# WRONG WAY: BLACK AUTO DEATHS UP IN WISCONSIN

Recent years brought a sharp increase in deaths of black Wisconsinites in motor vehicle crashes, and long-term trends saw the rate of such deaths overtake those of white and Hispanic Wisconsinites and all black Americans. Many of these fatalities occurred in Milwaukee, which saw a sharp increase in speeding-related fatalities. Local officials have raised concerns about a reckless driving epidemic; several other factors are also worth considering.

From 2013 to 2018, the motor vehicle crash fatality rate for black, non-Hispanic Wisconsinites nearly doubled on an age-adjusted basis, according to data from the federal Centers for Disease Control (see Figure 1). In raw numbers, motor vehicle deaths for black Wisconsinites increased from 31 in 2013 to 39 in 2014, 56 in 2015, and 62 in 2016. They hit a high of 79 in 2017.

Such deaths declined to 63 in 2018, the most recent year for which CDC data is available. But with the exception of 2017, the raw total and age-adjusted rate for black Wisconsinites in 2018 remained higher than any other year since 2000, the first year for which data are available.

Figure 1: Black Wisconsinites' Fatality Rate Diverges
Age-Adjusted Motor Vehicle Crash Deaths per 100,000

Source: Centers for Disease Control WONDER Database
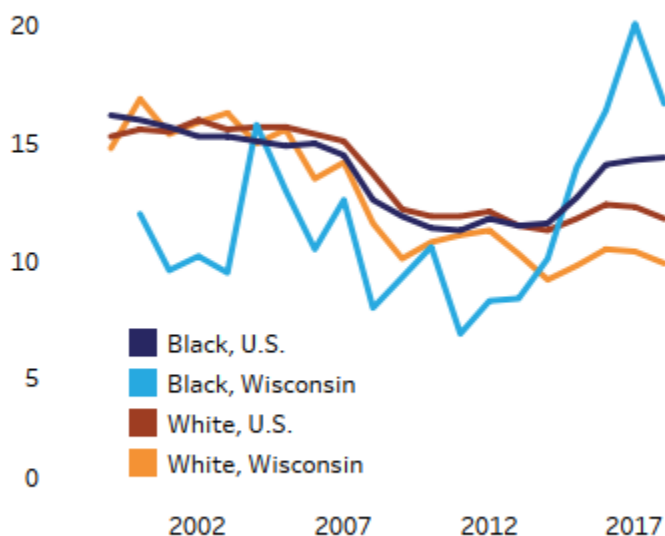
While motor vehicle crash fatality rates also increased slightly from 2013 to 2018 for white and Hispanic Wisconsinites, and somewhat more for all black Americans, the increase was far greater for black Wisconsinites. The end result is that black Wisconsinites -- who not long ago had lower motor vehicle fatality rates than white or Hispanic Wisconsinites or their national black peers -- by 2018 had become more likely to die in a motor vehicle crash. The age-adjusted rate of motor vehicle fatalities per 100,000 residents for black Wisconsinites was 16.7 in 2018, compared to 9.9 for white Wisconsinites, 8.6 for Hispanic Wisconsinites, and 14.4 for black Americans.

Taking a longer-term view also shows how black Wisconsinites have taken a different path than others in the state or their national peers. From 2001 to 2018, the motor vehicle crash death rate for black Wisconsinites increased 74% on an age-adjusted basis. The same measure declined 35.7% over the same period of time for white Wisconsinites, 17.3% for Hispanic Wisconsinites, and 8.3% for all black Americans.

Vehicle fatality data compiled by the National Highway Traffic Safety Administration (NHTSA), while not identical due to differences in methodology, shows the same pattern. The NHTSA data show nearly two-thirds of the motor vehicle fatalities for blacks in the state occurred in the city of Milwaukee, roughly matching the share of the state's black population that resides there. In Milwaukee and the rest of the state, black motor vehicle fatalities have increased sharply since 2013, the data show.

Both Milwaukee County and the city of Milwaukee have seen an overall increase in motor vehicle fatalities in recent years, as well as an increase in the number of motor vehicle fatalities that involved speeding. At the same time, Milwaukee-area community leaders and public safety officials have heard growing concern from residents in recent years about an increase in reckless driving incidents. A recently established Carjacking and Reckless Driving Task Force made up of Milwaukee city and county leaders has taken public testimony on the issue and recently issued recommendations on ways to tackle the problem.

A few potential factors to explain the trend have been cited in public discussions about reckless driving. They include changes to a Milwaukee Police Department policy that from 2010 to 2017 made it less likely officers would pursue reckless drivers, and changes that restricted access to affordable driver's education classes for students in the Milwaukee Public Schools for a period of more than a decade ending in 2016.

In addition to data on speeding and fatal crashes, other potential factors we note here include the economic cycle and its relationship with motor vehicle fatalities, and declining transit ridership in the Milwaukee area.

LONG-TERM SHIFT

The Forum's research on this topic emerged from our previous report on the decline in life expectancy in Wisconsin and racial disparities in top causes of mortality in the state. When we examined those disparities more closely, we found a stark contrast in accidental death rates among black Wisconsinites relative to white Wisconsinites and all black Americans. The white-black gap between motor vehicle fatalities helps account for this disparity.

The two datasets used for this report include both motor vehicle victims who died at the scene of a crash and those who died later from crash injuries. The USHTA data only include fatalities occurring within 30 days of a crash, while the CDC has no time restriction. The USHTA data only include fatalities from crashes involving "a motor vehicle traveling on a trafficway customarily open to the public," while the CDC data include both traffic and non-traffic motor vehicle fatalities.

The inclusion of age-adjusted mortality rates allows for better comparisons among different population groups and across time, since the prevalence of nearly all types of death varies by age.

## LOWER UNEMPLOYMENT; GREATER SPEED

Comparing motor vehicle fatality trends in the city of Milwaukee to the rest of the state exposes a sharp contrast. In Milwaukee, fatalities increased 97% from 2013 to 2018. In the rest of the state, fatalities increased 3% during that span.

A similar trend emerges in motor vehicle fatalities involving speeding. These are defined by NHTSA as instances in which the driver's speed was related to the crash as identified by law enforcement on an accident report. In Milwaukee, such fatalities increased 117% from 2013 to 2018. In the rest of Wisconsin, speeding-involved fatalities decreased 8% in that time.

Comparing the trend in Milwaukee to the rest of the state illustrates how the state's largest city is an outlier in speeding-involved fatalities, as illustrated in Figures 2 and 3. They have increased 117% in Milwaukee from 2013 to 2018, and 129% from 2004 to 2018. In the rest of the state, speeding-involved fatalities decreased 8% from 2013 to 2018, and 47% from 2004 to 2018.

The period from 2013 to 2018 largely has been one of nationwide economic growth. Past research has shown motor vehicle fatalities generally decline during
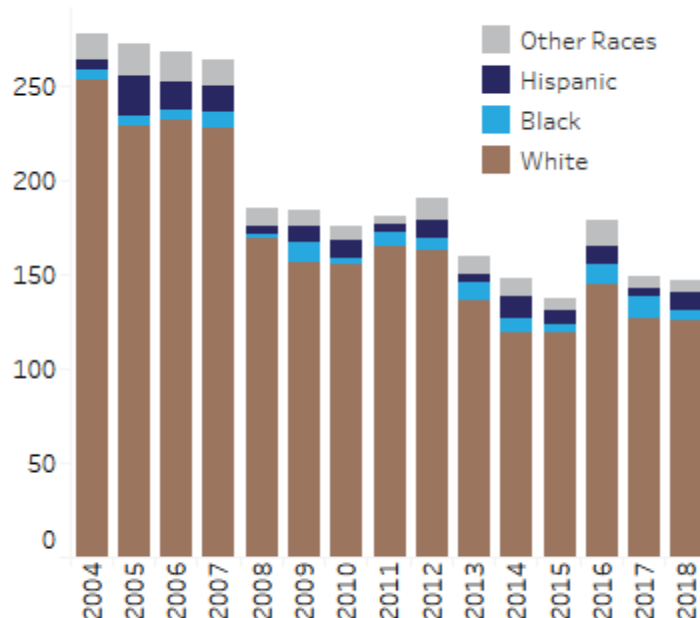

Figure 2: Speeding-Involved Fatalities Increasing
Speeding-involved fatalities by race for Milwaukee
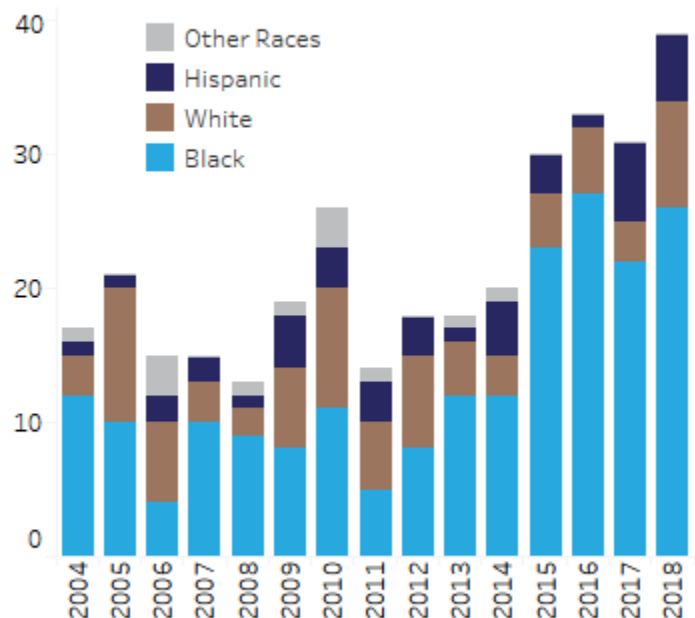
Source: National Highway Traffic Safety Administration Fatality Analysis Reporting System

Figure 3: Speeding-Involved Fatalities Decreasing
Speeding-involved fatalities by race for the rest of state

Source: National Highway Traffic Safety Administration Fatality Analysis Reporting System

economic downturns and increase during periods of expansion. Reasons for this are debated, but possible causes include factors such as more workers being employed and driving more while commuting to work, and an increased volume of large truck traffic.

From the 2011 peak in unemployment following the last recession to 2018, U.S. Census Bureau data show a greater share of black Wisconsinites moved from unemployed to employed status than either white residents in the state or blacks nationally. Black Wisconsinites saw a 15.3-percentage-point shift from unemployed to employed status, compared to a 4.3-percentage-point change for white Wisconsinites and 9.0 percentage points for all black Americans. Census Bureau data also showed during the period a much greater proportional rise in blacks in Wisconsin who reported driving alone to work compared to whites in the state or blacks nationally. That suggests there may have been a larger percentage increase in the number of miles driven by African-Americans in Wisconsin.

OTHER POSSIBLE CONTRIBUTORS

Reckless driving has become a significant concern in recent years for Milwaukee residents. Steps taken by local leaders include heightened enforcement by local police and a request by city of Milwaukee officials to

Gov. Tony Evers for additional state funds to combat the problem. Milwaukee city and county officials also have created a task force that is hearing public testimony and crafting recommendations to curb reckless driving.

Heightened enforcement by Milwaukee police stems in part from changes to a departmental policy that previously restricted instances in which officers could conduct vehicular pursuits of reckless drivers. In 2010 the police department revised its pursuit policy to specify that for officers to pursue a suspect, they must have probable cause to believe that a violent felony has occurred or is about to occur. In response to mounting community concerns about reckless driving, this policy was revised again in September 2017 to specify that officers could pursue a vehicle engaged in reckless driving if "the vehicle or occupant(s) present a clear and immediate threat to the safety of others." A 2018 report by the Milwaukee Fire and Police Commission showed police pursuits increased sharply after the policy was revised.

Some observers also have cited a period of more than a decade during which free driver's education was not available in Milwaukee schools. The state discontinued funding to school districts for driver's education in 2004. While driver's education classes remained available to students for a fee, this may have contributed to an income-based gap in access to driver's education. In 2016, Milwaukee schools introduced a program by which high schoolers could take driver's education courses for free, with the only cost being a $35 fee to obtain a learner's permit. Yet many of today's Milwaukee motorists came of age during the years when access to free driver's education was limited.

In addition, Milwaukee County's transit ridership has declined at a faster rate than the nation as a whole. By one key measure, transit ridership in Milwaukee County declined about 40% from 2008 to 2018, compared to a 6% decline nationally, according to the Federal Transit Administration's National Transit Database.

This is notable because transit is a safer mode of transportation than automobile travel. A study by the American Public Transportation Association found it is 10 times safer on a per-mile basis when comparing rates of injury and death. As is true nationally, African-Americans in Milwaukee rely on transit more on a per-capita basis than other large racial or ethnic groups,

according to U.S. Census Bureau survey data compiled by Governing Magazine.

CONCLUSION

The increase in motor vehicle fatalities among Wisconsin's black residents is a complicated phenomenon, and this report does not presume to fully account for its causes. Rather, we hope to highlight the problem and a few potential contributors, many of which already were raised by community members and local leaders in Milwaukee.

The complexity of the problem also means solutions must be considered carefully. In October, the city-county task force on reckless driving released its draft report with recommendations including:

- Asking state lawmakers to increase criminal penalties for adults who engage in reckless driving or flee police;
- Consideration of red-light cameras;

- Greater police enforcement and prosecutorial efforts to combat reckless driving;
- More usage of traffic engineering measures shown to reduce speed and enhance safety, such as narrower roadways, pedestrian islands or traffic signals, roundabouts, or speed bumps;
- Increased programming and funding for driver's education in Milwaukee high schools and technical colleges.

A look at the auto fatality numbers in Milwaukee shows how the problem has escalated and reveals its disproportionate impact on African American residents. While a great deal of attention has focused on the perceived increase in reckless driving in the city, other factors are also worth considering. We hope this report provides important context and adds urgency to efforts to reverse this tragic trend.

VISIONZERONETWORK

Vision, Strategies, Action:

**Guidelines for an Effective
Vision Zero Action Plan**

December 2017

ACKNOWLEDGEMENTS

LivableStreets

Rethinking urban transportation

MASSACHUSETTS VISION ZERO COALITION

VISION ZERO NETWORK

INTRODUCTION

Across the country, U.S. towns and cities are committing to Vision Zero, which, in addition to setting the goal of zero traffic deaths or severe injuries, also commits communities to a fundamental shift in how they approach traffic safety.

Once a community has committed to Vision Zero, it should create an Action Plan to clearly lay out action steps, timelines, and priorities and include broader community and stakeholder input.

At its best, Vision Zero has the potential to galvanize a thorough and lasting shift in how we design and use our transportation systems to prioritize the preservation and quality of human life. At its worst, Vision Zero runs the risk of becoming a watered-down slogan that provides only a vague attempt toward real, life-saving change.

The guidelines presented here are meant for communities that have already committed to Vision Zero, to outline key principles of the initiative, and just as importantly, to help committed communities effectively move from planning to on-the-ground implementation and institutionalization of safety priorities.

WHAT DISTINGUISHES VISION ZERO

Vision Zero is a strategy to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all. In creating a Vision Zero Action Plan, stakeholders should understand, acknowledge, and discuss how Vision Zero differs from the traditional approach to traffic safety:

Any Vision Zero Action Plan must be rooted in the understanding that traffic deaths are preventable through:

- » **The prioritization of proven safety strategies**
- » **Multi-departmental collaboration toward the shared goal of zero**
- » **A focus on data-driven decision-making**
- » **A systems-based approach**

Vision Zero is not just "business as usual" with a new name; its core principles must be acknowledged and built into everyday efforts. (Read our publication *Moving from Vision to Action* to learn more on Fundamental Principles, Policies and Practices of Vision Zero.)

TRADITIONAL APPROACH	VS	VISION ZERO
Traffic deaths are **INEVITABLE**		Traffic deaths are **PREVENTABLE**
PERFECT human behavior		Integrate **HUMAN FAILING** in approach
Prevent **COLLISIONS**		Prevent **FATAL AND SEVERE CRASHES**
INDIVIDUAL responsibility		**SYSTEMS** approach
Saving lives is **EXPENSIVE**		Saving lives is **NOT EXPENSIVE**

HOW TO USE THIS GUIDE

A Vision Zero Action Plan should be a living document. This guide is designed to help cities who have committed to Vision Zero build an implementation plan that is concrete and action driven, while being responsive to the context and needs of the community you are serving.

This guide lays out two key components of a strong Action Plan: **Foundational Elements** and **Actionable Strategies.** These key components are underpinned by a process of continued **Community Engagement** and attention to **Equity.** Below we have defined each of these components in more detail.

All together this creates a guide that is a road map for action, as well as a tool for measuring and assessing progress towards the bottom line goal of eliminating severe injury crashes and fatalities.

FOUNDATIONAL ELEMENTS

Foundational elements are just that - foundational to the success of Vision Zero implementation. These are baseline best practices for creating any strong plan of action.

ACTIONABLE STRATEGIES

While every city and town is unique, there are certain strategies that are fundamental to achieving Vision Zero. This is especially important to ensure local actions follow the Vision Zero strategy of prioritizing safe roadway design and managing speed, amongst other strategies.

ROBUST COMMUNITY ENGAGEMENT

The process of building an Action Plan is just as important as the final product. Vision Zero is based on the concept of shared responsibility for safety, and outreach and engagement to communities — especially those who are most vulnerable on the roadways — is absolutely essential for success.

★ Recommendations to underpin the success of your Vision Zero Action Plan:

1. Create a multi-stakeholder Vision Zero Task Force that includes perspectives from representatives in public health, transportation, policy makers, police, community, and advocates, among others.

2. Conduct meaningful community outreach prior to releasing the Action Plan, in order to inform its priorities.

3. Gather input from residents, **particularly those in Communities of Concern**—specifically low-income communities, communities of color, seniors, children, people with disabilities, and people who rely on walking, biking, and transit as their primary means of transportation—about what they see and experience on the streets. Learn about their unique context and adapt the language and approach you are using.

EQUITY PRIORITY

Equity is not only a desired outcome of Vision Zero, it is integral to every component of Vision Zero planning and implementation. Equitable strategies such as prioritizing safety improvements in areas that have historically been underserved, and building robust engagement strategies to reach those who are most vulnerable on the roadways and who have not typically been included in traditional city planning processes are fundamental to achieving Vision Zero.

★ Recommendations to underpin the success of your Vision Zero Action Plan:

1. Prioritize outreach and street design safety efforts in Communities of Concern, which have been traditionally underserved.

2. Utilize data to determine if people of color are disproportionately being targeted by law enforcement in your community. Make a public commitment that Vision Zero efforts will not result in racial profiling and commit to report publicly on this issue to build trust with the community.

3. Provide anti-racism and cultural competency training for all staff and departments involved in Vision Zero.

Throughout this document, we have provided examples of what equitable approaches might look like as you build out the Foundational Elements and Actionable Strategies for your Action Plan. These examples should not be considered all inclusive, as we acknowledge this is an area with great room for expansion and improvement.

THE VISION ZERO APPROACH

ACTIONABLE STRATEGIES

Community & Equity

Community & Equity

FOUNDATIONAL ELEMENTS

IMPLEMENTATION

Community & Equity

Community & Equity
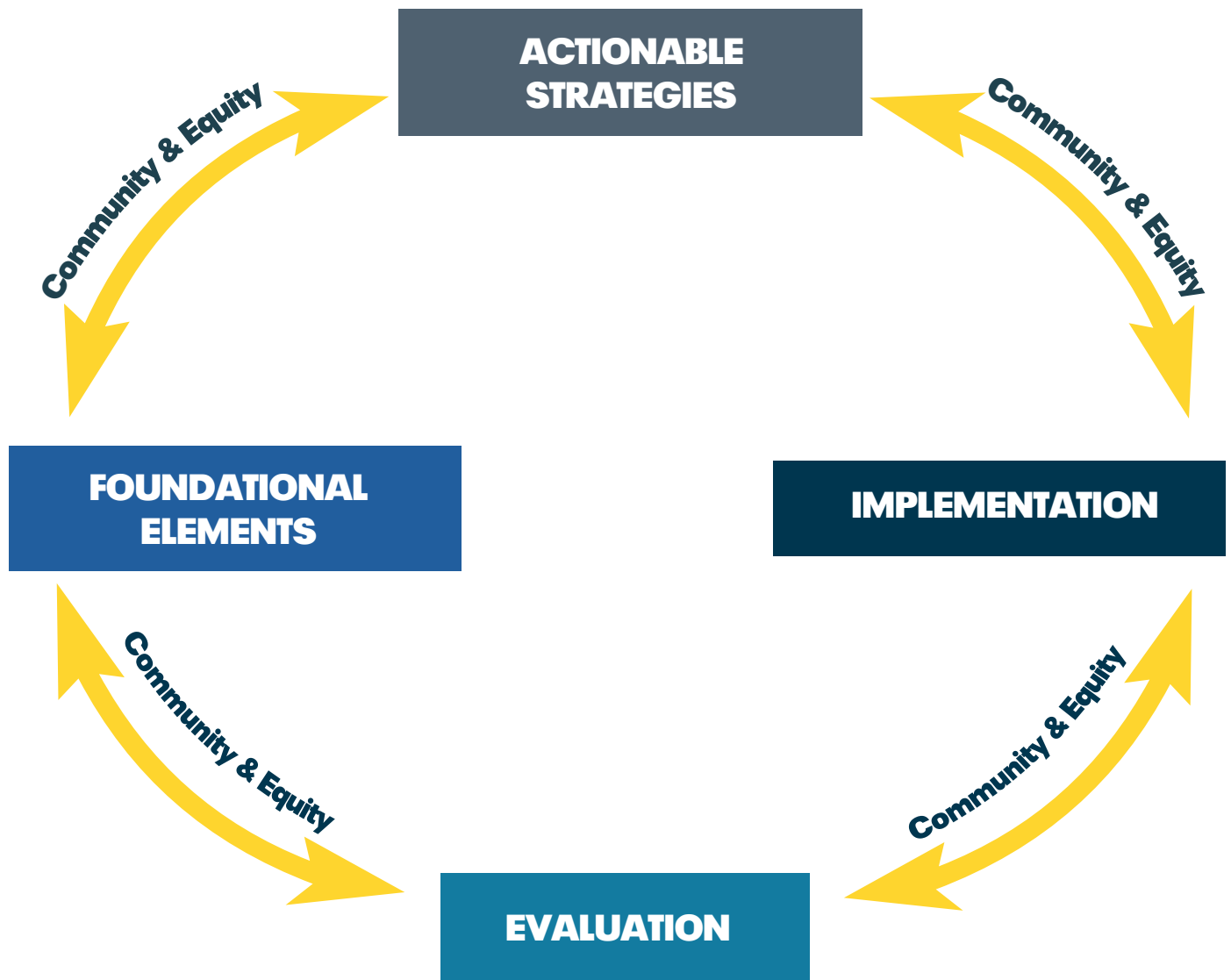
EVALUATION

A good action plan is a living document and includes a dynamic, iterative process to establish and implement strategies, evaluate progress, and make corrective actions as needed, all the while engaging community and prioritizing equity.

FOUNDATIONAL ELEMENTS

1. BUILD A ROBUST DATA FRAMEWORK

Vision Zero is a data-driven approach, and gathering, analyzing, utilizing, and sharing both formal data on injury crashes and community input to understand traffic safety priorities is fundamental to Vision Zero success.

We recommend that injury crash data be collected before the Action Plan is created, focusing on fatal and serious injuries, specifically.

The data should answer questions like:

» **Are injury crashes more likely to occur in certain locations? At certain times of day?**

» **Are some demographics and road users over-represented in injury crashes? If so, who? Where?**

» **What crash factors are prominent? (Examples include behaviors such as high speeds, left turns, or the lack of Complete Streets facilities for people walking/bicycling.)**

It is also important to consider who is involved in collecting and putting forward the data. A burgeoning best practice includes supplementing traditional injury crash data collected by police, with hospital data. This has been shown to better represent certain populations, such as low-income and communities of color, and those walking and bicycling. Including public health department professionals, policy makers, and other stakeholders in the data collection and assessment process, along with those in the transportation and police departments, can help ensure a more complete and comprehensive understanding of the data.

Ultimately, analysis of Vision Zero data should lead to the development of a High Injury Network that geographically identifies locations where investments in safety are most urgent, which in turn will drive your implementation strategy. Given that all communities have limited resources, this data-driven approach will help allocate resources to those locations that need them most.

🔍 EQUITY LENS

While data is important, it also needs context and usually does not tell the full story on its own. For example, communities that have been systematically marginalized may be less likely to report traffic crashes. Additionally, some locations feel so dangerous and unwelcoming that people avoid walking or biking there, which means they are not elevated as problem spots with high injuries, but still may deserve attention. Depending on data alone will leave gaps in your strategy and may compound inequities in already underserved communities. To gather an accurate picture, a successful and equitable data-driven approach will require both collecting data as well as a robust community engagement process that prioritizes outreach in Communities of Concern.

RELEVANT EXAMPLE

PORTLAND'S VISION ZERO PROGRAM overlays the city's High Injury Network with its Communities of Concern as shown in the image below. Cities including Denver, Los Angeles, Chicago, and San Francisco use a similar methodology.
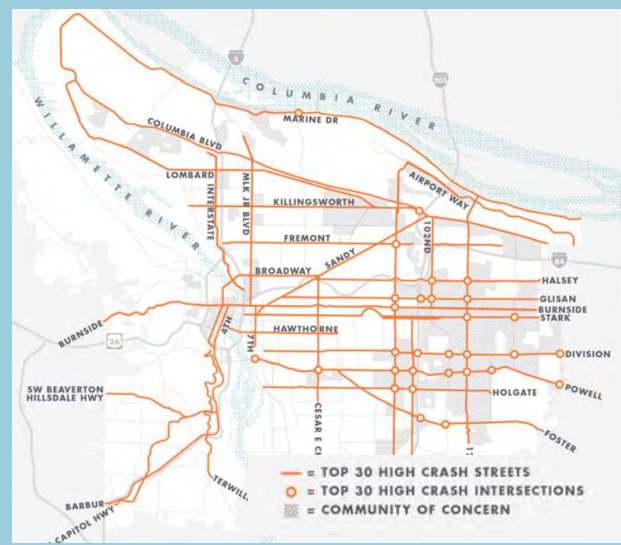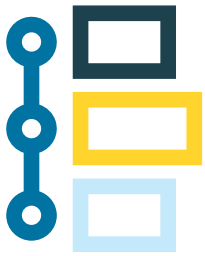
2. SET MEASURABLE GOALS WITH A CLEAR TIMELINE FOR IMPLEMENTATION

Clear, measurable short-term and mid-term goals, combined with timelines and ownership from responsible government agencies, will create a framework that is easier to evaluate and fund, and will build buy-in, accountability, and transparency throughout the implementation process.

We recommend identifying your "reach zero year" as a baseline. Many cities are using a 10 year time frame as their baseline. Your Action Plan should then include near term (2-3 year) goals along with interim goals and measures of progress (5-8 year time horizon). This will ensure that your Action Plan is more than just a 1-2 year list of priorities, but truly a long-term strategy.

Each goal identified in your Action Plan should be measurable and provide answers to the following questions:

» **What does success look like? What are the measures of success?**

» **Who is primarily responsible for achieving this goal and in what timeframe?**

» **What are the conditions and limitations for success? (For example, are more staff and/or funding needed in certain areas to succeed? If so, be clear about that need.)**

🔍 EQUITY LENS

There is overwhelming evidence that communities of color are disproportionately impacted by traffic crashes. When setting goals for Vision Zero, it is important to both acknowledge these disparities, as well as set specific goals designed to close this gap, in addition to reducing the overall number of serious crashes.

RELEVANT EXAMPLE

EACH OF THE STRATEGIES LISTED IN PHILADELPHIA'S VISION ZERO ACTION PLAN includes the Lead Agency and a timeline for implementation. The timeline distinguishes between short-term (1 to 3 years) and long-term goals.

2) Establish plans and processes to internalize Vision Zero principles within department operations

ACTION ITEM	DESCRIPTION	LEAD AGENCY	VISION ZERO YEAR
2.1	Integrate Vision Zero into the City of Philadelphia's Development Services Program Checklist to ensure that streets are being designed for the most vulnerable roadway users	P&D	1
2.2	Continue the routine Philadelphia Streets resurfacing program and include pedestrian/bicycle infrastructure and loading zones as part of resurfacing projects, as informed by a multimodal improvement prioritization program	Streets	1+
2.3	Continue to expand the ongoing sidewalk inventory efforts to identify and prioritize improvements for City-owned and private sidewalks	oTIS/ P&D/ Streets	1+
2.4	Integrate Vision Zero into the City of Philadelphia's Development Services Program Checklist to ensure that streets are being designed for the most vulnerable roadway users. Update the Philadelphia Pedestrian and Bicycle Master Plan and include the following elements: · Address line of sight issues; · Define protected bike lanes and protected intersections; · Standardized speed limit reduction by roadway type; · Other innovative roadway treatments in conjunctions as they are developed and evaluated	oTIS/ P&D/ Streets	1-2
2.5	Conduct a study to identify best practices in peer cities for sidewalk repair and enforcement programs in construction zones, as well as recommendations for Philadelphia	oTIS	2
2.6	Update the Philadelphia Pedestrian and Bicycle Master Plan and include the following elements: · A pedestrian and bicycle safety action plan; · Gaps analysis and prioritization study for sidewalk and bikeway network gaps	oTIS/ P&D	2-3
2.7	Develop comprehensive Access Management Policy and Right-Of-Way Standards that take into account driveway placement (among other potential safety hazards)	Streets	2-3
2.8	Develop pick-up and drop-off safety training for School District schools	oTIS/ Streets	3
2.9	Create database of streets and intersections with line of sight issues	Streets	L/T

3. BE ACCOUNTABLE

Vision Zero is rooted in the shared responsibility among system designers and policymakers to design and operate safe systems for transportation. Clear ownership of Action Plan strategies is important to achieving success and long-term institutionalization of Vision Zero principles and outcomes.

Each Action Plan strategy should identify the lead agency responsible, along with supporting/partner agencies, and budget needs.

Being clear about the budget implications for each strategy will help ensure the sustainability of your Vision Zero work and identify the need for additional resources early on. This will also help to foster more cross-departmental collaboration and community partnerships to help fill those resource gaps.

Questions you should answer for each strategy:

» **Is the strategy currently funded? If not, what is the need?**

» **Will you need to invest in training for planners, engineers, public works staff, police, or others to ensure everyone is working with the same understanding of Vision Zero implementation?**

» **Are there other key influencers outside of the city family that will be key to this goal's success, such as the county or state? If so, lay out an action to address this need.**

» **Have you considered the seasonality of your Action Plan? Do annual weather patterns impact your construction schedules? Will you need to buy new equipment to ensure year-round maintenance of new facilities?**

EQUITY LENS

When you are planning annual Vision Zero funding priorities, make sure to include support for training and resources for city staff on the role structural racism has played in creating inequitable street and safety conditions in your community. It is important to ensure that municipal staff have the training, resources, and tools necessary to achieve the goals they've been assigned in an equitable manner.

RELEVANT EXAMPLE

Action	0-2 Years	3-5 Years	Partners*
Establish a Vision Zero program within the City			
Establish a permanent, dedicated funding source for Vision Zero implementation and coordination. Continue to create a Vision Zero program with dedicated staff.	$2M/year; 1.5 FTE/year	$3M/year; 2 FTE/year	DPW, *Mayor's Office, DPD, DEH, CDOT*
Coordinate existing funding already going to Vision Zero projects or that could be applied to such projects.	Complete action		DPW, *BMO, CDOT*
Institutionalize Vision Zero as the City's approach to its transportation system			
Convene regular meetings of safety stakeholders to review traffic safety performance and determine strategies for improvement.	6 meetings/ year	6 meetings/ year	DPW or Mayor's Office, *DPD, DEH, others*
Convene regular meetings of executive-level departmental representatives to coordinate Vision Zero efforts.	4 meetings/ year	4 meetings/ year	Mayor's Office, Xcel Energy, *DPW, DPD, DEH, others*
Ensure that Denver Vision Zero staff are represented at CDOT Region 1/City and County of Denver coordination meetings.	Ongoing action	Ongoing action	DPW, *CDOT*
Make the City and County of Denver a model Vision Zero adopter, including possible fleet modifications, operational changes, and training.	Ongoing action	Ongoing action	DPW

DENVER'S ACTION PLAN includes time-bound measurable goals with the responsible city departments identified.

4. ENSURE TRANSPARENCY

The process of establishing baseline data, creating the Action Plan, and assessing progress towards the goal of zero must be transparent to key stakeholders and the broader community.

Provide regular opportunities to measure progress, celebrate success, identify unforeseen challenges, prevent against problematic actions, and create an opportunity for course-corrections when needed.

At a minimum, cities should prioritize the following actions to promote transparency:

» **Maintain a comprehensive, public website to share crash data and progress on Action Plan strategies, and solicit feedback on safety concerns, projects, and strategies;**

» **Meet routinely with your Vision Zero Task Force to solicit input, review data, and provide ongoing feedback on progress and challenges;**

» **Meet with and solicit input from residents in an ongoing dialogue about Vision Zero projects, priorities and safety concerns; and**

» **Seek opportunities for 3rd party assessment of your progress, and report regularly (annually at a minimum) to key stakeholders, decision making bodies, and the public.**

EQUITY LENS

As part of San Francisco's Vision Zero commitment, the city's Traffic Commander reports quarterly to the SF Police Commission, in a public forum, on their traffic enforcement activities, providing opportunities for transparency and ensuring against problematic activities, such as racial bias in traffic stops.

RELEVANT EXAMPLE

SEATTLE routinely posts Vision Zero updates on its website. For example, each of the projects listed below opens to a new page with more project details and information for "What's happening now?" The city also provides progress reports and additional project analyses to update the public.

Rainier Ave S Corridor Improvements

SDOT is designing options to help reduce crashes and improve bus reliability on Rainier Ave South

35th Ave SW Road Safety Corridor Project

SDOT has begun a collaborative process to review roadway conditions along 35th Avenue SW

Banner Way NE

Construction is nearly complete along Banner Way NE. We will be collecting data and monitoring this project, and we will be releasing a 1-year evaluation report

NE 65th St Vision Zero Project

SDOT has begun a collaborative process to review street conditions along NE 65th St

23rd Ave E Vision Zero Project

Enhancing safety & mobility on 23rd/24th Ave E between E John St and E Roanoke St

Protected Bike Lanes

A bikeable city is one where people ride bicycles because it is a convenient, fun, safe, and healthy choice

ACTIONABLE STRATEGIES

PRIORITIZE ROADWAY DESIGN

Roadway design is the most important factor that influences speed and safety. Cities should consider and plan transportation systems that make slower, safe speeds the norm to protect the most vulnerable road users, especially in areas with historic patterns of fatalities and serious injuries, which will, in turn, mean that all road users are safer.

Recommended Actionable Strategies:

1. Invest in capital safety treatments in high injury areas, prioritizing improvements in Communities of Concern. Along with large capital improvements, consider low-cost, near-term safety treatments, such as painted corner sidewalk extensions and paint-and-post-protected bike lanes.

2. Identify intersections, corridors, and areas through predictive analysis where severe crashes are likely to occur, based on characteristics of the built environment, to proactively target interventions and prevent future serious crashes.

3. Create a rapid response protocol and delivery timelines for safety improvements when serious crashes do occur. This includes a rapid, on-the-ground assessment of the crash scene and immediate implementation for short-term or pilot interventions.

4. Employ policies including Complete Streets and Transit First in all projects in order to increase safety for all modes, and to boost the number of trips by walking, bicycling, and transit. Overall, more people moving by these modes and fewer by private autos will boost safety.

> **Public transportation investment is among the most cost effective ways to enhance traffic safety for a community.** Public transit passengers have less than 1/10 the per-mile crash rates as automobile occupants, and transit-oriented communities have less than 1/5 the total per capita traffic fatality rates as in automobile-dependent communities.
>
> Source: American Public Transportation Association

FOCUS ON SPEED MANAGEMENT

In addition to roadway design, cities should employ specific strategies to reduce speed for the sake of safety. Most important is designing (or redesigning) roadways for safe, intended speeds. Proven countermeasures include lowering speed limits and the smart use of automated speed enforcement. A 2017 study by the National Transportation Safety Board recommends both greater usage of automated speed enforcement and flexibility for cities to lower speeds for the sake of safety.

Recommended Actionable Strategies:

1. Prioritize designing streets to reduce vehicle speed in the High Injury Network first. Most Vision Zero cities have found that a relatively small percentage of the local road network contributes to the majority of severe crashes. Reducing speed on these roads through proven design measures will bring some of the biggest benefits.

2. Lower speed limits to fit context. In communities where there is a mix of people walking, biking, driving, and taking transit, speeds are generally more appropriate in the 20-25 mph range, and particularly in areas with schools, senior centers, parks, and transit centers.

3. Institute an automated speed enforcement program, a strategy which is proving effective in encouraging safe behavior and saving lives in communities in the U.S. and around the world. This should be carefully planned to ensure that safety and equity are the priorities of the program, avoiding the pitfalls of troubling perceptions about an over focus on revenue generation.

4. Create a neighborhood traffic calming program to reduce the number and severity of crashes on residential streets. These programs can be designed to allow communities to identify their own problems and nominate themselves for projects as in Boston's Neighborhood Slow Streets program.

UTILIZE IMPACTFUL EDUCATION STRATEGIES

While roadway design and speed management are core to Vision Zero, education can bolster the success of Vision Zero implementation. While this includes educating people about safe road behaviors, it also includes educating policy makers, decision makers, and other influencers about the importance of Vision Zero and the strategies that are proven to be most effective in order to make real change.

Recommended Actionable Strategies:

1. Use data and research to prioritize the most effective education/outreach strategies. This includes focusing on dangerous driving behaviors such as speeding, distracted driving, and driving under the influence, while avoiding overemphasizing attention on "distracted" pedestrians. Using this data-driven approach to proactively educate key stakeholders, including government partners and community members, about the leading causes and locations of injury crashes helps align efforts appropriately.

2. Implement or expand Safe Routes educational programming, such as Safe Routes to School, Safe Routes for Seniors, Safe Routes for People with Disabilities. These efforts should prioritize vulnerable populations and high crash areas, as well as areas targeted for increasing walking and bicycling trips.

3. Develop a Vision Zero training manual to share with key stakeholders. Training can include high-level principles, communications strategies, leading causes of injury crashes, the definition and meaning of the High Injury Network, etc. We also recommend requiring all municipal employees and contractors who drive a vehicle as part of their job to participate in Vision Zero safety trainings.

4. Require Vision Zero training for frequent drivers, such as fleet operators, taxi drivers, and large vehicle operators to meet certain safety practices. Cities can model good behavior by ensuring their own fleets, and those they contract with, require Vision Zero safety training.

EQUITY LENS

Develop educational materials and communicate in languages that are appropriate for diverse communities. This may include multilingual flyers, pop-up information tents within the community, having information available on the city website, and working with community-based organizations who have developed relationships and trust in that community. Read our report *Elevating Equity in Vision Zero Communications* for more information.

RELEVANT EXAMPLE

NEW YORK CITY: Injury crash data showed a concentration of serious crashes during late afternoon and evening hours, so the Task Force developed and implemented a multi-pronged education and enforcement seasonal campaign aimed at night safety. The city measured a 30% decrease in traffic fatalities for the time period that year compared to the same time frame during the three previous years. (Read here for more details on NYC's research and campaign.)
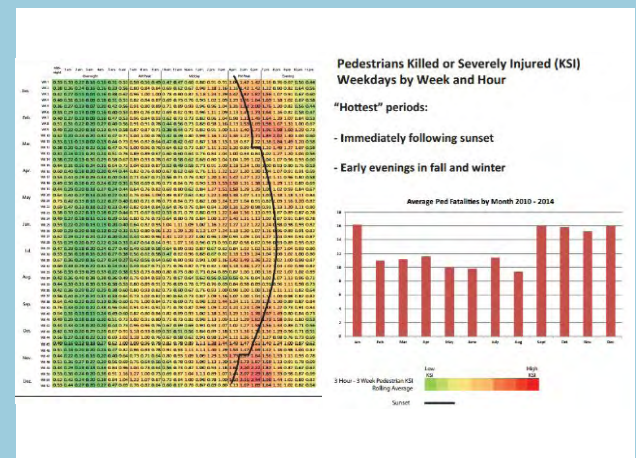
ENSURE ENFORCEMENT IS EQUITABLE

As we emphasize Vision Zero's safe systems approach on the front-end – particularly through street design and speed management strategies proven to encourage safe behavior – we can reduce the need to correct for individual problems on the back-end via traffic stops, ticketing, and fines. Admittedly, this requires long-term investment to shift our environment and our culture. In the meantime, we must acknowledge and address today's pressing problems related to racial bias in traffic enforcement and, by extension, to Vision Zero enforcement activities.

It is important that promoters of Vision Zero in U.S. communities recognize that officer-initiated traffic stops allow for higher-than-average levels of individual discretion and can be a slippery slope for racial bias and aggressive police action. The broader Vision Zero community has a role and responsibility in improving – not exacerbating – these problems.

The most appropriate enforcement strategies will focus on providing education on the most dangerous driving behaviors and will be community supported, as well as ensure transparency into police activity. While enforcement has a role to play in traffic safety efforts, it should not be a primary strategy and should be approached thoughtfully.

Recommended Actionable Strategies:

1. **Vision Zero Action Plans should commit to employing enforcement strategies that will not result in racial profiling.** (See Portland's example in sidebar.) Of course, a commitment is not all that is needed, but it is an important first step.

