website for public access.

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2022-2023

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