



Agenda City Council Policy Session

Tuesday, January 25, 2022

2:30 PM

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CALL TO ORDER**COUNCIL INFORMATION AND FOLLOW-UP REQUESTS**

This item is scheduled to give City Council members an opportunity to publicly request information or follow up on issues of interest to the community. If the information is available, staff will immediately provide it to the City Council member. No decisions will be made or action taken.

CONSENT ACTION

This item is scheduled to allow the City Council to act on the Mayor's recommendations on the Consent Agenda. There was no Consent Agenda for this meeting.

CALL FOR AN EXECUTIVE SESSION

A vote may be held to call an Executive Session for a future date.

REPORTS AND BUDGET UPDATES BY THE CITY MANAGER

This item is scheduled to allow the City Manager to provide brief informational reports on topics of interest to the City Council. The City Council may discuss these reports but no action will be taken.

DISCUSSION AND POSSIBLE ACTION (ITEM 1)**1 Comprehensive Road Safety Update**

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This report provides an update on the Street Transportation Department's efforts related to comprehensive road safety to improve the safety on Phoenix roadways. Additionally, based on the Oct. 20, 2021, Transportation, Infrastructure and Planning Subcommittee discussion, this item also provides information and requests possible action on a proposal to become part of the Vision Zero Network and incorporate "Vision Zero" into the goals of the City's Comprehensive Road Safety Action Plan.

THIS ITEM IS FOR DISCUSSION AND POSSIBLE ACTION.**Responsible Department**

This item is submitted by Deputy City Manager Mario Paniagua and the Street Transportation Department.

ADJOURN

Comprehensive Road Safety Update

This report provides an update on the Street Transportation Department's efforts related to comprehensive road safety to improve the safety on Phoenix roadways. Additionally, based on the Oct. 20, 2021, Transportation, Infrastructure and Planning Subcommittee discussion, this item also provides information and requests possible action on a proposal to become part of the Vision Zero Network and incorporate "Vision Zero" into the goals of the City's Comprehensive Road Safety Action Plan.

THIS ITEM IS FOR DISCUSSION AND POSSIBLE ACTION.

Summary

This update addresses the status of the Comprehensive Road Safety Action Plan (RSAP) and near-term safety improvements at three intersections specifically identified for funding at the March 2, 2021, City Council meeting, as well as an update on other ongoing transportation safety initiatives. This item also provides an opportunity for discussion and possible action to incorporate "Vision Zero" into the goals of the City's Comprehensive RSAP.

The potential benefits of becoming recognized as a Vision Zero City include:

- Improved competitiveness for federal funding from the recently adopted Bipartisan Infrastructure Law, which includes elements that provide specific funding for the development and implementation of a "Vision Zero" safety action plan;
- Given Phoenix's status among the deadliest roadways in the nation, it provides a clear and prominent commitment to the community of the City's goal and plans to seek to eliminate roadway deaths and serious injuries;
- Provides a catchy term to help communicate the City's goal toward zero traffic-related deaths and serious injuries; and
- Joins Phoenix to a network of 51 other Vision Zero cities nationwide with the same goal but unique approaches within their action plans.

It is also important to note that becoming a Vision Zero Network-recognized city does not entail universal measures, like blanket reductions of speed limits or widespread lane reductions. Each roadway segment and intersection would continue to be

evaluated individually based on the unique needs, environment, and community input specific to the location. Phoenix's action plan will be completely distinctive based on expert staff and consultant evaluation and recommendations, community input, and Council approval.

Additional detail regarding Vision Zero is provided later in the report.

Background

Recent traffic fatalities within the City increased from 177 fatalities in 2019 to 185 fatalities in 2020. Of the 185 fatalities in 2020, 69 were pedestrians (a decrease of four percent from 2019), three were bicyclists (a decrease of three fatalities from 2019) and 113 were motor vehicle related (an increase of 23 percent from 2019, excluding pedestrian and bicycle collisions).

The most recent, but unofficial data for 2021 shows a total of 232 traffic fatalities (an increase of 24 percent from 2020), which includes 97 pedestrian-related fatalities (an increase of 40 percent from 2020), eight bicyclists (an increase of five fatalities from 2020), and 127 motor vehicle-related fatalities (an increase of 12 percent from 2020, excluding pedestrian and bicycle collisions). Of the 127 motor vehicle-related fatalities, 32 of these involved motorcyclists.

The Street Transportation Department (Streets) strives to provide an accessible City with safe mobility options for everyone regardless of their mode of transportation. Streets staff work with Citywide data related to traffic collisions to make sound decisions about road safety. These efforts are best described by the "Four E's" approach to traffic safety that is based on the strategic interaction between Evaluation, Engineering, Enforcement and Education. Streets staff recognizes that investments in Evaluation and Engineering programs can yield significant dividends and greatly improve road safety. However, roadway users' behaviors that frequently disregard traffic laws greatly impact road safety, and so Enforcement and Education are also key components to addressing overall traffic safety.

In 2018, Council approved the formation of the Office of Pedestrian Safety to address pedestrian safety issues. Due to overall road safety issues and to provide a comprehensive approach to all traffic collisions, on March 2, 2021, Council unanimously approved funding for the development of a Comprehensive RSAP, funding for safety enhancements for three intersections listed on Maricopa Association of Governments' Top 100 Intersections Ranked by Crash Risk - Using 2015-19 Crash Data (MAG Top 100 List) and additional staff to support those efforts. The three intersections on the MAG Top 100 List specified for safety enhancements were:

- 75th Avenue and Indian School Road;
- 19th Avenue and Southern Avenue; and
- 16th Street and Camelback Road.

All three of the projects are now in the construction phase, as notices to proceed have been issued to Streets' contractors.

Road Safety Action Plan

The RSAP will be a comprehensive safety plan applying a data-driven decision-making process to guide the identification and prioritization of transportation safety improvements with a “Four E's” approach. Streets staff immediately began the process of recruiting a transportation safety professional to lead and manage the development and implementation of the RSAP, and to also develop the scope of work to identify and select a consultant to assist Streets staff in the preparation of the RSAP. In April 2021, Streets staff hired a traffic engineer to lead the comprehensive road safety efforts. Additionally, Streets staff selected and issued a notice to proceed to Y2K Engineering in June 2021, to serve as the prime consulting firm to develop the RSAP, safety analysis tools, and an interactive safety dashboard.

Multiple workshops have been held by the RSAP team to identify, evaluate, and coordinate the road safety efforts with multiple City departments and divisions within Streets. The goal of these workshops has been to build inter- and intra-departmental support; open additional lines of communication; and better evaluate existing data, processes, and procedures that impact road safety.

Two inter-departmental Visioning and Emphasis Area Workshops were conducted to bring various stakeholders together within the City to gain a stronger understanding and provide input into the RSAP development. The first workshop was held on Sept. 28, 2021, and provided RSAP background information and visioning, and the second was held on Oct. 15, 2021, and focused on proposals for safety emphasis areas for the RSAP.

Public Involvement Plan

Public engagement is crucial to developing and implementing a successful RSAP. Streets staff has developed a Public Involvement Plan (PIP) working with a consultant and in coordination with Council. The PIP establishes a website for public information and comments, and interactive participation in two Citywide meetings, and eight Council District-specific meetings for each phase of the two-phase traffic safety improvements effort. Whether these events and meetings are virtual or in-person will depend on COVID guidelines in place at that time. The intent of the PIP effort is to

engage with the community to gather input on the public's localized priorities for road safety, create awareness, educate, and receive comments and feedback regarding the RSAP.