2. **Focus enforcement on the most dangerous behaviors based on reliable data to ensure that this is communicated effectively to ensure public understanding.** Activities such as speeding and violating pedestrian right of way are more dangerous than minor infractions such as broken taillights or overly tinted windows, so police activity should focus on the former.

3. **Provide regular updates on law enforcement's traffic stop activities.** This is essential to building trust amongst the community for a productive role for enforcement.

Understanding who is being stopped by police, where, and when, as well as who is ticketed, etc. will be important information to ensure accountability.

4. **Support a Community Policing approach as part of Vision Zero work.** The U.S. Department of Justice presents 10 Principles of Community Policing, including two that police and the community share ownership, responsibility, and accountability for the prevention of crime, and that mutual trust between the police and the community is essential for effective policing.

5. **Create a diversion program to provide alternatives to traffic fines.** Recognizing the disproportionate impact of traffic fines on low-income communities, we recommend developing diversion programs that offer education and positive reinforcement of safe behavior in place of overly burdensome fees.

EQUITY LENS

When utilized properly, automated speed enforcement can reduce the number of crashes as well as severity of injuries. Though far under-used, this approach is cited as one of the most effective in influencing behavior and lowering dangerous speeds, while also de-emphasizing officer-initiated traffic stops that cause concern about racial profiling. If used inappropriately, these technologies can reinforce structural inequities. It is important to recognize that no piece of technology exists in a vacuum. Any automated speed enforcement program must be developed with input and buy-in from the most marginalized and vulnerable people in your community.

RELEVANT EXAMPLE

Portland's Vision Zero Action Plan includes an explicit statement that the plan will be equitable and "it will not result in racial profiling." The diversity of participants drafting Portland's Action Plan brought equity to the forefront throughout its development. As a result, Portland explicitly commits to develop and implement a set of actions that would not lead to disproportionately negative outcomes for communities of color and low-income communities.

For more about Portland's approach and other recommendations regarding centering equity in Vision Zero, see visonzeronetwork.org/resources/equity.

EVALUATION & RESOURCES

While elements of evaluation are included throughout this guide, we want to highlight the importance of creating a transparent and regular evaluation process for your Action Plan. Evaluation can be one of the best ways to ensure your Action Plan is a living document. How updates will be developed should be included in the Plan, as well as when progress updates will be provided to the public.

Lead agencies working toward Vision Zero should regularly update policymakers, other agencies, and the public. This reporting and evaluation process should include regular updates in a variety of forums such as community conversations, events, report cards, or other creative engagement strategies.

Recommended Actionable Strategies:

1. **Highlight and celebrate accomplishments, but be real about challenges.** Be transparent when you don't achieve a goal, assess what happened, and recommend changes to the strategy to correct course.

2. **Revisit the Foundational Elements every time you modify a goal or strategy.** A good Action Plan is a living document that is utilized often and evolves over time. However, it is important to maintain your foundation throughout the process.

3. **Utilize the Community Engagement and Equity Strategies** outlined in this document to get feedback on progress from the people in your community most impacted by traffic crashes.

CONCLUSION

Ultimately, there are no shortcuts or compromises in achieving the goals of Vision Zero. The metrics of success are simple: one fatality or serious injury in traffic is one too many. A strong Action Plan will be a road map for success in your Vision Zero efforts.

RESOURCES

Numerous resources available at www.visionzeronetwork.org/resources

VISION ZERO PRINCIPLES
Why Vision Zero Differs from the Traditional Approach to Traffic Safety

Nine Components of a Strong Vision Zero Commitment

Moving from Vision to Action: Fundamental Principles, Policies & Practices to Advance Vision Zero in the U.S.

COMMUNITY ENGAGEMENT
Incorporating and budgeting for community group engagement

Philadelphia, Pennsylvania, p. 18

Denver, Colorado, p. 8

EQUITY
Vision Zero Equity Strategies for Practitioners

Elevating Equity in Vision Zero Communications

Health Equity Road Map for Getting to Zero

Untokening 1.0 - Principles for Mobility Justice

COMMUNITIES OF CONCERN DEFINITIONS
Denver, Colorado, p. 6

Los Angeles, California

Portland, Oregon

San Francisco, California

HIGH INJURY NETWORK EXAMPLES
Denver, Colorado, p. 8

Los Angeles, California

San Francisco, California, p. 6

PROGRESS REPORTS
New York City, New York

Seattle, Washington

Washington, D.C.
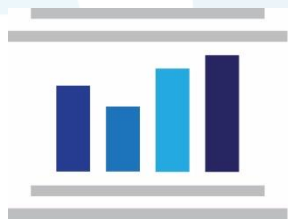
WISCONSIN POLICY FORUM

WHO ARE WE?

The independent, nonpartisan Wisconsin Policy Forum is a nonprofit supported by businesses, local governments, institutions, other nonprofits, and individuals. They help us make our research available to all and ensure we serve as a true statewide "forum."

At least seven people, including four children, hurt in Milwaukee crash on Friday

At least seven people, including four children, were injured Friday after a two-car crash in the 4400 block of North Hopkins Street on Milwaukee's west side. Emergency crews were dispatched to the crash at 10:39 a.m.

RICK WOOD / MILWAUKEE JOURNAL SENTINEL

JOE TASCHLER | MILWAUKEE JOURNAL SENTINEL | 2:20 pm CST January 31, 2020

Recent years brought a sharp increase in deaths of black Wisconsinites in motor vehicle crashes.

Long-term trends saw the rate of such deaths overtake those of white and Hispanic Wisconsinites and all black Americans.

WISCONSIN
POLICY FORUM

Black Wisconsinites' Fatality Rate Diverges

Age-adjusted Motor Vehicle Crash Deaths per 100k

Legend: Black Wisconsinites — White Wisconsinites — Black Americans — White Americans

X-axis: 1999, 2002, 2005, 2008, 2011, 2014, 2017
Y-axis: 0, 5, 10, 15, 20, 25

WISCONSIN POLICY FORUM
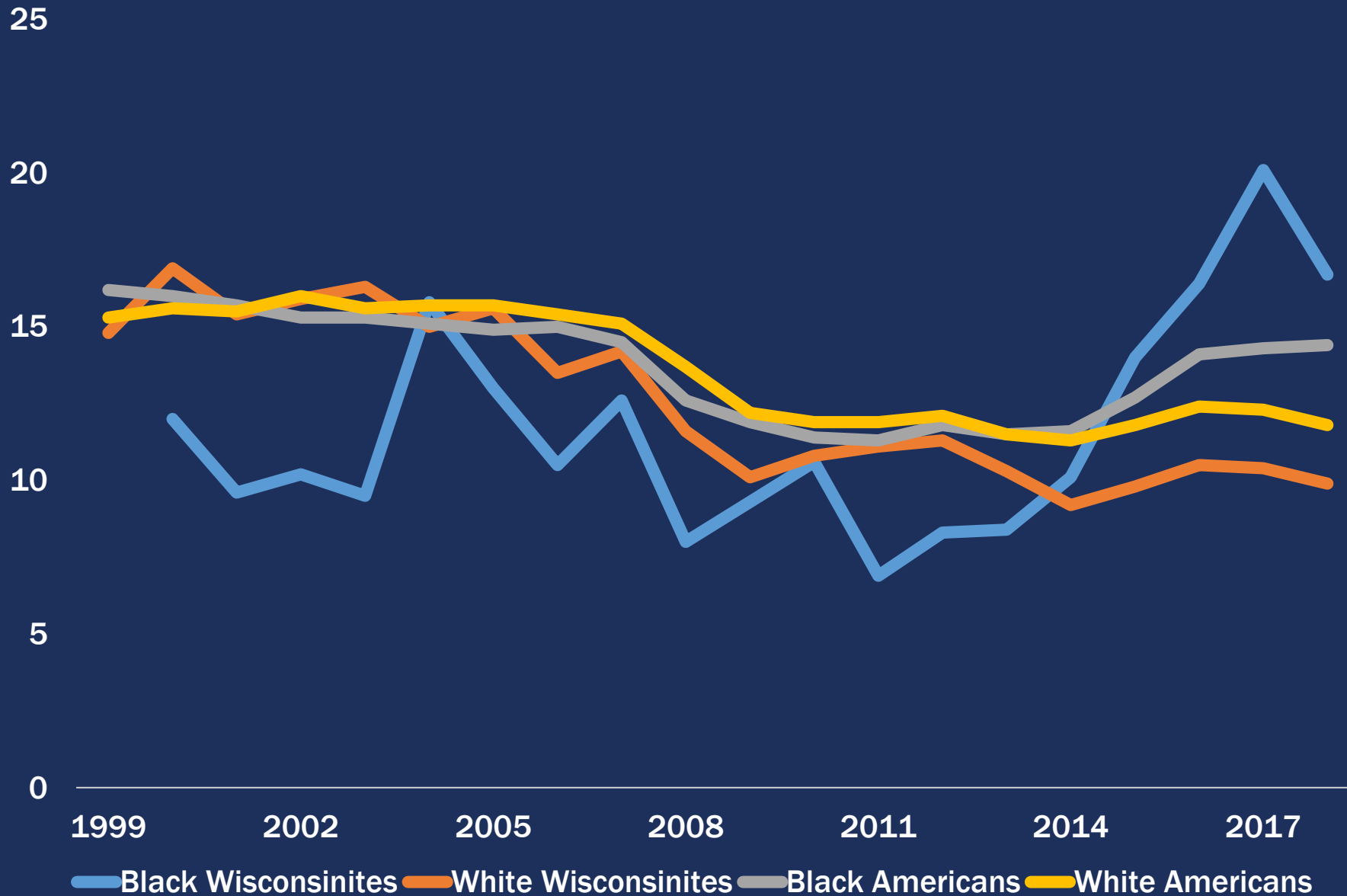
So what is causing this?

We don't presume to know all the answers. But here are a few things we found.

WISCONSIN
POLICY FORUM

About two-thirds of these fatalities occurred in Milwaukee, matching the share of the state's African-American population that resides there.

Milwaukee also saw a recent spike in speeding-involved fatalities.

Speeding-Involved Fatalities in Milwaukee
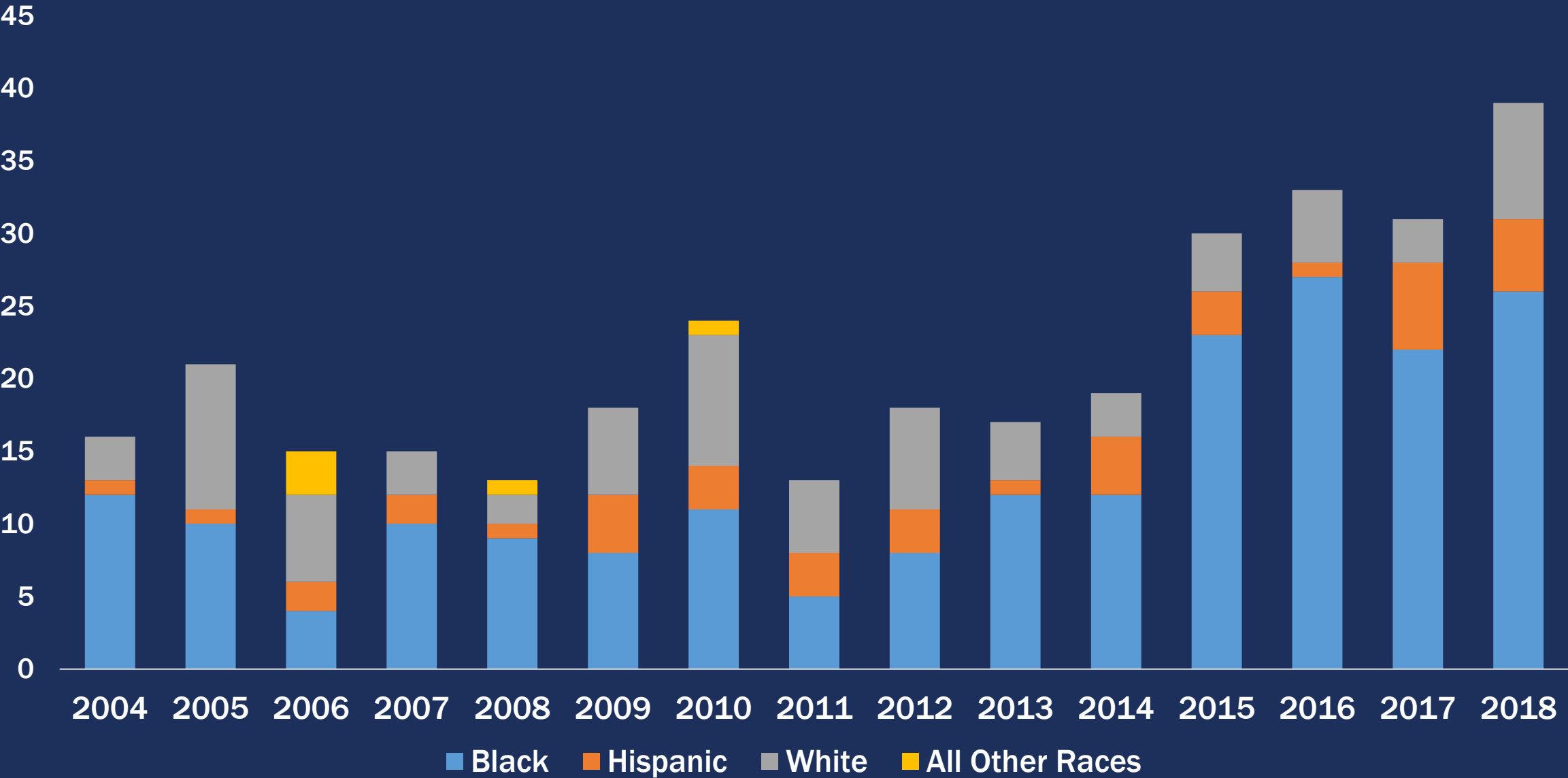
Speeding-Involved Fatalities in the Rest of the State

Black   Hispanic   White   All Other Races

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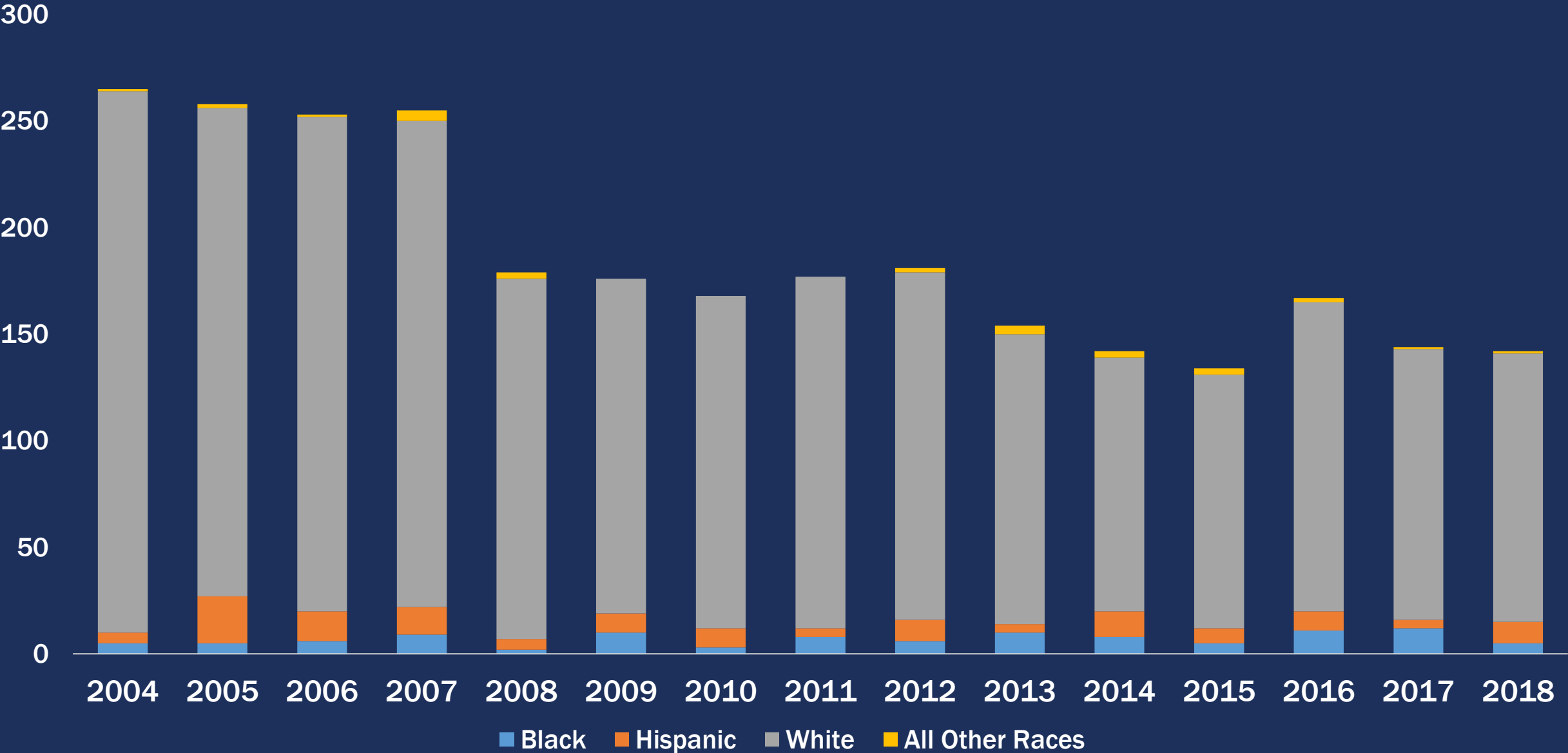
We do not suggest this is only about reckless driving!

Other possible contributors to this trend include:

- Sharp decline in public transit ridership in Milwaukee in the last decade, relative to the rest of the country

- Past lack of access to free driver's education in public schools

- Greater recent change in unemployment among black residents, causing a greater change in miles driven.

WISCONSIN
POLICY FORUM

Final analysis: Our look at auto fatality numbers in Wisconsin shows how the problem has escalated and reveals its disproportionate impact on our state's African-American residents.

We hope this report provides important context and adds urgency to efforts to reverse this tragic trend.

CITY OF MILWAUKEE TRAFFIC TRENDS

Public Safety and Health Committee

April 25, 2019

Prepared by:

MILWAUKEE POLICE DEPARTMENT AND DEPARTMENT OF PUBLIC WORKS
AND TRAFFIC ENGINEERING

CITY OF MILWAUKEE CRASHES 2008-2018

Crashes - General				
Year	**All Crashes**	**Injury Crashes**	**Fatal Crashes**	**Pedestrian Fatalities**
2008	12,975	3,845	30	10
2009	10,811	3,320	29	4
2010	10,622	3,467	44	13
2011	10,593	3,354	31	12
2012	10,989	3,600	35	11
2013	11,614	3,688	28	7
2014	11,985	3,819	46	14
2015	13,615	4,381	59	18
2016	14,576	4,677	46	12
2017	14,056	4,307	59	18
2018	16,338	4,552	51	17

From TOPS: 2008-2018 data for the City of Milwaukee, Intersection and Non-Intersection crashes, highway class U CITY and U STH only (not U IH).

City of Milwaukee Crashes 2008-2018

(All Crashes, Fatalities, Incapacitating Injuries, Non-Incapacitating Injuries, Possible Injuries and Total Injuries)

	Crashes - **Fatalities** and Injuries				
Year	All Crashes	Fatalities (Total Killed)	Incapacitating Injuries	Non-Incapacitating Injuries	Possible Injuries	Total Injuries
2008	12,975	31	219	1,579	3,760	5,558
2009	10,811	31	214	1,442	3,165	4,821
2010	10,622	48	188	1,431	3,348	4,967
2011	10,593	33	147	1,306	3,387	4,840
2012	10,989	37	182	1,478	3,512	5,172
2013	11,614	30	204	1,556	3,643	5,403
2014	11,985	49	173	1,618	3,894	5,685
2015	13,615	64	180	1,901	4,584	6,665
2016	14,576	57	267	2,082	4,772	7,121
2017	14,056	64	359	2,286	3,687	6,332
2018	16,338	57	338	2,316	4,083	6,737

From TOPS: 2008-2018 data for the City of Milwaukee, Intersection and Non-Intersection crashes, highway class U CITY and U STH only (not U IH).
From Milwaukee Police Department Specialized Patrol Division Crash Reconstruction Unit Data Base 2018-2008.

CRASHES BY DRIVER FACTORS

Crashes - Driver Factors

Year	Alcohol		Speed		Failure to Yield		Inattentive Driving		Disregard Traffic Control		Hit and Run	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
2008	430	3.3%	1552	12.0%	2,598	20.0%	2,281	17.6%	1,207	9.3%	3,796	29.3%
2009	412	3.8%	1009	9.3%	2,296	21.2%	2,066	19.1%	853	7.9%	2,961	27.4%
2010	357	3.4%	831	7.8%	2,228	21.0%	1,967	18.5%	832	7.8%	2,684	25.3%
2011	356	3.4%	937	8.8%	2,226	21.0%	1,936	18.3%	844	8.0%	2,726	25.7%
2012	402	3.7%	885	8.1%	2,330	21.2%	2,156	19.6%	886	8.1%	2,791	25.4%
2013	405	3.5%	1159	10.0%	2,513	21.6%	2,081	17.9%	890	7.7%	3,008	25.9%
2014	326	2.7%	1,222	10.2%	2,535	21.2%	2,166	18.1%	902	7.5%	3,178	26.5%
2015	292	2.1%	1,394	10.2%	3,001	22.0%	2,600	19.1%	1,173	8.6%	3,874	28.5%
2016	327	2.2%	1,600	11.0%	3,154	21.6%	2,859	19.6%	1,253	8.6%	4,313	29.6%
2017	404	2.9%	1,332	9.5%	2,910	20.7%	684	4.9%	1,573	11.2%	4,480	31.9%
2018	493	3.0%	1,761	10.8%	3,334	20.4%	788	4.8%	1,672	10.2%	5,246	32.1%

From TOPS: 2008-2018 data for the City of Milwaukee, Intersection and Non-Intersection crashes, highway class U CITY and U STH only (not U IH).

Alcohol is ALCFLAG, Hit and Run is HITRUN, and Speed is SPEEDFLAG (not DRVRPCFLAG SPD, which does not include if a driver received a citation for speeding).

Note: Percentage is represented by total crashes / Driver Factor. Ex. 2018 (16,338 total crashes / 493 total alcohol crashes = 3.0 %)

CRASHES BY UNIT TYPE

Crashes - Unit Types													
	Bicycles				Pedestrians				Motorcycles/Mopeds				School Buses	Other Buses
Year	Crashes	K = Fatalities	A = Injuries	B/C = Injuries	Crashes	K = Fatalities	A= Injuries	B/C= Injuries	Crashes	K= Fatalities	A= Injuries	B/C= Injuries		
2008	133	0	8	105	439	10	57	365	225	3	29	159	216	179
2009	147	0	15	119	416	5	60	357	176	8	17	121	193	146
2010	163	1	9	138	397	14	48	322	205	7	26	158	172	154
2011	143	1	5	117	416	12	58	342	173	5	16	118	168	125
2012	168	2	11	138	442	11	54	373	236	3	38	161	149	148
2013	163	0	12	132	435	7	59	361	175	8	21	109	177	150
2014	133	0	4	104	407	16	48	342	190	9	20	125	173	177
2015	156	1	4	130	424	18	47	349	184	9	18	120	218	151
2016	117	1	8	101	404	13	52	329	184	4	15	136	203	169
2017	113	2	10	86	393	18	73	291	168	5	31	105	231	145
2018	123	0	8	94	434	17	66	326	197	3	27	115	214	142

From TOPS: 2008-2018 data for the City of Milwaukee, Intersection and Non-Intersection crashes, highway class U CITY and U STH only (not U IH).

Number of Bicycle, Pedestrian, Motorcycle, and Moped crashes of each type found using related flags (BIKEFLAG, PEDFLAG, CYCLEFLAG, MOPFLAG).

Number of School Buses and Other Buses involved in crashes found using VEHTYPE and the categories SBS and BUS.

Number of people killed and injured found using ROLE and INJSVR.

CRASHES BY MANNER OF COLLISION

Crashes - Manner of Collision									
Year	All Crashes	Angle	Head On Collision	No Collision	Rear End	Rear to Rear	Sideswipe/ Opposite Direction	Sideswipe/ Same Direction	Unknown	Blank/Not Reported
2008	12,975	4,210	249	3,784	2,598	11	391	1,670	43	19
2009	10,811	3,460	193	3,417	2,085	12	338	1,295	11	0
2010	10,622	3,435	158	3,309	2,147	9	294	1,262	8	0
2011	10,593	3,431	164	3,250	2,137	11	309	1,267	23	1
2012	10,989	3,539	154	3,382	2,235	12	329	1,329	8	1
2013	11,614	3,732	152	3,623	2,360	14	332	1,391	9	1
2014	11,985	3,803	170	3,750	2,413	16	331	1,493	9	0
2015	13,615	4,515	193	4,088	2,633	16	381	1,772	17	0
2016	14,576	4,782	317	3,224	3,257	17	500	2,421	57	1
2017	14,056	4,969	684	2,378	3,196	39	378	2,227	59	126
2018	16,338	5,310	834	3,014	3,812	44	389	2,761	68	106

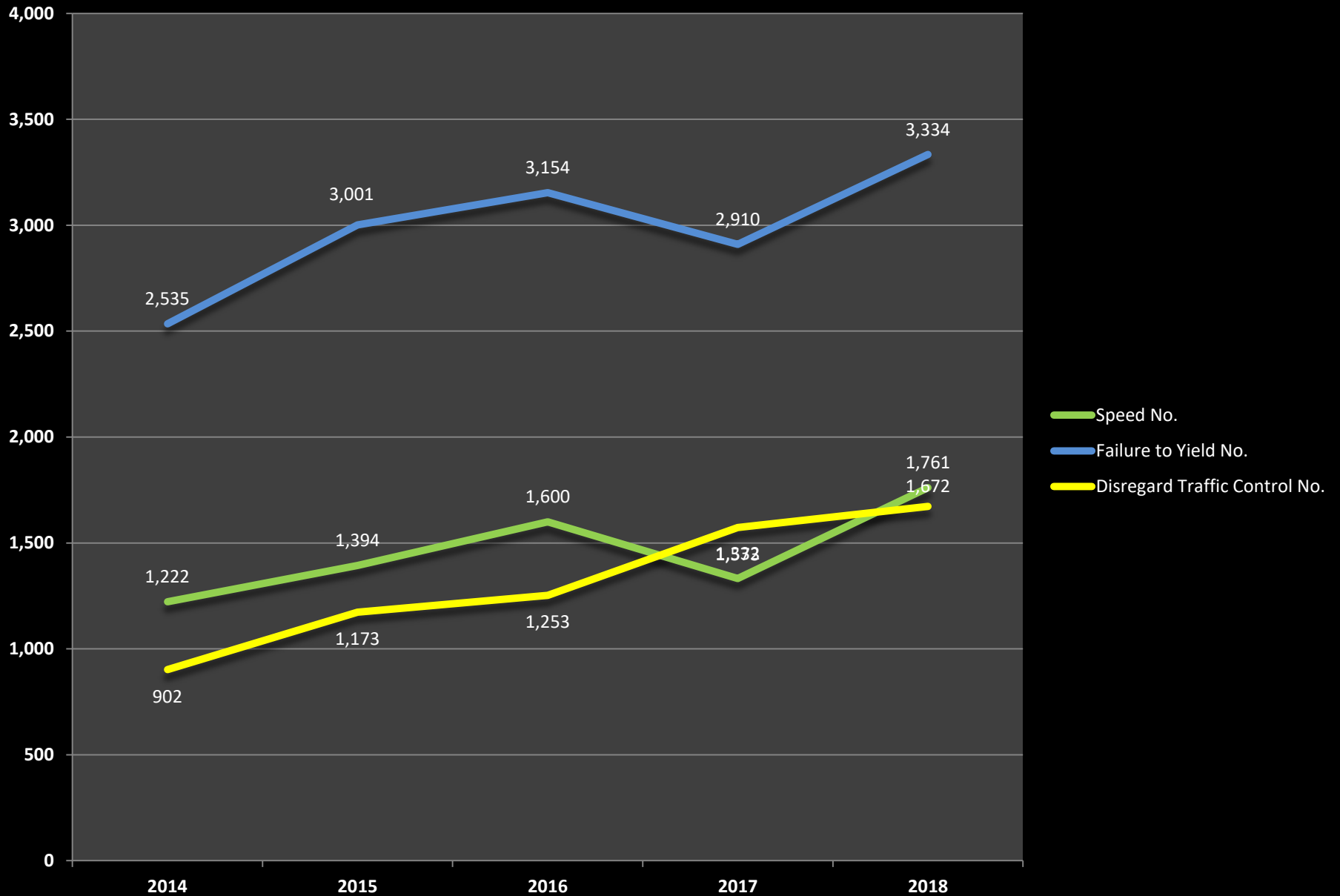# TOTAL CRASHES AND INJURY CRASHES

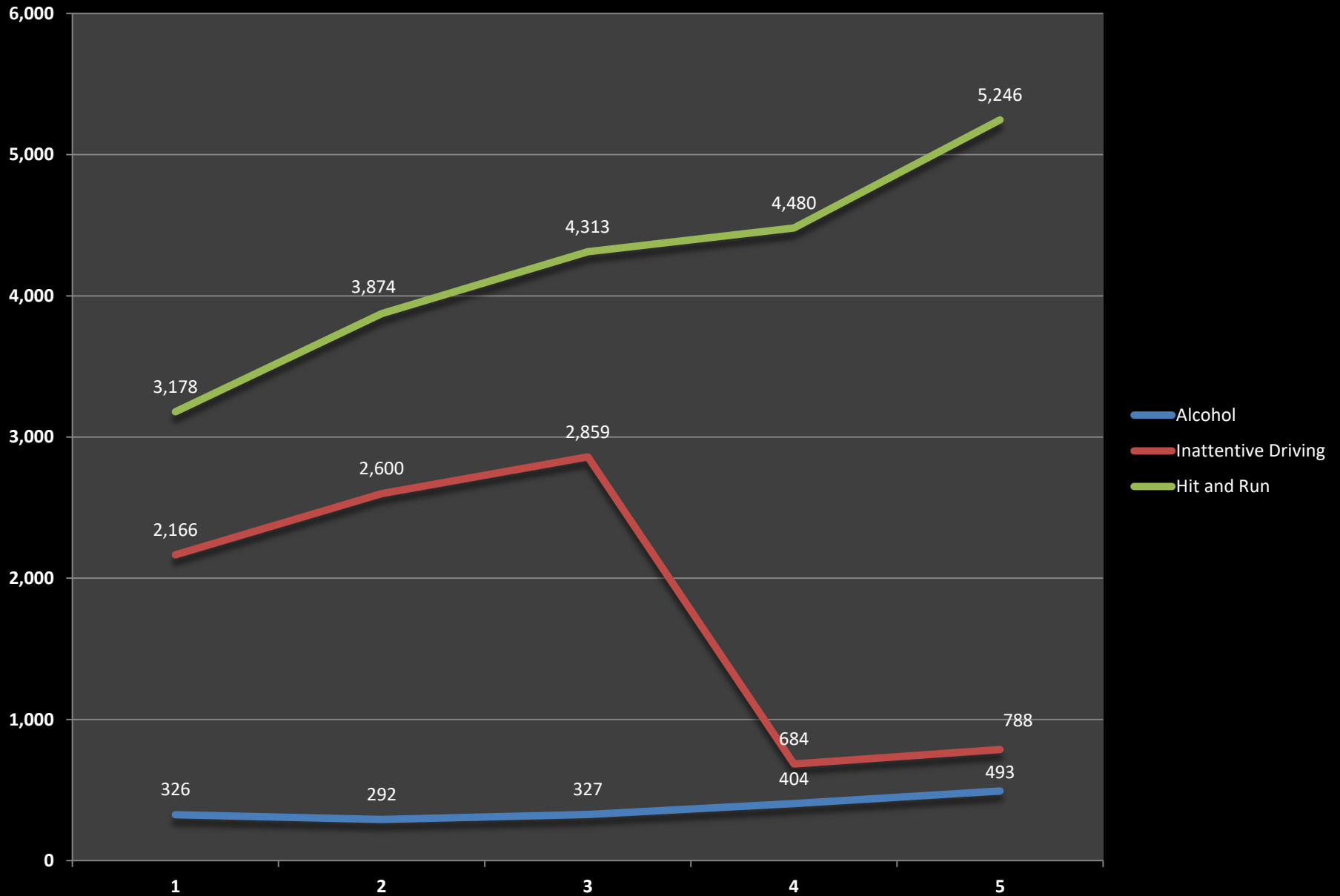TOTAL CRASHES AND INJURY CRASHES 2014-2018
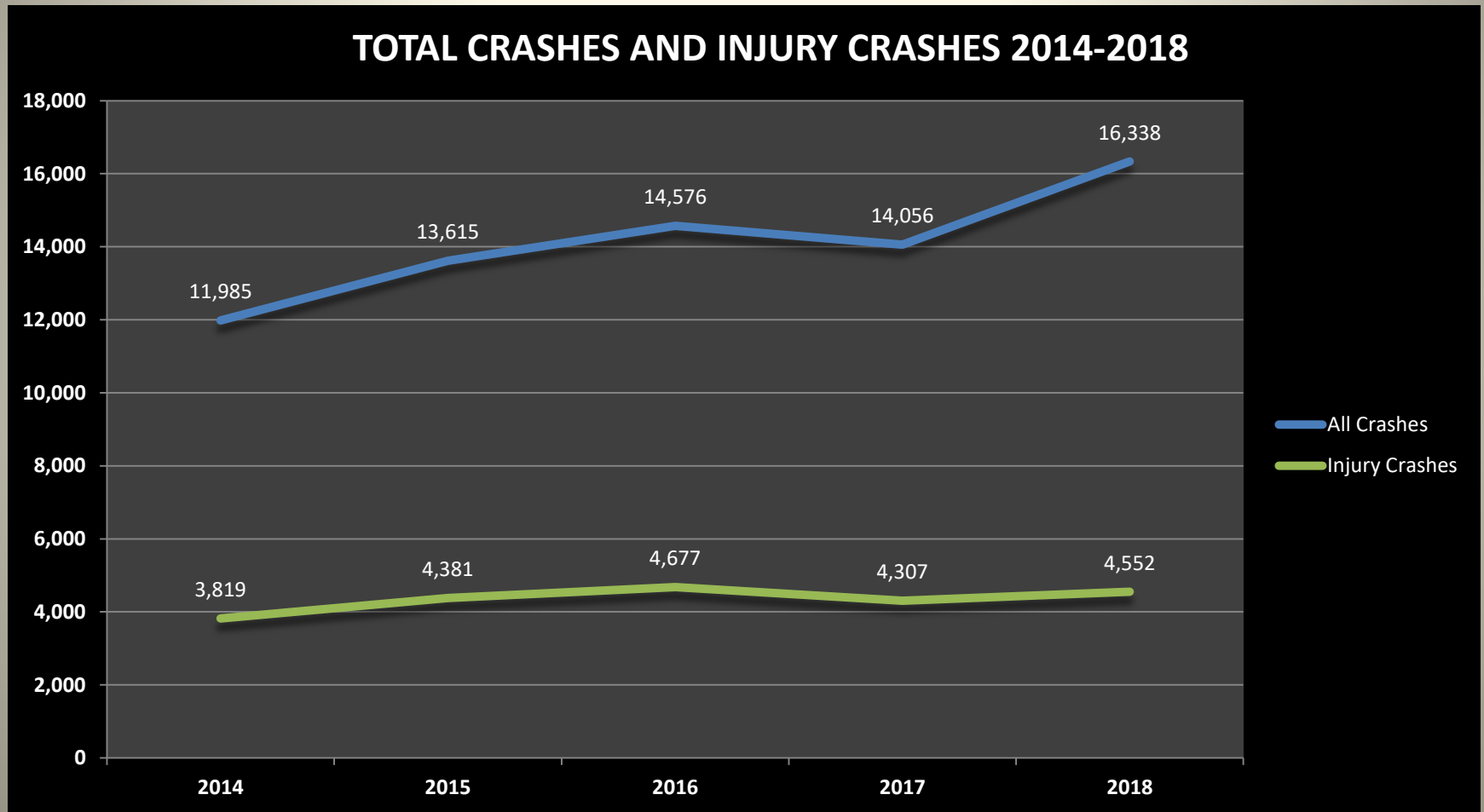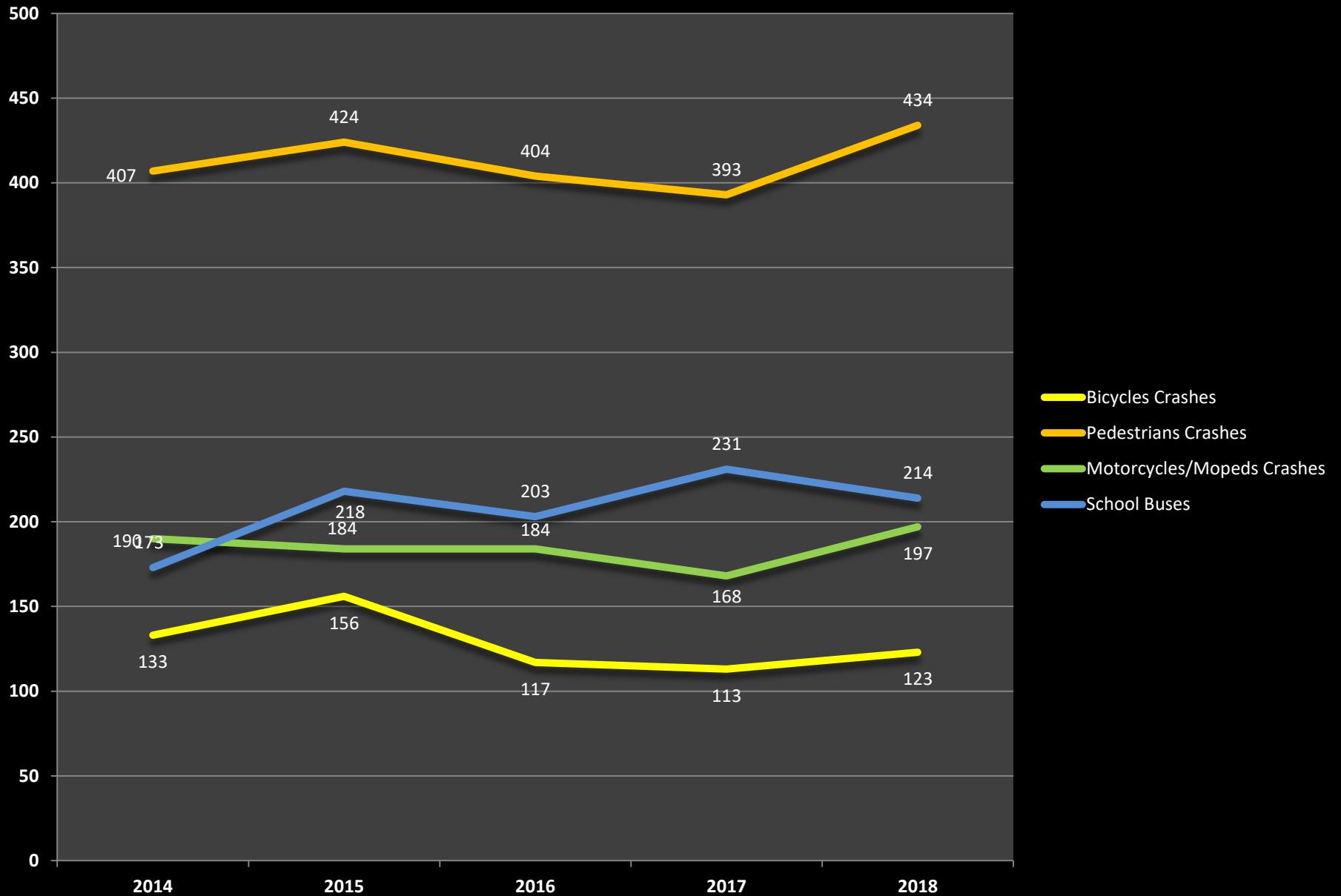
FATALITIES & INCAPACITATING INJURIES (SEVERE INJURIES) 2014-2018
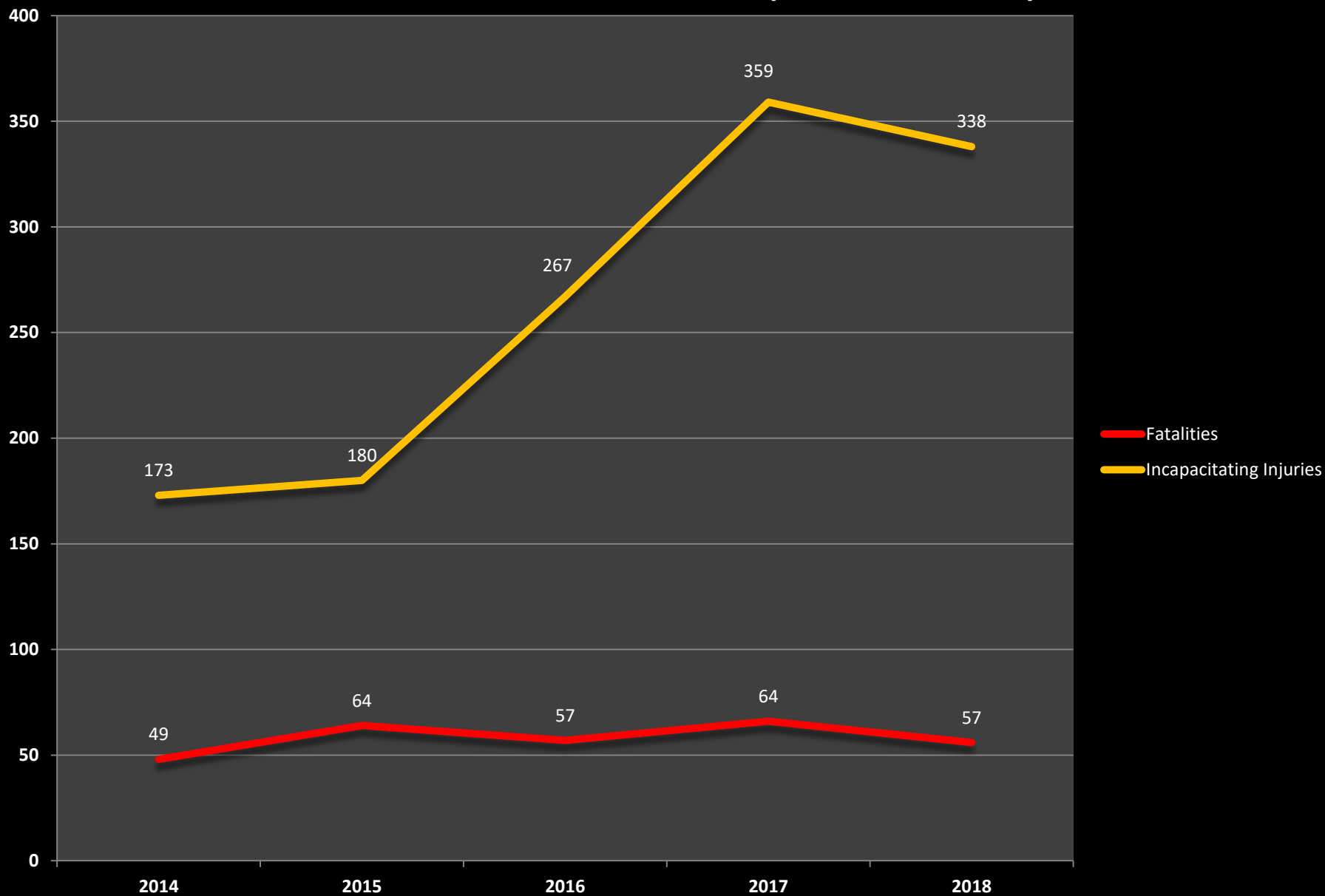
CRASHES BY DRIVER FACTORS 2014-2018

CRASHES BY DRIVER FACTORS 2014-2018 (cont.)