A virtual Citywide meeting was held on Nov. 16, 2021, and is posted and available as a recorded meeting on the RSAP project website. The public website is live and features a MetroQuest engagement survey that will remain live through the completion of the Phase I public engagement meetings in February 2022. Streets staff conducted one of the eight Council District-specific meetings in December, and has two meetings scheduled for later this month or early February, and is working to schedule the remaining meetings to take place by the end of February.

The RSAP project website can be found at phoenix.gov/roadsafety.

RSAP - Evaluation and Engineering

With respect to the Evaluation and Engineering components of the "Four E's," the RSAP team has reviewed and utilized the crash data from MAG's Regional Transportation Safety Information Management System (RTSIMS) and drafted the Phoenix Crash Safety Review (**Attachment A**), which was finalized in mid-September. The Phoenix Crash Safety Review provides a high-level summary of crash data for the City and will be utilized to help identify safety emphasis areas.

The RSAP team is also reviewing nearly 40 completed Road Safety Assessments to identify potential common themes that may warrant modifying existing standards, processes, or procedures.

As the RSAP is a data-driven plan, data and data integration are of primary concern. Multiple data sources from various City departments have been identified and will be reviewed for integration. Various technologies and business analytics tools will be used to identify safety related patterns. Additionally, a high-injury network has been developed (**Attachment B**) to identify locations with strong potential for safety enhancements. Finally, a safety dashboard is also being developed to report on safety performance metrics, enhancing transparency and accessibility of the data to the community.

These safety analytic tools will be updated and managed to scan the roadway network for locations where safety may be improved by installing a traffic signal, a High-Intensity Activated CrossWalk (HAWK) signal, or left turn phase protection. The automation of the screening process will reduce the effort currently required to identify potential safety improvement locations.

RSAP - Enforcement and Education

Streets and Police staff are working in partnership in the development of the RSAP. The scope for the RSAP consultant includes evaluating additional data analytics tools that can assist Police staff with Enforcement and Education activities. The RSAP team anticipates that additional Enforcement and Educational opportunities will be identified and developed as the Evaluation and Engineering tasks included in the RSAP near completion.

RSAP - Near-Term Safety Projects

The completion of all phases of the community engagement process and development of the RSAP is expected to be complete by September 2022. The Council also approved near-term safety projects through known and proven safety-improvement strategies, which Streets staff will implement as the RSAP is developed.

As approved by the Council on March 2, 2021, Streets staff will make improvements to three intersections from the MAG Top 100 List. These intersections will be redesigned and reconstructed to updated traffic signal standards. The process of reconstructing traffic signals has demonstrated substantial safety benefits, while furthering the City's ability to manage traffic capacity and congestion. The three intersections (75th Avenue and Indian School Road, 19th and Southern Avenues, and 16th Street and Camelback Road) will receive expedited traffic safety improvements in a two-phase effort.

Phase I improvements will primarily modernize the traffic signals at each location with design and construction utilizing in-house and on-call contractor capabilities. The signal modernization is comprised of providing new traffic signal heads above each through lane, improved intersection illumination with a streetlight fixture at each side of marked crosswalks, emergency vehicle preemption, vehicular video detection, Closed-Circuit Television (CCTV) cameras, Americans with Disabilities Act (ADA) accessibility, signal-related signage, network communication, Flashing Yellow Arrow capabilities, as well as new poles, mast arms, wiring, conduit, mounting hardware, control cabinets and controller equipment. Phase I improvements can be completed within existing right-of-way and without the need for construction easements or utility relocations. Phase I design plans for all three intersections have been completed, and construction has begun. For the 19th and Southern Avenues intersection, the third southbound curb lane that ends just south of Southern Avenue will transition into an exclusive right-turn lane just north of Southern Avenue, allowing for an extension of the southbound bike lane with a buffer from Southern Avenue to Lynne Lane.

Phase II improvements will begin immediately after Phase I improvements. Phase II safety improvements may require the acquisition of additional right-of-way, construction easements, and utility relocations; all of which can have an impact on

delivery timelines. Phase II safety improvements are expected to include additional streetlights along the approaches to the intersections to improve illumination and visibility, as well as signing and pavement striping/markings modifications. For the 16th Street and Camelback Road intersection, there will be additional evaluation for enhanced crosswalk locations, including installation of a HAWK signal(s) to address the pedestrian activity associated with the retail, residential, dining and car dealerships in the area. On-street parking and loading zones may also be evaluated for this intersection.

As the total costs for improvements to these three intersections are identified, Streets staff will identify additional intersections from the MAG Top 100 List to receive similar safety improvements within the initial \$6 million authorized by Council in March 2021.

Office of Pedestrian Safety

The Office of Pedestrian Safety (OPS) also uses a multi-departmental, data-driven approach with emphasis on the Four E's. The OPS is allocated an annual budget of \$2 million to address pedestrian safety across the City through various projects and programs. To date, the City has installed 71 HAWK signals with another 22 locations currently programmed for installation. The OPS has initiated an effort to upgrade all mid-block arterial street crosswalks to high visibility crosswalks with improved signage and markings.

The OPS has also initiated a study to evaluate mid-block marked crosswalks and the conversion of Rectangular Rapid Flashing Beacons to either circular yellow flashing beacons or HAWK signals. A significant portion of pedestrian fatalities occur at night where there is no or limited street lighting. The OPS has initiated several projects to provide additional streetlights in those areas. Education is also a major component of pedestrian safety with education primarily focused on school-aged children through the Safe Routes to School Program.

Traffic Operations and Intelligent Transportation Systems

Streets staff has additional existing programs and initiatives that address road safety concerns and needs. Neighborhood traffic mitigation evaluations, primarily utilizing signing, striping, and speed cushions/humps to deter excessive speed and cut-through traffic, are regular activities. Review of access control of new developments to provide safer ingress and egress by restricting certain traffic movements is also conducted on a regular basis.

Further, as Streets staff completes pavement preservation projects, lane narrowing to provide dedicated bike lanes or add bike lane buffers is also considered to improve bicycle safety and encourage lower vehicular speeds.

The City has 1,162 standard traffic signals, many of which are not designed to current national standards. To address this, each year Streets staff implements signal modernization projects, which are typically comprised of providing new traffic signal heads above each through lane, improved intersection illumination with a street light fixture at each side of marked crosswalks, emergency vehicle preemption, vehicular video detection, CCTV cameras, ADA accessibility, signal related signing, network communication, Flashing Yellow Arrow capabilities, as well as new poles, mast arms, wiring, conduit, mounting hardware, control cabinets and controller equipment. To highlight how signal modernization projects can address safety, the addition of an individual signal head per traffic lane is a proven traffic safety measure that is shown to improve driver compliance with traffic signals and should reduce the frequency of drivers running red lights. Red light running crashes, which are caused by a failure to yield right-of-way or disregarding traffic signals at intersections, often lead to severe angle or left-turn crashes, which are the most violent and deadly roadway crashes.

Streets staff has utilized HAWK signals to reduce risk and improve safety for pedestrians at high- or critical-crossing locations. To improve HAWK signal user experience and compliance, Streets staff modified its HAWK signals for quicker actuation when the activation button is pressed. Previously, HAWK signals were activated only after the progression window ended but now are activated immediately after the button is pushed if there is not a conflict with traffic progression, reducing the wait time for pedestrians to safely cross at a HAWK signal location.