Traffic Fatalities By Police Districts: 2018 vs. 2017

2018		2017	
Police Districts:	Fatalities:	**Police Districts**:	Fatalities:
Police District 1	4	Police District 1	2
Police District 2	7	Police District 2	5
Police District 3	8	Police District 3	13
Police District 4	6	Police District 4	12
Police District 5	4	Police District 5	10
Police District 6	5	Police District 6	3
Police District 7	17	Police District 7	19
Total Traffic Fatalities:	**57**	**Total Traffic Fatalities:**	**64**

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2018 Traffic Fatalities by Aldermanic District

Ald. District	Total Fatalities		Ald. District	Total Fatalities
1st (Ald. Hamilton)	8		9th (Ald. Lewis)	1
2nd (Ald. Johnson)	4		10th (Ald. Murphy)	4
3rd (Ald. Kovac)	0		11th (Ald. Borkowski)	1
4th (Ald. Bauman)	7		12th (Ald. Perez)	8
5th (Ald. Dodd)	3		13th (Ald. Witkowski)	3
6th (Ald. Coggs)	1		14th (Ald. Zielinski)	1
7th (Ald. Rainey)	9		15th (Ald. Stamper II)	4
8th (Ald. Donovan)	3			

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2017 Traffic Fatalities by Aldermanic District

Ald. District	Total Fatalities		Ald. District	Total Fatalities
1st (Ald. Hamilton)	9		9th (Ald. Lewis)	3
2nd (Ald. Johnson)	10		10th (Ald. Murphy)	3
3rd (Ald. Kovac)	1		11th (Ald. Borkowski)	1
4th (Ald. Bauman)	3		12th (Ald. Perez)	1
5th (Ald. Bohl Jr.)	3		13th (Ald. Witkowski)	1
6th (Ald. Coggs)	3		14th (Ald. Zielinski)	1
7th (Ald. Rainey)	10		15th (Ald. Stamper II)	10
8th (Ald. Donovan)	5			

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2018 CITY OF MILWAUKEE FATAL MOTOR VECHILE CRASHES BY MONTH

FATAL MOTOR VECHILE CRASHES BY MONTH

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TOTAL	4	5	2	4	5	7	6	3	3	6	2	4

2018 CITY OF MILWAUKEE FATAL MOTOR VECHICLE CRASHES BY TIME OF DAY

2018 CITY OF MILWAUKEE FATAL MOTOR VEHICLE CRASHES BY DAY OF THE WEEK

TOTAL FATAL MOTOR VEHICLE CRASHES BY DAY OF THE WEEK

Day	Crashes
SAT	7
FRI	5
THU	11
WED	5
TUE	6
MON	8
SUN	9

Legend: SUN, MON, TUE, WED, THU, FRI, SAT

17
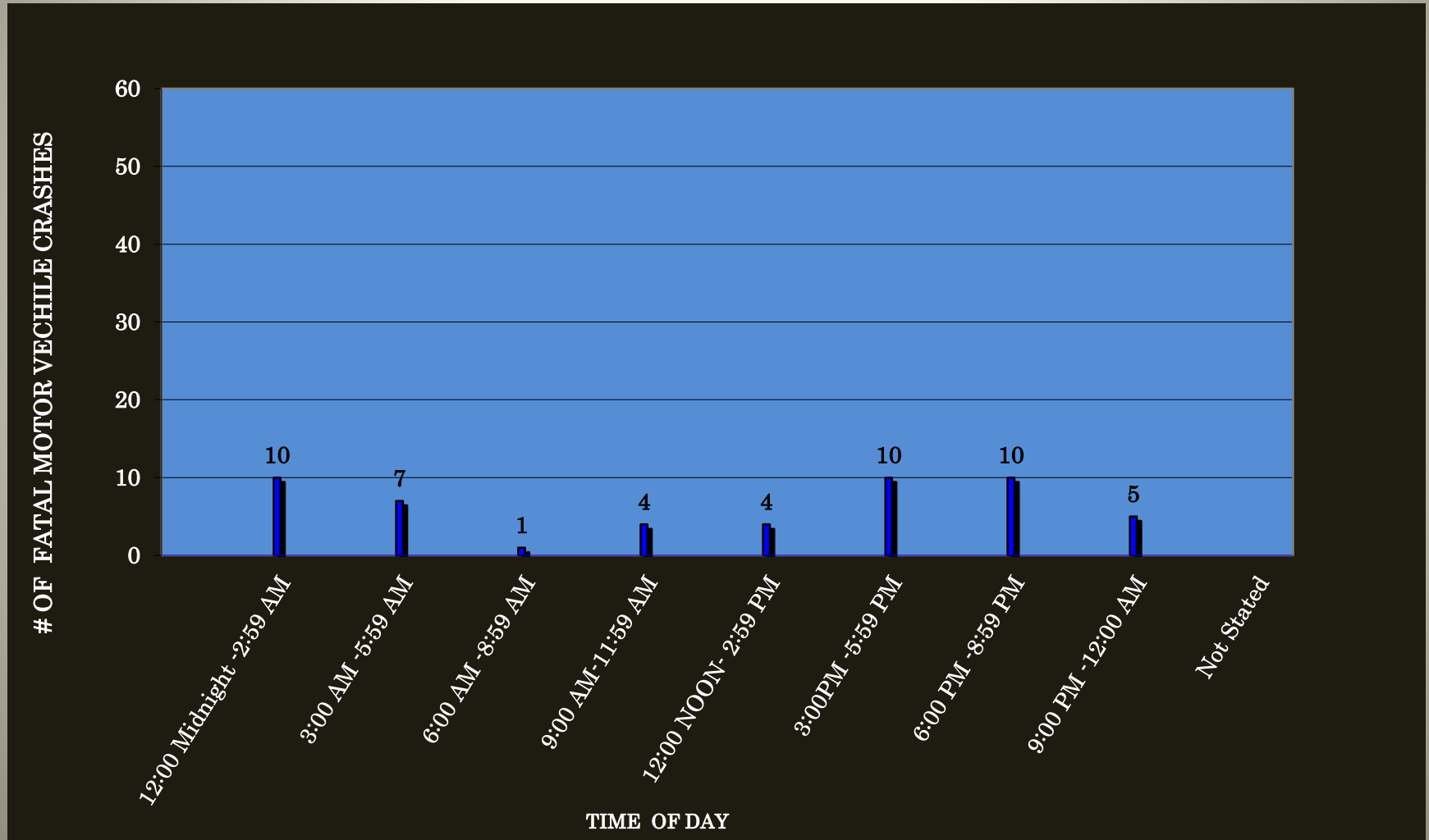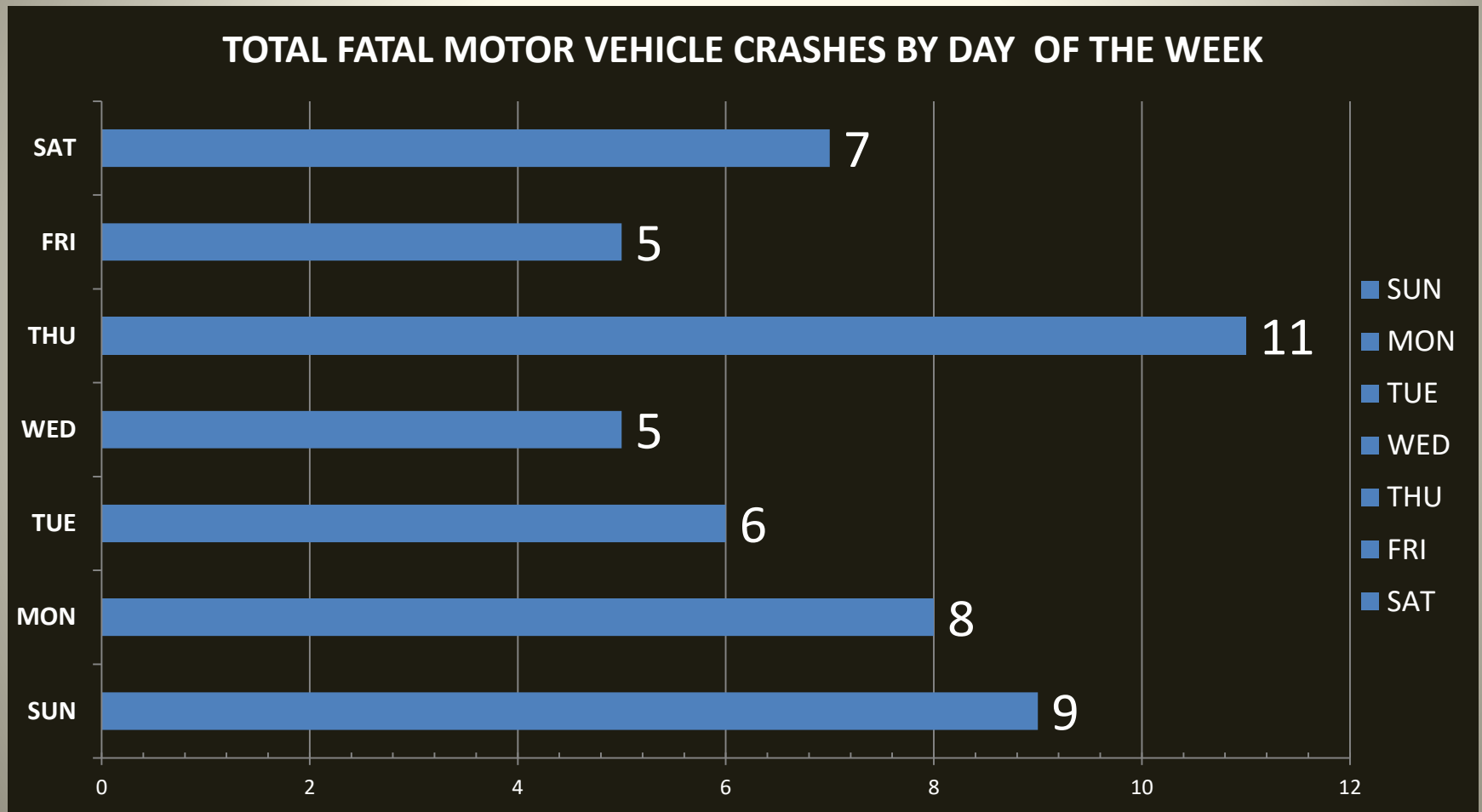
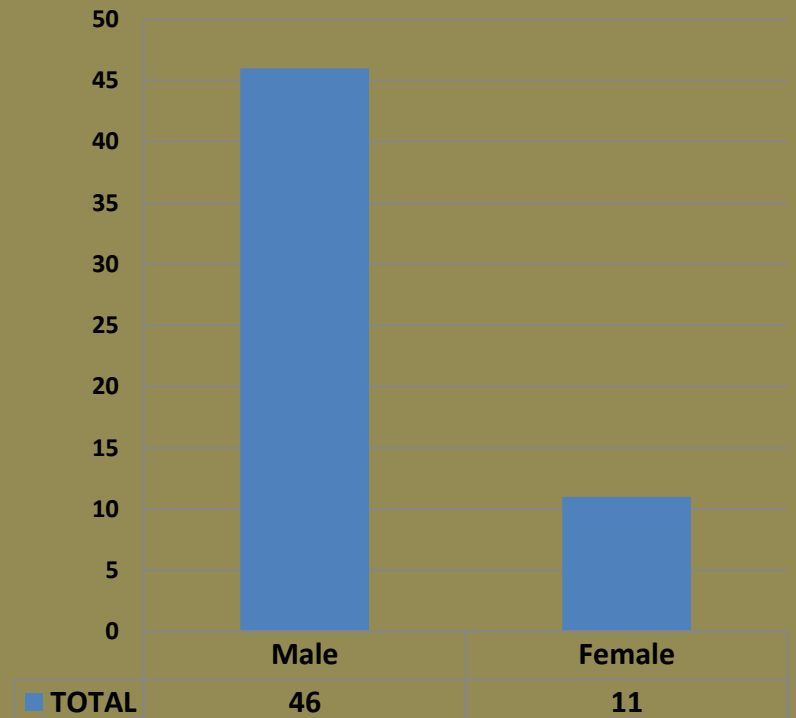# FATAL CRASHES BY INTERSECTION
& MOTOR VECHILE TRAFFIC FATALIITES BY GENDER

FATAL CRASHES AT INTERSECTIONS AND NON INTERSECTIONS
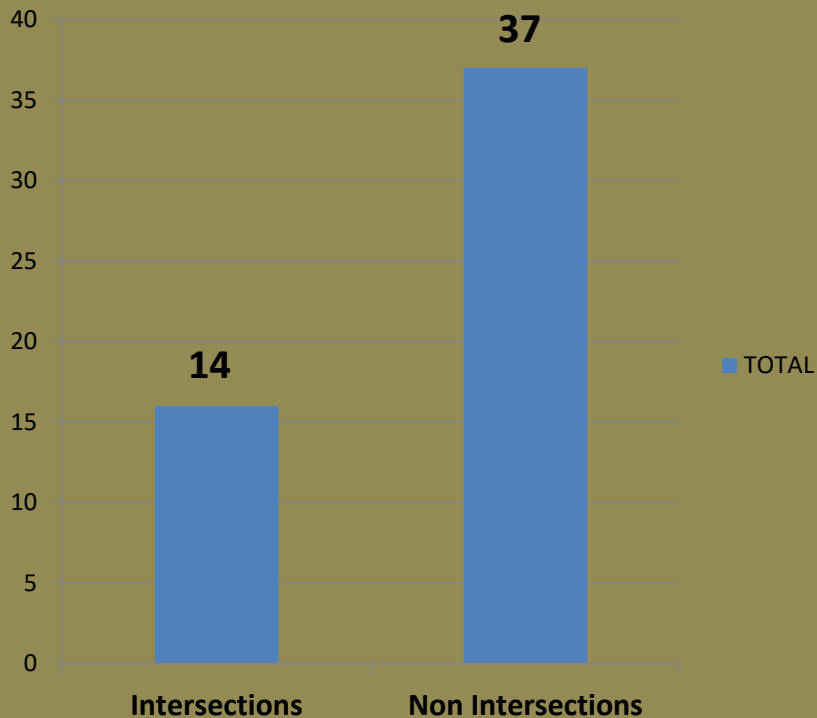
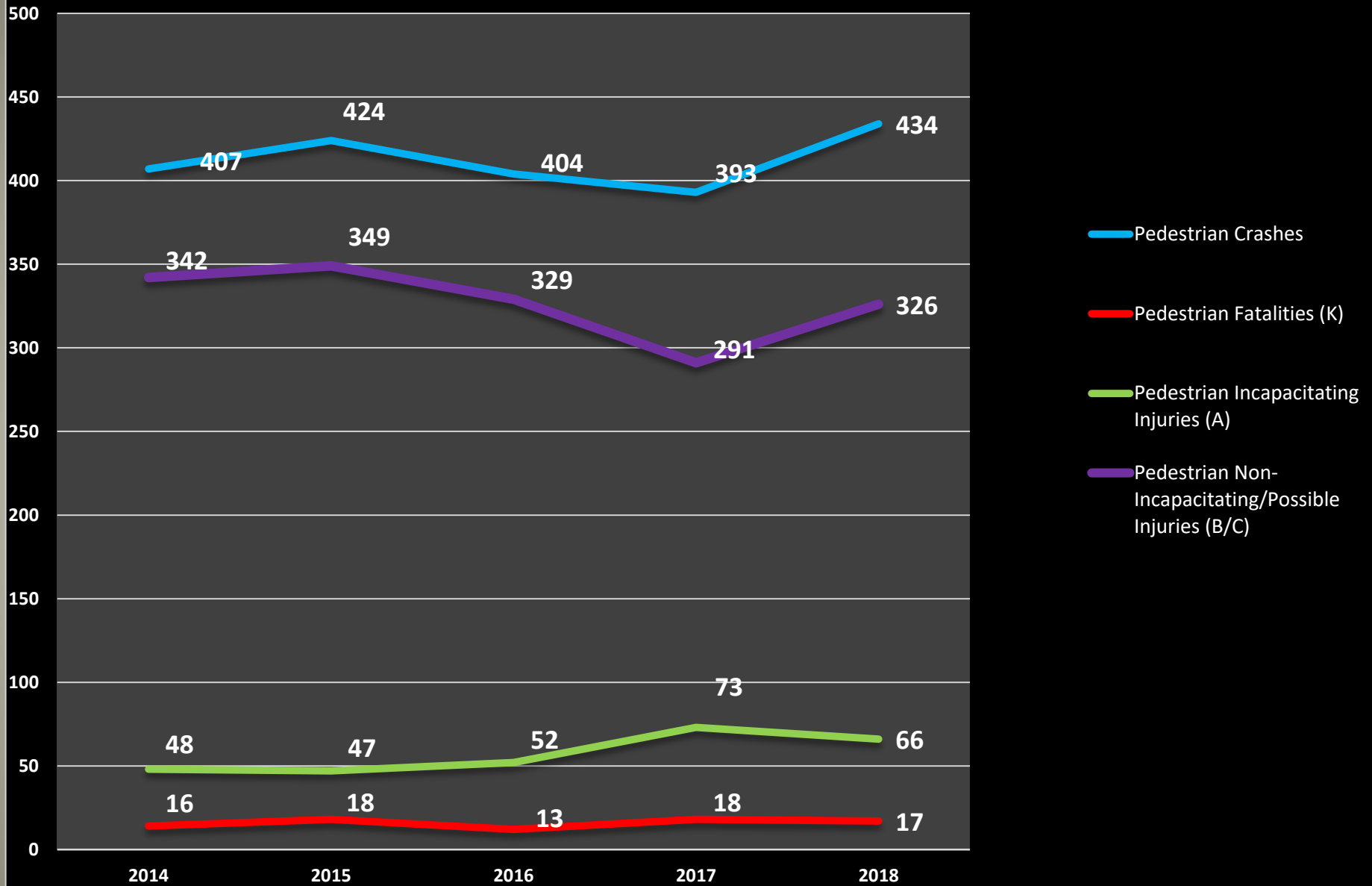MOTOR VECHILE TRAFFIC FATALITIES MALES VS FEMALES

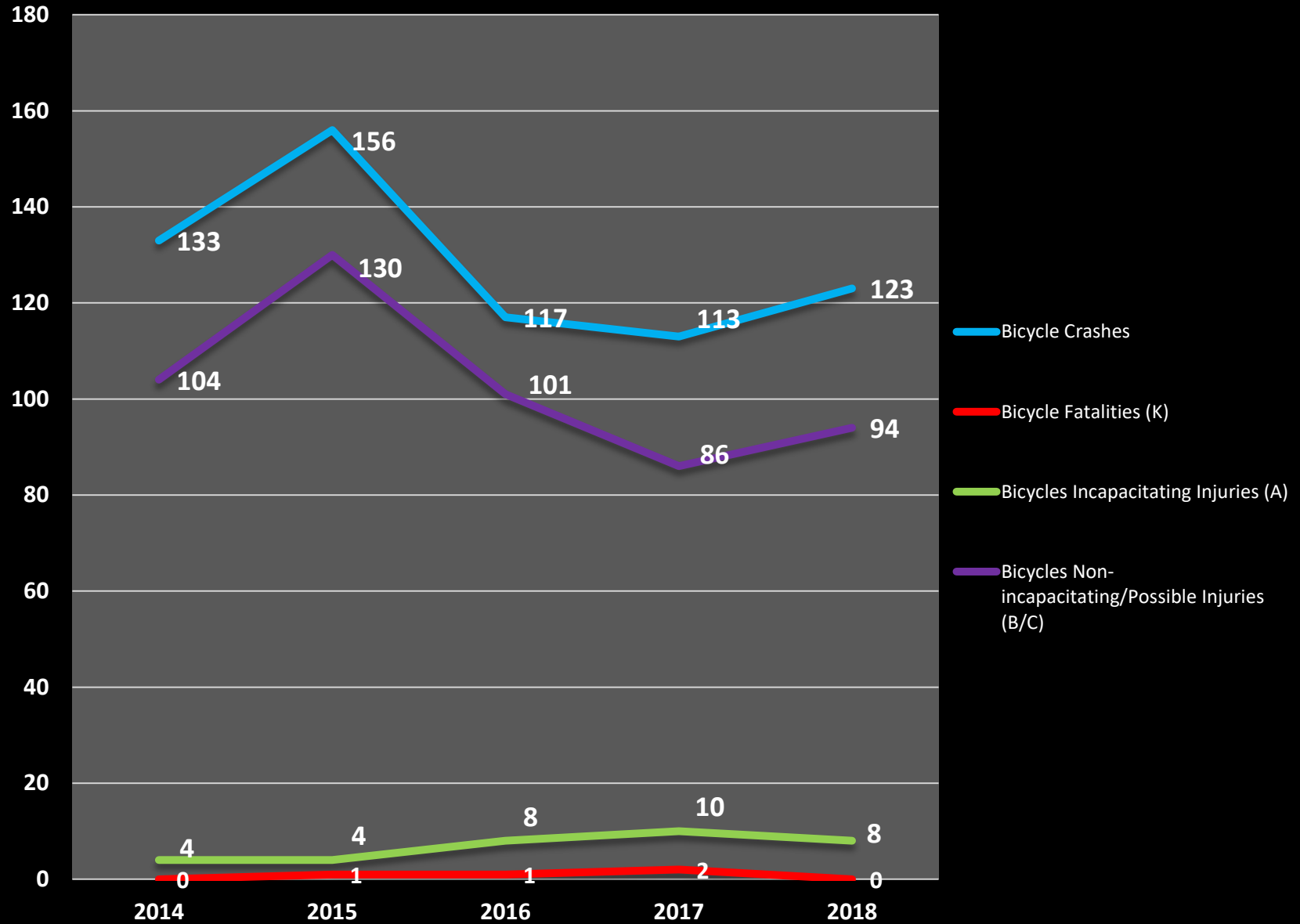| TOTAL	Male	Female
TOTAL	46	11

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2018 TRAFFIC FATALITIES BY DRIVER, PASSENGER, PEDESTRIAN, BICYCLIST & MOTORCYCLIST
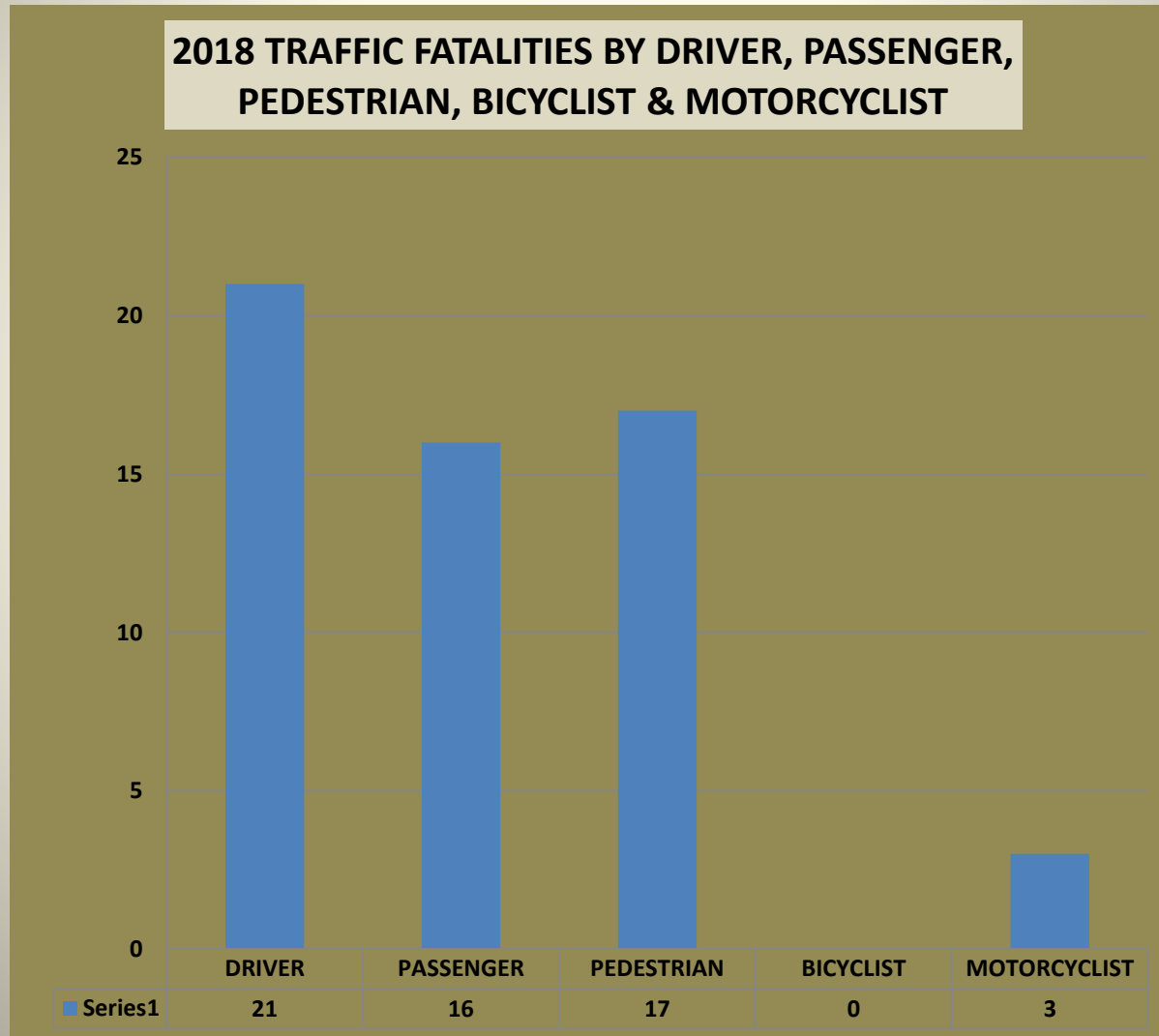
PEDESTRIAN CRASHES BY TYPE 2014-2018

BIKE CRASHES BY TYPE 2014-2018

CITY OF MILWAUKEE 2017 HIGH CRASH INTERSECTIONS
BY CRASH FREQUENCY

Rank	Intersection	Control	Entering Volume*	2017						2016		
				Crash Rate	Total Crashes	Total Fatalities	Total Injuries	Pedestrian Crashes	Bicycle Crashes	Total Crashes	Total Fatalities	Total Injuries
1	W. Capitol Dr. (STH 190) & N. Sherman Blvd.	City Signal	58,350	2.07	44	1	38	1	0	34	0	13
2	W. Capitol Dr. (STH 190) & N. 35th St.	City Signal	49,250	2.00	36	3	12	0	0	40	0	41
3	W. Center St. & N. 27th St	City Signal	35,000	2.66	34	0	25	2	1	22	0	14
4	W. Capitol Dr. (STH 190) & N. 51st Blvd.	City Signal	48,950	1.68	30	0	18	0	0	40	0	33
5	W. Hampton Ave. & N. Teutonia Ave.	City Signal	41,400	1.92	29	1	21	1	0	19	0	11
6	W. Hampton Ave. & N. Hopkins St.	City Signal	33,100	2.32	28	1	12	3	0	17	0	12
7	W. Capitol Dr. (STH 190) & N. 34th St.	City Signal	51,500	1.44	27	0	18	0	0	18	0	9
8	N. Teutonia Ave. & W. Villard Ave.	City Signal	29,950	2.38	26	1	13	1	0	18	0	16
9	W. Capitol Dr. (STH 190) & N. 76th St. (STH 181)	City Signal	52,450	1.36	26	0	19	1	0	14	0	7
10	W. Capitol Dr. (STH 190) & N. Teutonia Ave.	City Signal	54,300	1.21	24	0	11	1	0	11	0	10
11	W. Center St. & W. Lisbon Ave. & N. 60th St.	City Signal	31,550	2.00	23	0	7	0	0	18	0	5
12	W. Hope Ave. & W. Hopkins St. & N. 35th St.	Stop Sign	14,250	4.23	22	0	28	0	0	6	0	0
13	W. Capitol Dr. (STH 190) & N. 26th St.	Stop Sign	36,600	1.65	22	0	17	1	1	9	0	14
14	W. Fond Du Lac Ave. (STH 145) & N. Sherman Blvd.	City Signal	64,400	0.94	22	0	15	3	0	14	0	7
15	W. Burleigh St. & W. Fond Du Lac Ave. (STH 145) & N. 35th St.	City Signal	45,200	1.33	22	0	8	1	0	33	0	17
16	W. Fond Du Lac Ave. (STH 145) & W. Locust St.	City Signal	29,150	1.97	21	1	14	0	0	25	0	18
17	W. Capitol Dr (STH 190) & N. 60th St.	City Signal	51,250	1.12	21	0	18	2	1	26	0	17
18	W. Hampton Ave. & N. Sherman Blvd.	City Signal	53,050	1.08	21	0	15	1	0	21	0	18
19	W. North Ave. & N. 27th St.	City Signal	26,350	2.18	21	0	14	1	0	14	0	11
20	W. Fond Du Lac Ave. (STH 145) & N. 27th St.	City Signal	31,450	1.83	21	0	11	0	0	12	0	10
21	W. Fond Du Lac Ave (STH 145) & W. Hampton Ave.	City Signal	56,700	0.97	20	0	15	0	0	17	0	11
22	W. Highland Ave. & W. Highland Blvd. & N. 27th St.	City Signal	26,400	2.08	20	0	13	1	0	6	0	2
23	W. Fond Du Lac Ave. (STH 145) & N. 68th St.	City Signal	41,800	1.31	20	0	12	0	0	5	0	2
24	W. Capitol Dr. (STH 190) & W. Fond Du Lac Ave. (STH 145)	City Signal	72,850	0.75	20	0	10	0	0	25	0	13
25	W. Layton Ave. & S. 27th St. (STH 241)	State Signal	52,500	0.99	19	1	5	0	0	22	0	8
26	W. Townsend St. & N. 27th St.	City Signal	15,500	3.36	19	0	18	0	0	9	0	3
27	W. Locust St. & N. Martin L King Jr Dr.	City Signal	43,250	1.20	19	0	17	0	1	19	0	14
28	W. Appleton Ave. (STH 175) & W. Capitol Dr. (STH 190)	City Signal	71,650	0.73	19	0	16	0	0	22	0	20
29	W. Lisbon Ave. & N. 35th St.	City Signal	27,250	1.91	19	0	16	0	1	14	0	10
30	W. Hampton Ave. & N. 60th St.	City Signal	46,000	1.13	19	0	15	0	0	21	0	15
31	W. Silver Spring Dr. & N. 91st St.	County Signal	48,050	1.08	19	0	13	0	0	14	0	10
32	W. National Ave. (STH 59) & S. 35th St.	City Signal	32,300	1.61	19	0	11	2	0	6	0	3
33	W. Vliet St. & N. 27th St.	City Signal	24,950	2.09	19	0	11	0	0	10	0	1
34	W. Villard Ave. & N. 60th St.	City Signal	32,300	1.61	19	0	10	0	0	14	0	11
35	W. Capitol Dr. (STH 190) & N. 27th St.	City Signal	51,000	1.02	19	0	3	1	0	26	0	18

Rank	Intersection	Control	Entering Volume*	2017						2016		
				Crash Rate	Total Crashes	Total Fatalities	Total Injuries	Pedestrian Crashes	Bicycle Crashes	Total Crashes	Total Fatalities	Total Injuries
36	W. Burleigh St. & W. Roosevelt Dr.& N. 60th St.	City Signal	33,850	1.46	18	0	12	0	1	16	0	9
37	W. College Ave. & S. 13th St.	County Signal	42,150	1.17	18	0	8	0	1	17	0	11
38	W. Fond Du Lac Ave. (STH 145) & W. Mc Kinley Ave. & N. 6th St.	City Signal	29,450	1.67	18	0	8	0	0	22	2	13
39	W. Layton Ave. & S. 13th St.	City Signal	38,050	1.30	18	0	8	1	0	13	0	6
40	S. Layton Blvd. & W. Lincoln Ave. & S. 27th St.	City Signal	39,100	1.26	18	0	7	2	0	18	0	13
41	W. Silver Spring Dr. & N. 64th St.	City Signal	52,300	0.94	18	0	7	1	0	6	0	3
42	W. Burleigh St. & N. 27th St.	City Signal	26,850	1.73	17	0	22	1	0	24	0	16
43	W. North Ave. & N. 35th St.	City Signal	32,650	1.43	17	0	16	2	0	22	0	16
44	W. Wisconsin Ave. & N. 11th St.	City Signal	18,850	2.47	17	0	12	0	0	14	0	2
45	W. Center St. & N. 35th St.	City Signal	84,700	0.55	17	0	11	0	0	27	0	22
46	W. Locust St. & N. 8th St.	City Signal	25,300	1.84	17	0	10	0	0	12	0	6
47	W. Becher St. & S. 6th St. (STH 38)	City Signal	24,400	1.91	17	0	4	0	0	8	0	3
48	W. Center St. & W. Fond Du Lac Ave (STH145)	City Signal	29,600	1.48	16	0	13	0	0	16	0	15
49	W. Locust St. & N. Sherman Blvd.	City Signal	29,950	1.46	16	0	13	0	0	11	0	4
50	W. Greenfield Ave. & S. Layton Blvd.	City Signal	38,100	1.15	16	0	11	2	1	10	0	2
51	W. Good Hope Rd. (CTH PP) & N. 60th St.	County Signal	41,700	1.05	16	0	8	0	0	17	1	10
52	W. Villard Ave. & N. 51st. Blvd.	City Signal	25,850	1.70	16	0	4	0	0	14	0	16
53	W. Wisconsin Ave. (USH 18) & N. 35th St.	City Signal	31,300	1.31	15	0	17	0	0	17	0	6
54	W. Hampton Ave. & N. 37th St.	City Signal	33,100	1.24	15	0	13	1	0	10	0	5
55	W. Locust St. & N. 35th St.	City Signal	22,000	1.87	15	0	11	0	0	14	1	7
56	W. Florida St. & S. 2nd St.	Stop Sign	8,600	4.78	15	0	8	0	0	6	0	2
57	S. Layton Blvd. (STH 57) & W. National Ave. (STH 59)	City Signal	37,000	1.11	15	0	7	2	0	17	0	11
58	W. Center St. & N. Martin L King Jr Dr.	City Signal	21,450	1.92	15	0	7	0	0	13	0	11
59	W. Fond Du Lac Ave. (STH 145) & N. 51st Blvd.	City Signal	56,650	0.73	15	0	7	0	0	18	0	9
60	W. Hampton Ave. & N. 76th St (STH 181)	City Signal	51,800	0.79	15	0	6	0	0	17	0	15
61	W. Grantosa Dr. & N. 76th St. (STH 181)	City Signal	43,500	0.94	15	0	5	0	0	12	0	4
62	W. Good Hope Rd. (CTH PP) & N. 76th St. (STH 181)	State Signal	66,850	0.61	15	0	3	0	0	21	0	14
63	W. Wisconsin Ave. & N. 10th St.	City Signal	20,800	1.98	15	0	3	0	0	18	0	6
64	W. Locust St. & N. 7th St.	City Signal	35,100	1.17	15	0	2	0	0	12	0	5

*Volume numbers are AADT from WisDOT Roadrunner website. In cases of discrepancy between initially visible summary number and more detailed available statistics, the summary number was used.

CITY OF MILWAUKEE 2017 HIGH CRASH INTERSECTIONS
THAT APPEARED ON THE 2016 LIST BUT NOT ON THE 2017 List

2016 Rank	Intersection	Control	2017					2016		
			Total Crashes	Total Fatalities	Total Injuries	Pedestrian Crashes	Bicycle Crashes	Total Crashes	Total Fatalities	Total Injuries
31	W. Hampton Ave. & N. 51st Blvd.	City Signal	14	0	3	0	0	18	0	13
37	W. North Ave. & N. 20th St. (STH 57)	City Signal	13	1	5	0	0	18	0	6
25	W. Locust St. & N. 27th St. (STH 57)	City Signal	13	0	8	0	0	25	0	11
38	W. St. Paul Ave. & N. 27th St. (STH 57)	City Signal	13	0	3	0	0	17	1	6
18	W. Silver Spring Dr. & N. 60th St.	City Signal	12	0	6	0	0	25	0	22
39	N. Lovers Lane Rd. & W. Silver Spring Dr.	State Signal	12	0	5	1	0	16	0	17
45	W. Burleigh St. & N. 51st Blvd.	City Signal	11	0	7	2	0	16	0	9
13	W. Mill Rd. (CTH S) & N. 76th St. (STH 181)	State Signal	10	0	15	1	1	21	0	17
40	W. Congress St. & N. Sherman Blvd.	City Signal	10	0	11	0	0	16	0	17
48	N. Humboldt Blvd. & E. Locust St.	City Signal	10	0	4	0	0	17	0	8
23	W. Blue Mound Rd. (USH 18) & N. Mayfair Rd. (STH 100)	State Signal	10	0	4	1	0	18	0	9
6	W. Fond Du Lac Ave. (STH 145) & N. 60th St.	City Signal	10	0	4	0	0	29	0	14
50	W. Forest Home Ave. (STH 24) & S. 27th St. (STH 241)	City Signal	9	0	6	0	0	16	0	7
47	W. Good Hope Rd. (CTH PP) & N. 107th St.	City Signal	9	0	6	0	0	20	0	9
42	N. Martin L King Jr Dr. & W. North Ave.	City Signal	9	0	3	0	0	17	0	13
54	S. Cesar E. Chavez Dr. & W. Mitchell St. & S. 16th St.	City Signal	8	0	8	0	0	18	0	12
27	W. Vliet St. & N. 35th St.	City Signal	8	0	2	0	0	18	0	5
52	W. Capitol Dr. (STH 190) & N. 20th St. (STH 57)	City Signal	7	0	4	0	0	16	0	5
33	Miller Park Way (STH 341) & W. National Ave. (STH 59)	West MKE Signal	7	0	1	0	0	19	0	14
55	W. Capitol Dr. (STH 190) & N. 56th St.	City Signal	4	0	4	1	0	15	0	3
56	W. State St. & N. 27th St. (STH 57)	City Signal	3	0	0	0	0	16	0	3

Proactive Traffic Safety Initiatives

- Speed Enforcement Initiatives
- Educational Traffic Safety Programs
- Traffic Safety information for local business, places of worship, and community groups.
- Traffic Slow Down Signs (MPD & AAA of WI)
- MPD Public Information Office- Traffic Safety Initiative Press Conferences
- Continue working with Milwaukee Safety and Civic Commission
- Working with DPW Traffic & Engineering on Traffic Calming Initiatives.

SOURCES

- Sources:
  - Milwaukee Police Department Safety Division
  - Milwaukee Police Department Office of Management Analysis and Planning
  - Milwaukee Police Department Neighborhood Task Force
  - Milwaukee Police Department Specialized Patrol Division Crash Reconstruction Unit
  - Milwaukee Police Department Traffic Enforcement Unit
  - Milwaukee Police Department Traffic Records
  - Milwaukee Police Department Citation Processing Unit
  - City of Milwaukee Department of Public Works Traffic & Engineering

  ❑ Data Sources: Wisconsin Traffic Operations and Safety (TOPS) Laboratory, University of Madison College of Civil & Engineering, The WisTransportal System Preliminary 2018 Crash data. The WisTransPortal is updated on a daily basis from preliminary DT4000 crash data extracts. The DT4000 form elements and attributes have been translated back to match MV4000 definitions.

  ❑ Note: Crash data obtained from the Wisconsin Transportation Portal (WisTransPortal) database. Crashes include the following location types: Intersections and non-Intersections. Crashes exclude the following location types: Parking lots and private property. Deer related crashes are also excluded. 2018 data preliminary and represents the latest set of available crash records for the current year and generally include crash reports transmitted by law enforcement as recently as the previous day. All preliminary data are subject to ongoing review and editing.

  ❑ Data Source: Milwaukee Police Department Specialized Patrol Division Crash Reconstruction Unit Data Base 2018-2008.

CITY	TYPE	2015	2016	2017	2018
Milwaukee	Ped. Fatal ax	20	12	20	17
**WisDOT	Under 18	5	4	0	7
St. Louis	Ped. Fatal ax	17	19	11	11
**St. Louis Metro Police	Under 18	2	1	1	0
Kansas City	Ped. Fatal ax	12	12	19	22
**Kansas City Police	Under 18	1	0	1	0
Columbus	Ped. Fatal ax	13	21	18	19
**Columbus Police	Under 18	0	2	2	1
Cleveland	Ped. Fatal ax	6	10	12	8
**Ohio DOT	Under 18	0	1	2	1

2019	Total	
8	77	
5	21	
11	69	
1	5	
10	75	
2	4	
20	91	
4	9	*ages 11, 6, 0, 0 (two of our fatalities were unborn children. One died *in*
8	44	
0	4	

utero and another died after an emergency C-section immediately prior to the mother's death.

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DDACTS
DATA-DRIVEN APPROACHES TO CRIME AND TRAFFIC SAFETY

Operational Guidelines

Integrating "hot spot" technologies to establish effective methods for deploying law enforcement resources through analysis of crash and crime data.

March 2014

U.S. Department of Transportation
National Highway Traffic Safety Administration

NHTSA

BJA
Bureau of Justice Assistance
U.S. Department of Justice

NIJ National Institute of Justice

IADLEST
Standards & Training
International Association of Directors of Law Enforcement

For additional information and technical assistance, contact:

Governors Highway Safety Office at:

www.ghsa.org/html/links/shsos.html

Or your Regional NHTSA Administrator at:

www.nhtsa.gov/nhtsa/whatis/regions/
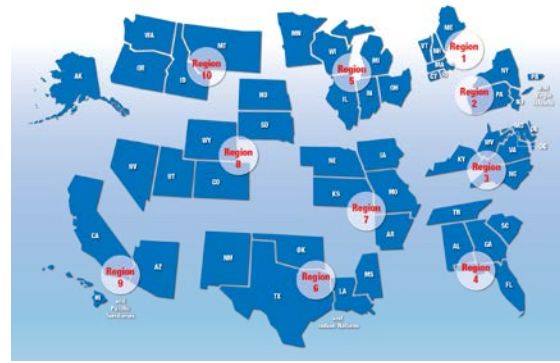
For further information, visit the DDACTS Web site at www.nhtsa.gov/ddacts or e-mail ddacts@iadlest.org.

International Association of Directors of Law Enforcement (IADLEST) provides project management and workshop implementations for DDACTS. The National Highway Transportation Safety Administration, the Bureau of Justice Assistance, and the National Institute of Justice collaborate to promote and support the DDACTS model.

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Meridian, ID 83642
Phone: (208) 288-5491

Resources: www.iadlest.org/Projects/DDACTS.aspx
www.nlearn.org
ddacts@googlegroups.com; Facebook/DDACTS; DDACTS on LinkedIn; or Twitter @DDACTS

DDACTS Implementation Workshops
For more information or questions regarding DDACTS, please contact the DDACTS National Project Manager at ddacts@iadlest.gov.

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Data-Driven Approaches to Crime *and* Traffic Safety (DDACTS) is a law enforcement operational model supported by a partnership among the Department of Transportation's National Highway Traffic Safety Administration, and two agencies of the Department of Justice, the Bureau of Justice Assistance (BJA), and the National Institute of Justice (NIJ). DDACTS integrates location-based traffic crash, crime, calls for service and enforcement data to establish effective and efficient methods for deploying law enforcement resources. By identifying areas through temporal and spatial analysis that have high incidences of crashes and crime, DDACTS employs highly visible, targeted traffic enforcement to affect these areas. This model affords communities the dual benefit of reducing traffic crashes and crime, thus reducing overall social harm. Drawing on the deterrent value of highly visible traffic enforcement and the knowledge that crimes often involve the use of motor vehicles, the goal of DDACTS is to reduce the incidence of crashes, crime, and social harm in communities across the country.

The model's focus on the collaboration of law enforcement with citizens, communities, businesses, and community organizations reinforces the crucial role that partnerships play in reducing social harm and improving quality of life. Building on this collaboration, DDACTS positions highly visible, strategic traffic enforcement in the exact areas and at the exact times that police services are most needed.

The DDACTS Model

DDACTS ensures accountability and provides a dynamic, evidence-based problem-solving approach to crashes and crime. This approach, grounded in community-oriented and evidence-based policing, suggests that time and place-based policing, "…as opposed to [traditional] person-based policing, is more efficient as a focus of law enforcement actions; provides a more stable target for law enforcement activities; has a stronger evidence base; and raises fewer ethical and legal problems."[1] The application of highly visible traffic enforcement is a proven and effective countermeasure that addresses both crashes and crime whether they occur simultaneously or independently in time and/or location. Furthermore, its reliance on analysis to identify the nexus of crashes and crime provides a scientifically based method for law enforcement to plan its efforts.

As leaders of this national initiative to improve the quality of life in local communities, NHTSA, BJA, and NIJ are fortunate to have support from a number of national partners. The following organizations will offer technical assistance and in-kind resources through their local affiliates to support law enforcement agencies that use DDACTS:

- American Probation and Parole Association;
- Commission on Accreditation for Law Enforcement Agencies;
- Federal Highway Administration;
- Federal Motor Carrier Safety Administration;
- Governors Highway Safety Association;
- International Association of Chiefs of Police;
- International Association of Crime Analysts;

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[1] Weisburd, D. (2008, January). Place-based Policing. *Ideas in American policing, Number 9.* Washington, DC: Police Foundation.

- International Association of Directors of Law Enforcement Standards and Training;
- National Criminal Justice Association;
- National District Attorneys Association;
- National Liquor Law Enforcement Association;
- National Organization of Black Law Enforcement Executives; and
- National Sheriffs' Association.

A Starting Point for Long-Term Change

Implementation of the DDACTS model is a starting point for achieving long-term change, where law enforcement professionals take a more evidence-based approach to the deployment of personnel and resources. The following presumptions about the future of law enforcement support the necessity for implementing DDACTS:

- Community-focused, place-based law enforcement will continue as an effective strategy for addressing current issues of social harm and safety concerns of citizens.
- Resources allocated for law enforcement activities are frequently not sufficient to keep pace with the demands placed on agencies to respond to calls for service and threats to public safety.
- Decreasing social harm and improving quality of life for communities continue to be primary missions of law enforcement agencies.
- The need for police executives to provide timely and accurate data to justify expenditures and deployment decisions will only increase as Federal, State, and local administrations, along with the public, continue to scrutinize the allocation of tax dollars.
- Technology will continue to improve the policies and practices of law enforcement. Existing and emerging technologies, such as smaller/faster computers, improved scanners and cameras, and the further application of information technology will greatly enhance the effectiveness of law enforcement practices.
- Law enforcement agencies will continue to collaborate and keep pace with other public and private service sectors that increasingly use information technology to assess needs, deploy resources, and manage costs.

Finally, because a shortage of law enforcement resources is likely to continue in the near future, police executives should continue to explore new strategies to improve quality of life in communities that suffer from high crash and crime rates.

Implementing the DDACTS Model

DDACTS relies on seven guiding principles, starting with building community partnerships to establish support for highly visible traffic enforcement and to aid in the development of strategic countermeasures. DDACTS is based on local data collection and analysis to identify crime, crashes, and traffic-related "hot spots." As law enforcement agencies employ DDACTS operational plans, routine information-sharing sessions with stakeholders reinforce the collective ownership of the initiative. Regular monitoring, evaluation, and the analysis of outcomes provide data-driven feedback for adjustments to DDACTS operational plans. This implementation guide outlines procedures and highlights operational considerations based on best practices in the field for each of the following seven guiding principles.

1. **Partners and Stakeholders Participation** ——Partnerships among law enforcement agencies and with local stakeholders are essential and provide opportunities and support for decreasing social harm and improving the quality of life in a community.

2. **Data Collection** ——Accurate and timely crash, crime, calls for service and enforcement-related data, including location, incident type, time of day, and day of week are the building blocks of DDACTS. Additional data may include arrests, citations, warnings, motor vehicle stops, citizen complaints, field interviews, and other nontraditional data such as the location of parolees and probationers, individuals with suspended or revoked licenses, and known offenders.

3. **Data Analysis** ——The creation of actionable analysis products, including maps that overlay crash, crime, and enforcement-related data allows agencies to identify problem locations, or hot spots. Additional analysis, through a number of proven evaluation techniques, can distinguish causation factors for each type of incident, delineate spatial and temporal factors, and consider environmental influences on crashes, crimes, and other disorder or social harm.

4. **Strategic Operations** ——Based on analysis, agencies are able to identify high activity hot spots, likely to include incidents of crashes, crimes, and other calls for service. These hot spots can then be targeted with strategic, highly visible traffic and other enforcement efforts at the most appropriate places and times. As discussed in the previous paragraph, hot spot analysis guides the realignment of workflow and operational assignments to focus highly visible traffic enforcement efforts and increase the efficiency of reducing social harm.

5. **Information Sharing and Outreach** ——Built into the model are opportunities to share comprehensive results and actionable information internally and externally, promote community participation, and document accomplishments. Regularly generated progress reports give management the documentation needed to keep officers informed, hold meetings with community members, and report to government administrators and elected officials. Progress reports also provide the basis for ongoing media relations.

6. **Monitoring, Evaluation, and Adjustments** ——Data collection and analysis procedures allow supervisors to monitor, evaluate, and **adjust** strategic operations and account for enforcement activity. They also provide an opportunity on a regular basis to assess crash and crime reduction, cost savings, and other outcome measures that define success. The DDACTS model is place-based and thus needs to keep pace with ever changing data.

7. **Outcomes** ——Goals and objectives that emerge during hot spot identification and strategic plan preparation are developed into outcome measures. These measures are used to assess effectiveness relating to reductions in crashes, crime, traffic violations; cost savings; the use of specific operational techniques and personnel deployment. The DDACTS model supports increased measurement of outcomes and decreased measurement of outputs in determining the effectiveness and efficiency of law enforcement operations.

Data-Driven Approaches to Crime *and* Traffic Safety (DDACTS)

INTRODUCTION

Data-Driven Approaches to Crime *and* Traffic Safety (DDACTS) is a law enforcement operational model supported by a partnership between the Department of Transportation's National Highway Traffic Safety Administration and two agencies of the Department of Justice, the Bureau of Justice Assistance, and the National Institute of Justice. DDACTS integrates location-based crash, crime, calls for service and enforcement data to establish effective and efficient methods for deploying law enforcement resources. By identifying areas, through temporal and spatial analysis, with high incidences of crime and crashes, DDACTS employs highly visible traffic enforcement strategies. By targeting high crash hot spots that are within high crime areas with highly visible traffic enforcement, the DDACTS model affords communities the dual benefit of reducing traffic crashes and crime thus reducing overall social harm. Drawing on the deterrent value of highly visible traffic enforcement and the knowledge that crimes often involve the use of motor vehicles, the goal of DDACTS is to reduce the incidence of crashes and crime, and thus reducing social harm in communities across the country.

Using the Guide

This guide presents procedures and recommended practices for communities to build a DDACTS implementation plan built upon the seven guiding principles that characterize comprehensive community-based law enforcement. The principles are (1) partners and stakeholder participation; (2) data collection; (3) data analysis; (4) strategic operations; (5) information sharing and outreach; (6) monitoring, evaluation, and adjustment; and (7) outcomes.

Beginning with an overview of DDACTS, the guide highlights research demonstrating the traffic safety and crime prevention benefits derived from strategically directed and highly visible traffic enforcement. The overview is followed by a general discussion of the use of analysis to drive operations. The main section presents the guiding principles, implementation considerations, and reference materials.

The DDACTS Model

As leaders of this national initiative to improve the quality of life in local communities, NHTSA, BJA, and NIJ understand the challenges faced by law enforcement executives, who strive to weigh competing demands for police services against the allocation of limited resources. Designed to address this challenge, DDACTS ensures accountability and provides a dynamic, problem-solving approach to crashes and crime. Ultimately, DDACTS aims to improve the quality of life in local communities by diminishing social harm caused by both traffic crashes and crime.

This approach, similar to community- and problem-oriented policing, suggests that place-based policing, "…as opposed to person-based policing, is more efficient as a focus of law enforcement actions; provides a more stable target for law enforcement activities; has a

stronger evidence base; and raises fewer ethical and legal problems."[2] The application of highly visible traffic enforcement is a proven and effective tactic that addresses both crashes and crime whether they occur simultaneously or independently in time or location. Furthermore, its reliance on analysis to identify the nexus of crashes and crime acknowledges the important role that data and technology play in law enforcement and other public safety arenas.

DDACTS builds on more than 35 years of research illustrating the residual crime control and traffic safety benefits resulting from data-driven, strategically directed traffic enforcement. One of the key elements of the DDACTS model is the nexus between the strategy and tactics of traffic enforcement and the prevention of crime. In other words, the application of *highly visible* traffic enforcement is a proven and effective strategy that addresses both crime and crashes whether they occur simultaneously or independently in time and/or location.

The relationship between traffic crashes, crime, and place-based policing has been the subject of a number of studies, each contributing an important piece to our understanding. Findings of several studies are highlighted as follows:

➢ In 1975, a study of 119 vehicular homicide cases indicated that victims and offenders were similar to those involved in other violent crimes in that "the tendency toward aggressive behavior, characteristic of a subculture of violence, influences the way an individual drives as well as his face-to-face interactions."[3]

➢ In 1978, James Wilson and Barbara Boland conducted a quantitative study to measure whether the policing style of a community had an effect on crime. In this study, Wilson and Boland examined law enforcement activity in 35 large American cities. This rigorous quantitative study concluded that cities that demonstrated "patrol aggressiveness" experienced the lowest rates of commercial robbery. They argued that, "by stopping, questioning, and otherwise closely observing citizens, especially suspicious ones, the police are more likely to find fugitives, detect contraband (such as stolen property or concealed weapons), and apprehend persons fleeing from the scene of a crime." They also suggested that, "an aggressive patrol strategy will affect the crime rate directly, and not only through its effect on the arrest rate, if it leads would-be offenders to believe that their chances of being arrested have increased, even though they have not."[4]

➢ In 1988, Robert Sampson and Jacqueline Cohen conducted a replication of the Wilson-Boland study using data from 171 American cities with populations over 100,000. As their measure of patrol aggressiveness, they used arrests per officer for driving under the influence

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[2] Ibid..

[3] Michalowski, R. J. (1975, January). Violence in the road: The crime of vehicular homicide. *Journal of Research in Crime and Delinquency, 12*(1), 30-43 (NCJ Publication No. 019248). Retrieved from www.ncjrs.gov/App/Publications/abstract.aspx?ID=19248

[4] Wilson, J. Q., & Boland, B. (1979). *Effect of the police on crime.* (NCJ Publication No. 058531). Retrieved from www.ncjrs.gov/app/publications/abstract.aspx?ID=58531

and arrests for disorderly conduct. Sampson and Cohen concluded that aggressive policing had a strong effect on increasing the certainty of arrest for robbery.[5]

➢ In 1989, a study indicated that in Minneapolis, 3.5% of the addresses accounted for 50% of the calls for service.[6]

➢ In 1992, a NIJ funded study in Kansas City, Missouri, had patrol officers focus on gun detection through aggressive patrol and increased vehicle stops. The results were striking in that gun seizures increased by 65% with no displacement to other areas, drive by shootings decreased by over 80% with no displacement, homicides were reduced and residents in the target area became less fearful of crime and more positive about their neighborhood.[7]

➢ In 1994, a study indicated that, in general, crime is not displaced and, in fact, surrounding areas often benefit from place-based strategies.[8]

➢ In 1994-1996, Peoria, Illinois, increased traffic enforcement with the assistance of the Illinois State Police and Peoria County Sheriff's Office. This resulted in significant reductions in traffic crashes, violent crime, property crime, and calls for service.[9]

➢ In 1995, Indianapolis, the police department increased traffic enforcement in eight patrol beats over a 6-week period resulting in significant decreases in burglaries and vehicle thefts. An interesting finding of this study is that a diffusion of these benefits (lower crime) was also realized in contiguous beat areas.[10]

➢ In 1997, police in Albuquerque, New Mexico, implemented a Safe Streets program involving saturation patrols, follow-up patrols, freeway speed enforcement, and sobriety checkpoints. The Safe Streets Program was developed after determining 27 of 33 high-crash locations were in only four general geographic areas, all four were also high-crime areas. The results were impressive in that there was a 9 percent decline in property damage crashes, 18% decline in injury crashes, 20% decline in driving while impaired (DWI) crashes, 34% decline

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[5] Sampson, R. J., & Cohen, J. (1988). *Deterrent effects of the police on crime: A replication and theoretical extension.* (NCJ Publication No. 115826). Retrieved from www.ncjrs.gov/app/publications/abstract.aspx?ID=115826

[6] Sherman, L. W., Gartin, P. R., & Buerger, M. E. (1989). Hot spots of predatory crime: Routing activities and the criminology of place, *Criminology, 27, 1,* 27-55 (NCJ Publication No. 115865). Retrieved from www.ncjrs.gov/App/Publications/abstract.aspx?ID=115865

[7] Sherman, L. W., Shaw, J. W., & Rogan, D. P. (1995). *The Kansas City gun experiment, Research in brief,* Washington, DC: National Institute of Justice; NCJ 150855; and Sherman, L. W., & Rogan, D. P. (1995). The effects of gun seizures on gun violence: 'Hot spots' patrol in Kansas City. *Justice Quarterly 12,* 673–693.

[8] Clarke, R. V., & Weisburd, D. (1994). Diffusion of crime control benefits: Observations on the reverse of displacement, *Crime Prevention Studies, Volume 2,* 165-183 (NCJ Publication No. 147834).

[9] National Highway Traffic Safety Administration. (1997). *The Peoria experience, Traffic enforcement and crime: It plays in Peoria.* Washington, DC: Author. Availabler at: http://www.nhtsa.gov/people/injury/enforce/peoria/peoria.pdf

[10] McGarrell, E. F., Chernak, S., & Weiss, A. (2002, November). Reducing gun violence: Evaluation of the Indianapolis Police Department's directed patrol project (NCJ Publication No. 188740). Washington, DC: National Institute of Justice.

in fatal crashes, 29% decline in homicides, 17% decline in kidnapping, and a ten percent decline in assaults.[11]

➢ In a 2000 study by David Giacopassi and David Forde, the relationship between traffic fatalities and crime was examined. Their study indicated, "traffic fatalities are indices of incivility and aggression, indicating a disregard for social conventions, leading to more serious normative violations like homicide." Moreover, they suggested that when law enforcement agencies pay inadequate attention to traffic law violations it could lead to "a general condition where people feel they may break the law with impunity."[12]

➢ In 2001, a report entitled, "Traffic Safety in the New Millennium," encouraged law enforcement executives to treat traffic safety as a core value, integrate traffic safety throughout their agencies, provide traffic safety training, equipment, staffing and emphasize the importance of traffic safety to all employees.[13]

➢ In 2004, Skogan and Frydal indicated that focusing police resources on place-based hot spots provide the strongest police effectiveness that is available.[14]

➢ In 2004, another study tells us that strategies focused only on offender data often changes because they "age out" of crime, whereas a focus on crime and crashes tends to be much more stable over time.[15]

➢ In 2007, an article in Police Chief Magazine indicates Northwestern University's Statistical and Tactical Approaches to Traffic Safety (STATS) supports and encourages sustainable traffic enforcement without Federal funding, data analysis to drive resource allocation, and traffic enforcement to reduce crashes and criminal activity.[16]

➢ Published in 2011, a long-term study looked at juvenile crime in Seattle. The study indicated that over a 14-year period from 1989 to 2002, half of all juvenile crime occurred at less than 1 percent of Seattle's street segments.[17]

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[11] Stuster, J., (2001). *Albuquerque Police Department: Safe streets program.* (Report No. DOT HS 809 278). Washington D.C.: National Highway Traffic Safety Administration. Available at http://www.nhtsa.gov/people/injury/enforce/SafeStreets/index.htm#toc

[12] Giacopassi, D. & Forde, D. R. (2000) Broken windows, crumpled fenders, and crime. *Journal of Criminal Justice 28* (5), 397–405.

[13] IACP & NHTSA (2001). *Traffic safety in the new millennium.* Alexandria, VA: International Association of Chiefs of Police, Washington, DC: National Highway Traffic Safety Administration. Available at www.nhtsa.gov/people/injury/enforce/trafficsafety.pdf

[14] Skogan, W., & Frydl, K. (2004). National Research Council of the National Academies. *Fairness and effectiveness in policing: The evidence.* Washington, D.C.: National Academies Press.

[15] Weisburd, D., Bushway, S., Lum, C., & Yang, S. (2004). "Trajectories of crime at places: A longitudinal study of street segments in the City of Seattle." *Criminology 42*(2), 283-322.

[16] Weiss, A., & Morckel, K. (2007, July). Strategic and tactical approaches to traffic safety. *Police Chief Magazine. 74*(7).

[17] Weisburd, D., Groff, E., & Morris, N. (2011, October). *Hot spots of juvenile crime: Findings from Seattle.* Washington, DC: Office of Juvenile Justice and Delinquency Prevention.

The Use and Availability of Spatial Analysis[18]

A digital point or dot map is essentially an online version of a traditional wall map on which pins are placed to represent crash and crime events. It comprises a series of points (dots representing locations of crash and crime incidents), lines (depicting street networks), and polygons (demarking jurisdictional boundaries or precincts). These types of simple maps were used historically by law enforcement to identify problem areas.

DDACTS extends beyond these simplified maps and seeks to use modern GIS to identify areas with disproportionately high incidences of crime and crashes. Analysts can evaluate these incidences in the context of longitudinal -time-patterns and trends. Identification and analysis of causal factors can then support the application of strategic, effective, and efficient responses based in problem-oriented and intelligence-led policing approaches. Geographic technologies have significantly improved the ability of analysts and researchers to understand crime and traffic patterns, as well as patterns of victimization. The use of spatial statistical techniques to identify clusters of crashes and crime provides firm evidence that these incidents often overlap in place and time. This identification of hot spots allows police to apply highly visible enforcement measures to affect crashes and crime together.

The use of GIS is growing in local government and across the public sector. In turn, GIS and spatial analysis technologies are widely available to law enforcement agencies as county and municipal governments invest in multipurpose mapping applications. GIS is used to support planning, resource deployment and infrastructure maintenance in even the smallest communities. Such use by law enforcement agencies helps to provide better understanding of problems within their jurisdictions. In such instances, learning about and using GIS applications (and contributing data to them) can help meet the specific mapping needs of law enforcement and create opportunities to access existing GIS capabilities.

There are many GIS software packages and programs capable of and even specifically designed for mapping crime and traffic incidents. Most major commercial GIS software packages can produce quality results for DDACTS mapping objectives. There are also free spatial statistical software and mapping applications available. These often have limited functionality in data transfer and analytical capability, but they can be useful in helping agencies to get started with mapping and spatial analysis. For example, CrimeStat is a crime mapping Windows-based analysis tool available through the National Institute of Justice.

Mapping requires a diverse set of skills including highly developed visual-spatial abilities, a facility for data management, and a creative way of thinking about the acquisition and use of various types of data. Along with these skills, mapping requires vigilant attention to data quality. Therefore, law enforcement executives will need to identify staff members who demonstrate an aptitude for analysis and provide them with the necessary training and resources.

The extent to which law enforcement agencies are using crime and crash mapping varies greatly, as do the analytical techniques used, the staff or "crime analyst" involved in the

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[18] Unless otherwise implied, information presented in this section is attributed to the following article: Markovic, J., Bueermann, J., & Smith, K. (2006, June). Coming to terms with geographical information systems. *The Police Chief*, *73*(6).

process, and the manner in which mapping is used for deployment decisions. In spite of this variation, as more law enforcement agencies adopt DDACTS and other data-driven approaches, the need for trained personnel and the importance of mapping will grow steadily. Ultimately, the usefulness of geographic technology rests with the proficiency of the individuals using it and the quality of the data used.

Mapping Technology and DDACTS

To measure the effectiveness of highly visible enforcement, law enforcement executives must be prepared to track crash, crime, and enforcement data from the entire jurisdiction. This allows for comparisons among areas in which DDACTS strategies and tactics are applied and other defined areas. The information below addresses some basic considerations for using GIS and spatial analysis software technology to implement DDACTS. It includes preliminary details on the use of spatial clustering techniques for identifying and analyzing hot spots.

Baseline Data

Since crash and crime frequencies are highly variable from year to year[19] [20] police departments should use three to five years of historical data to establish a baseline for analysis, if such data is available. The use of a single year of crash and crime data for identifying high crash and high crime locations may yield misleading results.

Geographical Units of Analysis

Analysts should select small geographical units for analysis, such as specific map areas, parcels or even the application of a grid system. This will allow for some degree of correlation between crashes and crimes, given they do not occur in the exact same space. Additional geographical units to consider may include traffic zones, police beats, or other administrative units, which are larger and will increase the strength of the relationship between crime and crash locations and assist in the development of specific responses and efficient deployment of resources.

There are two reasons for using small geographical units. First, most crashes occur on roads and most crimes occur either on sidewalks or within a property boundary (parcel), so exact locations will rarely coincide. Second, common factors are likely to involve the interaction between the road system and the land uses it traverses.

Analysis of Crashes and Crime

To be effective, hot spot analysis must account for the type of crime or crash, its location, and the time of day that it occurred. Thus, the deployment of highly visible enforcement will be driven by knowing whether a hot spot has an abundance of driving while impaired (DWI) crashes, auto thefts, and robberies, for example, that may occur mostly in the evening, as opposed to other types of crashes and crimes that may occur mostly in the morning and afternoon.

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[19] Nicholson, A. J. (1985). The variability of accident counts. *Accident Analysis and Prevention*. *17*(1), 47-56.
[20] Nicholson, A. J. (1986). The randomness of accident counts. *Accident Analysis and Prevention*. *18*(3), 193-198.

Spatial Clustering, a.k.a. Hot Spots

Optimally, analysts will use spatial clustering techniques to identify hot spots of overlapping crashes and crimes. The analysis begins with a global analysis and then proceeds to hot spot identification. The purpose of the global analysis is two-fold: one to determine if clustering exists at all in the jurisdiction, and two, to determine how much one cluster [i.e. data group] is more clustered than the other. Analysis of clusters or hot spots can then give rise to temporal analysis and the appropriate and efficient deployment of resources.

Appendix C, **A Framework for Mapping Technology Implementation,** gives detailed information and suggested procedures on the use of spatial clustering and hot spot evaluation techniques.

For additional information on mapping techniques, see Eck, J. E. et al. (2005, August). *Mapping crime: Understanding hot spots,* listed in Appendix A, reference section.

The identification of hot spots using spatial and temporal analysis techniques is the foundation of DDACTS. These analyses will provide stronger evidence for a concentration of crashes and crime and provide an objective framework for deployment of resources and strategic high-visibility enforcement actions.

As the role of crime and crash analyses, hot spot identification, and the efficient deployment of scarce public service resources are becoming the benchmarks of 21st century policing, law enforcement managers should understand the theory, processes, and nomenclature of these principles.

A Starting Point for Long-Term Change

As mentioned earlier in the Executive Summary, implementation of DDACTS is a starting point for achieving long-term change where law enforcement professionals take a more integrated approach to the deployment of officers and resources. The following presumptions about the future of law enforcement support the need for implementing DDACTS:

- Resources not sufficient to keep pace with the demands to respond to calls for service and threats to public safety;
- Decreasing social harm and improving quality of life for communities;
- The need for timely and accurate data to justify expenditures and deployment decisions;
- Technology has and will continue to affect the policies and practices of law enforcement;
- Law enforcement agencies must collaborate and keep pace assessing needs, delivering services, and managing costs; and
- Community-focused, place-based law enforcement has emerged as an effective strategy for addressing public safety.

Police executives should continue to explore new strategies to further improve quality of life in communities that suffer from the effects of high-crime and crash rates, because the shortage of police resources is likely to continue in the future. A note of thanks to each of you for your participation in the DDACTS workshop and willingness to embrace a new

paradigm as you strive to make your communities safer. The hope is that this information is beneficial to you and we want to continue to offer support as you go forward applying the guiding principles. The DDACTS model works and we know you can implement this program to make a difference in your towns, reducing crashes and crime.

In addition to recognizing the efficiency and effectiveness of traffic enforcement as a tool for reducing crashes and crime, DDACTS positions traffic enforcement as a logical rationale for a highly visible law enforcement presence in a community. Its focus on collaboration with citizens, community businesses, and community organizations reinforces the important role that partnerships play in reducing social harm. Furthermore, by analyzing the place-based relationship between crashes and crime, DDACTS gives law enforcement agencies an opportunity to use an effective intervention to address both problems.

As law enforcement agencies implement these plans, it is suggested that regular information-sharing sessions with partners and stakeholders reinforce the collective ownership of DDACTS. Finally, monitoring, evaluation, and analysis of outcomes provide data-driven feedback for needed operational adjustments.

The following sections elaborate on the seven guiding principles. They outline implementation procedures and highlight operational considerations based on best practices in the field. Although the principles are presented sequentially, many of the activities may be undertaken simultaneously.

Guiding Principle I--Partners and Stakeholder Participation

Partnerships among criminal justice agencies, law enforcement agencies, and local stakeholders are essential to the success of the DDACTS model. Stakeholders may contribute data and other information, help promote the initiative to the community, and provide important feedback on how the community is reacting to increased traffic enforcement. In simple terms, a stakeholder is a person or group that has an interest in community and traffic safety. A partner is a person or group that not only has a stake but also is willing to take action. Both are important but should be considered separately.

As part of DDACTS partnership efforts, law enforcement agencies will need to reach out to stakeholders and partners. Stakeholders and partners can include any individual, business, or organization that is interested in reducing social harm and improving the quality of life in a particular community, such as:

- Local civic and business organizations such as Rotary Clubs and Chambers of Commerce;
- State Departments of Social Services;
- Local government agencies such as courts, Offices of the District Attorney, Departments of Corrections, Divisions of Probation and Parole, licensing bureaus, Departments of Transportation, Metropolitan Planning Organizations;
- Law enforcement agencies with concurrent jurisdictions: State police, sheriffs' offices, adjacent local and municipal law enforcement agencies;
- Elected officials;
- Crime or crash victims;
- Neighborhood associations;
- Community leaders;

- Urban renewal groups such as "Weed and Seed" organizations;
- Commercial establishments;
- Media; and
- Other organizations with an interest in crime reduction and traffic safety issues.

Stakeholder and partner support for highly visible traffic enforcement is vital to the success of a DDACTS initiative. Therefore, it is very important to allow enough lead time to engage and develop stakeholder and partner input.

> **For additional information on partnerships and stakeholders,** see Schmerler, K., et al. (1998, April; Revised 2006, July) *Problem-solving tips: A guide to reducing crime and disorder through problem-solving partnerships;* listed in Appendix A, reference section.

Key Element I - Identify and Make Initial Contact with Potential Partners and Stakeholders

Look for traditional as well as nontraditional partners and stakeholders to engage in discussions regarding the logic behind a DDACTS initiative. Focus on local organizations and businesses most impacted by the social harm currently prevalent in the identified hot spots. The partners' or stakeholders' contributions or roles regarding their support of the DDACTS initiative should be a main topic of these discussions.

Action Items

- Develop a list of partner and stakeholder categories.
- Identify known individuals, businesses, and organizations for each category.
- Identify the assistance, support, or data that partners or stakeholders might provide.
- Assign personnel responsible for contacting partners and stakeholders.
- Give a DDACTS overview to each potential partner and stakeholder.

Considerations

- Community residents and businesses are a good source of information about where and when traffic safety issues and criminal activity occur.
- Solicit law enforcement staff for input regarding partner and stakeholder participation.

A written description of the DDACTS initiative and the role that partners and stakeholders might play can help them make decisions regarding participation. (Agencies can modify NHTSA's brochure describing the DDACTS initiative for this purpose.)

> *"The Thibodaux Police Department engages our partners and stakeholders with personal contacts, public CompStat forums, and social media. By managing our message of total data-reliance for identifying and strategically addressing social harms, the DDACTS philosophy engrains itself into the agency's culture and endears itself within the community's perception of safety."*
> *~ Chief Scott Silverii, Thibodaux, Louisiana Police Department*

Key Element II - Develop a Plan for Partner and Stakeholder Participation

Partners and stakeholder groups will make different contributions to the DDACTS initiative, directly and indirectly. In some instances, they will lend credibility to the use of highly visible enforcement; in other instances, they might provide access to various populations within a community or provide information about incidents regarding traffic safety concerns and criminal activity. The following considerations for plan development include the need to:

- Identify the various roles and contributions that partners and stakeholders can make to the DDACTS initiative;
- Develop organizational structures that define expectations and interactions (e.g., coalition, advisory group, working group);
- Create specific objectives for partner and stakeholder participation;
- Define expectations for the agency's interactions with partners and stakeholders (e.g., number and frequency of meetings, reporting of DDACTS activities);
- Delineate staff responsibilities for interactions with various partner and stakeholder groups (e.g., documentation of meetings, calls, and e-mails); and
- Identify resources for hosting partner and stakeholder participation (e.g., meeting rooms, presentation technology).

Action Items

- Assign responsibility and a timeframe for plan development.
- Assign responsibility for logistical and administrative support.
- Conduct initial and follow-up meetings with partners and stakeholders.
- Designate partners and stakeholders who will provide feedback and public support to achieve consensus for the final plan.
- Distribute the plan.
- Implement the plan.

Our SIU (Special Investigations Unit) contacted every business in our DDACTS area to meet personally, explain the goals and expectations in the DDACTS area, and to inform them about highly visible operations and increased police presence. ~ Captain Bill Hisle, Shawnee Kansas Police Department

Considerations

- Allocate sufficient time for partner and stakeholder outreach and the formation of relationships.
- Make sure partner and stakeholder relationships are in place before starting enforcement activities.
- Invite partners and stakeholders to internal planning sessions, when appropriate.
- Always document interactions with stakeholders.
- Seek opportunities to promote stakeholder support.

Guiding Principle II – Data Collection

Accurate and timely crash, crime, calls for service and enforcement data are the building blocks of DDACTS. At a minimum, the data must include accurate and complete information on location, date, time, and incident type. If possible, it is also of great value to have access to crash and crime causation factors, enforcement activity such as citations, warnings, arrests, field interviews/contacts, citizen complaints, etc. Further information and/or data regarding violations, known offenders, probation and/or parole, census tracts, property-related information, community factors and other non-traditional data types can also be extremely valuable. Access to the data and consistency of data quality must also be considered. Ultimately, the data is only data until the analysis process turns it into actionable information.

> **For additional information on data collection and analysis,** see Boba, R. (2003, March), *Problem analysis in policing,* and Schmerler, K., et al. (1998, April; Revised 2006, July), *Problem-solving tips: A guide to reducing crime and disorder through problem-solving partnerships;* listed in Appendix A, reference section.

Key Element I - Review Current Data Collection and Analysis System

A review of the current system includes assessment of existing computer-aided dispatch (CAD) and records managements systems (RMS) capabilities, policies, procedures and protocols, report writing and report review and priorities for accurate, timely and complete data collection, data access and formats, data consistency, and software and hardware needs in regard to data access and collection. The following action items provide an overview of the areas to examine when assessing an agency's data collection and analysis system as a precursor to undertaking a DDACTS initiative.

Action Items

- DDACTS requires that someone be assigned the responsibility for data collection and analysis. Identify the need for additional staff or training of current staff to undertake the collection, mapping, and analysis of crash, crime, calls for service and enforcement data.
- Examine existing capabilities for data access, collection, analysis, and mapping and consider the possibility of the need to acquire hardware and/or software applications to support these efforts.
- Give special consideration to location data and identify ways in which addresses are verified within the CAD and/or RMS. These data points could be used to support mapping, hot spot identification and other spatial analysis methods.

Considerations

- Agencies should start implementing DDACTS with whatever data and analysis is available. DDACTS does not necessarily require sophisticated or expensive software systems. The implementation will allow agencies to assess capabilities and develop plans for improvement, if needed.

- DDACTS requires expertise in crime and traffic data collection and analysis. As law enforcement executives assess personnel resources, consideration should be given to these responsibilities and whether they can be addressed with existing personnel.
- Agencies pursuing implementation of DDACTS, but not currently using information technology for crime and traffic data analysis, can seek technical assistance through International Association of Crime Analysts (IACA), Federal, State, and local government agencies to identify systems used in other jurisdictions.
- Assessing the current data collection system provides an opportunity for management to examine data requirements, compatibility with other data systems, and data accessibility.
- Information generated from DDACTS can provide an opportunity to modify and expand reporting protocols and make greater and more efficient use of data collection and information-sharing systems.

> *"We are all being asked to do more with less. Our resources are strained and very limited. A great data collection and analysis plan supports our overall goal to best utilize what we have. If the data is accurate and mined properly, it will maximize the likelihood of deploying in the area that would most benefit our community.*
> *The mapping system does not need to be expensive or state-of-the-art. It just needs to be a tool to provide a visual for analysis and deployment. Data collection is the platform needed to build the model, therefore a necessary cog in the DDACTS wheel."*
> *~ Inspector Christine Coulter, Philadelphia Police Department*

Key Element II - Finalize Selection of Mapping Software

Based on its current software and hardware systems for analyzing crime and crashes, agency staff can determine the need for additional mapping resources. Agencies without in-house capabilities can examine traditional approaches for mapping or identify additional resources and partnering opportunities to develop mapping capabilities.

Action Items

- Identify all existing access to GIS and mapping resources and capabilities. Many large and small communities and jurisdictions have GIS departments and/or networked GIS software that a police agency may be able to make use of for its own needs. Local GIS professionals may be able to offer mapping services and support. These resources should be identified prior to making any GIS purchasing decisions.
- Begin building a case for budget allocations in support of mapping hardware and software for future budget cycles.

Considerations

- Consider seeking technical assistance and funding through Federal, State, and local government agencies that might provide support for data collection, analysis, and mapping tools.
- Consult with agencies that have mapping programs to obtain input regarding free and commercial mapping programs.

- Be aware of the limitations of proprietary off-the-shelf software (e.g., interoperability, transfer limitations, licensing fees).
- Explore the use of shared systems with internal and external partners.

Key Element III - Create a Data Collection Plan and Identify Data Sources

The data collection process starts the minute a call for service is received or enforcement action is initiated. It is critical that the process, standard operating procedures, policies, and systems that are in any way related to data collection be reviewed and understood. Plans should be developed to address any identified needs.

Analysis, including mapping, can only be as good as the data that it is based upon. Data collection requires hardware and software to support any level of reporting efficiency, but data quality, accuracy, timeliness and completeness relies upon a prioritized system of report writing and report review, assisted by technology. Success at reducing social harm through DDACTS is dependent upon the accurate identification of crash and crime hot spots, and that identification is reliant upon accurate, timely, and complete data. This need for accurate data reporting must be acknowledged and understood by all agency personnel.

Action Items

- Identify the specific data to be collected.
- Incorporate data storage systems.
- Identify data sources.
- Develop guidelines for data quality control.
- Ensure that data gaps are identified and addressed.
- Identify protocols/data collection procedures.
- Develop a process and plan for data access.

Considerations

- Give all appropriate personnel the opportunity to make recommendations about the types of data the agency will collect and analyze.
- Obtain input from community stakeholders about nontraditional data that might enhance hot spot analysis.
- Consider how community stakeholders will react to the data collection plan. Be prepared to explain the benefits of all information being collected.

Guiding Principle III - Data Analysis

The analysis of crashes, crimes, and calls for service allows agencies to identify high-activity hot spots within the jurisdiction. Research has shown that crashes, crimes and other social harms tend to cluster in geographic space and time. Examples may include crashes involving serious injuries at a specific intersection or curve along a stretch of roadway. Robberies may be common at convenience stores or automated teller machines or speeding along a stretch of highway may

be common just after the evening rush hour period. Research has further shown us that clusters of crashes, crimes and other social harms and disorder may overlap.

The utilization of data to identify these hot spots can help agencies identify locations where highly visible traffic enforcement can impact a variety of public safety issues, ultimately achieving reductions in both crimes and crashes. The ability to graphically display these overlapping hot spots on a map can provide commanders and supervisors, as well as partners and stakeholders, with further justification and support for strategic, effective, and efficient deployment of resources.

> **For additional information on data analysis and hot spots,** see Eck, J. E., et al. (2005, August). *Mapping crime: Understanding hot spots*, listed in Appendix A, reference section.

Key Element I - Develop a Clear Process for Data Analysis

DDACTS is applicable for agencies at both ends of the analysis spectrum. Those agencies that already employ professional analysts and support analysis units will find that the Guiding Principles of DDACTS provide further structure and justification for analysis to drive operations. Those agencies that may be just beginning to utilize data analysis in decision-making will find that the DDACTS Guiding Principles address all necessary factors for the development of an effective process for actionable analysis.