Streets staff has also increased deployment of Flashing Yellow Arrows (FYAs) at signalized intersections. A significant number of roadway fatalities are due to drivers not yielding the right-of-way while making left turns and being struck by oncoming vehicles. The use of FYAs provides a protected phase and/or permitted phase dependent upon traffic conditions, and is a proven traffic safety measure that improves safety and vehicular delay.

The use of network communication technologies enables real-time traffic control to reduce unexpected bottle necks that may result in reduced rear-end crashes due to unexpected traffic queuing. Streets staff is actively working to further expand the fiber communication network to allow improved connectivity between traffic signals and the Traffic Management Center to improve response to incidents and events within the transportation system.

Regional, State, and Federal Funding

Streets staff continues to leverage local funding with opportunities for regional, state, and federal funding to improve road safety, taking advantage of the Highway Safety

Improvement Program (HSIP) administered by ADOT and MAG's Road Safety Program (RSP). Streets staff completed a HSIP grant funding application for enhanced corridor street lighting improvements for 14 locations Citywide with a grant value exceeding \$3 million. Streets staff has also completed applications for the current MAG RSP cycle requesting two additional HAWK signals and two traffic signals on behalf of the OPS. The RSAP will improve the process that Streets staff uses for screening safety needs and increase competitiveness for these grant programs.

Vision Zero Communities

The Vision Zero Network is a U.S.-based non-profit organization that advocates for cities to adopt the core philosophy of Vision Zero: that traffic-related deaths and serious injuries are preventable. The Vision Zero Network recognizes cities that take action towards adopting this approach to road safety as a "Vision Zero Community." Additional information about the Vision Zero Network and the steps to pursue this designation is included as **Attachment C**. One of the key steps towards this recognition is a political commitment to adopt the goal of eliminating all traffic-related deaths. If Phoenix were to consider becoming a Vision Zero Community, a suggested resolution for this action is provided as **Attachment D**.

Phoenix's existing efforts on its Comprehensive RSAP do closely align with the framework of a Vision Zero Action Plan, with its emphasis on meaningful community engagement and data driven, systems-based strategies to improve road safety for all Phoenixians.

Fifty-one cities in the United States have been recognized by the Vision Zero Network.

Financial Impact

The City Council approved the allocation of \$3 million in Streets' Transportation 2050 (T2050) revenues and \$3 million in General Fund resources over five years to support near-term road safety projects.

Concurrence/Previous Council Action

The Citizens Transportation Commission:

- Recommended City Council approval of the development of the RSAP on Jan. 28, 2021, by a vote of 15-0; and
- Was provided with an update on the RSAP on Oct. 28, 2021.

The Transportation, Infrastructure and Innovation Subcommittee recommended City Council approval for the development of the RSAP on Feb. 3, 2021, by a vote of 4-0.

The City Council approved development of the RSAP, completion of near-term projects, and additional staffing resources on March 2, 2021.

The Transportation, Infrastructure and Planning Subcommittee was provided with an update on the RSAP on Oct. 20, 2021.

Responsible Department

This item is submitted by Deputy City Manager Mario Paniagua and the Street Transportation Department.



Phoenix Crash Safety Review Using MAG RTSIMS Data

City of Phoenix Roadway Safety Action Plan

Final Report

September 28, 2021

PREPARED FOR:



PREPARED BY:

Y2K Engineering, LLC.

Project No. 21-059B



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EXECUTIVE SUMMARY

The City of Phoenix is currently in the process of developing a Comprehensive Roadway Safety Action Plan, which will further shape the City's planning efforts in roadway safety. This project involves a review of current safety trends, existing programs and processes, and public/stakeholder involvement to create a vision and plan for the future. This memorandum is intended to provide a preliminary overview of historical crash trends within the City of Phoenix within the past five years. In later stages of this project, a dynamic crash dashboard will be developed to provide enhanced abilities in data analytics and reporting.

In the initial stages of this project, crash queries were obtained through the Maricopa Association of Governments (MAG) software tool for crash analysis, the Regional Transportation Safety Information Management System (RTSIMS). This report uses existing tools to conduct a safety analysis of the past five years, and compares trends to regional and statewide data. The following key findings are based on a review of RTSIMS crash data from 2015 to 2019:

- An annual average 30,376 crashes per year were reported during the five year study period. This equates to 83 crashes per day.
- Crashes on arterial and local roadways in the City of Phoenix increased by a rate of about 4.4% per year. This trend suggests that the crash frequency increased at a higher rate than the City's population, which in the same period grew 1.5% per year, on average.
- Most crashes result in no injury (70%), approximately one-quarter result in possible or minor injury (27%), 2.6% result in serious injury, and 0.6% result in fatal injury. This equates to two serious injury crashes occurring each day, and one fatal crash occurring every other day.
- The percentage of fatal and serious injury crashes has remained generally consistent over the past five years; however the percentage of no injury crashes has steadily increased over time.
- For all crash severities, rear end crashes were the most common collision manner, followed by left-turn crashes. These two crash types account for about half of all crashes.
- For fatal and serious injury crashes, the "Other" collision manner was reported most frequent (25%), which is commonly selected for crashes involving pedestrians and bicyclists. Other frequent crash types for fatal and serious injury crashes were left-turn (23%) and angle (21%).
- Crashes involving unrestrained drivers (i.e, lack of seatbelt or helmet use) have reduced in frequency.
- Due to lack of protection on impact, pedestrians and bicyclists (vulnerable users) are more frequently seriously injured when involved in motor vehicle crashes. In the City of Phoenix, crashes involving bicyclists and pedestrians represent nearly half (48%) of all fatal crashes.
- A greater share of pedestrian crashes is occurring in Phoenix compared to other agencies within the MAG Region. Phoenix represents 36% of Maricopa County's population and about 43% of the County's local and arterial road crashes; however, 63% of County crashes involving pedestrians occurred on City of Phoenix's local and arterial roads.
- Bicyclist crashes are occurring at a greater rate in Phoenix than in other agencies within the MAG Region. About 43% of all crashes involving bicyclists in Maricopa County occurred on City of Phoenix's local and arterial roads.
- For all crash severities, the majority of crashes occur during daylight hours (71%), with the remaining 29% of crashes occurring during dawn, dusk, or dark conditions.
- A correlation exists between injury severity and lighting condition; fatal and serious injury crashes occurred more frequently during dawn, dusk, and dark conditions (45%) compared to daylight conditions (55%).

MAG RTSIMS tool provided the ability to retrieve data quickly for numerous Citywide statistics. During the analysis process, several discrepancies were identified when comparing to past Phoenix data, which is common when comparing different datasets. The City of Phoenix conducts a robust data scrubbing process each year, which confirms crashes exist within the City of Phoenix boundaries, omits freeway crashes, and reviews characteristics of crashes in detail to correct the manner of collision if originally mis-coded. The RTSIMS crash data is not scrubbed, and comes directly from ADOT ACIS. These differences, along with variations in the querying process, are acknowledged as part of this report. This data contained in this report is intended to provide preliminary information; later stages of this project will modernize the existing City of Phoenix crash analysis process to improve and enhance data analytics and visualization.