"The addition of accurate crime and crash data analysis has allowed our agency to be proactive in our approach to social harms and helped us to utilize precision policing to address social harm in our community. This has enabled us to be a more focused, efficient and effective provider of law enforcement services to our community."
~ Chief Brett Railey, Winter Park FL Police Department

The availability of existing resources such as trained personnel, data access, data quality, and mapping capabilities will drive the pace of that process. Identification of such resources is a critical first step in DDACTS implementation. Analysis is used to efficiently and effectively allocate resources. Analysis, including mapping, can identify locations of crime and crash overlap, as well as clusters of repeat, routine calls for service that may be a drain on available work force. With the application of appropriate hot spot theory, maps can communicate vital information to law enforcement officials and community members.[21]

Action Items

- Establish parameters for the scope and capacity of the data analysis function.
- Articulate and describe analytical products that will be actionable and valuable to commanders, supervisors and street level personnel as well as community partners and stakeholders.

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[21] Eck, J. E., Chainey, S., Cameron, J. G., Leitner, M., & Wilson, R. E. (2005, August). *Mapping crime: Understanding hot spots* (NCJ Publication No. 209393). Washington, DC: Office of Justice Programs, National Institute of Justice.

- Identify personnel to be assigned the analysis responsibilities. Utilize outside support if necessary.
- Perform analysis to identify and map hot spots.
- Perform analysis of causation and temporal factors and environmental influences.
- Consider the use of non-traditional data and identify further data needs.
- Consider the role that displacement and diffusion might have on crime reduction and traffic activities.[22]
- Use historical data as a means to evaluate the impact and effectiveness of DDACTS and overall operations.

Considerations

- Analysis will lead to the identification of locations where enforcement can achieve an impact in the reduction of crime, crashes, and social harm. Such results will, in turn, create buy-in and lead to a cycle of success within the agency and within the community.
- Data quality and accuracy of analysis must always be primary considerations at all times.
- Access to enforcement data such as arrests, citations, summonses, warnings, and field contacts can allow for the analysis and mapping of enforcement in relation to incidents with the intent to align enforcement activity with desired outcomes.
- Many groups will be interested in the results of the data analysis. Be clear about who will have access to what information and how it will be presented.

Key Element II - Develop Reporting Procedures

The findings from the data analysis are an important tool for garnering internal and external support for DDACTS implementation within identified hot spots. In addition to encouraging officer buy-in, findings from the data analysis can be used to inform government officials, community members, and the media about progress, challenges, and expectations for crime reduction and traffic safety improvements.

Action Items

- Determine to whom and how analytical reports and products will be distributed so that the information will be best utilized.
- Consider various formats for analysis.
- Distinguish between internal and external analysis needs.
- Develop a reporting schedule.
- Ensure accuracy and transparency of information prepared for distribution.
- Develop a review process for all information prepared for external use.

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[22] Guerette, R. T. (2009, June). *Analyzing displacement and diffusion.* (Tools Series, Guide No. 10)., Washington, DC: Office of Community Oriented Policing Services, U.S. Department of Justice.

Guiding Principle IV Strategic Operations

DDACTS is designed to provide accurate and timely analysis to identify hot spots and an unbiased basis for making strategic and tactical decisions. Based on the objective findings of the data analysis, agencies can identify a mix of highly visible traffic enforcement tactics. Data analysis also guides the realignment of workflow and operational assignments to help pin point the focus of traffic and crime enforcement efforts, thus increasing efficiency. Law enforcement executives must take strong leadership roles to successfully integrate DDACTS into routine operations. In these roles, they should be prepared to:

- Promote the effectiveness and efficiency of highly visible traffic enforcement as a core operational element for reducing crashes and crime;
- Review agency policies, goals, and objectives to ensure that they support the use of highly visible traffic enforcement specifically within designated hot spots;
- Commit appropriate time and resources to the implementation of the model;
- Reallocate resources to purchase needed equipment to support traffic enforcement (e.g., speed-measuring devices, portable breath test devices, license plate readers);
- Discuss possible pushback and lack of buy-in from officers concerning increased traffic enforcement;
- Offer them thoughtful justification for effective strategies and tactics and present them with analysis in support of DDACTS implementation;
- Conduct training in the DDACTS philosophy and Guiding Principles;
- Demonstrate flexibility and creativity to address possible negative reactions from the community to highly visible traffic enforcement;
- Make adjustments to field and internal procedures as appropriate; and
- Promote teamwork among staff focusing on reducing crashes and crime.

For additional information on strategic operations, see IACP. (2003, August). *Traffic safety strategies for law enforcement: A planning guide for law enforcement executives, administrators and managers,* and Braga, A. A. (2008). *Police enforcement strategies to prevent crime in hot spot areas;* listed in Appendix A, reference section.

Key Element I - Identify Strategies and Tactics

The types of crashes, crime and traffic safety issues identified through the data analyses will dictate the selection of enforcement strategies and tactics. During this process, agencies may need to consider the procurement of additional equipment, provision of additional training, and the reallocation of personnel necessary for specific enforcement. Creating patrol time and/or combating the perception that no patrol time is available for a DDACTS initiative can be problematic. Analysis of available patrol hours and an objective examination of documented unobligated time is highly recommended. As appropriate, staff should include partners and stakeholders in discussions on enforcement measures.

Action Items

- Identify all traffic and crime enforcement activities currently underway in the hot spots to counter any overlapping or interference of effort and/or resource allocation.
- Develop a preliminary list of proposed traffic enforcement measures.
- Make projections on the effect that increased traffic enforcement may have on traffic safety and crime reduction. Develop interim goals supporting these projections and measures.
- Identify equipment, training, personnel, and other needs associated with the selected countermeasures.
- Measure actual unobligated patrol time that could be made available for DDACTS enforcement.
- Obtain input from partners and stakeholders.

> *"Using highly visible enforcement in areas where the incidences of traffic crashes and crimes overlap is a more efficient use of resources than trying to address both issues independently. We know that visible traffic enforcement can change driving behavior while, simultaneously, creating an environment that is uncomfortable for criminals. This is purpose-driven enforcement that leads to results."*
> *~ Chief Howard Hall, Roanoke County, Virginia Police Department*

Considerations

- Identify the strategies and tactics needed to address the problems in the hot spots.
- Ensure that all discussions on enforcement efforts include staff members who are engaged in implementing the strategies.
- Build on the positive experiences of others that have used a mix of highly visible traffic enforcement.
- Review exemplary programs and consult with other law enforcement executives who have used saturation patrols and other highly visible traffic enforcement strategies to improve traffic safety and reduce crime.
- Examine the benefits of investing in existing and new enforcement technologies.
- Consider and address, when appropriate, objections to specific tactics raised by partners and stakeholders.
- Be prepared to counter arguments that available unobligated patrol hours do not exist and proactive DDACTS patrol is not possible.

Key Element II—Develop an Operational Plan

A comprehensive operational plan describes the overall deployment strategy for the hot spot and provides the framework for monitoring, evaluating, and adjusting the strategy. An important component of this strategy is training that addresses the multiple skill sets associated with traffic and crime enforcement. The operational plan might include the following elements.

- Goals and objectives
- Strategic approach to hot spot deployment
  - Traffic enforcement tactics
  - Crime reduction tactics
  - Frequency and timing of countermeasures
  - Multijurisdictional interaction and enforcement

- Personnel requirements
- Training of staff
- Equipment and other resources
- Operational plan implementation
  - Daily enforcement activities
  - Weekly enforcement activities
  - Officer assignments
  - Reporting activities
  - Internal briefings
  - External briefings
  - Debriefings
  - Scheduling
- Budgeting
- Evaluation

Action Items

- Assign writing responsibilities for plan development.
- Gather information necessary for plan development.
- Develop schedule.
- Identify review process.
- Review and finalize the plan.
- Distribute plan.

Considerations

- Law enforcement executives need to identify goals and objectives that address the impact of DDACTS on overall operations, as well as the impact on improving traffic safety and reducing crime in hot spots.
- Operational categories for plan development can include impact on personnel assignments and scheduling, staff performance, expenditures, and accountability.
- Other agencies that have jurisdiction in the hot spot should be involved in plan development.
- Incorporate cost-benefit criteria when developing the operational plan.
- Include projected available unobligated patrol hours available for a DDACTS initiative.

Key Element III—Implement Plan

A number of administrative, environmental and community related factors may influence the best time to start highly visible traffic enforcement. In addition to considering these factors, law enforcement executives should allow time for informing staff, partners, and stakeholders, formally and informally, about the timing of plan implementation.

Action Items

- Set up formal meetings and briefings, before plan implementation, to prepare staff for changes.
- Hold a formal briefing for all staff to announce the start of DDACTS.

- Work with partners, stakeholders, and media to develop awareness.
- Ensure staff members understand the importance of communicating the appropriate message during every citizen contact.

Considerations

- All staff should be kept informed throughout DDACTS implementation.
- A formal announcement and media outreach addressing the startup of DDACTS traffic enforcement is vital to the success of plan implementation.
- Launching the initiative with a formal announcement and media event will demonstrate respect for the community and promote collaboration with partners and stakeholders.

Guiding Principle V - Information Sharing and Outreach

Information sharing and outreach reflects the community-based nature of DDACTS, in which law enforcement agencies not only share progress but also rely upon feedback from community members and other partners and stakeholders. Throughout the communications process, law enforcement agencies should include messages that reinforce the objective nature of DDACTS. This objective process allows law enforcement agencies to use data to identify hot spots and provide an unbiased basis for making strategic and tactical decisions. Communicating this information to partners and stakeholders will increase understanding and support for DDACTS.

For additional information on information sharing and working with the media, see NHTSA. (undated). *Guidelines for developing a municipal speed enforcement program,* listed in Appendix A, reference section.

Key Element I - Review Partner and Stakeholder Plan to Identify Tactics for Information Sharing and Outreach

Regularly generated analytical products give management documentation needed to keep staff informed, hold meetings with community members, and report to government administrators and elected officials. Regular evaluation also provides the basis for ongoing media relations.

Many factors can affect the implementation of DDACTS and law enforcement executives must be prepared to address challenges as well as successes. Therefore, communications strategies should be based on the goals and objectives identified with the partners and stakeholders involvement.

Action Items

- Review partner and stakeholder participation plan to identify roles in outreach activities.
- Based on roles, identify tactics for sharing and gathering information.
- Identify tools for communicating with partners and stakeholders.
- Assign staff responsibilities for coordinating the preparation of outreach materials and conducting information-sharing sessions.

Considerations

- Meet with appropriate staff to determine what information is suitable for sharing with partners and stakeholders and the timing of its availability.
- Consider monitoring staff expectations to ensure continual buy-in.
- Identify information milestones and timeframes for information sharing.
- Identify opportunities for partners and stakeholders to participate in internal briefing sessions.

Key Element II—Develop a Plan for Communicating Through Media Outlets

Informing the public regarding traffic enforcement and crime reduction activities and the resulting impact of DDACTS is crucial to long-term success. Working with data analysts and designated staff, the agency's public information officer or spokesperson should develop a plan for communicating through media outlets to share information about the DDACTS initiative.

> *"The timely and accurate sharing of information, both internally and externally is critical to the success of the DDACTS model. In order to effectively resolve crime and traffic safety concerns and prevent them from reoccurring, police personnel must be aware of and have immediate access to information that describes when and where those incidents are taking place. The business owners, residents, and other stakeholders of an area adversely impacted by these issues need to know about what's occurring and the initiatives law enforcement is undertaking to address them. By communicating openly and sharing information, police resources are utilized more efficiently, and community members are presented with a better understanding of what their law enforcement agency is focused on, and why. This can lead to community buy-in and support of the law enforcement agencies objectives."*
> *~ Chief Keith Ternes, Fargo, North Dakota Police Department*

Action Items

- Develop a communications plan for working with the media that includes background information, key events, and milestones that warrant publicity.
- Develop accurate, consistent messages delineating the goals, objectives, elements, and results of DDACTS.
- Identify general and audience-specific media outlets that reach all designated audiences.

Considerations

- Develop background information for the media that describes DDACTS; emphasizes the deterrent effect of highly visible traffic enforcement; and includes a list of partners, stakeholders, and other supporters of the initiative.

- Be prepared to address traffic safety issues, along with issues pertaining to possible, perceived, or the actual displacement of crime.
- Make sure to communicate successes in crime suppression.
- Include DDACTS information for the public on the agency's web site.

Guiding Principle VI—Monitoring, Evaluation and Adjustments

Law enforcement executives should monitor the effectiveness of traffic enforcement and the impact on crashes, crime, and social harm. The goal should be to align enforcement with incidents in order to achieve identified, desired outcomes. Strategic operations can only be evaluated, and adjusted accordingly, if data is available to monitor the impact of enforcement.

Regular evaluation of arrests, citations, citizen contacts and all other enforcement activity allows for adjustments to the mix of traffic enforcement measures and the deployment of officers. In addition, scheduled briefings keep executives aware of officers' performance and concerns. The accountability of first line supervisors is critical. First line supervisors must be given the authority to manage, and then be held accountable for the effort displayed by patrol officers.

Law enforcement executives also will have the opportunity to assess the impact that highly visible traffic enforcement has on the performance of other law enforcement activities—non-traffic-related arrests, processing arrested individuals, filing reports, making court appearances. This information will contribute to decisions about the reallocation of resources and the deployment of officers who investigate crime.

> **For additional information on monitoring and evaluating,** see Clark, R. V., et al. (2005, August). *Crime analysis for problem solvers in 60 small steps*, listed in Appendix A, reference section.

Key Element I—Use Data and Other Information to Make Adjustments to DDACTS Field Operations

The intervals and duration of enforcement may determine the timing of data analysis and reporting. Staff feedback, along with information obtained from partners and stakeholders may be summarized in daily, weekly, monthly, or as needed reports.

Action Items
- Develop a schedule for analysis, allowing for feedback from staff, partners, and stakeholders.
- Meet with analysts and staff to discuss findings.
- Make appropriate adjustments.

Considerations

- Be aware of displacement and diffusion as factors that can contribute to crime reduction; make adjustments to account for each.

- Based on the data analysis, adjust highly visible presence and enforcement in response to increases and decreases in crimes and crashes.
- Examine the need for additional training.
- Compare staff efficiency and focus before and after implementation of DDACTS.
- Maintain contact with appropriate criminal justice officials regarding the effect that increased traffic enforcement has on their processes.

Key Element II—Document and Report Changes

Documenting changes and adjustments to all aspects of DDACTS will increase the potential for long-term success. As analysis and analytical products adapt and change in relation to changing and expanding operations, it is important to maintain accuracy, timeliness, and consistency in analysis. It is important that everyone understand what is being measured and evaluated and that success and/or failure of operations be true, accurate and statistically significant so that operations can be adjusted accordingly. These changes and adjustments might pertain to:

"It is imperative that current and historical data be reviewed on a continual basis in order to determine the level of success or lack thereof in enhancing the quality of life in known hotspots. As we all know, some geographical locations have historically and will continue to present challenges, however a daily review of crash and crimes will also keep current locations in mind so that resources can be deployed accordingly to combat both historic and newly developed hotspots."
~ Captain Mike Alexander, Specialized Investigations Division, Nashville Metro PD, TN

- Additions or deletions of data sources;
- Changes in mapping techniques;
- Expansion of data analysis;
- Benefits/challenges associated with use of nontraditional data sources;
- Benefits/challenges of working with various partners and stakeholders;
- Equipment purchases;
- Reallocation of resources and staff;
- Staff training;
- Administrative duties; and
- Expenditures and budget reallocations.

Action Items

- Review the operational plan to identify areas for measure and evaluation.
- Develop procedures and formats for documenting DDACTS activities and outcomes.
- Assign responsibility for documentation and reporting activities.
- Seek to utilize technology to the greatest extent possible and limit the need for hand-written documentation.

Considerations

- Reports should be accurate, transparent, understandable, timely, and thorough.
- Disseminate reports to appropriate staff, partners, and stakeholders.
- Key partners and stakeholders should review final reports prior to general distribution.

Guiding Principle VII--Outcomes

Inherent in the decision to implement DDACTS is a commitment to changing attitudes and practices regarding crash reduction and prevention, traffic safety and the resulting reduction of crime. To document this change, law enforcement executives should identify desired outcomes that are based upon analysis and are as specific as possible.

Outcome measures or measures of impact that address a reduction in crashes and crime may include, but not be limited to the following:

We have an ongoing evaluation in place. We track officers' activity in the DDACTS area (arrests, tickets, warnings, contacts, and time on task) weekly. We also do an evaluation of stranger crimes every six months. We compare year to year and compare before/after DDACTS (years prior to DDACTS starting to after DDACTS implementation). Outcomes are shared with Partners and Stakeholders, media, and interdepartmentally. ~ Captain Bill Hisle, Shawnee Kansas Police Department

- The reduction in calls for service;
- Individual and collective numbers of fatal, injury, and property-damage-only crashes;
- Numbers of Part I and Part II crimes;
- Increasing numbers of enforcement contacts for specific driving offenses; and
- Reduction in gang violence incidents.

Administrative outcomes may include more effective and efficient utilization of work force and other resources. Additional outcomes may include:

- Increase in personnel and equipment.
- Increased cooperation and coordination among all officers, working together toward the identified desired outcomes.
- Community support

Action Items
- Identify areas for monitoring and evaluation.
- Develop outcome measures.
- Identify monitoring and evaluation methods.
- Assign responsibility for monitoring and evaluation.

Considerations
- Include staff in the development of outcome measures.
- Look for ways to apply the findings from hot spot analysis to deployment decisions in other locations.
- Monitor relationships with partners and stakeholders from the hot spot location to obtain insights on ways to improve community relations in other hot spots.
- Incorporate cost-benefit criteria when measuring outcomes.

NATIONAL SUPPORT FOR DDACTS

As leaders of this national initiative to improve the quality of life in local communities, NHTSA, BJA, and NIJ are fortunate to have support from a number of national partners. The following organizations will offer technical assistance and in-kind resources through their local affiliates to support law enforcement agencies that undertake DDACTS initiatives:

- American Probation and Parole Association;
- Commission on Accreditation for Law Enforcement Agencies;
- Federal Highway Administration;
- Federal Motor Carrier Safety Administration;
- Governors Highway Safety Association;
- International Association of Chiefs of Police;
- International Association of Crime Analysts;
- International Association of Directors of Law Enforcement Standards and Training;
- National Criminal Justice Association;
- National District Attorneys Association;
- National Liquor Law Enforcement Association;
- National Organization of Black Law Enforcement Executives; and
- National Sheriffs' Association.

NHTSA, BJA, NIJ, and their partners are prepared to facilitate the provision of technical assistance teams to work with local law enforcement agencies on various aspects of DDACTS. They also will serve as intermediaries for identifying local partnerships and obtaining technical assistance from local affiliates and State agencies.

REFERENCES / RESOURCES

Boba, R. (2003, March). *Problem analysis in policing.* Washington, DC: Police Foundation.

Braga, A. A. (2008). *Police enforcement strategies to prevent crime in hot spot areas.* Washington, DC: Center for Problem Oriented Policing. Retrieved from www.cops.usdoj.gov/RIC/ResourceDetail.aspx?RID=456

Bruce, C. W., & Smith, S. C. (2011). *Spatial statistics in Crime analysis: Using CrimeStat III.* Washington, DC: National Institute of Justice.

Clarke, R. V., & Eck, J. E. (2005, August). *Crime analysis for problem solvers in 60 small steps*. Washington, DC: Center for Problem Oriented Policing. Retrieved from www.cops.usdoj.gov/ric/ResourceDetail.aspx?RID=47

Clarke, R. V., & Schultze, P. A. (2005, April). *Researching a problem.* Washington, DC: Center for Problem Oriented Policing. Retrieved from www.cops.usdoj.gov/ric/ResourceDetail.aspx?RID=182

Clarke, R. V., & Weisburd, D. (1994). Diffusion of crime control benefits: Observations on the reverse of displacement, *Crime Prevention Studies, Volume 2*, 165-183. (NCJ Publication No. 147834). Retrieved from www.ncjrs.gov/app/publications/abstract.aspx?ID=147841

Eck, J. E. (2004, January). *Assessing responses to problems: An introductory guide for police-problem solvers*. Washington, DC: Center for Problem Oriented Policing. Retrieved on from www.cops.usdoj.gov/ric/ResourceDetail.aspx?RID=12

Eck, J. E., Chainey, S., Cameron, J. G., Leitner, M., & Wilson, R. E. (2005, August). *Mapping crime: Understanding hot spots.* (NCJ Publication No. 209393). Washington, DC: Office of Justice Programs, National Institute of Justice.

Giacopassi, D., & Forde, D. R. (2000). Broken windows, crumpled fenders, and crime. *Journal of Criminal Justice, 28* (5) pp. 397–405. (NCJ Publication No. 186386).

Guerette, R T. (2009, June). *Problem-oriented guides for police problem-solving tools series, guide no. 10: Analyzing displacement and diffusion*, Washington, DC: Office of Community Oriented Policing Services. Retrieved on from www.popcenter.org/tools/pdfs/displacement.pdf

Hillyard, P., & Tombs, S. (2007). From crime to social harm. *Crime, Law & Social Change, 48* (1-2), 9-25.

International Association of Chiefs of Police.. (2003, August). *Traffic safety strategies for law enforcement: A planning guide for law enforcement executives, administrators, and managers*. Alexandria, VA: Author.

IACP & NHTSA. (2001). *Traffic safety in the new millennium.* Alexandria, VA, And Washington, DC: Authors. Retrieved from www.nhtsa.gov/people/injury/enforce/millennium/index.htm

Levine, N. (2010, July). *CrimeStat: A spatial statistics program for the analysis of crime incident locations (v 3.3).* Houston, TX: Ned Levine & Associates, and Washington D.C.: National Institute of Justice. Retrieved from www.icpsr.umich.edu/CrimeStat/contact.html

Markovic, J., Bueermann, J., & Smith, K. (2006, June). Coming to terms with geographical information systems. *The Police Chief*, *73*(6).

McGarrell, E. F., Chernak, S., & Weiss, A. (2002, November*). Reducing gun violence: Evaluation of the Indianapolis Police Department's directed patrol project.* (NCJ Publication No. 188740). Washington, DC: National Institute of Justice.

Michalowski, R. J. (1975, January). Violence in the road: The crime of vehicular homicide. *Journal of Research in Crime and Delinquency, 12*(1), 30-43. (NCJ Publication No. 019248). Retrieved from www.ncjrs.gov/App/Publications/abstract.aspx?ID=19248

National Highway Traffic Safety Administration. (2009, August). *Data driven approaches to crime and traffic safety (DDACTS): Operational guide.* Washington, D.C.: Author.

NHTSA. (undated). *Guidelines for developing a municipal speed enforcement program.* Washington, DC: National Highway Traffic Safety Administration. Retrieved from www.nhtsa.dot.gov/people/injury/enforce/program.htm

NHTSA. (1997). *The Peoria experience, Traffic enforcement and crime: It plays in Peoria.* Washington, DC: Author.

Nicholson, A. J. (1985). The variability of accident counts. *Accident Analysis and Prevention. 17*(1), 47-56.

Nicholson, A. J. (1986). The randomness of accident counts. *Accident Analysis and Prevention. 18*(3), 193-198.

National Institute of Justice, Center for Problem Oriented Policing. (2008, July.) *Geography & Public Safety. Volume 1, Issue 2,* Washington, DC: Author. Retrieved from www.cops.usdoj.gov/ric/ResourceDetail.aspx?RID=458

Ratcliffe, J. H. (2007, August). *Integrated intelligence and crime analysis: Enhanced information management for law enforcement leaders,* Washington, DC: Police Foundation.

Rinehart, T. A., Laszlo, A. T., & Briscoe, G. O. (2001). *Collaboration toolkit: How to build, fix, and sustain productive partnerships.* Washington, DC: Office of Community Oriented Policing Services. Retrieved from www.cops.usdoj.gov/RIC/ResourceDetail.aspx?RID=386

Sampson, R. J., & Cohen, J. (1988) *Deterrent effects of the police on crime: A replication and theoretical extension.* (NCJ Publication No. 115826). Retrieved from www.ncjrs.gov/app/publications/abstract.aspx?ID=115826

Schmerler, K., Perkins, M., Phillips, S., Rinehart, T., & Townsend, M. (1998, April; Revised 2006, July). *Problem-solving tips: A guide to reducing crime and disorder through problem-*

solving partnerships, Washington, DC: Center for Problem Oriented Policing. Retrieved from www.cops.usdoj.gov/RIC/ResourceDetail.aspx?RID=386

Sherman, L. W. (1998, July). Evidence-based policing. *Ideas in American policing.* Washington, DC: Police Foundation. Retrieved from www.policefoundation.org/content/evidence-based-policing

Sherman, L. W., Gartin, P. R., & Buerger, M. E. (1989). Hot spots of predatory crime: Routing activities and the criminology of place, *Criminology, 27,* 1, 27-55. (NCJ Publication No. 115865). Retrieved from www.ncjrs.gov/App/Publications/abstract.aspx?ID=115865

Sherman, L. W., & Rogan, D. P. (1995). The effects of gun seizures on gun violence: 'Hot spots' patrol in Kansas City. *Justice Quarterly, 12,* 673–693.

Sherman, L. W., Shaw, J. W., & Rogan, D. P. (1995). The Kansas City gun experiment, *Research in Brief*, Washington, DC: National Institute of Justice. (NCJ Publication No. 150855).

Skogan, W., & Frydl, K. (2004). *Fairness and effectiveness in policing: The evidence.* Washington, DC: National Academies Press.

Stuster, J. (1995, August). *Experimental evaluation of municipal speed enforcement programs. Final report.* Washington, DC: National Highway Traffic Safety Administration.

Stuster, J. W. (2001, June). *The Albuquerque Police Department's safe streets program.* (Report No. DOT HS 809 278). Washington, DC: National Highway Traffic Safety Administration. Retrieved from www.nhtsa.dot.gov/people/injury/research/ss7.pdf.

Weisburd, D., Bushway, S., Lum, C., & Yang, S. (2004). "Trajectories of crime at places: A longitudinal study of street segments in the City of Seattle." *Criminology 42*(2), 283-322.

Weisburd, D., Groff, E., & Morris, N. (2011, October). *Hot spots of juvenile crime: Findings from Seattle.* Washington, DC: Office of Juvenile Justice and Delinquency Prevention.

Weisburd, D. (2008, January). Place-based policing. *Ideas in American policing, Number 9.* Washington, DC: Police Foundation.

Weiss, A., & Freels, S. (1996, September). The effects of aggressive policing: The Dayton traffic enforcement experiment, *American Journal of Police, 15*(3), 45–64.

Weiss, A., & Morckel, K. (2007, July). Strategic and tactical approaches to traffic safety. *Police Chief Magazine. 74*(7).

Wilson, J. Q., & Boland, B. (1979). *Effect of the police on crime.* (NCJ Publication No. 058531). Retrieved from www.ncjrs.gov/app/publications/abstract.aspx?ID=58531

Baseline data – Basic information gathered before a program begins. It is used later to provide a comparison for assessing program impact. Three years of baseline data is recommended, particularly for crash incidence.

Crime*Stat* -A spatial statistics program for the analysis of crime incident locations, funded by grants from the National Institute of Justice. Retrieved December 18, 2012 from www.nedlevine.com/nedlevine17.htm

Data-Driven Approaches to Crime *and* Traffic Safety (DDACTS) National Initiative
– A joint effort of NHTSA, BJA, NIJ, and partner organizations to encourage law enforcement agencies to implement a business model that uses highly visible traffic enforcement strategies to fight crime and reduce crashes at the local level by using geo-mapping techniques to identify hot spot areas, which support enhanced resource allocation. The initiative encourages using the full range of traditional and non-traditional partners to increase effectiveness.

Deconfliction – The process of avoiding conflicts in investigative and operational programs. Often, investigative efforts such as undercover operations create the potential for conflict between agencies, which are unknowingly working in close proximity to each other, or may be coordinating an event on the same suspect at the same time. In either case, agencies may interfere with each other's cases, causing investigative efforts to be disrupted or, worse, officers to be unintentionally hurt or killed. Deconfliction databases such as the RISS Officer Safety Website serves as a nationwide repository for issues related to officer safety to avoid problems and further information is available at www.riss.net/Resources/RISSafe.

Diffusion - The opposite of crime displacement is diffusion of crime control benefits. Crime diffusion entails the reduction of crime (or other improvements) in areas or ways that are related to the targeted crime prevention efforts, but not targeted by the response itself. Diffusion is recorded in many research evaluations of crime prevention responses that have impact on geographic areas and crime statistics outside the targeted area in which improvements were gained without expending resources in those areas.[23]

Displacement – Displacement of crime refers to changes in crime patterns that occur because offenders adapt their behavior as a result of some change in opportunities for offending. www.weedandseed.info/docs/studies_other/displacement-final-report.pdf

Evidence-Based Policing - Evidence-based policing is the use of the best available research on the outcomes of police work to implement guidelines and evaluate agencies, units, and officers. Put more simply, evidence-based policing uses research to guide practice and evaluate practitioners. It uses the best evidence to shape the best practice. www.policefoundation.org/content/evidence-based-policing

Erosion – A natural decrease in criminal activity and traffic crashes as a result of displacement and/or diffusion.

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[23] Guerette. (2009).

Geo-mapping – The location-based tracking of an event or incident, most often using some type of computerized geographic information system.

Highly visible enforcement – The use of sustained and focused traffic enforcement strategies to fight crime and reduce crashes and traffic violations.

Hot Spot - A geographical area identified through data analysis that has a distinguishing concentration of crime, crash, and safety problems.

Intelligence-Led Policing – Intelligence-led policing is a business model and managerial philosophy where data analysis and crime intelligence are pivotal to an objective, decision-making framework that facilitates crime and problem reduction, disruption and prevention through both strategic management and effective enforcement strategies that target prolific and serious offenders. http://jratcliffe.net/research/ilp.htm

Kernel Density Estimation (KDE) technique – A spatial analysis method that creates a smooth surface of the variation in the density of point events across an area.

Nearest Neighbor Hierarchical Clustering – A spatial analysis method that uses a technique to identify groups of a minimum number of user-defined points. The technique identifies only those points that are closer than expected under spatial randomness.

Nontraditional data – Data not normally used to track traffic or criminal activity. Non-traditional data is somewhat of a catchall term for anything else besides CAD and RMS data. Some examples might be census bureau data, public health, emergency care specifically related to shootings, drugs and other crimes, utilities, property and assessor-type data related to vacant and/or foreclosed properties, zoning, very specific traffic engineering or roadway use data, income levels and property values, etc. Although there are frequent references and suggestions about the use of non-traditional data, it can be very complicated and fraught with issues. The analyst has to be sure of the quality and availability of the data, as well as access to the data.

Person-based policing – An approach to crime reduction that focuses on individuals who commit crimes or engage in unsafe driving behaviors as a means for deploying resources.

Place-based policing – An approach to crime and crash reduction that focuses on places where crime and crashes occur as a means for deploying resources.

Shared system – A system designed for use by more than one agency (e.g., 911 dispatch).

Social harm – An approach to community issues that should encompass physical harm, financial/economic harm, emotional/psychological harm, and cultural safety.

A Framework for Mapping Technology Implementation

A general framework should be implemented to identify crash and crime hot spots. As the primary focus of DDACTS is to examine the relationship between crashes and crimes, the use of spatial statistical techniques to identify clusters of each is needed to provide firm evidence that both are occurring together in the same places, and at the same times. Through this unique identification of crash and crime hot spots, high-visibility enforcement countermeasures can be focused to more efficiently affect crime and crashes together. Spatial statistical techniques can also be applied to identify areas that are hot spots of crashes but not of crimes, and areas that are hot spots of crimes but not of crashes, so that appropriate countermeasures may be taken. The following is a general method for locating high concentrations of crimes and crashes:

1. Analyze relatively small geographical areas, but not pinpoint locations. There are two reasons for this. First, exact locations will rarely coincide, due to the fact that most crashes occur on roads whereas most crimes occur off the roads, either on sidewalks or within a property boundary (parcel). Second, common factors are liable to involve the interaction between the road system and the land uses they traverse. The analysis unit should be as small as possible such as a block group, traffic analysis zone, police beat, or some other administrative unit. The preferred unit would be the block group. This will allow some degree of correlation to be observed between crashes and crimes given they do not happen in the exact same space.

2. Use three years of baseline data to account for high annual variations in crash frequencies (Nicholson, 1985[24], 1986[25]). In fact, it is common (if not required) in crash analysis to require three years of data as a basis for allocating Federal safety funds.

3. Determine if a simple correlation exists between crashes and crimes at a given location. Please note a simple correlation may be a poor indicator of coincidence because both crashes and crimes are highly clustered. In most locations, there may be no relationship between the two types of events. However, in key locations, the relationship should be very strong.

4. Analyze correlations by time of day. Many hot spots are temporally bound. For example, many crashes occur in the afternoon and early evening. Thus, many crash hot spots would have a periodicity. Likewise, driving while impaired crashes tend to occur at night and their crash hot spots also would tend to occur during similar intervals. For crimes, burglaries occur mostly in the afternoon while auto thefts and robberies occur mostly in the evening. Without analyzing crashes and crimes by time of day, inaccurate associations may occur.

5. Conduct spatial analyses to determine:

   a. *The degree of global spatial autocorrelation.* Often, crime is more concentrated than crashes, though both are highly concentrated relative to the population distribution. Crashes tend to correlate with the distribution of employment whereas crimes tend to correlate with the interaction of employment and lower income levels. It must be

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[24] Nicholson, A. J. (1985). The variability of accident counts. *Accident Analysis and Prevention. 17*(1), 47-56.
[25] Nicholson, A. J. (1986). The randomness of accident counts. *Accident Analysis and Prevention. 18*(3), 193-198.

recognized that there is only limited overlap between crime and crashes. DDACTS primary focus is in those locations where there is substantial overlap.

b. *A visualization of the concentration of events using a Kernel Density Estimation technique*. A fixed bandwidth (standard search distance) should be used to identify clusters of crimes and crashes. This allows for the scale of identified clusters to be consistent for comparative purposes. The distance should be relatively small due to crashes being confined to a street network and will allow a high-visibility intervention program to be implemented in more precise areas.

Ripley's K in *CrimeStat*[26] can be used to identify the fixed distance to be specified. It should be used for all crime types and crashes and the average distance between a crime type and crashes will become the fixed distance to use. In terms of the mathematical function, a quartic function is commonly used, as it is more compact and will consider only those observations that fall within the specified fixed distance for clustering. Given that, the size of the bandwidth will be small, and likely non-normal, it provides a distance decay weighting that falls off systematically in calculating estimates that are more uniform under the kernel.

c. *Independently determine specific hot spots for crashes and correlated crime types.* There are a number of techniques for identifying these, but it is recommended that the Nearest Neighbor Hierarchical Clustering (NNHC) routine in *CrimeStat* be used. NNHC identifies clusters of incidents that are closer together than random chance. There are two types of geographic outputs from the NNHC technique, which are standard deviational ellipses (SDE) and convex hulls. The convex hulls should be used for comparison between the crime types and crashes, as they are more precise as to the true geographic distribution than the SDEs. This should be done by time of day based on the prevalence of a crime type and specific crash types.

Once identified each of the results from the crime and crash incidents should be overlaid and then ranked for priority for the intervention.

d. *Risk-adjusted hot spots data is available for use*. Crime hot spots typically occur where the greatest concentration of people occurs, usually in commercial areas (and where employment can be used as a rough estimate of this). Crash hot spots tend to occur where traffic volumes are highest. In order to control for the underlying number of persons who could be exposed to these events, it is preferable to analyze the incidents relative to a baseline of exposure. For crashes, the analysis is the number of crashes relative to vehicle miles traveled, usually in terms of 10 million vehicle miles traveled, (VMT); while for crimes, the analysis is the number of crimes relative to employment (or population). There are two ways to conduct a risk-adjusted clustering. One is through a dual kernel density interpolation that assigns crashes or crimes to small grid cells and then includes vehicle miles traveled (VMT) or employment. The second is to conduct risk analysis through the risk-adjusted nearest neighbor hierarchical clustering routine (NNHC) in *CrimeStat*; this routine conducts a nearest neighbor hierarchical clustering (NNHC) but relative to the baseline variable, VMT and employment/population respectively.

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[26] Levine, N. (2010).

e. The identification of hot spots of crashes and crime types that overlap using this technique will provide stronger evidence for the coinciding of the two, as they will have been adjusted for a factor they are associated with. However, this data can be difficult to obtain and at a scale that allows it to be used.
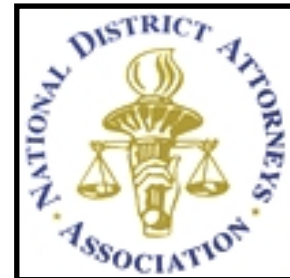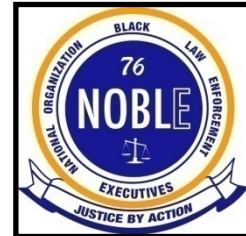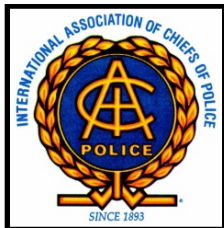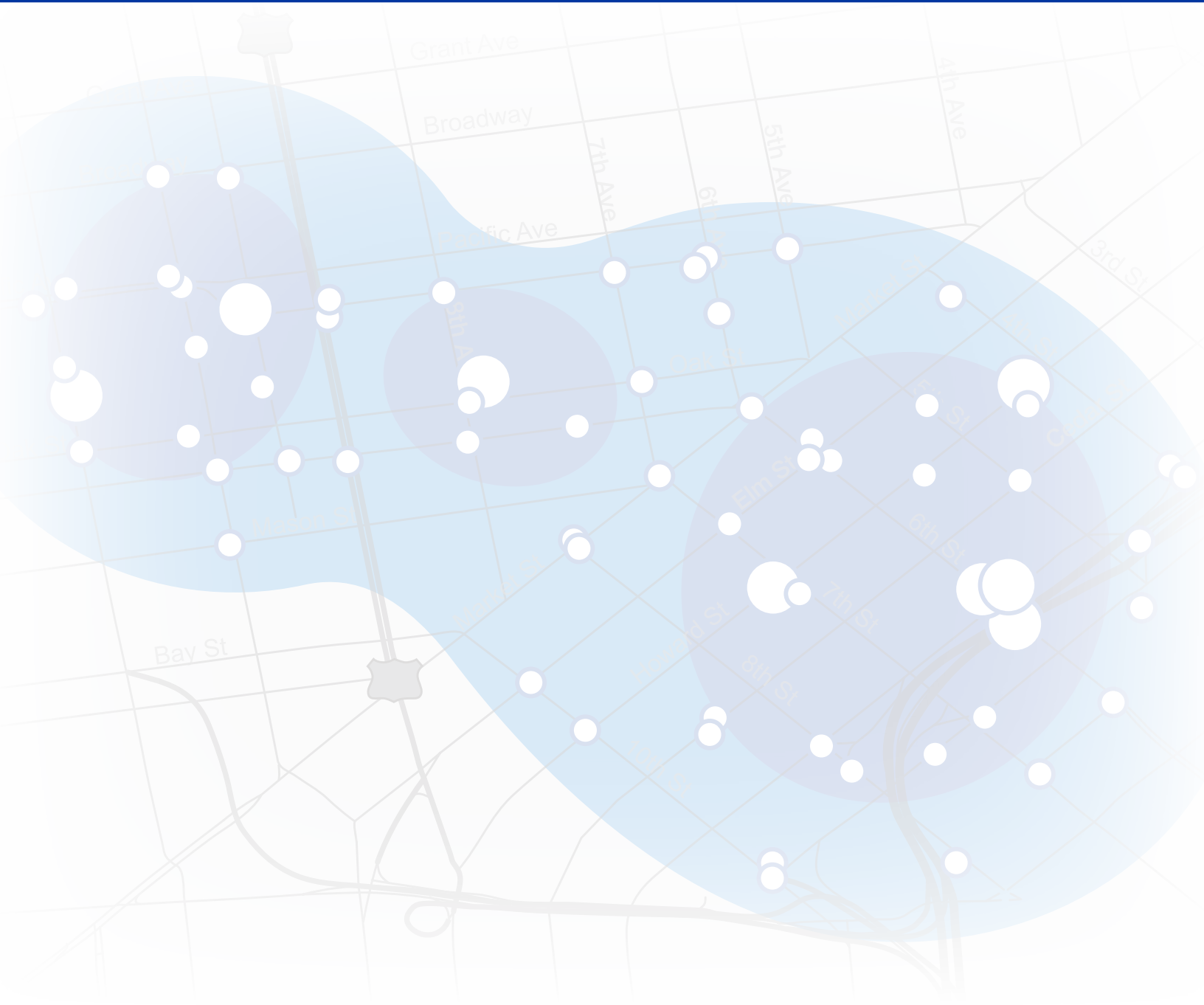
For information about DDACTS,
including the DDACTS toolkit,
please visit www.nhtsa.gov/ddacts.

U.S. Department of Transportation

**National Highway Traffic Safety
Administration**

NHTSA

12321-050516-v1

Revocations and Suspensions by Reason of Conviction
January - December, 2018

Rank	Code	Charge	Quantity YTD	% of Total
1	FPF	Failure to pay forfeiture	243,323	58.75%
2	DR	Driver record	57,450	13.87%
3	OWI	Operating under influence of intoxicant or con. sub.	26,079	6.30%
4	BAC	Blood alcohol concentration	18,070	4.36%
5	NCI	Noncompliance with Assessment Interview	11,671	2.82%
6	FPJ	Failure to pay forfeiture-juvenile	9,231	2.23%
7	INC	Insurance Cancelled	7,957	1.92%
8	NCP	Noncompliance with Driver Safety Plan	5,236	1.26%
9	OWS	Operating while suspended	3,857	0.93%
10	FCC	Failure to complete course	3,657	0.88%
11	FPS	Failure to pay support	3,202	0.77%
12	IC	Implied consent	3,119	0.75%
13	SE	Speeding excess	2,837	0.68%
14	DQF	Disqualification	2,769	0.67%
15	DJN	Damage judgment accruing from negligent operation	2,363	0.57%
16	PAC	Prohibited Alcohol Concentration	2,056	0.50%
17	SRR	Safety Responsibility suspension of registration and operating privilege	1,928	0.47%
18	UAL	Underage alcohol	1,562	0.38%
19	SR	Safety Responsibility - suspension	1,093	0.26%
20	AEO	Attempt to elude officer	882	0.21%
21	OAR	Operating after revocation	737	0.18%
22	T	Truancy	696	0.17%
23	VUF	Vehicle used in commission of felony	591	0.14%
24	HTO	Habitual traffic offender	500	0.12%
25	DPI	DJN default on PIAG	379	0.09%
26	NCA	Noncompliance Arrest while in Plan	352	0.08%
27	JA	Juvenile alcohol	283	0.07%
28	SVO	Serious violation-occupational license	272	0.07%
29	OII	Operating while intoxicated causing injury	252	0.06%
30	FSA	Failure to stop after accident	214	0.05%
31	UAO	Underage alcohol operation	179	0.04%
32	NCT	Noncompliance Pay Treatment Fee	171	0.04%
33	SDD	SRR default on installment	157	0.04%
34	FYR	Failure to yield right of way	149	0.04%
35	NCF	Noncompliance with Assessment Fee	87	0.02%
36	INF	Insurance Filed	84	0.02%
37	SRD	SR default on installment	68	0.02%
38	OCS	Operating while intox.-controlled substance	57	0.01%
39	D	Drug convictions	54	0.01%
40	OWL	Operating without driver license	51	0.01%
41	GBH	Great bodily harm	50	0.01%
42	DCI	DJN default on CIAG	47	0.01%
43	CWI	Commercial operating while intoxicated	46	0.01%
44	JCS	Juvenile controlled substances	40	0.01%
45	NHI	Negligent homicide intoxicated	38	0.01%
46	IP	Improper plates	33	0.01%
47	NH	Negligent homicide	26	0.01%
48	FOS	Failure to obey traffic sign or signal	24	0.01%
49	S	Speeding	20	0.00%
50	LR1	Lifetime revocation 1	19	0.00%
51	RD	Reckless driving	19	0.00%
52	FA	Falsified application	10	0.00%
53	IT	Illegal turn	10	0.00%

Revocations and Suspensions by Reason of Conviction
January - December, 2018

Rank	Code	Charge	Quantity YTD	% of Total
54	LR2	Lifetime revocation 2	10	0.00%
55	RHT	Repeat HTO	10	0.00%
56	DWS	Driving on wrong side of highway	9	0.00%
57	CAC	Commercial administrative suspension	8	0.00%
58	FD	Found delinquent	8	0.00%
59	CNI	Compulsory insurance - no insurance	7	0.00%
60	PI	Passing illegally	7	0.00%
61	OSJ	Out of state judgment certified by state	6	0.00%
62	FSU	Failure to stop after accident-unattended vehicle	5	0.00%
63	BI	Backing illegally	4	0.00%
64	IIV	Intoxicant in vehicle carrying underage person	4	0.00%
65	UV	Unregistered vehicle	4	0.00%
66	IVO	Intoxicant in vehicle-operator	3	0.00%
67	SI	Speeding intermediate	3	0.00%
68	CIC	Commercial implied consent	2	0.00%
69	CNP	Compulsory insurance - no proof	2	0.00%
70	DLT	Deviating from lane of traffic	2	0.00%
71	FFS	Failure to fasten seat belt	2	0.00%
72	IUL	Illegal use of operator's license	2	0.00%
73	LNP	License not on person	2	0.00%
74	ORS	Operating while Registration Suspended	2	0.00%
75	OSS	SR out of state	2	0.00%
76	CAI	Commercial alcohol causing injury	1	0.00%
77	CCS	Commercial OWI-controlled substance	1	0.00%
78	CSE	Commercial speeding excess (20 or more over)	1	0.00%
79	CSR	Child safety restraint	1	0.00%
80	FDL	Failure to dim lights	1	0.00%
81	FRA	Failure to report accident	1	0.00%
82	FVC	Failure to keep vehicle under control	1	0.00%
83	GCV	GDL Curfew Violation	1	0.00%
84	ICU	Implied consent underage	1	0.00%
85	ID	Inattentive driving	1	0.00%
86	IDT	Ignition/immobilization device	1	0.00%
87	IVP	Intoxicant in vehicle-passenger	1	0.00%
88	TPV	Transporting person or vehicle illegally	1	0.00%
89	UID	Underage ID	1	0.00%
90	VOR	Violation of restriction	1	0.00%

Total   **414,176**

Source: WisDOT/DMV - Bureau of Driver Services, Report No. WDLSUM
*The total includes all revocations and suspensions for both in-state and out-of-state residents.
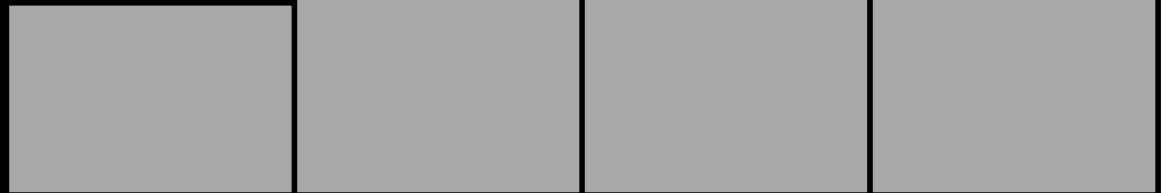
**Fiscal Year 2017
High Risk Young Men
Performance Benchmarks and Outcomes Report**

Overview and Highlights

In FY 17, Roca served 854 participants across four sites in Boston, Chelsea, Lynn, and Springfield Massachusetts (56% were enrolled in prior fiscal years and 44% participants were new enrollments in FY17). By the end of the fiscal year, 340 participants were in Phase 1, 299 were in Phase 2, and 215 were in Phase 3. The table below illustrates Roca's progress towards achieving performance measures and Intermediate Outcomes with these young men, shown both by site and for the full organization.

	BOS	CHE	LYN	SPR	MEN
Participants Served					
Participants Served	246	215	114	279	**854**
Retention	74%	78%	85%	80%	**79%**
Performance Measures (Phase 1 and 2 Participants Served)	**n=219**	**n=161**	**n=105**	**n=224**	**n=709**
Increase Engagement with Staff					
Weekly Average Contact Rates (2x/wk.)	68%	58%	66%	58%	**62%**
Increase Programming Engagement					
Weekly Average Programming Rates	20%	32%	26%	42%	**30%**
Weekly Average Programming Rates (1x/wk.)	40%	50%	39%	49%	**46%**
Weekly Average Programming Rates (2x/wk.)	15%	25%	21%	38%	**24%**
Overall Programming Engagement (1x)	80%	80%	83%	88%	**83%**
Life Skills Engagement (1x)	73%	71%	75%	79%	**75%**
CBT (1x)	72%	70%	72%	75%	**73%**
Healthy Habits (1x)	5%	29%	22%	21%	**18%**
Educational / Pre-Vocational Engagement (1x)	61%	67%	67%	72%	**67%**
Employment Engagement (1x)	65%	58%	56%	67%	**63%**
Transitional Employment					
Basic Transitional Employment Enrolled	52	57	37	128	**274**
Eligible to Complete Basic Transitional Employment	27	19	12	29	**87**
Completed Basic Transitional Employment	5	2	1	20	**28**
Basic Transitional Employment Completion Rate	19%	11%	8%	69%	**32%**
Intermediate Outcomes (Enrolled 24 Months or Longer)	**n=71**	**n=89**	**n=31**	**n=92**	**n=283**
Placed in Unsubsidized Employment	66%	89%	74%	83%	**80%**
Still Employed	51%	71%	52%	46%	**56%**
Retained 90 Days	75%	88%	57%	71%	**76%**
Retained 180 Days	56%	87%	53%	54%	**66%**
Retained 365 Days	52%	83%	57%	43%	**63%**
Intermediate Outcomes (Enrolled 24 Months or Longer)	**n=71**	**n=89**	**n=31**	**n=92**	**n=283**
No New Arrests For New Charges Since 24th Month of Enrollment	79%	88%	90%	82%	**84%**

Roca's Mission is to disrupt the cycle of incarceration and poverty by helping young people transform their lives.

Roca's Intervention Model is a cognitive-restructuring, behavioral change and skill development intervention, which focuses on high-risk young men in a non-mandated program. Roca's Model focuses on 17-to-24-year-old men who are either: 1) aging out of the juvenile justice or juvenile probation systems with a strong propensity for re-incarceration as an adult; 2) connected with the adult justice system; or 3) are high-risk members of the community being served who have a strong propensity for incarceration as an adult.

Roca's Intervention Model is designed to allow participants enough time to undergo meaningful behavior change, which will enable them to stay out of jail and go to work. The Model is thus four years long: the first two years involve intensive interaction between the program and the young man, focusing on gradually engaging the participant in programming and promoting behavior change; the subsequent two years focus on sustaining the positive change in behavior. The ultimate goals of the Model are reducing participants' incarceration rates and increasing participants' ability to retain employment over time. Data tracking and performance management are built into the Model, to ensure that the Model is achieving its goals.

Relentless Outreach and Follow-Up

Transformational Relationships
- Youth Workers, Educators, and Crew Supervisors
- (All Staff)

Programming
- Life Skills
- Education / Pre-Voc
- Employment

Engaged Institutions
- Formal System Change
- Informal System Change
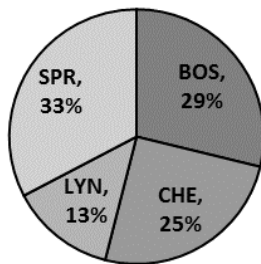
Roca receives referrals from both formal and informal networks within the surrounding cities in Eastern Massachusetts including: Boston, Cambridge, Charlestown, Chelsea, East Boston, Everett, Lynn, Malden, Medford, Revere, Somerville, Winthrop, and Western Massachusetts including: Chicopee, Holyoke, Ludlow, Springfield, and Westfield. These networks consist of community partners, local and state agencies, and affiliates of participants whom we serve.

Roca uses an assessment tool to identify participants' dynamic and static risk factors that make them high risk for long-term incarcerations and disconnection from employment/education. These include: risky behaviors, current and historical criminal involvement, and education and employment history. This information is gathered through intentional conversations with the participant and through community partners involved in their lives. Supervisors convene weekly to discuss the status of referrals received and determine eligibility for participants within 90 days from the referral date.
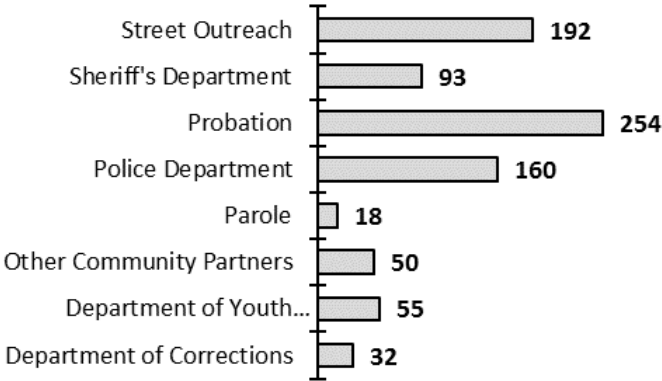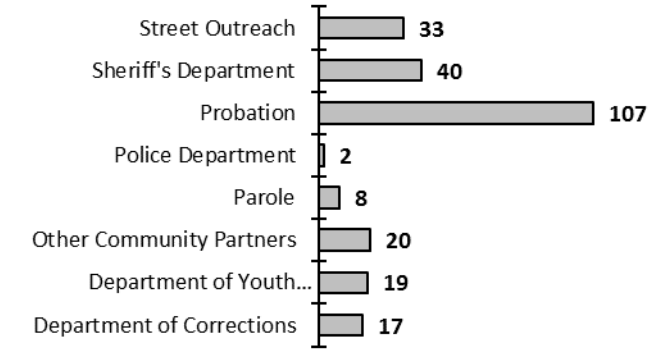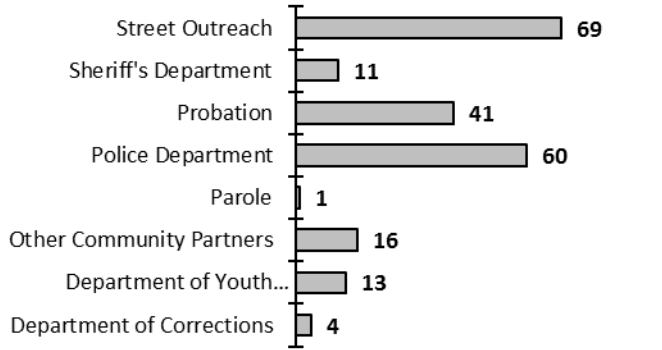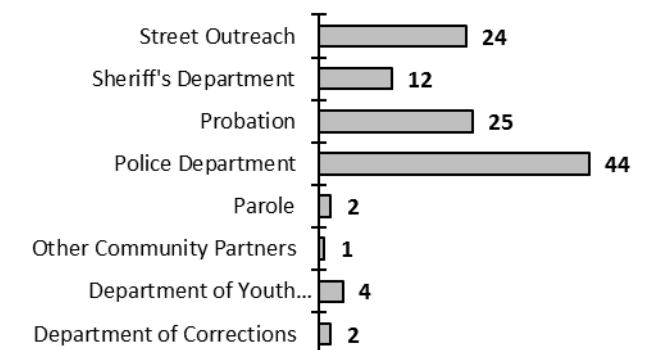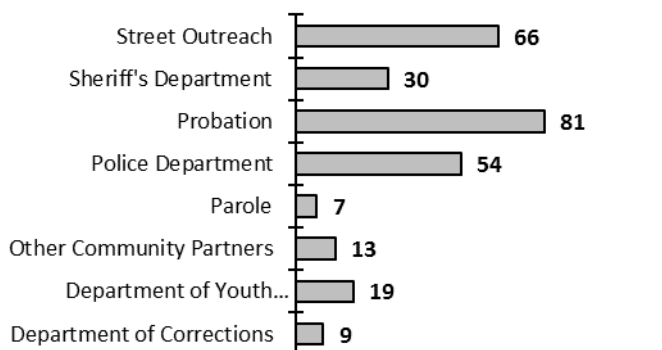
Roca is seeking to serve those who are the highest risk for long-term re-incarceration and disconnection from employment and cannot succeed in other educational and employment programs because they are neither ready, nor willing.

In FY 17, Roca served 854 young men at three sites across Massachusetts. Details on the demographics of these young men can be found below.

ENROLLED

Roca Enrollments			
854		SPR, 33% — BOS, 29% — LYN, 13% — CHE, 25%	
Boston	**Chelsea**	**Lynn**	**Springfield**
246	215	114	279

In FY 17, Roca served 854 young men at four sites across Massachusetts.

Of those served, 44% or 377 were new enrollments during that fiscal year. The proportion of new enrollments is relatively consistent across sites, with the exception of Roca's new site in Lynn. New enrollments at each site are itemized below.

- Boston: 40% or 98 out of 246
- Chelsea: 38% or 82 out of 215
- Lynn: 59% or 67 out of 114
- Springfield: 47% or 130 out of 279

Note: While Roca served young people from Lynn prior to FY16 through our PFS contract, Roca opened up its satellite office in Lynn and began serving clients through the Safe and Successful Youth Initiative in Lynn in FY17.

REFERRAL SOURCES

Roca Referral Sources

Roca receives referrals from its young men's programming through three key sources: State Referrals as part of the Pay for Success Project; direct partner referrals through organizations such as local police, Probation and other community partners; and, more traditional street outreach.

Referrals sources for FY17 are outlined in the chart to the right and by site below. Roca's three largest referral sources this fiscal year include:
- the Office of the Commissioner of Probation who referred 30% or 254 out of 854;
- Police and Sheriff's Departments who referred 30% or 253 out of 854; and,
- Street Outreach which resulted in 22% or 192 out of 854 referrals.

Boston	Chelsea

Lynn	Springfield

RISK FACTORS

Roca designed the Intervention Model to target the highest risk young men in the communities we serve – the shooters, the gang leaders, the 3% of a city's population responsible for 50% of violent crime. This is not an "easy" population to engage in programming. Roca's young men are not ready, willing, or able to participate in traditional programming, and in fact have walked away, blown out of, or been banned from the majority of the programming options available to them because of behavioral, cognitive, or criminal reasons. Roca developed the Intervention Model using evidence- and best practice-based principles. Roca is committed to demonstrating that these young men can change their behavior over time, can reduce their future incarceration, and can help them to succeed through sustained employment.

Perhaps more significantly, although Roca's "baseline" target population is already high-risk at the outset, Roca is currently witnessing an *elevated* level of risk among these groups. They are, in fact, demonstrating a combination of community and individual level risks that are well above that baseline, , risks that directly impact their ability to successfully engage in transitional employment. Our frontline and management staff are seeing the elevated risk levels manifested in the following ways:

- *Gang-related violence.* The majority of young people served at our Boston site are so seriously threatened by rival gangs that they are in a constant state of hypervigilance, terrified to leave their homes or their blocks. Access to guns is easy and many believe that they need to carry a gun as they fear for their lives. Their use of social media increases safety risks and contributes to their hypervigilance. Tragically, anxiety has seeped into every aspect of their lives , such that that they are distracted and on alert even while standing in line at the grocery store, visiting the doctor, or reporting to their probation officer.

  To date, this has resulted in dramatic programmatic changes at the Boston site, including increased tracking of gang involvement, robust data sharing with the Boston Police Department, safety protocols regarding physical access to the Roca Boston building, and developing a portable version of the Intervention Model, which is delivered one-on-one within the community. This is true for all elements of the Roca Intervention Model, including transitional employment.

  An estimated 1/3 of participants in Boston, an estimated 50 young men at any given time, are unable to engage in transitional employment because they pose a significant safety risk to themselves or to other young people on work crews. To address this, Roca has implemented a rapid employment program, allowing these young people to gain work experience.

- *Opioids.* The percentage of young people who battle drug addiction, and particularly heroin, fentanyl and other opioids, is higher than ever before. Opioids are particularly affecting young people served at our Chelsea and Lynn sites, which primarily serve the smaller urban communities outside the City of Boston.

  In Lynn, for example, nearly 40% of participants are abusing opioids and 15% are assessed by the staff as being on the verge of overdose, given their aggressive daily use of substances. More than 65% of Lynn's participants are abusing substances, compared to prior years where this number might only run as high as 35%. For purposes of this discussion, Roca has defined abuse as the use of a substance 3 or more times per week where that substance use impedes engagement in programming and/or employment. Across the whole organization, young people in the throes of addiction, incidences of drug-related crime and arrests, as well as overdoses and deaths, are on the rise. Roca believes this increase in abuse is tied directly to the ease in obtaining fentanyl and other opioids, an increase that has impacted not only the communities Roca serves but communities across the country.

- *Trauma.* Across all our sites, our frontline workers must contend more than ever with increased trauma levels among young people. The traumatic incidents our young people have been exposed to is often related to their closest family members, their childhood friends, and their neighbors. These incidents include extreme violence, death, abuse of all kinds, neglect, and other incidents with long-term and wide-ranging impacts.

  While U.S.-born young people are dealing with more trauma and violence in their pasts than we have ever seen before, Central American youth – most of them unaccompanied minors – meanwhile report witnessing truly unspeakable atrocities committed upon friends and family members, both while abroad and while on the journey to the United States. As a result, Roca's young people present with greater degrees of anxiety, depression, and increasingly severe mental health issues than they did, even two years ago. They are more engaged in criminal behaviors and even less ready than before to get a job and hold a job.

Details on the risk factors of the young men we served in FY 2017 are outlined below.

Roca Participant Risk Factors (n=854)	
	As noted above, Roca serves our communities' highest risk young men. Roca tracks eight risk factors for the young people we serve and in FY17 68% or 582 out of 854 were identified with six or more risk factors. Perhaps most telling of those: 94% or 802 out of 854 had a history of criminal involvement; 82% reported drug involvement at intake; 87% were street/gang involved at intake; 80% had no employment history at intake; and, 82% had no high school diploma or GED at intake.
Boston (n=246)	**Chelsea (n=215)**
Lynn (n=114)	**Springfield (n=279)**

Drug Involved 82%
Street/Gang Involved 87%
No Employment History 80%
Dropped out of High School 82%
Prior Juvenile Supervisions 48%
Prior Adult Supervisions 65%
Prior Adult Incarcerations 56%
History of Arrests 93%

Boston:
Drug Involved 89%
Street/Gang Involved 94%
No Employment History 82%
Dropped out of High School 83%
Prior Juvenile Supervisions 57%
Prior Adult Supervisions 83%
Prior Adult Incarcerations 73%
History of Arrests 99%

Chelsea:
Drug Involved 80%
Street/Gang Involved 87%
No Employment History 77%
Dropped out of High School 76%
Prior Juvenile Supervisions 42%
Prior Adult Supervisions 49%
Prior Adult Incarcerations 35%
History of Arrests 90%

Characteristic	Left	Right
Drug Involved	75%	81%
Street/Gang Involved	84%	83%
No Employment History	71%	82%
Dropped out of High School	80%	86%
Prior Juvenile Supervisions	55%	42%
Prior Adult Supervisions	68%	61%
Prior Adult Incarcerations	60%	55%
History of Arrests	92%	90%

BASIC DEMOGRAPHICS

City/Neighborhoods (n=854)

Western Massachusetts, 33%
Eastern Massachusetts, 67%

Roca serves young men from 21 communities across the Commonwealth. In FY17, services were delivered out of three locations in Eastern Massachusetts, serving 67% of Roca's program participants (Boston, Chelsea and Lynn), and one site in Western Massachusetts (Springfield), serving 33% of our program participants.

Details regarding the specific communities served by each site are provided in the charts below.

Boston (n=246)

Neighborhood	%
Roxbury	17%
Roslindale	5%
Mattapan	9%
Hyde Park	7%
Dorchester	48%
Boston	15%

Chelsea (n=215)

Community	%
Other	3%
Somerville	6%
Revere	11%
Medford	2%
Malden	7%
Everett	6%
East Boston	6%
Chelsea	54%
Cambridge	5%

Lynn (n=114)

Community	%
Other	10%
Saugus	2%
Salem	4%
Revere	3%
Peabody	1%
Lynn	82%

Springfield (n=279)

Community	%
Other	1%
Springfield	84%
Indian Orchard	2%
Holyoke	9%
Chicopee	4%

Race/Ethnicity (n=85%4)

White 8%
Other 2%
Hispanic/Latino 50%
Black or African American 36%
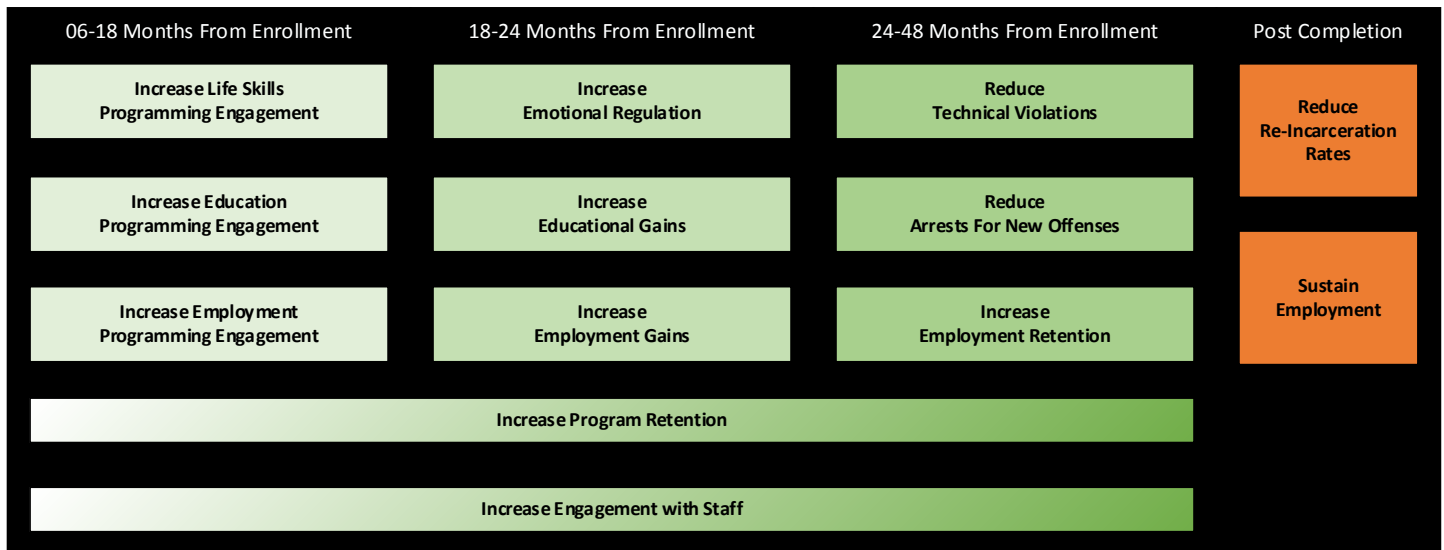Bi/Multi-Racial 4%
Asian 0%

The majority of the young people that Roca serves are young people from communities of color: 50% are Hispanic/Latino; 36% are Black/African American; 4% are Bi/Multi-Racial; and, 2% are from other communities of color.

The ethnic/racial breakdown of participants from each site varies, in large part, based on the communities the site serves. This breakdown is detailed in the tables below.

Boston (n=246)

White 2%
Other 1%
Hispanic/Latino 22%
Black or African American 69%
Bi/Multi-Racial 6%
Asian 0%

Chelsea (n=215)

White 12%
Other 0%
Hispanic/Latino 65%
Black or African American 18%
Bi/Multi-Racial 6%
Asian 0%

Lynn (n=114)

White 21%
Other 2%
Hispanic/Latino 46%
Black or African American 22%
Bi/Multi-Racial 7%
Asian 2%

Springfield (n=279)

White 4%
Other 3%
Hispanic/Latino 65%
Black or African American 28%
Bi/Multi-Racial 1%
Asian 0%

Age Range (n=854)

Age Range	Percent
14 - 16 Years Old	2%
17 - 18 Years Old	11%
19 - 20 Years Old	22%
21 - 22 Years Old	26%
23 - 24 Years Old	27%
25 Years Old and Older	12%

Roca predominantly serves young men between the ages of 17 and 24. In fact, the majority of the participants Roca serves are between 21 and 24 years of age (53%), with the average age at enrollment being 22.1.

Roca Chelsea serves a small group of Central American youth in Chelsea between the ages of 15 and 17 who meet all risk factors for Roca engagement based on significant community need.

Additionally, there are a small number of participants who Roca served in FY17 who are 25 or older (12% of those served). These young men began their engagement in the Intervention Model prior to their 24th birthday.

Boston (n=246)

Age Range	Percent
14 - 16 Years Old	0%
17 - 18 Years Old	8%
19 - 20 Years Old	17%
21 - 22 Years Old	24%
23 - 24 Years Old	34%
25 Years Old and Older	16%

Chelsea (n=215)

Age Range	Percent
14 - 16 Years Old	8%
17 - 18 Years Old	14%
19 - 20 Years Old	22%
21 - 22 Years Old	21%
23 - 24 Years Old	22%
25 Years Old and Older	12%

Lynn (n=114)

Age Range	Percent
14 - 16 Years Old	0%
17 - 18 Years Old	10%
19 - 20 Years Old	25%
21 - 22 Years Old	26%
23 - 24 Years Old	26%
25 Years Old and Older	13%

Springfield (n=279)

Age Range	Percent
14 - 16 Years Old	0%
17 - 18 Years Old	12%
19 - 20 Years Old	24%
21 - 22 Years Old	31%
23 - 24 Years Old	25%
25 Years Old and Older	9%

Roca's Interventional Model is a 4-year behavioral change and skills development intervention that helps young people avert future incarceration and learn to go to work. Participants are expected to demonstrate intermediate recidivism and employment outcomes in years 3 and 4 while long-term outcomes are observed 1 year after completing the intervention model.

The first 6 months of enrollment are heavily focused on building intentional relationships with staff and light engagement in life skills, education, and/or employment programming. The next 12 months (6 to 18 months from enrollment) are focused on sustaining those relationships and working on intentional skill building to change behaviors and increase competencies by increasing the frequency of engagement in programming. By 18 to 24 months, participants are starting to demonstrate positive behavior changes and gains in education and/or employment. As a result, by 24 months, participants are at a lower risk of recidivating or being unemployed.

06-18 Months From Enrollment	18-24 Months From Enrollment	24-48 Months From Enrollment	Post Completion
Increase Life Skills Programming Engagement	Increase Emotional Regulation	Reduce Technical Violations	Reduce Re-Incarceration Rates
Increase Education Programming Engagement	Increase Educational Gains	Reduce Arrests For New Offenses	
Increase Employment Programming Engagement	Increase Employment Gains	Increase Employment Retention	Sustain Employment
Increase Program Retention			
Increase Engagement with Staff			

Length Enrolled

Length Enrolled in Intervention Model (n=854)

Duration	Percentage
00 - 02 Months	11%
02 - 04 Months	10%
04 - 06 Months	10%
06 - 12 Months	22%
12 - 18 Months	9%
18 - 24 Months	10%
24 - 30 Months	9%
30 - 36 Months	7%
36 - 42 Months	6%
42 - 48 Months	7%

More than half or 53% out of 854 participants served in FY17 had been enrolled for less than 12 months with the greatest number of participants having been engaged for 6 to 12 months.

This pattern is true not only for the organization as a whole but also in individual sites, as illustrated in the charts below.

Boston (n=246)

Month Range	Percentage
00 - 02 Months	14%
02 - 04 Months	11%
04 - 06 Months	6%
06 - 12 Months	17%
12 - 18 Months	14%
18 - 24 Months	14%
24 - 30 Months	7%
30 - 36 Months	11%
36 - 42 Months	6%
42 - 48 Months	0%

Chelsea (n=215)

Month Range	Percentage
00 - 02 Months	7%
02 - 04 Months	7%
04 - 06 Months	11%
06 - 12 Months	21%
12 - 18 Months	7%
18 - 24 Months	12%
24 - 30 Months	9%
30 - 36 Months	4%
36 - 42 Months	4%
42 - 48 Months	20%

Lynn (n=114)

Month Range	Percentage
00 - 02 Months	8%
02 - 04 Months	12%
04 - 06 Months	14%
06 - 12 Months	31%
12 - 18 Months	5%
18 - 24 Months	7%
24 - 30 Months	11%
30 - 36 Months	4%
36 - 42 Months	7%
42 - 48 Months	2%

Springfield (n=279)

Month Range	Percentage
00 - 02 Months	11%
02 - 04 Months	10%
04 - 06 Months	12%
06 - 12 Months	23%
12 - 18 Months	9%
18 - 24 Months	5%
24 - 30 Months	9%
30 - 36 Months	8%
36 - 42 Months	8%
42 - 48 Months	5%

Retention and Attrition

Fundamental to programmatic success is Roca's ability to hold on to participants that are unable to engage in traditional programming or work. Roca's model is designed to help young people build strong relationships with the front line program staff, engage in programming designed to meet their level of readiness, and to see and feel incremental progress as well as learning from failures and relapses. Services are, however, voluntary for most young men served.

FY17 Retention and Attrition:
The graphics below illustrate Roca's one-year retention rate for any participants served during the FY17 fiscal year.

Roca Retention			
78%			
664 out of 854			
Boston	Chelsea	Lynn	Springfield
74%	**78%**	**84%**	**79%**

By the end of Fiscal Year 2017, 78% or 664 participants served were still actively engaged in or completed Roca's intervention model while 22% or 190 were dismissed due to mobility or other unsuccessful reasons.

When examining two-years of programming, Roca, on average, retains 55% of all enrollees for 24 full months.

Attrition and Attrition Reasons:

Roca Attrition			
22%			
190 out of 854			
Boston	Chelsea	Lynn	Springfield
26%	**22%**	**16%**	**21%**

As noted above, 190 of the 854 young people served during FY17 (22%) were no longer engaged or did not successfully complete the model. This outcome varies somewhat by site, with 16% of participants in Lynn and 26% of Boston participants attriting from the Intervention Model.

Attrition Reasons

Reason	Percentage
Unsuccessful completion	4%
Unable to provide services - Severe Substance...	2%
Unable to provide services - Severe Mental...	1%
Unable to contact/locate - Lost Contact	14%
Unable to contact/locate - Extreme Refusal	6%
Unable to contact/locate - Active Warrant	4%
Moved out of service area	31%
Incarcerated/Detained	33%
Detained by ICE	2%
Deceased	4%

Of those terminated, 33% (63 out of 190) were terminated as a result of long term incarceration or detention, 4% (8 out of 190) were deceased, 2% (4 out of 190) were detained by ICE, 3% (6 out of 190) were terminated due to severe substance abuse or mental health issues.

Due to the transitory nature of the very high-risk young men Roca serves, 33% (63 out of 190) were dismissed because they moved out of the service area.

The tables below provide these breakdowns by site and show some clear variations in termination patterns based on location.

Boston (n=65)

Reason	Percentage
Unsuccessful completion	3%
Unable to provide services - Severe Substance...	5%
Unable to provide services - Severe Mental...	2%
Unable to contact/locate - Lost Contact	15%
Unable to contact/locate - Extreme Refusal	2%
Unable to contact/locate - Active Warrant	3%
Moved out of service area	31%
Incarcerated/Detained	28%
Detained by ICE	3%
Deceased	9%

Chelsea (n=48)

Reason	Percentage
Unsuccessful completion	4%
Unable to provide services - Severe Substance...	2%
Unable to provide services - Severe Mental...	0%
Unable to contact/locate - Lost Contact	13%
Unable to contact/locate - Extreme Refusal	8%
Unable to contact/locate - Active Warrant	2%
Moved out of service area	42%
Incarcerated/Detained	27%
Detained by ICE	2%
Deceased	0%

Lynn (n=18)

Reason	Percentage
Unsuccessful completion	0%
Unable to provide services - Severe Substance...	0%
Unable to provide services - Severe Mental...	6%
Unable to contact/locate - Lost Contact	11%
Unable to contact/locate - Extreme Refusal	0%
Unable to contact/locate - Active Warrant	0%
Moved out of service area	56%
Incarcerated/Detained	22%
Detained by ICE	0%
Deceased	6%

Springfield (n=59)

Reason	Percentage
Unsuccessful completion	7%
Unable to provide services - Severe Substance...	0%
Unable to provide services - Severe Mental...	0%
Unable to contact/locate - Lost Contact	15%
Unable to contact/locate - Extreme Refusal	10%
Unable to contact/locate - Active Warrant	7%
Moved out of service area	14%
Incarcerated/Detained	46%
Detained by ICE	2%
Deceased	0%

Length Enrolled Prior to Dismissal

Length	Percentage
00 - 02 Months	13%
02 - 04 Months	11%
04 - 06 Months	11%
06 - 12 Months	22%
12 - 18 Months	14%
18 - 24 Months	11%
24 - 30 Months	8%
30 - 36 Months	5%
36 - 42 Months	1%
42 - 48 Months	4%
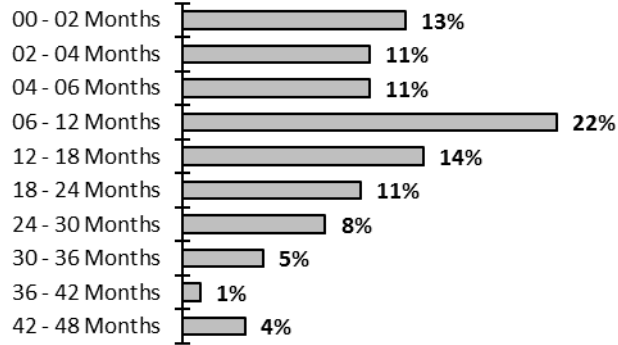
Typically, it takes 4-6 months to begin building a strong relationship with each young person. Despite multiple efforts by program staff, there is a higher likelihood of losing young people during this period as it is the time we are just beginning this relationship development.

As a result, and not surprisingly, as detailed in the chart to the right, of the 190 who were dismissed, 35% were within 6 months of enrollment, 22% were dismissed within 6-12 months of enrollment.

Boston (n=65)

Length	Percentage
00 - 02 Months	12%
02 - 04 Months	8%
04 - 06 Months	6%
06 - 12 Months	18%
12 - 18 Months	17%
18 - 24 Months	22%
24 - 30 Months	9%
30 - 36 Months	8%
36 - 42 Months	0%
42 - 48 Months	0%

Chelsea (n=48)

Length	Percentage
00 - 02 Months	8%
02 - 04 Months	10%
04 - 06 Months	17%
06 - 12 Months	27%
12 - 18 Months	13%
18 - 24 Months	6%
24 - 30 Months	6%
30 - 36 Months	2%
36 - 42 Months	0%
42 - 48 Months	10%

Lynn (n=18)

Length	Percentage
00 - 02 Months	22%
02 - 04 Months	6%
04 - 06 Months	22%
06 - 12 Months	17%
12 - 18 Months	6%
18 - 24 Months	6%
24 - 30 Months	17%
30 - 36 Months	6%
36 - 42 Months	0%
42 - 48 Months	0%

Springfield (n=59)

Length	Percentage
00 - 02 Months	15%
02 - 04 Months	17%
04 - 06 Months	8%
06 - 12 Months	24%
12 - 18 Months	15%
18 - 24 Months	3%
24 - 30 Months	7%
30 - 36 Months	3%
36 - 42 Months	3%
42 - 48 Months	3%

Time Elapsed Between Enrollment and Attrition Due to Long-Term Incarceration/Detention:

Roca (n=62)

00 - 02 Months 15% 02 - 04 Months 11% 04 - 06 Months 8% 06 - 12 Months 23% 12 - 18 Months 27% 18 - 24 Months 3% 24 - 30 Months 6% 30 - 36 Months 0% 36 - 42 Months 3% 42 - 48 Months 3%	During FY17 20% of participants served or 169 out of 854 were arrested for new offenses. • 39% or 66 occurred within 6 months of enrollment • 18% or 30 occurred between participants' 6th and 12th month of enrollment Further, 62 young people (7.3% of those served during the fiscal year) were ultimately incarcerated/detained for more than 6 months and terminated from the program • 34% or 21 out of 62 participants were incarcerated/detained within the first 6 months of enrollment • 23% or 14 out of 62 participants were incarcerated/detained between their 6th and 12th month of enrollment • 27% or 17 out of 62 participants were incarcerated/detained between their 12th and 18th month of enrollment • 81% or 50 out of 62 participants incarcerated/detained were for new offenses

These patterns vary by site served, with Boston's arrest patterns showing significant differences from other sites, as detailed in the tables below. Roca is currently investigating these differences, trying to understand if differences in the how services are delivered may potentially be impacting this timing.

Boston (n=18)	Chelsea (n=13)
00 - 02 Months 11% 02 - 04 Months 6% 04 - 06 Months 0% 06 - 12 Months 33% 12 - 18 Months 44% 18 - 24 Months 6% 24 - 30 Months 0% 30 - 36 Months 0% 36 - 42 Months 0% 42 - 48 Months 0%	00 - 02 Months 0% 02 - 04 Months 8% 04 - 06 Months 8% 06 - 12 Months 38% 12 - 18 Months 23% 18 - 24 Months 0% 24 - 30 Months 15% 30 - 36 Months 0% 36 - 42 Months 0% 42 - 48 Months 8%

Lynn (n=4)	Springfield (n=27)
00 - 02 Months 25% 02 - 04 Months 25% 04 - 06 Months 25% 06 - 12 Months 25% 12 - 18 Months 0% 18 - 24 Months 0% 24 - 30 Months 0% 30 - 36 Months 0% 36 - 42 Months 0% 42 - 48 Months 0%	00 - 02 Months 22% 02 - 04 Months 15% 04 - 06 Months 11% 06 - 12 Months 7% 12 - 18 Months 22% 18 - 24 Months 4% 24 - 30 Months 7% 30 - 36 Months 0% 36 - 42 Months 7% 42 - 48 Months 4%

Served Within the First Two Years of the Intervention Model

To assess participant progress, our customized Performance Management System measures short term benchmarks and indicators, intermediate outcomes and long-term participant outcomes as defined through the 3 Phases of the Intervention Model. Phase 1 (00-06 months from enrollment) of the model is defined by indicators reflecting initial participant engagement. Phase 2 (06-24 months from enrollment) is defined by benchmarks and intermediate outcomes reflecting significant behavior change. Phase 3 (24-48 months from enrollment) is defined by intermediate and long term outcomes reflecting sustained, positive behavior change.

Roca Phase 1 and 2 Served	
724	Phase 2, 53% / Phase 1, 47%

Boston	Chelsea	Lynn	Springfield
159	106	232	724

Of the 854 participants served, 85% or 724 received intensive services.