INTRODUCTION

The City of Phoenix is currently in the process of developing a Comprehensive Roadway Safety Action Plan, which will further shape the City's planning efforts in roadway safety. This project involves a review of current safety trends, existing programs and processes, and public/stakeholder involvement to create a vision and plan for the future. This memorandum is intended to provide a preliminary overview of historical crash trends within the City of Phoenix within the past five years. Through the development of the project, a dynamic crash dashboard will be developed to provide enhanced abilities in data analytics and reporting. In the initial stages of the project, crash queries were obtained through the Maricopa Association of Governments (MAG) software tool for crash analysis, the Regional Transportation Safety Information Management System (RTSIMS).

The City of Phoenix prepares comprehensive collision summary reports each year, documenting the past year of motor vehicle, pedestrian, and bicycle-related crashes. This report uses existing tools (RTSIMS) to conduct a supplementary safety analysis of the past five years, and compare trends to regional and statewide data.

Crash data within the City of Phoenix was obtained for the past five years through the RTSIMS tool, from January 1, 2015, to December 31, 2019. At the time of the analysis, 2020 crash data was not available. The RTSIMS platform compiles historical crash data from the Arizona Crash Information System (ACIS) crash database maintained by the Arizona Department of Transportation (ADOT). The RTSIMS data excludes freeways, highways, and ramps; only arterial, collector, and local roadways are included. RTSIMS refers to this group as "Arterial and Local Roads". This naming refers to roadway classification and does not imply roadway ownership. The results of traffic safety data queries may differ slightly based on data source, filtering assumptions, modifications to raw data, and/or query techniques. The RTSIMS safety review is intended to identify trends and inform decisions to support roadway safety.

Due to the limited sample size of fatal crashes, fatal and serious injury crashes were combined to analyze trends in critical crashes. Unlike less severe crashes, the most common collision manner for fatal and serious injury crashes is "Other", which primarily represents bicyclist and pedestrian crashes, followed by left-turn and angle crashes. It was also observed that KA crashes are overrepresented in non-daylight conditions.

According to the US Census Bureau Annual Population Estimates (**Figure 1**), the City of Phoenix's population has grown about 6% during the five years under study, from 2015 to 2019. In 2020, the City of Phoenix's residents represented 23% of Arizona's population and 36% of Maricopa County's Population.

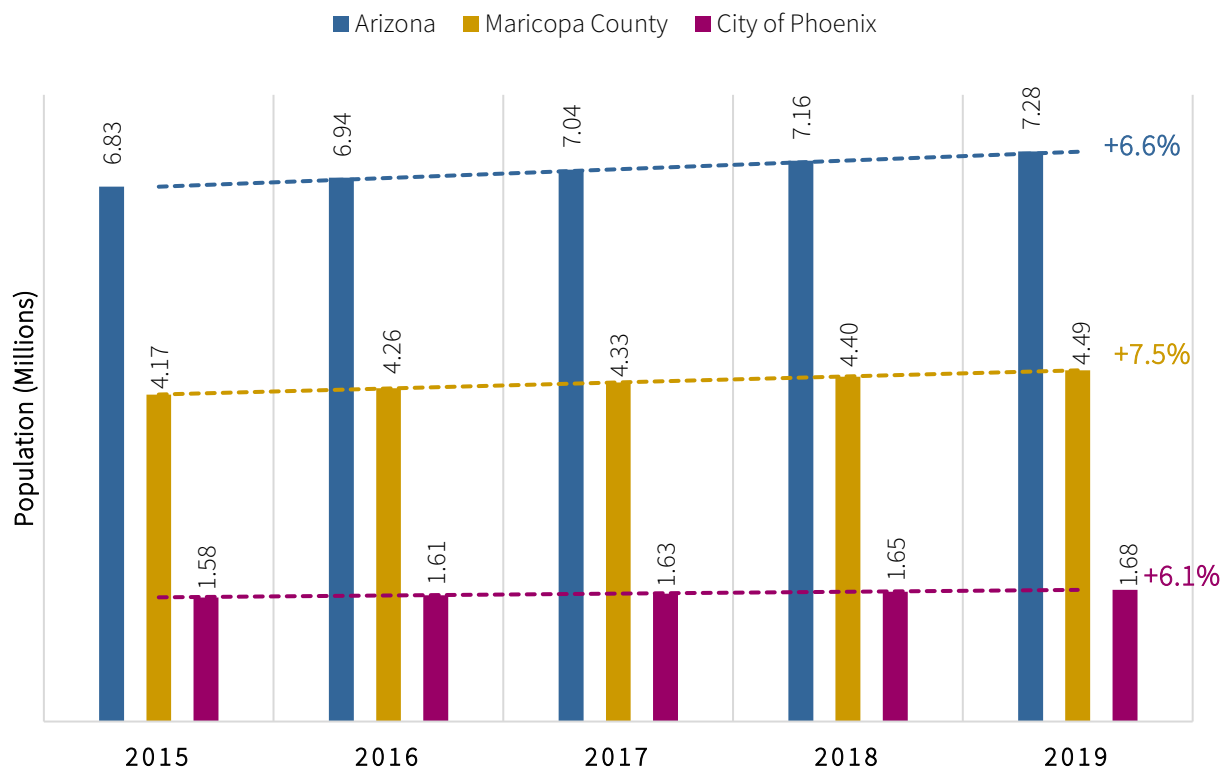


Figure 1: City of Phoenix Population Comparison to State and County
(Source: US Census Bureau, Annual Estimates of Resident Population)

GENERAL TRENDS

Since 2015, the total number of crashes within the City of Phoenix has been steadily increasing, with a total of 31,827 crashes occurring in 2019 on the City's local and arterial roadway network. **Figure 2** shows the number of crashes by injury severity for each year in the analysis period. The percentage of fatal crashes has stayed relatively constant, ranging from 0.5% to 0.7% of all crashes. The percentage of serious injury crashes varied between 2.1% and 3.2% of fatal crashes. The combined minor injury and possible injury ranged has steadily decreased over the past five years, from 30.7% (2015) to 23.8% (2019). The share of no injury crashes has increased over the past five years, from 66.0% (2015) to 73.6% (2019). This data suggests a slight downward trend in the severity of crashes.

Figure 3 shows the number of fatal and serious injury crashes from 2015 to 2019, which combined are trending towards fewer crashes since 2016.