By the end of the fiscal year:
- 47% of participants (340 out of 724) were in Phase 1; and,
- 53% of participants (383 out of 724) were in Phase 2.
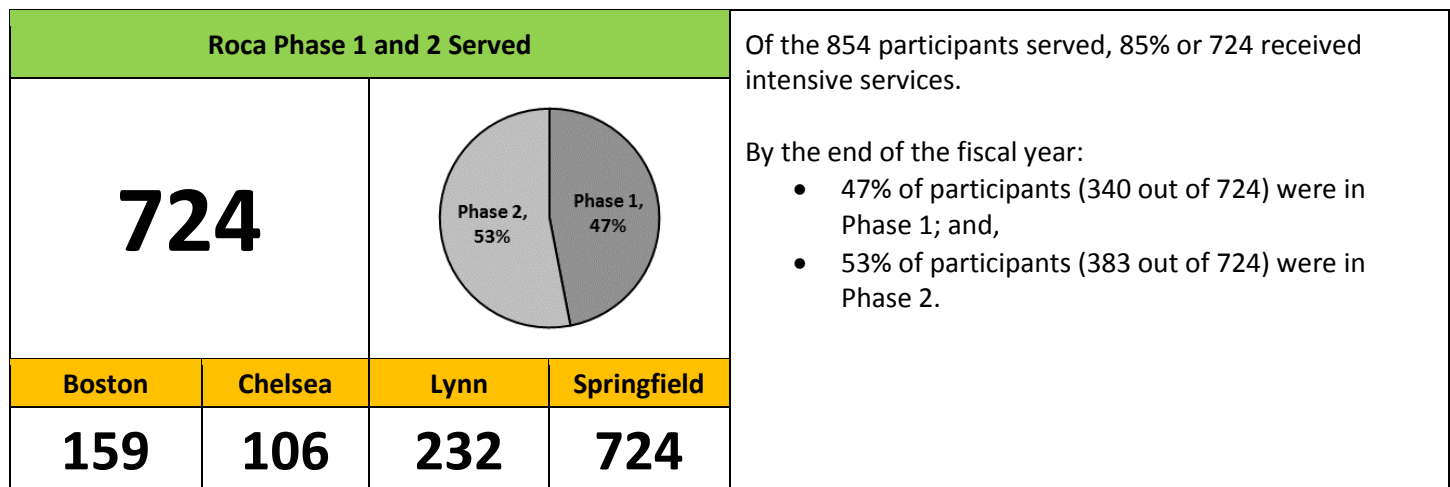
Increase Engagement with Staff

Transformational Relationships are the basis of Roca's intensive case management. The underlying theory behind our Intervention Model is that relationships change us—that positive change comes about within the context of mutuality, shared experience, and a sense of responsibility, not only to oneself, but to another. That's why Roca's youth workers are available 24 hours a day and are often the only adult in a high-risk young person's life who is there when they are in trouble, go to court, enter lockup, or are released from jail. Their relationship is more profound than a friendship—it is effectively intentional and mutually respectful.

Weekly Average Contact Rates (2x/wk.):
Because high-risk young people have had little or no experience with adults who impose consistent expectations of healthy behavior, they are prone to frequent disengagement and rejection of constructive relationships. Therefore, a youth worker must relentlessly reconnect with a young person who periodically rejects them and refuses to engage in programming. This pattern is crucial to the process and must happen continuously throughout the relationship. While a young person may show up at Roca three times in one week, they may just as likely refuse to come back the following week. It is the youth worker's responsibility to track down that young person and reengage them.

The charts below illustrate the percentage of participants who receive a minimum of 2 contacts per week by phase in the Intervention Model and by program operating site.

Weekly Average Contact Rates (2x/wk)	Youth worker contacts with young people are critical to helping them to change their negative behaviors over time.

				• Youth worker contacts with young people are critical to helping them to change their negative behaviors over time. • Contact percentages do not include efforts made by the youth worker that did not result in a face-to-face or a verbal conversation with the participant.

62%

Boston	Chelsea	Lynn	Springfield
68%	**58%**	**66%**	**58%**

Increase Programming Engagement

Engaged in Programming:

Another key component of Roca's model is stage based programming which includes alternative education, prevocational training, life skills training and transitional employment. All stage based programming is designed for young people who are not ready to engage in traditional programming and as such, each component starts with drop in programming and grows to more traditional certifications. This allows our participants the time necessary to develop behaviors critical to succeeding in traditional educational or employment programming and/or jobs.

Roca's stage based programming creates opportunities for our young men to learn and practice new skills and behaviors by meeting them where they are in their readiness, willingness, and ability to be engaged, to learn, and to change. The charts below illustrate the proportion of Roca participants in their first two years of the Intervention Model who were engaged in stage based programming in FY17.

Engaged in Programming			
83%		In FY 17, 83% of Roca participants were engaged in programming, including educational and prevocational training (EDU/PVOC), employment programming (EMP) and life skills programming (LS). Engagement levels for programming vary by site based upon the participant base and level of risk based on Roca's internal risk assessment tool. Details on programming received at each site can be found below.	
Boston	Chelsea	Lynn	Springfield
79%	**81%**	**83%**	**87%**

Boston				Chelsea				Lynn				Springfield			
ANY	EDU/PVOC	EMP	LS	ANY	EDU/PVOC	EMP	LS	ANY	EDU/PVOC	EMP	LS	ANY	EDU/PVOC	EMP	LS
79%	60%	64%	72%	81%	69%	61%	73%	83%	66%	57%	75%	87%	72%	66%	78%

Cognitive Behavioral Theory Curriculum Engagement (Formal Lessons):

One key component of Roca's Life Skills Programming is engagement in our Cognitive Behavioral Theory (CBT) curriculum. During FY16, Roca began piloting a unique CBT curriculum designed to specifically meet the needs of our young people. This targeted curriculum, designed in partnership with Massachusetts General Hospital's Community Pride Clinic, has been designed to strengthen Roca's model with a holistic curriculum that can be implemented through formal practice (both group format and traditional classroom setting) and through informal practice (individual format, and via day-to-day interactions with Roca staff). Delivered in frequent "doses," this approach will be grounded in the teaching and modeling of 10 core CBT skills: 1) Labeling Emotions; 2) Increasing Positive Emotions; 3) Emotion/Urge Surfing; 4) Mindfulness: Anchoring in the Present; 5) Mindfulness: Practicing Self-Compassion (Keeping judgments in check); 6) Increasing Value-Driven Behaviors; 7) Challenging Unhelpful or Inaccurate thoughts; 8) Reducing Emotional Avoidance; 9) Practicing Interpersonal Skills; 10) Practicing Problem-Solving Skills. While this work is currently being studied and more formal results will be released in 2018, the following tables illustrate the number of young people engaged in the formal component of the CBT curriculum, by site during FY17.

CBT Engagement			
63%			
459 out of 724			
Boston	Chelsea	Lynn	Springfield
64%	**58%**	**66%**	**65%**
145 out 227	93 out 159	70 out 106	151 out 232

Of those engaged:
- 75 or 16% completed one skill
- 59 or 13% completed two skills
- 62 or 14% completed three skills
- 50 or 11% completed four skills
- 45 or 10% completed five skills
- 38 or 8% completed six skills
- 36 or 8% completed seven skills
- 40 or 9% completed eight skills
- 31 or 7% completed nine skills
- 23 or 5% completed ten skills

Cognitive Behavioral Therapy (CBT) Skills Received:

CBT Skill	BOS (n=145)	CHE (n=93)	LYN (n=70)	SPR (n=151)	ROCA (n=459)
Skill 01: Label Your Feelings	62%	57%	46%	46%	53%
Skill 02: Feel Your Feelings	48%	47%	50%	46%	47%
Skill 03: Filling Up Your Tank	52%	45%	41%	54%	50%
Skill 04: Being Present	39%	51%	49%	44%	45%
Skill 05: Facing Reality	39%	61%	44%	53%	49%
Skill 06: Act in Line with What You Value	45%	70%	67%	56%	57%
Skill 07: Approach! Don't Avoid	48%	43%	36%	37%	41%
Skill 08: Flex Your Thinking	40%	43%	49%	45%	44%
Skill 09: Problem Solving	34%	52%	36%	52%	44%
Skill 10: Conflict Resolution	30%	31%	26%	32%	30%

Basic Transitional Employment (BTEP) Engagement:
Another critical component of Roca's stage-based programming is our Transitional Employment model, which offers young people a protected space in which to learn how to show up, follow instructions, and develop basic skills such as cleaning, painting, and maintenance. It also offers young people the time and space to get fired, and then re-hired—which happens frequently, allowing them to learn from their own mistakes while developing a concrete work history.

This period where young people can learn from their failures is critical to the success of our young people. Roca assesses successful completion in Basic Transitional Employment by tracking young men who meet with benchmark of 60 days without losing his work slot within the 18-month program time limit. Only after completing these consecutive work days can a participant begin to work on long term employment and larger opportunities. It takes our young people 15-18 months to put in 60 days of work in a row, often taking five to six attempts at transitional employment prior to their engagement.

The graphics below illustrate participant engagement in basic transitional employment during FY16.

BTEP Engagement			
274			
Boston	Chelsea	Lynn	Springfield
52	57	37	128

BTEP Completion Rate

ROCA (n=87): 32%
BOS (n=27): 19%
CHE (n=19): 11%
LYN (n=12): 8%
SPR (n=29): 69%
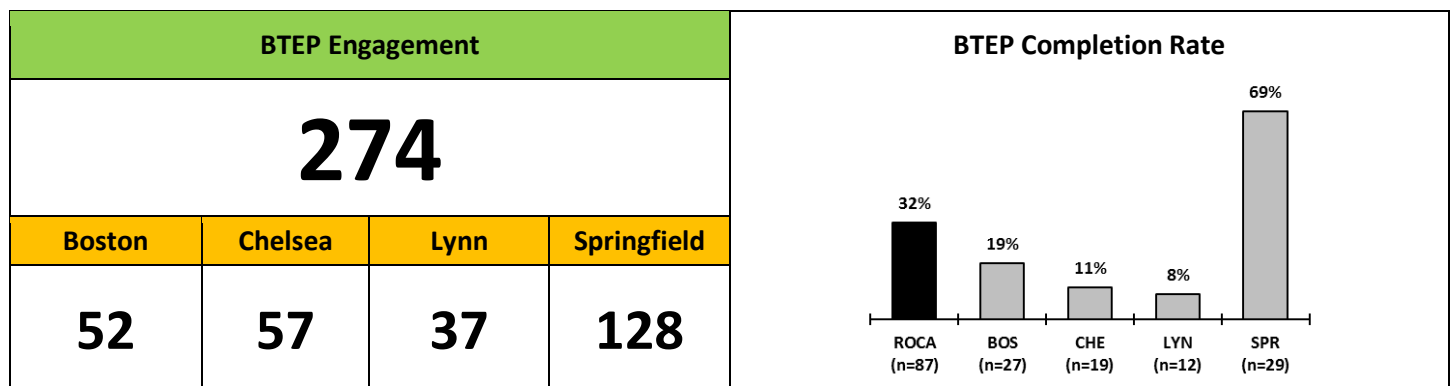
Throughout the fiscal year, Roca enrolled 274 participants in Basic Transitional Employment. Of those enrolled:

- 70% or 193 were still actively enrolled at the end of the fiscal year
  (**BOS:** 50% or 26; **CHE:** 95% or 54; **LYN:** 92% or 34; **SPR:** 63% or 80)

- 19% or 52 were terminated for exceeding BTEP's 18-month program limit or were dismissed from Roca's Intervention Model for unsuccessful reasons
  (**BOS:** 40% or 21; **CHE:** 2% or 1; **LYN:** 5% or 2; **SPR:** 22% or 28)

- 10% or 28 participant successfully completed
  (**BOS:** 10% or 5; **CHE:** 4% or 2; **LYN:** 3% or 1; **SPR:** 16% or 20)

Advanced Transitional Employment Engagement:
For those young men who complete basic transitional employment but still need additional structured employment experience, Roca has created Advanced Transitional Employment (ATE.) ATE provides young people with an opportunity to develop more concrete, hard skills as they continue to refine their workforce readiness and address other barriers to employment. Participants can spend a maximum time of 6 months in ATE.

Increase Educational and Employment Gains

Educational Gains				Gains are observed for those who have been enrolled for 18 months or longer. Educational gains are defined as demonstrating gains from pre and posttest scores, attaining a High School Equivalency, and/or attaining an industry recognized certification.
61% 112 out of 184				Of those enrolled for 18 months or longer, 61% or 112 out of 184 made educational gains.
Boston	**Chelsea**	**Lynn**	**Springfield**	
57% 41 out 72	**59%** 26 out 44	**50%** 11 out 22	**76%** 35 out 46	

High School Equivalency	BOS	CHE	LYN	SPR	ROCA
Needs High School Equivalency	47	31	15	40	133
Made HiSET Pre and Post Score Gains	51%	74%	53%	65%	61%
Attained High School Equivalency	5	3	0	2	10

Additional High School Equivalencies were attained for those not in this cohort:
- BOS: 4 additional for a total of 10 attained
- CHE: 2 additional for a total of 5 attained
- LYN: 2 additional for a total of 2 attained
- SPR: 2 additional for a total of 4 attained

Industry Recognized Certifications	BOS	CHE	LYN	SPR	ROCA
Needs Industry Recognized Certifications	73	86	25	64	248
Attained Industry Recognized Certification	58%	30%	20%	47%	42%

Employment Gains			
82%			
162 out of 198			
Boston	**Chelsea**	**Lynn**	**Springfield**
84%	**74%**	**63%**	**96%**
62 out 74	35 out 47	17 out 27	48 out 50

Gains are observed for those who have been enrolled for 18 months or longer. Employment gains are defined as being assessed as work ready, completing Roca's Basic Needs Assessment, completing 8 workforce readiness workshops, demonstrating positive workforce behaviors and skills, and/or completing Transitional Employment.

Of those enrolled for 18 months or longer, 82% or 162 out of 198 made employment gains.

Intermediate Outcomes

Roca's long-term outcomes, measured 5 years from enrollment, are to increase long-term employment retention and reduce re-incarceration (as measured by post-sentence bed days).

In order to understand if we are making progress toward these outcomes with our young men Roca tracks some key intermediate outcomes for participants engaged in the model for 24 months or longer. The most significant intermediate outcomes that help us understand if our participants are on track for long term outcomes are: Employment placements and retention and no new arrests.

Data for young people who have completed two years of the intervention model is provided in the illustrations below.

Two-Year Graduates

Roca Enrollments		
283	SPR, 33% / BOS, 25% / LYN, 11% / CHE, 31%	
Boston	**Chelsea**	**Lynn**	**Springfield**
71	**89**	**31**	**92**

- Of the 854 young people served in FY17, 283 completed the first two years of the intervention model.
- Because sustained behavior change takes a young person 18-24 months, it is this group that Roca looks at to assess its intermediate outcomes.
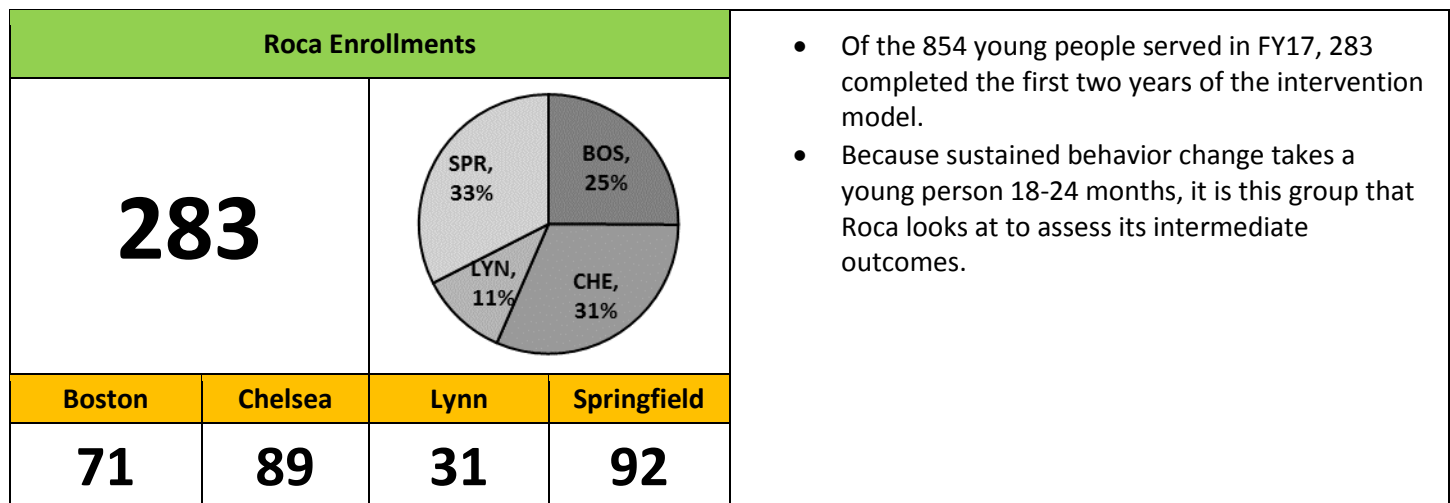
Increase Employment Retention

Of those enrolled for 24 months or longer, 80% or 225 out of 283 were placed in unsubsidized employment, this is an increase from 78% in FY16. This can be seen in the table below.

Employment Placements			
80%			
225 out 283			
Boston	**Chelsea**	**Lynn**	**Springfield**
66%	**89%**	**74%**	**83%**
47 out of 71	79 out of 89	23 out of 31	76 out of 92

Percent Still Employed

Days Retained:

Employment Retention	Below are employment retention rates for those enrolled for 24 months or longer and placed in unsubsidized employment.

Employment Retention

| 30 Days (n=218) | 60 Days (n=212) | 90 Days (n=198) | 180 Days (n=179) | 365 Days (n=120) |
| 90% | 83% | 76% | 66% | 63% |

Below are employment retention rates for those enrolled for 24 months or longer and placed in unsubsidized employment.

- Of those still being served who were placed in employment at least 30 days ago, 90% successfully worked 30 days (196 out of 218 young men).
- Of those still being served who were placed in employment at least 90 days ago, 76% successfully worked 90 days (151 out of 198 young men).
- Of those still being served who were placed in employment at least 180 days ago, 66% successfully worked 180 days (118 out of 179 young men).
- Of those still being served who were placed in employment at least 365 days ago, 63% successfully worked 365 days (76 out of 120 young men).

Boston

| 30 Days (n=44) | 60 Days (n=43) | 90 Days (n=40) | 180 Days (n=36) | 365 Days (n=23) |
| 91% | 88% | 75% | 56% | 52% |

Chelsea

| 30 Days (n=76) | 60 Days (n=75) | 90 Days (n=72) | 180 Days (n=63) | 365 Days (n=48) |
| 91% | 88% | 88% | 87% | 83% |

Lynn

| 30 Days (n=23) | 60 Days (n=23) | 90 Days (n=21) | 180 Days (n=19) | 365 Days (n=14) |
| 83% | 70% | 57% | 53% | 57% |

Springfield

| 30 Days (n=75) | 60 Days (n=71) | 90 Days (n=65) | 180 Days (n=61) | 365 Days (n=35) |
| 91% | 79% | 71% | 54% | 43% |

Reduce Arrests for New Offenses:

No New Arrests	
84% **237 out 283**	Of those enrolled for 24 months or longer, 84% or 237 out of 283 did not get arrested for a new offense since their 24th month of enrollment. Roca successfully achieved its targeted goal of 80% for the fiscal year. Further, it should be noted that these rates again vary by site served and may be impacted by the way the Intervention Model is delivered in any given site. Roca is studying this issue further during FY18 to gain a better understanding of how to serve young people as effectively as possible.

Boston	Chelsea	Lynn	Springfield
79%	**88%**	**90%**	**82%**
56 out of 71	78 out of 89	28 out of 31	75 out of 92

2017

Spatiotemporal Convergence of Crime and Vehicle Crash Hotspots: Additional Consideration for Policing Places

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Spatiotemporal Convergence of Crime and Vehicle Crash Hotspots: Additional Consideration for Policing Places

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Abstract

Policing strategies that seek to simultaneously combat crime and vehicle crashes operate under the assumption that these two problems have a corollary relationship—an assumption that has received scant empirical attention and is the focus of the present study. Geocoded vehicle crash, violent crime, and property crime totals across were aggregated to Indianapolis census blocks over a 36-month period (2011-2013). Time series negative binomial regression and local indicators of spatial autocorrelation analyses were conducted. Results indicate that both violent and property crime are significantly related to vehicle crash counts, both overall and during the temporal confines of patrol tours. Relationship strength was modest. Spatiotemporal analysis of crime and crash data can identify places for police intervention and improved scholarly evaluation.

Keywords

crime-and-place, vehicle crashes, spatiotemporal clustering, problem-solving, police intervention

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Introduction

Evidence supporting the concentration of crime in micro-places (Weisburd, 2015) and hotspots policing (Braga, Papachristos, & Hureau, 2014) has demonstrated a promising path forward for policing strategies in urban areas. Although this growing body of research has largely focused on crime, scholars have also concluded that disorder concentrates in small geographies (Braga & Bond, 2008; Yang, 2010) and is distinctly different than crime (Gau & Pratt, 2010). Disorder can manifest through a range of problem behaviors and have implications for effective policing strategies to reduce crime (Sampson & Raudenbush, 1999). A particular problem behavior that has received increased empirical attention is motor vehicle traffic crashes, with scholars arguing that the increased understanding of this behavior has important policy implications for public safety (Kuo, Lord, & Walden, 2013). Despite such an importance, the scholarly attention to the spatiotemporal distribution of different problem behaviors and outcomes remains relatively scant compared with crime and ". . . it is crucial for future research, not just for place-based research, to scrutinize the meanings and effects between various types of problem behavior" (Yang, 2007, p. 149).

There exists no single, testable theory of crime and crashes, particularly regarding their co-location within micro-places. Rather, a number of studies across disparate literatures lend strong support for an anticipated relationship between these two problems police face on a daily basis, as well as promise for police to affect these problems. Moreover, a number of policing strategies that seek to simultaneously affect crime and vehicle crashes operate under the assumption that the two share a corollary relationship, an assumption that has received little empirical attention and is the focus of the present study. The research to be reviewed reveals three salient themes. First, there is logic and value in extending hotspots policing and crime and place studies to include a more expansive view of harms to society and problems facing police. Second, traffic deviance is not random, but has a root cause resulting from aggressive behavior and low self-control. Third, there appears to be consistent correlation between criminality, disorder, deviance, and traffic violations. Thus, a further understanding of traffic-related problems and crime may lend additional insights to better comprehend criminal behavior, focused deterrence, and crime prevention strategies. Corsaro, Gerard, Engel, and Eck (2012) note,

> That the police are largely responsible for addressing both sets of problems [crime and crashes] creates research opportunities for academics who are routinely involved with policing. They should do more to take advantage of this set of circumstances. Judging from the current literature, however, it appears that the criminal justice interest in vehicle crashes, when it occurs, is largely accidental. (p. 512)

The present study examines the spatiotemporal relationship between crime and vehicle crashes in Indianapolis, Indiana, census blocks from 2011 to 2013. Specifically, we draw upon individual- and macro-level criminological frameworks to explain the anticipated relationship between crime and crashes. Using Geographic Information Systems (GIS), we measure monthly vehicle crash, violent crime, and property crime totals across Indianapolis census blocks over a 36-month study period. Time series negative binomial regression models measured the level to which violent crime and property crime levels correlate with traffic crashes. Findings suggest that police seeking to simultaneously address crime and vehicle crashes should first identify micro-level units in the jurisdiction that stand to benefit most from such an intervention and lend promise for the inclusion of vehicle crash data in spatiotemporal modeling to improve evaluations of placed-based criminology and effective problem-oriented policing (POP) strategies.

Spatiotemporal Concentration of Crime and Vehicle Crashes

An anticipated relationship between spatiotemporal patterns of crime and vehicle crashes is supported by theories of criminal behavior and environmental criminology. Gottfredson and Hirschi's (1990) general theory of crime asserts low levels of self-control bespeak criminal and deviant behaviors, many of which ". . . are trivial and mundane affairs that result in little loss and little gain" (p. 90). Arneklev, Grasmick, Tittle, and Bursik (1993) extend the general theory of crime to what they refer to as imprudent behaviors wherein "Low self-control is also responsible for differential rates of various irresponsible acts" (p. 227). Similar to criminality, imprudent behaviors are the result of immediate gratification and a lack of regard for long-term consequences and aid in the explanation of a range of deviant behaviors. Such behaviors have also been shown to manifest in the form of traffic safety violations (Smith & King, 2013). Low self-control has been linked to drunk driving (Keane, Maxim, & Teevan, 1993) and a lack of seatbelt use (Vaughn, Salas-Wright, & Piquero, 2012). In addition, criminality and risk-seeking predict risky driving behaviors such as speeding (Brace, Scully, Clark, & Oxley, 2010), reckless driving (Junger, West, & Timman, 2001), crashes (Giacopassi & Forde, 2000), and texting while driving (Quisenberry, 2015).

From an environmental criminology perspective, risk heterogeneity occupies a central space in research on neighborhoods and crime and deviance. Shaw and McKay's (1942) theory of social disorganization argues that negative community characteristics lead to the disruption of social organization. This creates a situation in which both formal and informal social networks,

which promote the ability to solve common problems, are not created or maintained within the community (Sampson & Groves, 1989). As a result, social disorganization disrupts the social order to an extent that weakens collective efficacy, defined as the "willingness [of residents] to intervene for the common good" (Sampson, Raudenbush, & Earls, 1997, p. 919). Communities with low collective efficacy have little ability to maintain effective social controls over residents, creating a situation ripe for crime and deviance. Thus, community characteristics that create social disorganization are likely to cultivate environments where people have higher disregard for laws and social norms.

Though research incorporating traffic-related offenses in place-based studies of crime and deviance are scant, there exists evidence to suggest traffic offenses concentrate in place similar to crime. Consistent with social disorganization, Cottrill and Thakuriah (2010) found vehicle crashes significantly clustered in Chicago's low-income and racially heterogeneous census tracts. In their examination of motor vehicle fatalities, Cubbin, LeClere, and Smith (2000) concluded that residents of neighborhoods with lower socioeconomic status and higher proportions of poor households headed by women are at higher risk. Using 5 years of aggregate crime and vehicle crash data to model improved police response times, Kuo et al. (2013) found that vehicle crashes clustered in the same census tracts as crime. Although the authors could not examine spatiotemporal distributions of crime and crashes in their study, they hypothesized that if such events are in fact concentrated in space and time, this approach could yield substantive reductions in police response time to handle varying calls for service. Evidence supporting the intersection of criminality and poor driving behaviors lends credence to the notion that areas with high concentrations of crime may be the same places with high concentrations of vehicle crashes. Put simply, given crime concentrates in place (Weisburd, 2015), it is reasonable to assume that such places may also experience higher rates of vehicle crashes that result from imprudent driving behaviors. This spatial convergence of the two primary enforcement activities of law enforcement (crime and traffic) lends promise for policing strategies, crime prevention, and the reduction of social harm.

The Convergence of Crime, Traffic, and Places as a Policing Strategy

Over the past decade, police executives recognized the need to maximize resource efficiency in light of lean budgets and increases in operational costs and demands for service (J. W. Wilson & Heinonen, 2012). Although crime control often receives the bulk of police expenditures as crime is viewed to be a more pressing public safety concern than traffic enforcement (Gascon &

Foglesong, 2010), the role and value of police as enforcers of traffic safety has been articulated as an area for potential resource efficiency gains (National Highway Traffic Safety Administration [NHTSA], 2014). The Strategic and Tactical Approaches to Traffic Safety (STATS) urged for the use of data-driven models to allocate enforcement resources and develop strategies for traffic enforcement to reduce overall criminal activity (Weiss, 2013).

With the recognition that police may obtain crime control, traffic safety, and resource benefits by leveraging advancements in data analyses and a focus on places, the NHTSA, Bureau of Justice Assistance (BJA), and National Institute of Justice (NIJ) coproduced the strategy currently known as Data-Driven Approaches to Crime and Traffic Safety (DDACTS). This approach combines community- and problem-oriented policing strategies with a reliance on data analysis to inform police decision making (R. E. Wilson, 2010). Put simply, DDACTS aims to utilize the analysis of crime and traffic data to guide the deployment of police resources while maximizing reductions in crime, disorder, and traffic safety. These desired outcomes are achieved through the identification of areas with the highest concentrations of crime and traffic crashes followed by high-visibility traffic enforcement in these areas (Hardy, 2010). To date, DDACTS has been piloted in a number of cities with initial evidence suggesting that a focus on aggressive traffic enforcement may yield promising reductions in violent crime hotspots; however, evaluations remain sparse and suffer from a high degree of implementation fidelity (McClure, Levy, La Vigne, & Hayeslip, 2014).

Beyond DDACTS, the focus on traffic offenses as a component to reduce crime and disorder has garnered considerable attention. For example, POP is focused on "a recurring set of related harmful events in a community that members of the public expect the police to address" (Clarke & Eck, 2014, p. 14). To this end, the Center for Problem-Oriented Policing (2016) has published seven guides specifically aimed at a variety of traffic issues. Municipal governments have also begun to dedicate resources targeting traffic crashes directly as a public safety issue, such as the Vision Zero program in New York City,[1] which was designed after similar programs throughout Europe (Johansson, 2008).

There also exists a strong body of evidence between increased traffic-related enforcement, or directed patrols, and reductions in criminal behaviors such as robbery (Kubrin, Messner, Deane, McGeever, & Stuckey, 2010; Sampson & Cohen, 1988), gun carrying, and violent crime (McGarrell, Chermak, Weiss, & Wilson, 2001; Sherman & Rogan, 1995), property crimes (Schnelle, Kirchner, Casey, Useleton, & McNees, 1977), and overall deviant behavior (Sherman & Weisburd, 1995). Cohen and Ludwig (2003) contend these reductions from directed patrols and focus on traffic offenses are a result

of increased police presence in target areas. Such effects were echoed by Ratcliffe, Taniguchi, Groff, and Wood (2011) in their randomized control trial of Philadelphia hotspots wherein they asserted that offenders were deterred through an increased likelihood of apprehension from increased police presence in hotspots. The effectiveness of visible traffic enforcement on crime has been observed in a number of additional studies (Stuster, Sheehan, & Morford, 1997; Weiss & Freels, 1996) and lends support for police to focus patrols on areas that experience significantly higher rates of vehicle crashes.

Finally, recent research has urged police and policing scholars to focus on societal harm (Sherman, Neyroud, & Neyroud, 2016). In his development of a harm policing index, Ratcliffe (2015) contends that data beyond crime and disorder should be considered for the deployment of police resources to maximize police efforts to improve communities. In his operationalization of the harm index, Ratcliffe specifically notes that "Given the commitment many agencies make to road safety, it would appear prudent to include a measure of traffic accidents within a harm matrix for most police agencies with responsibility for a geographic area" (p. 172). Along with incidents of traffic accidents, Ratcliffe included measures of part one crime, part two crime, and investigative stops to measure harm within Philadelphia police districts from 2004 to 2013. He observed that in some police districts, traffic accidents comprised a greater contribution to the harm index than any other measure, including total part two crimes. Moreover, the findings suggested that police emphasis on part one crimes had a diffusion of benefits effect on traffic accidents in districts that experienced higher rates of traffic accidents. Indeed, multiple lines of research across hotspots policing, directed patrols, DDACTS, harm reduction, and focused deterrence suggest additional crime and disorder benefits may be achievable through the inclusion of vehicle crashes in spatiotemporal modeling to inform the allocation of scarce police resources.

Method

City of Study: Indianapolis, Indiana

Indianapolis, Indiana, is the largest city in the state, the state capital, and a consolidated city-county municipality.[2] In 2013, Indianapolis had a population of 843,393 persons with a population density of 2,129 persons per square mile. The majority of citizens are White (59%) with much smaller proportions of ethnic minorities (28% Black, 9% Hispanic, and 2% Asian). Median household income was US$41,361, with 20% living below the poverty line (compared with 15.4% statewide), and 24% of the population had a bachelor's degree or higher (U.S. Census Bureau, 2016). The city's roadway system comprises a combination of

rural roads and large thoroughfares connecting business, education, and recreational areas. Five interstate highways along with six U.S. and four Indiana highways converge in the city. Unlike other large metropolitan cities in the United States, Indianapolis lacks notable public transportation alternatives leaving citizens to rely more heavily upon personal means of transportation.

Data

Data used in the current study were collected from a variety of sources. Crime data were provided electronically from the Indianapolis Metropolitan Police Department (IMPD) for the period from January 2011 through December 2013. Crime incidents were classified according to the Federal Bureau of Investigation's Uniform Crime Report definitions. For the current study, the research team aggregated individual crime types into two categories: violent crime (aggravated assault, homicide/manslaughter, rape, and robbery) and property crime (burglary, larceny theft, and motor vehicle theft).[3] Vehicle crash data were obtained from the Indiana State Police's Automated Reporting Information Exchange System (ARIES). The ARIES program provides Indiana police officers a user-friendly method of completing and submitting electronic crash reports accurately and efficiently. These reports then become part of the statewide database of Indiana motor vehicle collisions maintained by the Indiana State Police.[4] Both crime and vehicle crash incidents were provided in spreadsheet format, capturing information on the date and time of occurrence, incident type, and location. XY coordinates were provided for each incident, which the research team used to create GIS shapefiles of crime and vehicle crash incidents. XY coordinates were available for over 99% of incidents for each crime type, which exceeds the minimum hit rate of 85% advocated by Ratcliffe (2004). While theory suggests, and our analyses assume, vehicle crashes are largely the result of disregard for traffic laws and norms, we recognize that vehicle crashes may occur for other reasons (such as road conditions or pedestrian actions). Analysis of the data confirms that 95.1% of all traffic crashes included in the data are the result of a traffic violation.

Boundaries of census blocks were obtained from the U.S. Census Bureau's Topologically Integrated Geographic Encoding and Referencing (TIGER) database. TIGER products are spatial extracts from the Census Bureau's data files, which correspond to common statistical reporting units for the decennial census. Census blocks were selected as the unit of analysis in recognition of insights from the crime-and-place literature. While neighborhood level studies have traditionally incorporated larger geographies, such as census tracts, contemporary crime-and-place scholars have largely adopted a "smaller is better" approach in designating units of analysis (Oberwittler &

Wikstrom, 2009). Smaller units minimize within group heterogeneity, avoiding the incorrect assumption that patterns observed across larger units apply equally to the mosaic of smaller units of which it is comprised (Johnson, Bowers, Birks, & Pease, 2009, p. 172), a problem commonly referred to as the Ecological Fallacy (Robinson, 1950). Therefore, we decided that the census block was the most appropriate spatial unit at which to measure the concentration of vehicle crashes and crime.

Sociodemographic data were collected from the American Community Survey (ACS). For each of the 3 years included in the study, 5-year estimates of sociodemographic data of interest were extracted from the ACS.[5] We operationalized two variables commonly incorporated as measures of social disorganization. The first was concentrated disadvantage, a standardized index composed of the percentage of residents receiving public assistance, the percentage of families living below the poverty line, the percentage of female-headed households with children under the age of 18, and the percentage of unemployed residents (Morenoff, Sampson, & Raudenbush, 2001; Sampson et al., 1997).[6] These measures, both collectively and individually, have been strongly linked to heightened levels of crime in prior research (Hipp & Wickes, 2016; Pratt & Cullen, 2005). The second social disorganization measure was racial heterogeneity, the probability of members of different ethnicities living in the same neighborhood, with high probabilities suggesting the coexistence of conflicting and competing values regarding the appropriateness of illicit conduct (Berg, Stewart, Brunson, & Simons, 2012, p. 412).

Research on social disorganization suggests that racial heterogeneity is an important predictor of crime under the assumption that areas with highly heterogeneous racial compositions are less cohesive and exhibit lower levels of social control (Bursik & Grasmick, 1993; Sampson & Groves, 1989). While percentage of minority residents has traditionally been used as an indicator of social disorganization, Williams (1984) demonstrated that crime and percentage of minority residents exhibited an inverted-U shape relationship, rather than linear. Thus, high levels of minority residents can actually stabilize an area once minorities become the dominate group at that place (Weisburd et al., 2012). Given that this is different from the linear relationship observed between crime and the other social disadvantage variables, we decided to account for racial heterogeneity via its own measure.[7] This follows the approach of recent crime-and-place studies (Berg et al., 2012; Nobles et al., 2016; Piza et al., 2016; Weisburd et al., 2012). Both concentrated disadvantage and racial heterogeneity were collected at the block group level, the lowest level of aggregation at which these data are available. For the analysis, each block was assigned the social disorganization and racial heterogeneity values of its surrounding block group.

Analytical Approach

For each month over the study period, counts of violent crime, property crime, and vehicle crash incidents were spatially joined to the 15,747 Indianapolis blocks within a GIS. To allow for longitudinal models, we converted the data set into panel format by which an observation was created for each spatial unit across each of the 36 time periods. This resulted in a total of 566,892 observations (36 months × 15,747 blocks). Chi-square goodness of fit tests conducted after exploratory Poisson regression models confirmed that vehicle crashes were distributed as a negative binomial process (Pearson $\chi^2 = 260,863.30$; $p = .00$). Hence, all analyses incorporated time series negative binomial regression models.

Models were conducted for four distinct time periods. To measure the general relationship between vehicle crashes and crime, all incidents were included in the first model. The three subsequent models incorporated crash and crime incidents occurring during each of the IMPD's patrol shifts: A tour (6 a.m. to 2 p.m.), B tour (2 p.m. to 10 p.m.), and C tour (10 p.m. to 6 a.m.). The tour-specific models more directly inform police allocation strategies by measuring the overlap of vehicle crashes and crime during each phase of officer deployment. These models allow for the possibility that simultaneously targeting vehicle crashes and crime may be a more prudent strategy during certain times of the day than others.

The dependent variable was the count of vehicle crashes. The main independent variables of interest were standardized (i.e., *z* score) violent crime and property crime levels. Standardized measures were used to account for the differing levels of violent and property crime. Statistically significant, positive relationships between the crime measures and vehicle crashes would suggest that hotspots of vehicle crashes and crime occupy the same microgeography in Indianapolis. Six variables were included as controls. Concentrated disadvantage and racial heterogeneity controlled for observed levels of social disorganization in the surrounding block group. To address observed levels of spatial autocorrelation in the dependent variable, a spatial lag variable was included. The spatial lag was created in the GeoDa spatial analysis software (Anselin, Syabri, & Youngihn, 2005).[8] We also included a temporal lag of the vehicle crash count ($t - 1$) to account for the fact that prior levels of vehicle crashes may be predictors of current levels, a phenomenon commonly observed with crime (Braga, Hureau, & Papachristos, 2012; Sampson et al., 1997). To account for linear trends in vehicle crashes, we included the sequential order of each month (January 2011 = 1, February 2011 = 2, and so on) while the number of days in each month was included to control for the differing month lengths in the study period.

Results

Table 1 displays descriptive statistics of all model covariates. Descriptive statistics are provided for the overall study period as well as the A, B, and C tour temporal periods. Figure 1 displays maps of the distributions of vehicle crash, violent crime, and property crime incidents across blocks in Indianapolis. In each case, blocks with incident counts greater than 2.5 standard deviations from the mean are dispersed throughout the city. Visual inspection of the map suggests that, for each incident type, high incident blocks tend to concentrate in the eastern and northwestern portions of the city. The northern and southern portions of Indianapolis contain a number of high vehicle crash and property crime blocks, while a cluster of high violence blocks appears in the city center. The correlation between these incident types is further diagnosed through the time series negative binomial regression models.

Findings of the negative binomial regression models are presented as incidence rate ratios (IRRs), which can be interpreted as the rate at which the dependent variable is observed, with a value of one as the baseline. An IRR of 0.90 suggests that, controlling for other independent variables, a one-unit increase in the variable is associated with a 10% decrease in the rate at which the dependent variable occurs, while an IRR of 1.10 suggests a 10% increase in the rate at which the dependent variable occurs (Braga & Bond, 2008). Table 2 displays the findings of the main model. Both the standardized violent crime and property crime rates achieved statistical significance, exhibiting positive relationships with vehicle crashes. However, the strength of the relationship is modest, with one-unit increases in the standardized violent crime and property crime levels associated with 1% and 2% increases in the vehicle crash count, respectively. The concentrated disadvantage index was significantly related to vehicle crashes, with every one-unit increase in the index associated with a 4% increase in vehicle crash counts. Racial heterogeneity did not achieve statistical significance.

Table 3 displays the findings of the A, B, and C patrol tour models. During A tour, each one-unit increase in the standardized property crime level was associated with a 1% increase in vehicle crash counts, while violent crime did not achieve statistical significance. Similar to the main model, concentrated disadvantage was significantly and positively related to vehicle crash counts while racial heterogeneity did not achieve statistical significance. During B tour, both violent crime and property crime were significantly related to vehicle crashes, with one-unit increases in each associated with a 1% increase in the dependent variable. Similar findings were observed for the social disorganization variables, with every one-unit increase in concentrated disadvantage associated with a 4% increase in vehicle crashes and racial heterogeneity failing to achieve statistical

Table 1. Descriptive Statistics.

	M (SD)	Minimum (Maximum)	3-year total
Dependent variable			
Crashes			
Overall	0.11 (0.46)	0 (16)	62,115
A tour	0.04 (0.23)	0 (7)	22,477
B tour	0.06 (0.29)	0 (11)	31,308
C tour	0.01 (0.13)	0 (5)	8,330
Independent variables			
Violent crime			
Overall	0.08 (0.38)	0 (21)	29,199
A tour	0.02 (0.16)	0 (13)	5,924
B tour	0.03 (0.22)	0 (20)	12,062
C tour	0.03 (0.20)	0 (14)	11,213
Violent crime (standardized)			
Overall	0 (1)	−0.27 (57.19)	
A tour	0 (1)	−0.15 (51.33)	
B tour	0 (1)	−0.20 (81.47)	
C tour	0 (1)	−0.19 (71.90)	
Property crime			
Overall	0.24 (0.87)	0 (93)	138,076
A tour	0.08 (0.35)	0 (21)	45,571
B tour	0.09 (0.52)	0 (91)	51,125
C tour	0.07 (0.33)	0 (52)	41,380
Property crime (standardized)			
Overall	0 (1)	−0.32 (85.84)	
A tour	0 (1)	−0.25 (55.28)	
B tour	0 (1)	−0.21 (104.87)	
C tour	0 (1)	−0.27 (96.67)	
Control variables			
Area (sq. miles)	0.03 (0.07)	0.00 (2.00)	
Spatial lag	6.12 (9.16)	0 (184)	
Racial heterogeneity	0.06 (0.57)	−2.25 (1.60)	
Concentrated disadvantage	−0.28 (3.23)	−5.87 (10.19)	

significance. Findings were largely replicated in the C tour model, with violent crime, property crime, and concentrated disadvantage each exhibiting statistically significant, positive relationships with vehicle crashes. As in the other models, racial heterogeneity failed to achieve statistical significance.
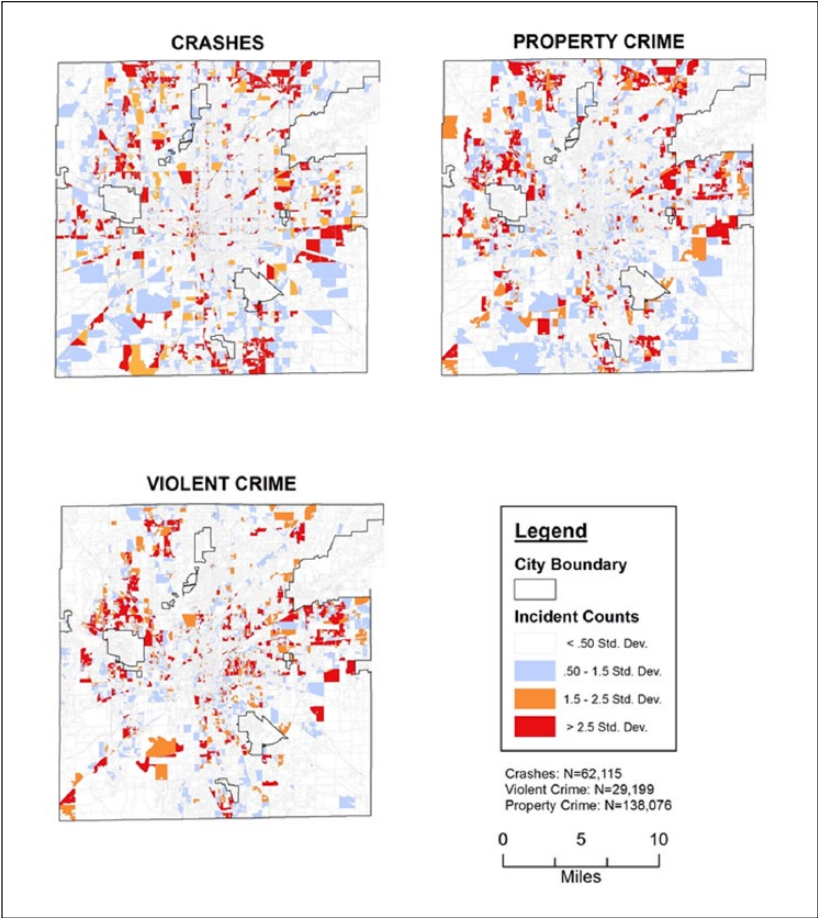
Figure 1. Distribution of crash, violent crime, and property crime incidents across census blocks (2011-2013).

The cumulative findings suggest a statistically significant, positive relationship between both property crime and violent crime and vehicle crashes. Despite the achieved significance, IRR values suggest a low effect size in each instance. The strongest relationships were observed in the C tour model. During this time frame (10 p.m.-6 a.m.), one-unit increases in violent crime and property crime were each associated with a 3% increase in vehicle crashes. To put this in perspective, blocks with violent crime and property crime levels three standard deviations or greater above the mean exhibited

Table 2. Times Series Negative Binomial Regression Findings: Overall.

Covariates	IRR	SE	z	p
Independent variables				
Violent crime (standardized)	1.01	0.00	3.53	.00**
Property crime (standardized)	1.02	0.00	6.42	.00**
Control variables				
Concentrated disadvantage	1.04	0.00	10.24	.00**
Racial heterogeneity	0.99	0.01	−1.15	.25
Area (sq. miles)	2,622.37	894.99	23.06	.00**
Spatial lag	1.09	0.00	33.27	.00**
Lagged crash count	1.09	0.00	22.17	.00**
Days in month	1.05	0.01	9.38	.00**
Month sequence	1.00	0.00	9.05	.00**
Model				
Log likelihood	−140,550.38			
Wald χ^2	2,779.52 (9)			

Note. N = 551,145. IRR = incidence rate ratio.
**p < .01.

vehicle crash level increases of at least 9%, an arguably modest total. This suggests that the tactic of simultaneously targeting crime and vehicle crashes should be reserved only for the blocks in Indianapolis experiencing the highest levels of activity. Furthermore, clusters of high-activity blocks should be distinguished from high-activity blocks that are more evenly dispersed throughout space. Clusters would make better target areas by allowing police to target numerous high risk areas without having to dedicate a substantial amount of additional patrol resources.

To identify high-activity blocks, we conducted a local indicators of spatial autocorrelation (LISA) analysis (Anselin, 1995) in the ArcGIS 10.2 software package.[9] LISA improves upon traditional hotspot identification tools by identifying clusters of places with values similar in magnitude, as well as spatial outliers. In particular, LISA can distinguish between statistically significant clusters of high values surrounding by high values (HH), low values surrounding by low values (LL), high values surrounded by low values (HL), and low values surrounded by high values (LH; Kennedy, Caplan, & Piza, 2011, p. 356).[10] Such information can be beneficial for police deployment because it allows for easy identification of areas that should be prioritized for intervention, as well as those that should perhaps receive a smaller allocation of available resources (Kennedy et al., 2011).

Table 3. Times Series Negative Binomial Regression Findings: Patrol Tours.

Covariates	IRR	SE	z	p
		A tour		
Independent variables				
Violent crime (standardized)	1.01	0.00	1.36	.17
Property crime (standardized)	1.01	0.00	3.93	.00**
Control variables				
Concentrated disadvantage	1.04	0.01	7.00	.00**
Racial heterogeneity	1.02	0.02	1.07	.29
Area (sq. miles)	2,291.40	890.47	19.91	.00**
Spatial lag	1.09	0.00	30.57	.00**
Lagged crash count	1.11	0.01	9.29	.00**
Days in month	1.05	0.01	5.23	.00**
Month sequence	1.00	0.00	6.37	.00**
Model				
Log likelihood	−71,536.94			
Wald χ^2	1,709.95 (9)			
		B tour		
Independent variables				
Violent crime (standardized)	1.01	0.00	3.31	.00**
Property crime (standardized)	1.01	0.00	4.53	.00**
Control variables				
Concentrated disadvantage	1.04	0.00	9.10	.00**
Racial heterogeneity	0.98	0.01	−1.64	.10
Area (sq. miles)	3,220.07	1,217.23	21.37	.00**
Spatial lag	1.09	0.00	31.21	.00**
Lagged crash count	1.12	0.01	15.03	.00**
Days in month	1.06	0.01	7.06	.00**
Month sequence	1.00	0.00	5.70	.00**
Model				
Log likelihood	−89,336.49			
Wald χ^2	2,072.66 (9)			
		C tour		
Independent variables				
Violent crime (standardized)	1.03	0.01	4.81	.00**
Property crime (standardized)	1.03	0.01	5.15	.00**
Control variables				
Concentrated disadvantage	1.05	0.01	9.38	.00**
Racial heterogeneity	0.99	0.24	−0.55	.58
Area (sq. miles)	725.30	248.56	19.22	.00**
Spatial lag	1.06	0.00	22.38	.00**
Lagged crash count	1.12	0.04	3.26	.00**
Days in month	1.06	0.02	3.73	.00**
Month sequence	1.00	0.00	1.64	.10
Model				
Log likelihood	−37,475.37			
Wald χ^2	1,097.68 (9)			

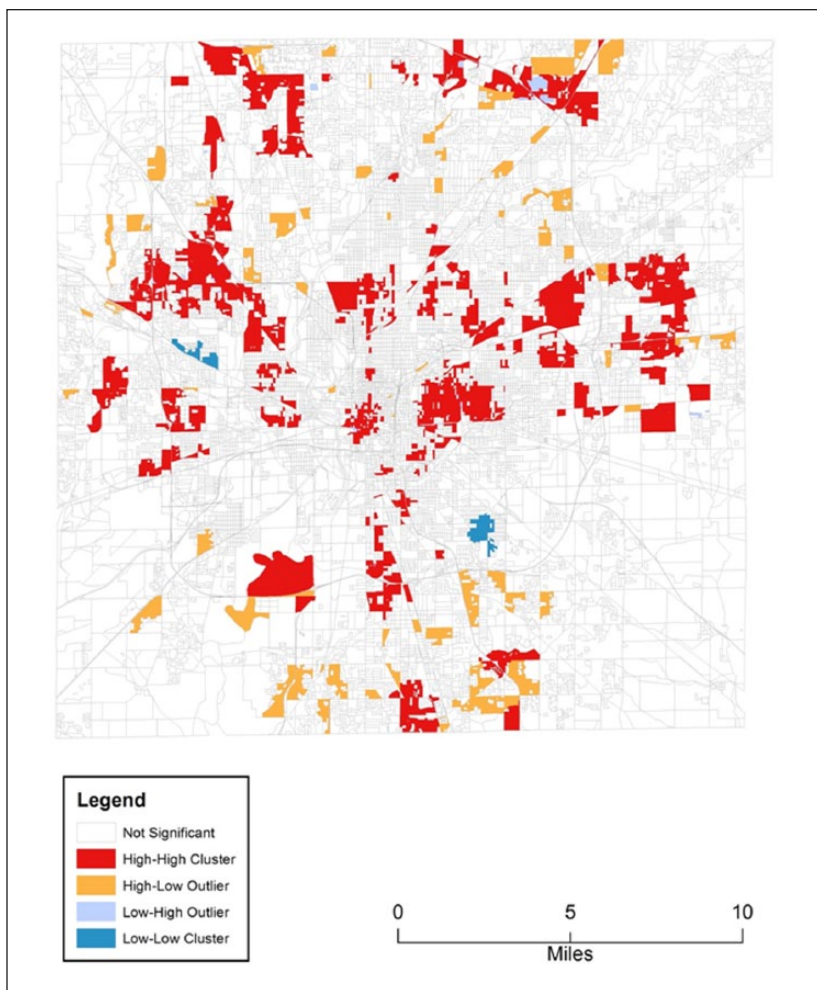*Note. N* = 551,145. IRR = incidence rate ratio.
**p < .01.

Figure 2. Local indicators of spatial autocorrelation (LISA) analysis for cumulative crash, violent crime, and property crime hotspots (2011-2013).

Figure 2 displays the results of a LISA analysis of cumulative violent crime, property crime, and vehicle crash levels throughout Indianapolis blocks. Given the different frequency of occurrence for these incident types, counts of violent crime, property crime, and vehicle crashes were first standardized within each block. The standardized scores were then summed to create an overall activity index. The LISA analysis was conducted on this

index. As displayed in Figure 2, clusters of statistically significant HH clusters appear throughout the city. Nearly as prevalent are HL outliers: high-activity blocks surrounded by low-activity blocks. The LISA analysis also found LL clusters and LH outliers, though they were rarely observed. This information can inform police deployment decisions by identifying clusters of HH blocks as target areas. Such an approach can also be used to evaluate progress and reallocate resources over time. For example, police can select a small subset of HH clusters for intervention, only adding additional target areas when the results of a LISA analysis confirm that risk has reduced in these areas. In a similar vein, police can monitor HL clusters to track whether observed crime and traffic problems expand to new areas (i.e., the HL clusters turn into HH clusters) or if a spatial diffusion of benefits occurs (i.e., HL clusters turn into LL clusters or lose statistical significance).

Discussion and Conclusion

There exists a strong collective knowledgebase that suggests police can enhance their operational focus through the inclusion of traffic crashes into spatiotemporal decision making. Traffic violations are considered to be indices of disorder, social incivility, and disregard for social norms (Giacopassi & Forde, 2000). Traffic crashes reflect a greater set of problems that plague communities and require proactive and preventive strategies in an order to reduce community exposure to harm (Corsaro et al., 2012). Moreover, there is promising evidence to support the use of hotspots policing (Braga et al., 2014) and directed patrols (McGarrell et al., 2001; Sampson & Cohen, 1988) to reduce crime and disorder in problem places. Police are expected to be responsive to these community problems and broader set of service tasks (Ratcliffe, 2015) amid stagnant or decreasing budgets (Cook, 2015). The inclusion of vehicle crash and crime data into spatiotemporal models lends promise to further inform the complex task of policing problem places and maximizing resource allocations.

To our knowledge, this study is the first to examine vehicle crash and crime data using spatiotemporal modeling. In sum, our findings suggest a positive and statistically significant relationship between both property crime and violent crime and vehicle crashes. Although effect sizes are modest at best, with the strongest relationship indicating a one-unit increase in violent crime and property crime associated with a 3% increase in vehicle crashes, the findings support the logic that crime and vehicle crash hotspots may prove worthy of directed police patrols and aggressive traffic enforcement. We do not contend that crime and vehicle crashes are similar problems that can be remedied by the same policing strategy; however, the literature

reviewed demonstrates that increased police activity can indeed affect both problems. For example, a study of 171 cities in the United States concluded that robbery was reduced while police conducted proactive drinking and driving activities (Sampson & Cohen, 1988). Evidence supporting hotspots policing lends promise that such an approach may generate crime deterrence through an increased perception of apprehension (Braga et al., 2014; Ratcliffe et al., 2011). Moreover, Sorg (2016) concluded that hotspots import crime; that is, people travel to hotspots to commit crime. An emphasis on traffic enforcement in areas that experience high rates of crime and crashes may deter would-be offenders from driving to criminal places—a notion supported by the diffusion of benefits observed in a number of hotspots policing studies (Telep, Weisburd, Gill, Vitter, & Teichman, 2014).

Deploying focused police patrols to traffic problem areas has been shown to have positive impacts on traffic disorder, such as reductions in speeding (Ryeng, 2012), traffic fatalities (DeAngelo & Hansen, 2014), and vehicle crashes (Newstead, Cameron, & Legget, 2001). A directed patrol strategy could also take the form of Data-Driven Approaches to Crime and Safety (DDACTS). Initial findings suggest DDACTS can reduce both crime and vehicle crashes (Bryant, Collins, & White, 2015; Rydberg, McGarrell, & Norris, 2014). Despite these promising results, there is scant literature that evaluates the deterrent effects for both crime and vehicle crashes in hotspots and should be a focal point of future research. Furthermore, the contemporary expectation is that police should aim to improve public safety and reduce harm in the communities they serve. As such, the inclusion of vehicle crashes into spatiotemporal modeling would enable police to develop and deliver more harm-focused strategies within areas of the city that do not experience equivalent levels of crime.

Although increased traffic enforcement has been shown to have crime reducing benefits while avoiding adverse outcomes among community members experiencing increased police activity (Chermak, McGarrell, & Weiss, 2001), a decision to use aggressive traffic enforcement to reduce vehicle crashes and crime presents the same community challenge police face with hotspots policing, primarily concerns of police-community relations and police legitimacy (Kochel, 2011; Weisburd, Hinkle, Famega, & Ready, 2011). A policing strategy that focuses on traffic enforcement in crash-crime hotspots may magnify the risk of reducing police legitimacy and community relations through perceptions of racial profiling and excessive police activity in communities that tend to be largely inhabited by minorities (Kochel, 2011). Despite evidence that those living in hotspots do not perceive increased activity to reflect poorly on the police (Haberman, Groff, Ratcliffe, & Sorg, 2016), the reality is that aggressive enforcement tactics, especially those grounded

in vehicle strops, would require police to consider efforts to promote the strategy with the community receiving the targeted intervention. This is especially important in light of the findings of a recent field experiment finding that residents exposed to directed police patrols reported reductions in perceptions of procedural justice and trust in police as compared with residents in areas assigned to problem-solving or control conditions (Kochel & Weisburd, 2017).

Our analyses suggest IMPD may be able to deter crime and vehicle crashes in geographic areas that experience significantly higher rates of each incident. Although reductions are likely to be marginal based on the IRRs observed, such reductions would be consistent with expected deterrence outcomes from problem-based (Weisburd, Telep, Hinkle, & Eck, 2010) and hotspot policing (Braga et al., 2014; Ratcliffe et al., 2011) interventions. Despite a growing evidence-base focused on temporal and geospatial policing in criminology and criminal justice, examinations of vehicle crash and other traffic-related offenses remain sparse and underdeveloped. Much of the work in this area has been generated by scholars in urban public health policy and demonstrates substantive promise (Corsaro et al., 2012). For these reasons, and those we articulate below, it appears evident that criminologist should devote additional attention to this line of research.

Micro-places of crash and crime concentrations also provide opportunities to pursue robust evaluations of police interventions as these locations may provide field settings to use rigorous evaluations methods, such as randomized control trials, that help to establish causality and improved internal validity. Data capturing traffic-related incidents can be paired with traditional crime and disorder measures to gauge program effectiveness, displacement, and diffusion of benefits. For example, results of our LISA analysis identify locations in Indianapolis where crime and crashes cluster at a statistically higher rate than contiguous areas. Such areas could be the focus of an intervention to assess intervention impact in the target area while capturing any potential displacement or diffusion in buffer areas. Furthermore, evaluations may include cost-benefit analyses given the availability of financial estimates related to vehicle crashes: an aspect of the hotspots policing research that Braga and his colleagues (2014) found to be severely lacking in their meta-analysis.

Relatedly, the identification of micro-places that experience significantly higher rates of vehicle crashes also creates opportunities to engage in POP strategies and subsequent evaluations. Significantly higher rates of crashes in micro-places may be the result of factors that can be improved upon through environmental design or modified traffic laws. Through a problem-oriented approach, police could identify the nature of vehicle

crashes (i.e., speeding crashes, vehicle-pedestrian crashes, or drunk-driving crashes) and develop solutions to mitigate these incidents. For example, an intersection may be poorly lit and vehicle operators do not see pedestrians walking or biking. Another example may be that surface streets around popular entertainment zones, such as bars, create traffic funnels where persons under the influence must navigate. Despite seven guides published by the Center for Problem-Oriented Policing to focus on problem-solving for traffic issues, a review of the literature reveals only a single study (Corsaro et al., 2012) that evaluates this approach. This lack of scholarly evidence is consistent with Weisburd et al.'s (2010) systematic review of POP in which few evaluations of POP used rigorous methods. Specifically, Weisburd et al. note,

> We think it a major public policy failure that the government and the police have not invested greater effort and resources in identifying the POP approaches and tactics that work best to combat specific types of crime . . . a much larger number of studies is needed to draw strong generalizations regarding the possible effectiveness of POP . . . (p. 164)

Spatiotemporal modeling of crime and crash hotspots can identify small units of geography for POP experiments in the field that use robust designs.

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Declaration of Conflicting Interests

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Notes

1. For more information, see http://www1.nyc.gov/site/visionzero/index.page
2. Although Marion County and Indianapolis share city-county boundaries, the cities of Beech Grove, Lawrence, Southport, and Speedway are independent cities also located within Marion County and fall outside of the Indianapolis Metropolitan Police Department's jurisdiction. Crime, crash, and control variable data for each of these four independent cities was not included in the present study.

3. While collected as part of the Uniform Crime Report (UCR), arson was not provided to the research team because it is primarily addressed by the Indianapolis Fire Department, rather than Indianapolis Metropolitan Police Department (IMPD). Therefore, arson was excluded from the study.

4. Indiana motor vehicle collisions have a number of characteristics that are used to determine whether or not an incident requires completion and submission of an Indiana crash report. If the answer to each of the questions below is "yes," the incident meets the definition of a motor vehicle crash that requires a crash report: (a) Did the incident involve one or more motor vehicles?; (b) Of the motor vehicles involved, was at least one in motion?; (c) Did the incident originate on a traffic way?; (d) Did the incident occur on private property and, as specified in IC 9-26-2-4: (1) occurred on commercial or other private property that is open to the public; and (2) resulted in: (A) personal injury or death; or (B) property damage to an apparent extent greater than US$1,000; (e) Was there at least one occurrence of injury or damage, which was not a direct result of a cataclysm (act of nature)?

5. American Community Survey (ACS) estimates included the 5-year periods of 2007-2011, 2008-2012, and 2009-2013 for the years 2011, 2012, and 2013, respectively.

6. While prior measures of social disadvantage have also included percentage of Black residents, racial composition was addressed via a separate variable, which is discussed in short.

7. Reliability coefficients (Cronbach's α) for the social disadvantage index were almost identical with (.8431) and without race (.8457). Diagnostic models with social disorganization inclusive of race mirrored the findings presented. These additional results can be provided by the authors upon request.

8. First order Queen Contiguity was used in the creation of the spatial lag variable. Moran's I was 0.188 ($p = .001$).

9. Spatial relationships were operationalized via the inverse distance method, meaning nearby neighboring features had a larger influence on computation for a target feature than features that are far away. Distance between features was measured via Manhattan distance, which adds the difference between the X coordinates of two points (corresponding to the center of a block) to the difference between the Y coordinates of the two points. This approach is a better measurement of distance in urban settings, where traveling from one are to another rarely occurs in a straight line, but rather follows predetermined networks such as roadways and sidewalks (Chainey & Ratcliffe, 2005; Rossmo, 2000).

10. It should be noted that each high/low combination may not be observed in all instances.

References

Anselin, L. (1995). Local indicators of spatial association-LISA. *Geographic Analysis*, *27*, 93-115.

Anselin, L., Syabri, I., & Youngihn, K. (2005). GeoDa: An introduction to spatial analysis. *Geographic Analysis*, *38*, 5-22.

Arneklev, B. J., Grasmick, H. S., Tittle, C. R., & Bursik, R. J. (1993). Low self-control and imprudent behavior. *Journal of Quantitative Criminology*, *9*, 225-247.

Berg, M., Stewart, E., Brunson, R., & Simons, R. (2012). Neighborhood cultural heterogeneity and adolescent violence. *Journal of Quantitative Criminology*, *28*, 411-435.

Brace, C., Scully, M., Clark, B., & Oxley, J. (2010). *The relationship between crime and road safety* (Report No. 284). Clayton, Australia: Accident Research Centre, Monash University.

Braga, A. A., & Bond, B. (2008). Policing crime and disorder hot spots: A randomized controlled trial. *Criminology*, *46*, 577-607.

Braga, A. A., Hureau, D., & Papachristos, A. (2012). An ex post facto evaluation framework for place-based police interventions. *Evaluation Review*, *35*, 592-626.

Braga, A. A., Papachristos, A., & Hureau, D. (2014). The effects of hot spots policing on crime: An updated systematic review and meta-analysis. *Justice Quarterly*, *31*, 633-663.

Bryant, K. M., Collins, G. M., & White, M. D. (2015). *Shawnee, Kansas, smart policing initiative: Reducing crime and automobile collisions through data-driven approaches to crime and traffic safety*. Washington, DC: Bureau of Justice Assistance, U.S. Department of Justice. Retrieved from http://www.smartpolicinginitiative.com/sites/all/files/Shawnee%20Site%20Spotlight%20FINAL%202015.pdf

Bursik, R., & Grasmick, H. (1993). *Neighborhoods and crime: The dimensions of effective community control*. New York, NY: Lexington Books.

Center for Problem-Oriented Policing. (2016). *Problem-specific guides*. Washington, DC: U.S. Department of Justice. Retrieved from http://www.popcenter.org/guides/

Chainey, S., & Ratcliffe, J. (2005). *GIS and crime mapping*. London, England: John Wiley.

Chermak, S., McGarrell, E. F., & Weiss, A. (2001). Citizen perceptions of aggressive traffic enforcement strategies. *Justice Quarterly*, *18*, 365-391.

Clarke, R. V., & Eck, J. E. (2014). *Becoming a problem-solving crime analyst*. London, England: Willan.

Cohen, J., & Ludwig, J. (2003). Policing crime guns. In J. Ludwig & P. J. Cook (Eds.), *Evaluating gun policy: Effects on crime and violence* (pp. 217-239). Washington, DC: Brookings Institution Press.

Cook, P. J. (2015). Will the current crisis in police legitimacy increase crime? Research offers a way forward. *Psychological Science in the Public Interest*, *16*, 71-74.

Corsaro, N., Gerard, D. W., Engel, R. S., & Eck, J. E. (2012). Not by accident: An analytical approach to traffic crash harm reduction. *Journal of Criminal Justice*, *40*, 502-514.

Cottrill, C. D., & Thakuriah, P. (2010). Evaluating pedestrian crashes in areas with high low-income or minority populations. *Accident Analysis & Prevention*, *42*, 1718-1728.

Cubbin, C., LeClere, F. B., & Smith, G. S. (2000). Socioeconomic status and injury mortality: Individual and neighborhood determinants. *Journal of Epidemiological Health*, *54*, 517-524.

DeAngelo, G., & Hansen, B. (2014). Life and death in the fast lane: Police enforcement and traffic fatalities. *American Economic Journal: Economic Policy*, *6*, 231-257.

Gascon, G., & Foglesong, T. (2010). *Making policing more affordable: Managing costs and measuring value in policing*. New Perspectives in Policing, National Institute of Justice, Harvard Kennedy School. Retrieved from https://www.ncjrs.gov/pdffiles1/nij/231096.pdf

Gau, J. M., & Pratt, T. C. (2010). Revisiting broken windows theory: Examining the sources of the discriminant validity of perceived disorder and crime. *Journal of Criminal Justice*, *38*, 758-766.

Giacopassi, D., & Forde, D. R. (2000). Broken windows, crumpled fenders, and crime. *Journal of Criminal Justice*, *28*, 397-405.

Gottfredson, M. R., & Hirschi, T. (1990). *A general theory of crime*. Stanford, CA: Stanford University Press.

Haberman, C. P., Groff, E. R., Ratcliffe, J. H., & Sorg, E. T. (2016). Satisfaction with police in violent crime hot spots: Using community surveys as a guide for selecting hot spot policing tactics. *Crime & Delinquency*, *62*, 525-557.

Hardy, E. (2010). Data-driven policing: How geographic analysis can reduce social harm. *Geography and Public Safety Bulletin*, *2*(3), 1-2.

Hipp, J., & Wickes, R. (2016). Violence in urban neighborhoods: A longitudinal study of collective efficacy and violent crime. *Journal of Quantitative Criminology*. Advance online publication. doi:10.1007/s10940-016-9311-z.

Johansson, R. (2008). Vision zero: Implementing a policy for traffic safety. *Safety Science*, *47*, 826-831.

Johnson, S., Bowers, K., Birks, D., & Pease, K. (2009). Predictive mapping of crime by ProMap: Accuracy, units of analysis, and the environmental backcloth. In D. Weisburd, W. Bernasco & G. Bruinsma (Eds.), *Putting crime in its place: Units of analysis in geographic criminology* (pp. 179-198). New York, NY: Springer.

Junger, M., West, R., & Timman, R. (2001). Crime and risk behavior in traffic: An example of cross-situational consistency. *Journal of Research in Crime & Delinquency*, *38*, 439-459.

Keane, C., Maxim, P. S., & Teevan, J. J. (1993). Drinking and driving, self-control, and gender: Testing a general theory of crime. *Journal of Research in Crime & Delinquency*, *30*, 30-46.

Kennedy, L., Caplan, J., & Piza, E. (2011). Risk clusters, hotspots, and spatial intelligence: Risk terrain modeling as an algorithm for police resource allocation strategies. *Journal of Quantitative Criminology*, *27*, 339-362.

Kochel, T. R. (2011). Constructing hot spots policing: Unexamined consequences for disadvantaged populations and for police legitimacy. *Criminal Justice Policy Review*, *22*, 350-374.

Kochel, T. R., & Weisburd, D. (2017). Assessing community consequences of implementing hot spots policing in residential areas: Findings from a randomized field trial. *Journal of Experimental Criminology*. Advance online publication. doi:10.1007/s11292-017-9283-5.

Kubrin, C. E., Messner, S. F., Deane, G., McGeever, K., & Stuckey, T. D. (2010). Proactive policing and robbery rates across U.S. cities. *Criminology*, *48*, 57-97.

Kuo, P., Lord, D., & Walden, T. D. (2013). Using geographical information systems to organize police patrol routes effectively by grouping hotspots of crash and crime data. *Journal of Transport Geography*, *30*, 138-148.

McClure, D., Levy, J., La Vigne, N., & Hayeslip, D. (2014). *DDACTS evaluability assessment: Final report on individual and cross-site findings* (Report No. 247889). Washington, DC: Urban Institute.

McGarrell, E. F., Chermak, S. M., Weiss, A., & Wilson, J. M. (2001). Reducing firearms violence through directed patrol. *Criminology & Public Policy*, *1*, 119-148.

Morenoff, J., Sampson, R., & Raudenbush, S. (2001). Neighborhood inequality, collective efficacy, and the spatial dynamics of urban violence. *Criminology*, *39*, 519-559.

National Highway Traffic Safety Administration. (2014). *Data-driven approaches to crime and traffic safety: Operational guidelines*. National Highway Traffic Safety Administration. Report No. DOT HS 811 185. Washington, DC.

Newstead, S. V., Cameron, M. H., & Legget, L. M. (2001). The crash reduction effectiveness of a network-wide traffic deployment system. *Accident Analysis & Prevention*, *33*, 393-406.

Nobles, M., Ward, J., & Tillyer, R. (2016). The impact of neighborhood context on spatiotemporal patterns of burglary. *Journal of Research in Crime and Delinquency*, *53*, 711-740.

Oberwittler, D., & Wikstrom, P. (2009). Why small is better: Advancing the study of the role of behavioral contexts in crime causation. In D. Weisburd, W. Bernasco & G. Bruinsma (Eds.), *Putting crime in its place: Units of analysis in geographic criminology* (pp. 35-59). New York, NY: Springer.

Piza, E., Feng, S., Kennedy, L., & Caplan, J. (2016). Place-based correlates of motor vehicle theft and recovery: Measuring spatial influence across neighbourhood context. *Urban Studies*. DOI: 10.1177/0042098016664299: 1-24.

Pratt, T. C., & Cullen, F. T. (2005). Assessing macro-level predictors and theories of crime: A meta-analysis. *Crime and Justice*, *32*, 373-450.

Quisenberry, P. N. (2015). Testing and driving: Can it be explained by the general theory of crime? *American Journal of Criminal Justice*, *40*, 303-316.

Ratcliffe, J. H. (2004). Geocoding rate and a first estimate of a minimum acceptable hit rate. *International Journal of Geographical Information Science*, *18*, 61-72.

Ratcliffe, J. H. (2015). Towards an index for harm-focused policing. *Policing: A Journal of Policy and Practice*, *9*, 164-182.

Ratcliffe, J. H., Taniguchi, T., Groff, E. R., & Wood, J. D. (2011). The Philadelphia foot patrol experiment: A randomized controlled trial of police patrol effectiveness in violent crime hotspots. *Criminology*, *49*, 795-832.

Robinson, W. (1950). Ecological correlations and the behavior of individuals. *American Sociological Review*, *15*, 351-357.

Rossmo, D. (2000). *Geographic profiling*. Washington, DC: CRC Press.

Rydberg, J., McGarrell, E. F., & Norris, A. (2014). *Flint DDACTS pilot evaluation*. Michigan Justice Statistics Center, School of Criminal Justice, Michigan State University. Retrieved from http://cj.msu.edu/assets/DDACTS-Report-ExecSummary_MSP_2012_BJ_CX_K036-FINAL.pdf

Ryeng, E. O. (2012). The effect of sanctions and police enforcement on drivers' choice of speed. *Accident Analysis & Prevention*, *45*, 446-454.

Sampson, R. J., & Cohen, J. (1988). Deterrent effects of the police on crime: A replication and theoretical extension. *Law & Society Review*, *22*, 163-189.

Sampson, R. J., & Groves, W. (1989). Community structure and crime: Testing social disorganization theory. *American Journal of Sociology*, *94*, 774-802.

Sampson, R. J., Raudenbush, S., & Earls, F. (1997). Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science*, *277*, 918-924.

Sampson, R. J., & Raudenbush, S. W. (1999). Systematic social observation of public spaces: A new look at disorder in urban neighborhoods. *American Journal of Sociology*, *105*, 603-651.

Schnelle, J. F., Kirchner, R. E., Casey, J. D., Useleton, P. H., & McNees, M. P. (1977). Patrol evaluation research: A multiple-baseline analysis of saturation patrolling during day and night hours. *Journal of Applied Behavior Analysis*, *10*, 33-40.

Shaw, C., & McKay, H. (1942). *Juvenile delinquency and urban areas*. Chicago, IL: The University of Chicago Press.

Sherman, L. W., Neyroud, P. W., & Neyroud, E. (2016). The Cambridge crime harm index: Measuring total harm from crime based on sentencing guidelines. *Policing: A Journal of Policy and Practice*, *10*, 171-183.

Sherman, L. W., & Rogan, D. P. (1995). The effects of gun seizures on gun violence: "Hot spots" of patrol in Kansas City. *Justice Quarterly*, *12*, 673-693.

Sherman, L. W., & Weisburd, D. (1995). General deterrent effects of police patrol in crime "hot spots": A randomized, controlled trial. *Justice Quarterly*, *12*, 625-648.

Smith, P., & King, R. D. (2013). From road rage to everyday automotive incivility: A routine activities approach to low-level deviance. *The Sociological Quarterly*, *54*, 476-500.

Sorg, E. T. (2016). Classifying import and domestic hot spots of crime by offender home proximity. *Policing: A Journal of Policy and Practice*, *10*, 264-277. doi:10.1093/police/paw002

Stuster, J., Sheehan, M., & Morford, G. (1997). *Contributions of traffic enforcement to the war on crime: Case study of the grand prairie, Texas Police Department*. Washington, DC: National Highway Traffic Safety Administration.

Telep, C. W., Weisburd, D., Gill, C. E., Vitter, Z., & Teichman, D. (2014). Displacement of crime and diffusion of crime control benefits in large-scale geographic areas: A systematic review. *Journal of Experimental Criminology*, *10*, 515-548.

U.S. Census Bureau. (2016). *State and country quick facts*. Retrieved from https://www.census.gov/quickfacts/table/PST045216/00

Vaughn, M. G., Salas-Wright, C. P., & Piquero, A. R. (2012). Buck up: Non-seat belt use and antisocial behavior in the United States. *Annals of Epidemiology*, *22*, 825-831.

Weisburd, D. (2015). The law of crime concentration and the criminology of place. *Criminology*, *53*, 133-157.

Weisburd, D., Groff, E., & Yang, S. (2012). The Criminology of Place. *Street Segments and Our Understanding of the Crime Problem*. New York, NY: Oxford University Press.

Weisburd, D., Hinkle, J. C., Famega, C., & Ready, J. (2011). The possible "backfire" effects of hot spots policing: An experimental assessment of impacts on legitimacy, fear and collective efficacy. *Journal of Experimental Criminology*, *7*, 297-320.

Weisburd, D., Telep, C. W., Hinkle, J. C., & Eck, J. (2010). Is problem-oriented policing effect in reducing crime and disorder? Findings from a Campbell systematic review. *Criminology & Public Policy*, *9*, 139-172.

Weiss, A. (2013). *Data-Driven Approaches to Crime and Traffic Safety (DDACTS): A historical overview*. Washington, DC: National Highway Traffic Safety Administration.

Weiss, A., & Freels, S. (1996). The effects of aggressive policing: The Dayton traffic enforcement experiment. *American Journal of Police*, *15*(3), 45-64.

Williams, K. (1984). Economic sources of homicide: Reestimating the effects of poverty and inequality. *American Sociological Review*, *49*, 283-289.

Wilson, J. W., & Heinonen, J. A. (2012). Police workforce structures: Cohorts, the economy, and organizational performance. *Police Quarterly*, *15*, 283-307.

Wilson, R. E. (2010). Place as the focal point: Developing a theory for the DDACTS model. *Geography & Public Safety Bulletin*, *2*(3), 3-4.

Yang, S. M. (2007). *Causal or merely co-existing: A longitudinal study of disorder and violence at places* (Doctoral dissertation). University of Maryland, College Park.

Yang, S. M. (2010). Assessing the spatial-temporal relationship between disorder and violence. *Journal of Quantitative Criminology*, *26*, 139-163.

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More Bicyclists' Deaths Spur a New Safety Plan

By WINNIE HU; Nefertari Elshiekh contributed reporting.
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Things could not get much worse in early July after three cyclists were killed in just over a week on the streets of New York City.

But they did. Two more cyclists were hit and killed on Tuesday -- one in Brooklyn and another on Staten Island -- and another struck on Wednesday morning in Queens was reportedly in critical condition.

The growing toll of 17 biking fatalities this year -- seven more than all of last year -- has provoked an outcry from cyclists and transportation advocates and ratcheted up pressure on Mayor Bill de Blasio, a Democrat running for president, to better protect cyclists at a time when biking is booming across the city.

In response, Mr. de Blasio plans to unveil a $58.4 million bike safety plan this week that will try to make cycling safer by rapidly installing more protected bike lanes, redesigning intersections to make turns safer for cyclists and hiring 80 new city transportation workers dedicated to bike improvements.

Mr. de Blasio's signature transportation policy, Vision Zero, has sought to make city streets safer.

"This year, we've seen a dangerous surge in cyclist fatalities," said Mr. de Blasio. "No loss of life on our streets is acceptable. Last year was the safest year on record and we have to keep pushing the envelope and increasing our efforts."

Under the new plan, the city will increasingly focus on creating a citywide network of protected bike lanes; currently the city has 1,243 miles of bike lanes, of which 480 miles are protected, meaning barriers physically separate cyclists from vehicles.

The city will now add 30 miles of protected bike lanes a year, up from an average of 20 miles a year over the past three years.

In addition, city officials will also expand bike lanes -- including protected lanes -- in 10 designated "bike priority districts" in Brooklyn and Queens that have relatively few bike lanes, but have had large numbers of serious injuries and fatalities involving cyclists.

These districts will cover neighborhoods including Corona, East Elmhurst and Jackson Heights in Queens, and Bay Ridge, Midwood, Sheepshead Bay and Brownsville in Brooklyn. This year, 12 of the 17 cycling fatalities happened in Brooklyn.

City transportation officials also plan to redesign 50 intersections to make cyclists more visible to turning motorists by using measures such as bike boxes, where cyclists wait in front of vehicles, and bike lanes painted green to provide more of a visual cue.

They will also expand a pilot program known as the "green wave" that adjusts the timing of green light signals so that all traffic -- including cyclists -- going about 15 miles per hour can pass one green light after another in a corridor. It reduces the temptation of running a red light and also slows down traffic.

The bulk of the money for the bike safety program will be used to hire more city transportation workers to carry out the improvements, adding to the 110 workers the city currently employs.

Police officers will also step up enforcement of traffic rules at 100 high-crash intersections, specifically targeting trucks. This month, the police had already discontinued a widely criticized practice of issuing tickets to cyclists breaking traffic rules at a site following a fatal crash.

"I think the things we are proposing here are things we know work," said Polly Trottenberg, the city's transportation commissioner. "Building out protected infrastructure, safer intersection designs, and targeted enforcement of dangerous driving behaviors."

The mayor's plan drew cautious praise from some cycling advocates, who said the measure would help the city -- and the mayor -- focus their attention on bike safety.

"We think on paper it looks good -- we need more protected bike lanes," said Jon Orcutt, the communication director for Bike New York, an education and advocacy group. "But the devil is in the implementation."

To really safeguard cyclists, Mr. Orcutt said, the new bike lanes would have to connect to other protected bike lanes instead of ending and forcing cyclists into traffic lanes.

He said the barriers should also be placed close together and be sturdy enough to keep cars from crossing into the bike lanes. Cars have driven through or right over flexible plastic rods that currently run alongside some lanes.

Cycling has exploded in New York as Citi Bike, the bike-share program, has expanded and growing frustration with subway and bus delays have pushed more commuters to take to two wheels.

About 460,000 bike rides take place in the city every day, up from about 180,000 bike rides in 2006, according to the city.

At the same time, the city's streets have become more congested than ever as Uber, Lyft and ride-app services have proliferated and truck traffic has surged from Amazon and online grocery deliveries.

"We have a toxic mix on the street with more cars, more trucks and more bikes," Mr. Orcutt said. "I think that's catching up with the city."

Councilman Ydanis Rodriguez, who is chairman of the City Council's transportation committee, said the mayor's plan was a step in the right direction but far more needed to be done. He has called for the city to build 100 miles of protected bike lanes a year over the next six years.

"We have seen larger numbers of New Yorkers are using bikes as a mode of transportation," he said. "We need to plan for that growth."

Several cyclists said they welcomed more bike lanes as the city's streets have become more congested and harder to navigate.

Nevada Griffin, 35, who lives in Brooklyn, said he has almost collided with cars and delivery trucks numerous times.

"Anything that moves the city toward a more pedestrian friendly, bikeable city is a good thing," he said.