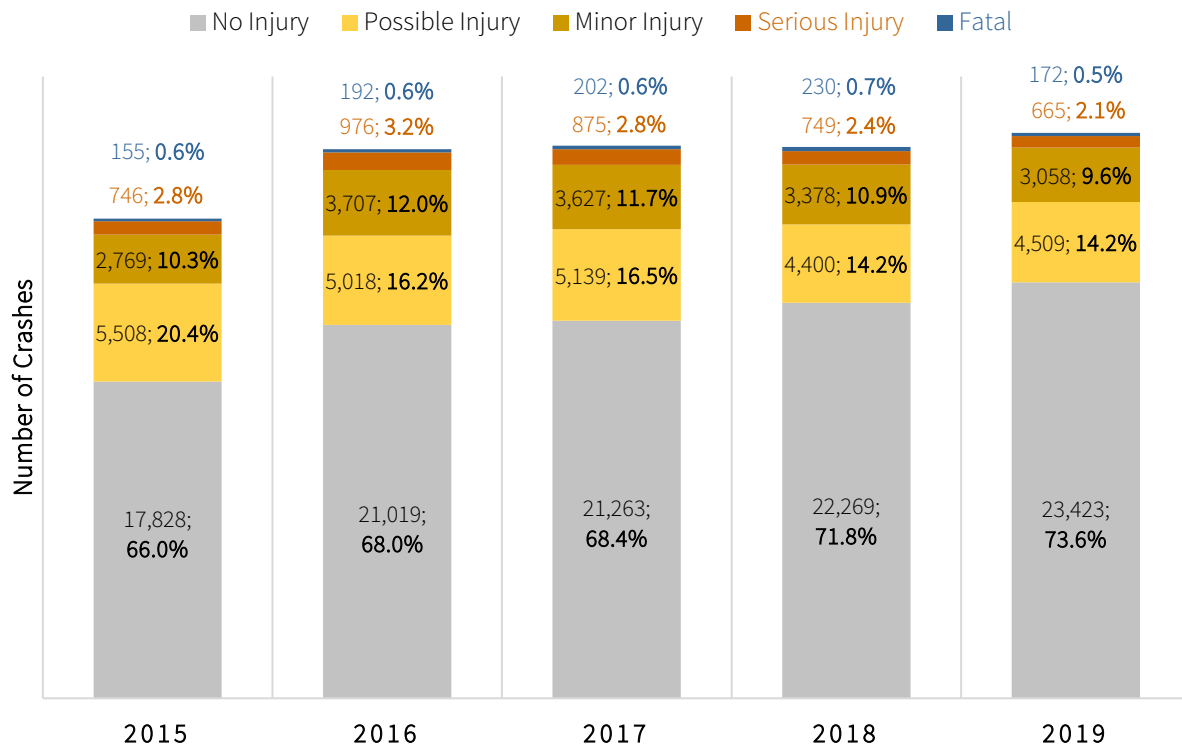


Figure 2: Total Number of Crashes per Year and Injury Severity (Local and Arterial Roads)

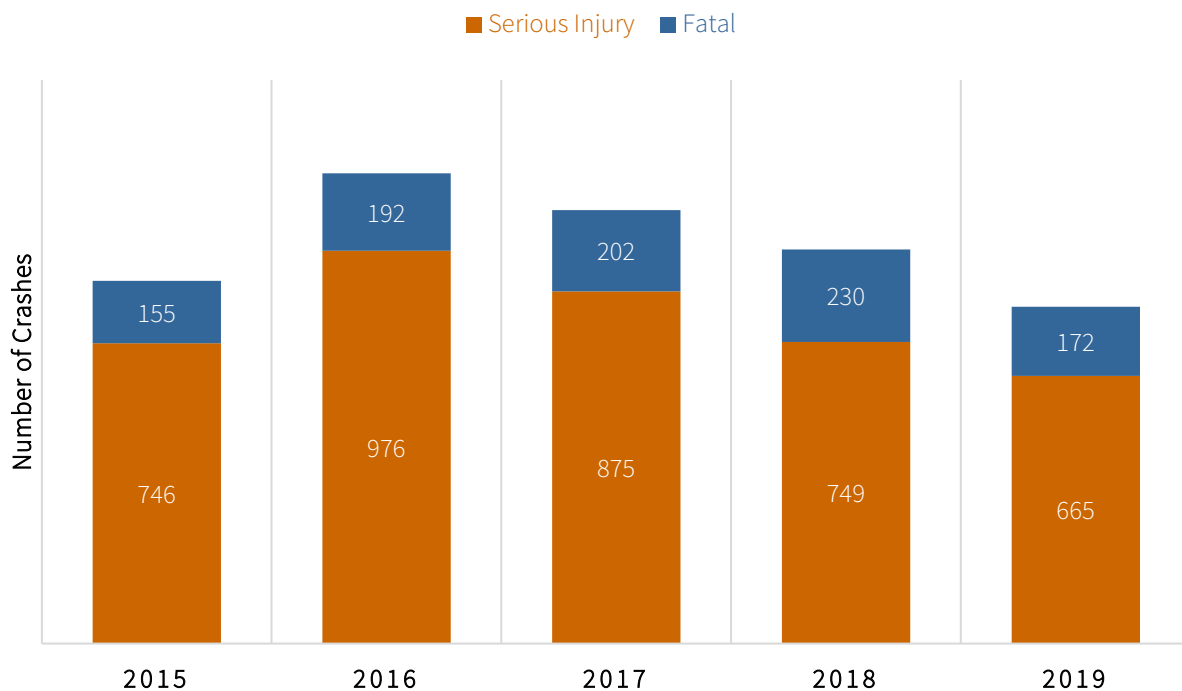


Figure 3: Total Number of Fatal and Serious Injury Crashes per Year (Local and Arterial Roads)

Crash data from 2020 was not available through RTSIMS at the time of this report. Based on a preliminary review of 2020 crash data, total number of crashes decreased by about 20% from 2019 crashes, which is presumed to be related to lower vehicle miles travelled as a result of the COVID-19 pandemic. The share of fatal and incapacitating injury crashes remained generally consistent with the previous five years; however, the share of no injury crashes followed the same positive trend (increasing from 73.6% in 2019 to 74.2% in 2020). Preliminary 2021 crash data, obtained through the Phoenix Police Department Vehicle Crimes Unit (VCU), indicate that there were 114 fatal crashes during the first six months of 2021.

Table 1 shows the distribution of crashes on City of Phoenix local and arterial roads by collision manner for the past five years. The most frequently-reported crash types were rear-end crashes (29% of all reported crashes) followed by left-turn crashes (23% of all crashes). Together, rear-end and left-turn crashes represent about half of all crashes.

Table 1: Number of Crashes per Year and Collision Manner

	2015	2016	2017	2018	2019	Total	%
Rear-end (Front-To-Rear)	8,319	9,144	9,002	8,811	8,870	44,146	29.1%
Left Turn	5,864	6,658	7,070	7,120	7,678	34,390	22.6%
Angle (Front to Side) (Other Than Left Turn)	5,246	5,434	5,448	5,434	5,404	26,966	17.8%
Sideswipe, Same Direction	3,259	4,176	4,149	4,374	4,602	20,560	13.5%
Single Vehicle	2,045	2,223	2,192	2,224	2,191	10,875	7.2%
Other (Includes Pedestrians and Bicyclists)	1,002	1,309	1,324	1,116	1,046	5,797	3.8%
Head-on (Front-To-Front) (Other Than Left Turn)	488	666	673	696	743	3,266	2.2%
Sideswipe, Opposite Direction	349	556	616	625	645	2,791	1.8%
Rear-To-Rear	163	430	277	230	195	1,295	< 1%
Rear-To-Side	161	183	193	193	208	938	< 1%
Unknown	110	133	162	203	245	853	< 1%
Total	27,006	30,912	31,106	31,026	31,827	151,877	

***Note:** The City of Phoenix uses a data scrubbing process to improve consistency of coding for collision manner. For example, the City of Phoenix defines left-turn crashes as involving vehicles originally traveling in the opposing (parallel) direction. If a crash involves a left-turning movement, but the vehicles originate in perpendicular paths, the collision is defined as an angle crash. The results of Table 1 were summarized using RTSIMS data, which does not involve the City of Phoenix scrubbing process. Therefore, these results vary from City of Phoenix scrubbed data, which identifies that the leading manner of collision is rear-end crashes, followed by angle crashes, then left-turn crashes.*

Table 2 shows the number of pedestrian and bicyclist crashes per year, as well as the injury severity. Pedestrian crashes have been slowly increasing over the past five years, while bicyclist crashes have been decreasing. An initial review of 2020 data indicates consistency with these trends.

Over the five-year period, pedestrians were involved in an average of 86 fatal crashes per year, and bicyclists were involved in an average of 8 fatal crashes per year. Combined, crashes involving pedestrians and bicyclists represent nearly half (48.6%) of all fatal crashes. Preliminary 2021 crash data, obtained through the Phoenix Police Department VCU, indicate that there a total of 114 fatal crashes reported in the first six months of 2021, 52 (45.6%) of which involved pedestrians, and 4 (3.5%) of which involved bicyclists.

Table 2: Number of Pedestrian and Bicyclists Crashes per Year and Collision Manner

	2015	2016	2017	2018	2019	Total
Bicyclists	438	485	470	384	298	2,075
No Injury	35	35	17	14	0	101
Possible Injury	157	151	152	129	118	707
Minor injuries	185	219	235	186	147	972
Serious Injury	53	71	52	52	26	254
Fatal	8	9	14	3	7	41
Pedestrians	617	771	813	825	820	3,846
No Injury	30	24	9	9	0	72
Possible Injury	153	164	194	186	247	944
Minor injuries	247	306	319	332	347	1,551
Serious Injury	127	189	197	187	148	848
Fatal	60	88	94	111	78	431
All Crashes	27,006	30,912	31,106	31,026	31,827	151,877

CRASHES BY MONTH

Figure 4 and Figure 5 show the frequency of crashes in the City of Phoenix (arterial and local roads) by month. The month-to-month trends are consistent between all crashes, serious injury crashes, and fatal crashes. March registered the highest number of crashes, including fatal and injury crashes. The month with the fewest reported crashes was July, which correlates with lower summer traffic volumes. Lower traffic volumes in June and July are often associated with school breaks, seasonal resident travel, lower pedestrian and bicyclist activity, and lower traffic volumes in general due to the high temperatures.

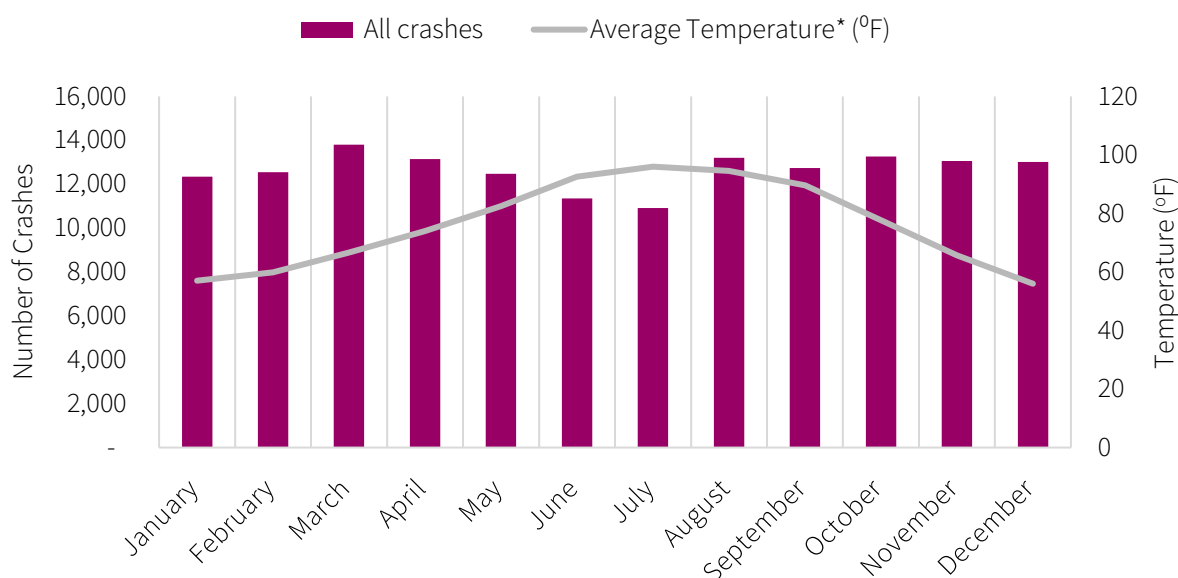


Figure 4: Number of Crashes by Month (2015-2019)

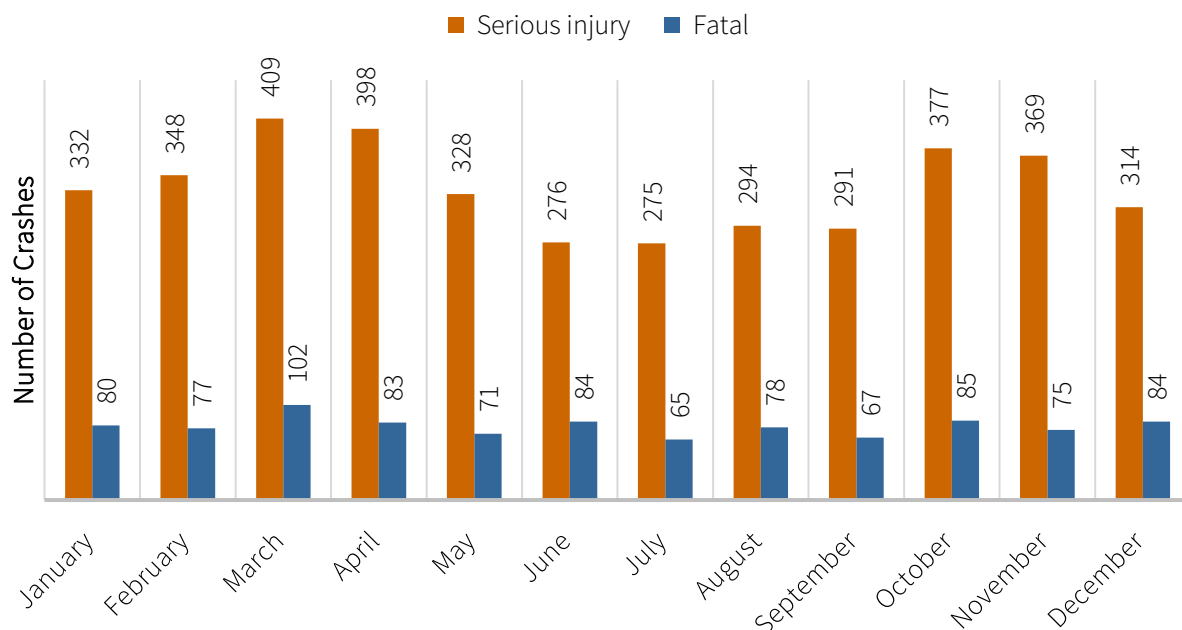


Figure 5: Number of Serious Injury and Fatal Crashes by Month (2015-2019)

CRASHES BY DAY OF WEEK

Figure 6 shows the distribution of crashes by weekday. Crashes occur most frequently on Fridays, while the fewest crashes occur on Sundays. Fatal crashes occur most often on Saturdays and Sundays, and occur less frequently on Mondays.

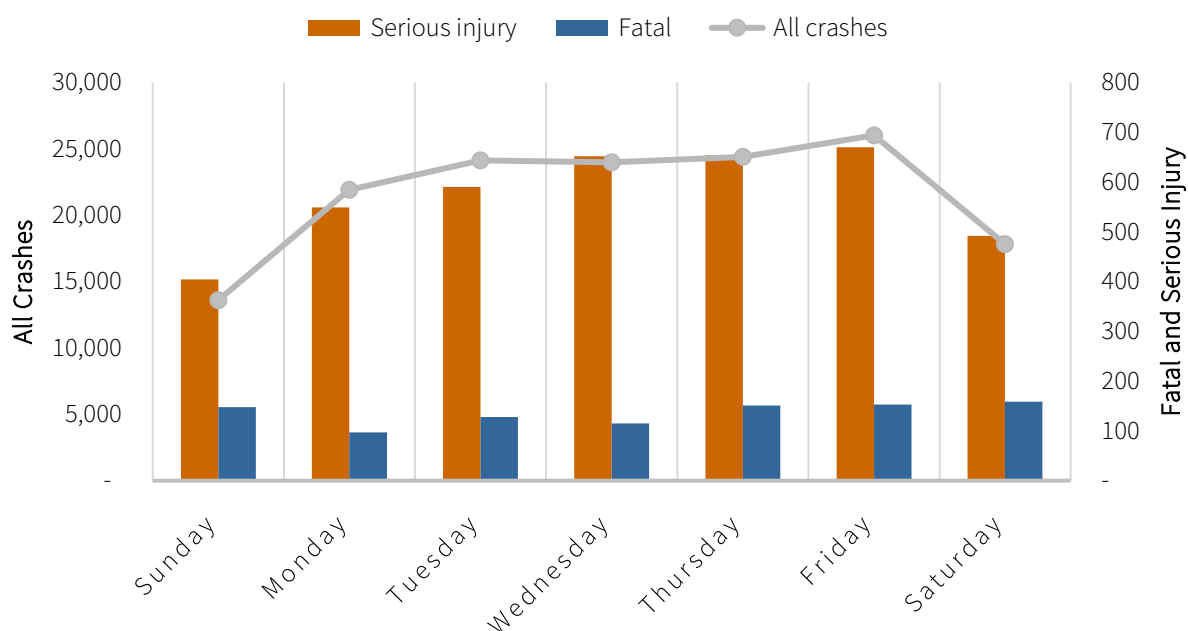


Figure 6: Number of Crashes by Day of the Week (2015-2019)

CRASHES BY TIME OF DAY

Figure 7 shows that the majority of crashes (71%) occurred under daylight conditions, with 29% of crashes occurring during dawn, dusk, or dark conditions.

Figure 8 shows how the crashes are distributed by lighting conditions over the course of the day. In addition to the AM peak around 7 to 8 AM, a large number of crashes occur during the PM peak from 3 to 6 PM.

Crashes involving dawn and dusk conditions were limited between 4 to 7 AM and 4 to 7 PM, respectively.

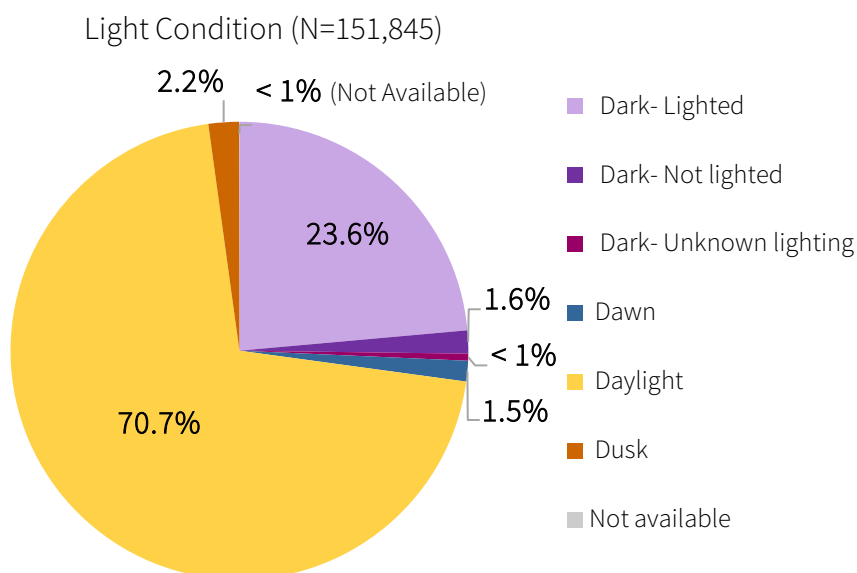


Figure 7: Share of Crashes by Light Condition, 2015-2019

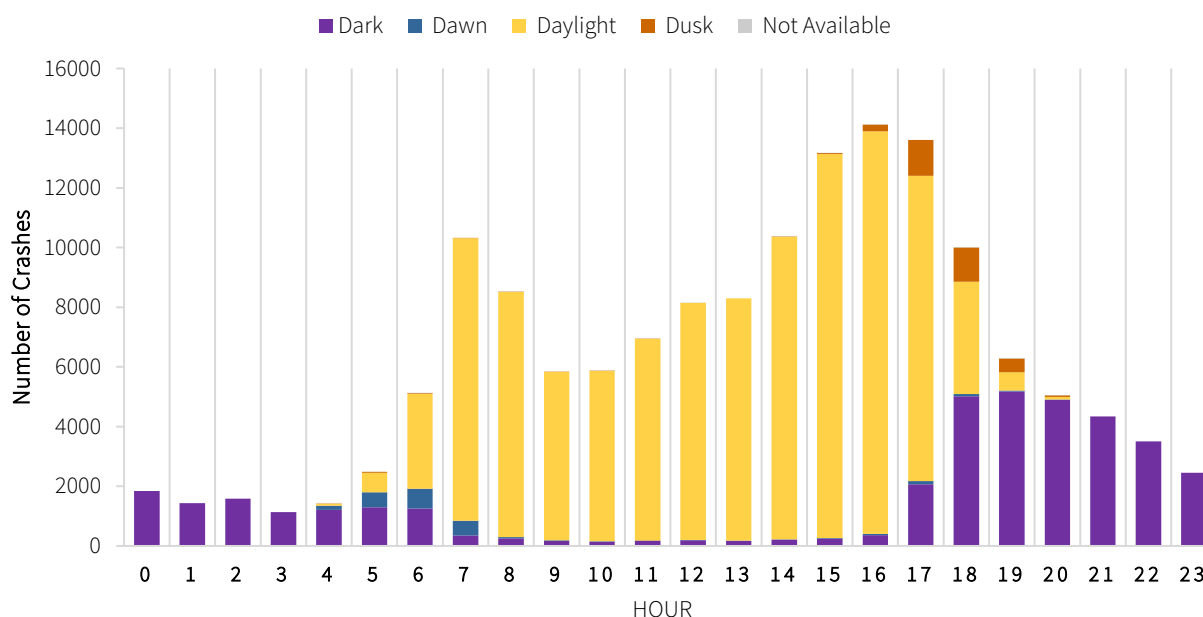


Figure 8: Number of Crashes by Hour of the Day and Light Condition (2015-2019)

CRASHES BY LOCATION

To classify a crash's relation to the junction, crashes were separated by Junction Type as either an Intersection/Interchange crash or a Non-Intersection/Non-Interchange crash. Figure 9 shows where the location type of crashes that occurred during the study period of 2015 to 2019.

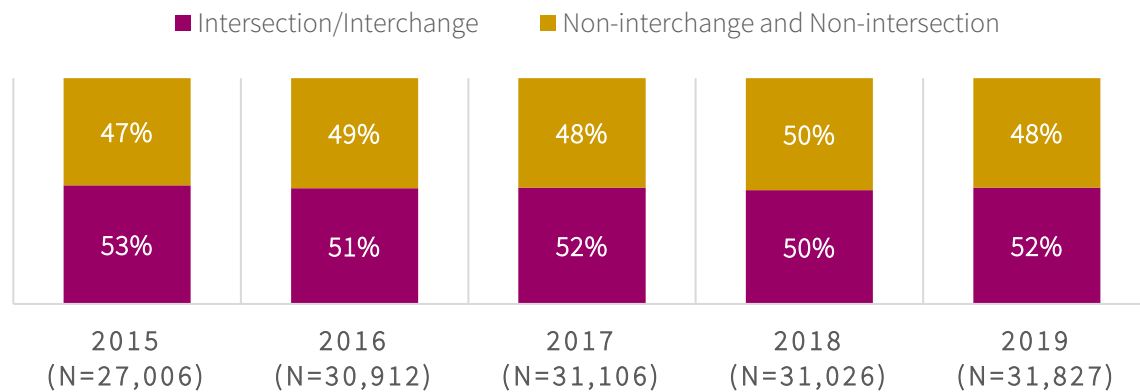


Figure 9: Crash Location Relative to Junctions, by Year

Figure 10 shows the injury severity between the three location types. In general, crashes are slightly more severe at intersections and interchanges, compared to segment collisions, which correlates with the greater frequency and types of collisions/conflict points possible.

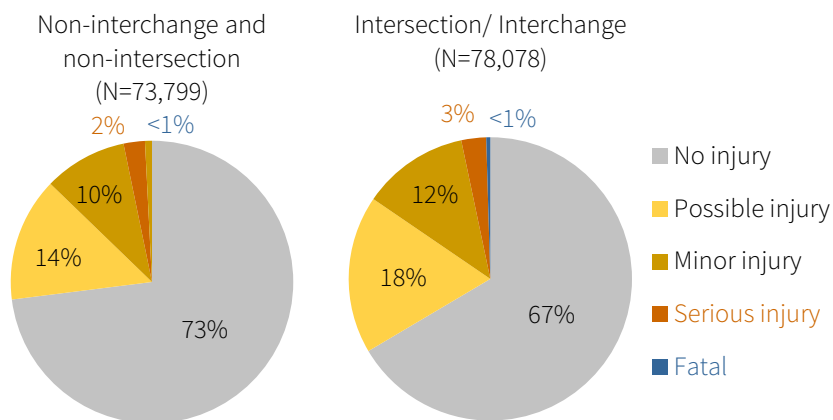


Figure 10: Injury Severity of Intersection/Interchange-Related Crashes

The collision manner of intersection and interchange crashes is shown in Figure 11. The three most common crash types at intersections are left-turns, rear-ends, and angle crashes, respectively.

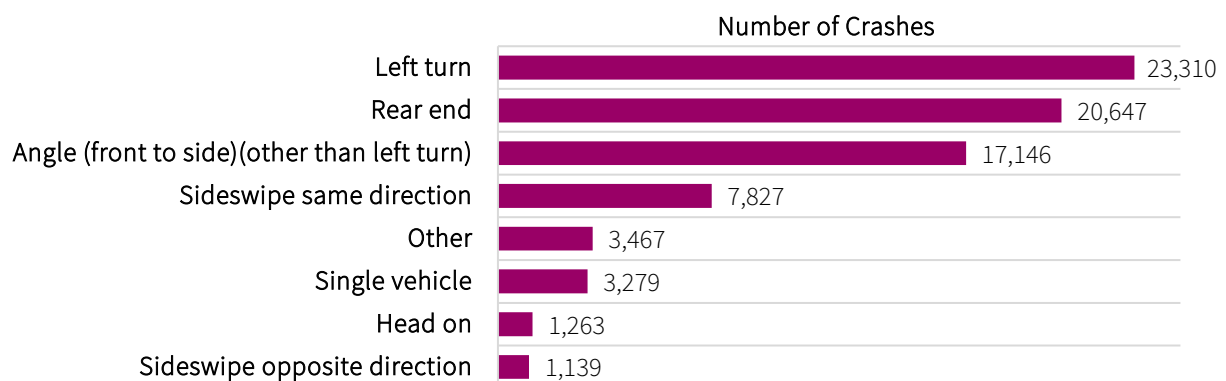


Figure 11: Collision Manner of Intersection/Interchange-Related Crashes

To rank the intersections based on a holistic safety analysis, the MAG's network screening methodology was used to classify the City of Phoenix's intersections per their safety score. The scoring methodology combines three safety attributes on the intersection, including crash frequency, crash severity, and crash type. The three factors are weighted together for the final Intersection Safety Score, with crash severity as 50%, crash frequency as 25%, and crash type as 25% of the weighting. **Table 3** and **Figure 12** show the Top 20 intersections with the highest Intersection Safety Score within the City of Phoenix.

The intersections with the greatest crash risk exist at 1) 75th Avenue and Indian School Road, 2) 67th Avenue and Indian School Road, and 3) 67th Avenue and McDowell Road. Formal Road Safety Assessments (RSA) have been conducted at 10 of the Top 20 high crash risk intersections.

Table 3: High Crash Risk Intersections (Intersection Safety Score)

Rank, City of Phoenix	Rank, MAG Region	RSA Conducted?	Location	# Crashes	Crash Frequency Score (CF)	Crash Severity Score (CS)	Crash Type Score (CT)	Final Score
1	1	2015*, 2021*	75th Ave & Indian School Rd	251	1.06	1.36	1.29	1.26
2	2	2013, 2015*, 2021*	67th Ave & Indian School Rd	273	1.15	1.32	1.18	1.24
3	3	2016	67th Ave & McDowell Rd	246	1.04	1.30	1.27	1.23
4	4		99th Ave & Lower Buckeye Rd	316	1.33	1.23	0.91	1.17
5	6		51st Ave & McDowell Rd	201	0.85	1.09	1.23	1.06
6	8		43rd Ave & Bethany Home Rd	194	0.82	1.08	1.16	1.03
7	9	2021*	75th Ave & McDowell Rd	215	0.91	1.07	0.97	1.01
8	10	2019*	27th Ave & Camelback Rd	203	0.86	1.07	0.97	1.00
9	13		7th Ave & Indian School Rd	191	0.81	0.97	1.10	0.96
10	14		75th Ave & Thomas Rd	192	0.81	1.01	1.01	0.96
11	15		35th Ave & Bethany Home Rd	194	0.82	0.99	1.04	0.96
12	16	2018	43rd Ave & Peoria Ave	196	0.83	1.06	0.89	0.96
13	17	2021	35th Ave & Glendale Ave	188	0.79	0.99	1.05	0.96
14	18	2021	24th St & Baseline Rd	204	0.86	1.00	0.92	0.95
15	19	2013	51st Ave & Indian School Rd	193	0.81	0.96	1.03	0.94
16	21		43rd Ave & Northern Ave	186	0.79	0.95	0.97	0.91
17	23		43rd Ave & McDowell Rd	184	0.78	0.97	0.90	0.91
18	24	2021*	83rd Ave & Indian School Rd	170	0.72	0.95	1.00	0.90
19	27		43rd Ave & Glendale Ave	190	0.80	0.94	0.82	0.88
20	28	2018	35th Ave & Bell Rd	150	0.63	0.89	1.08	0.87

Note: *Location was studied as part of a corridor RSA.

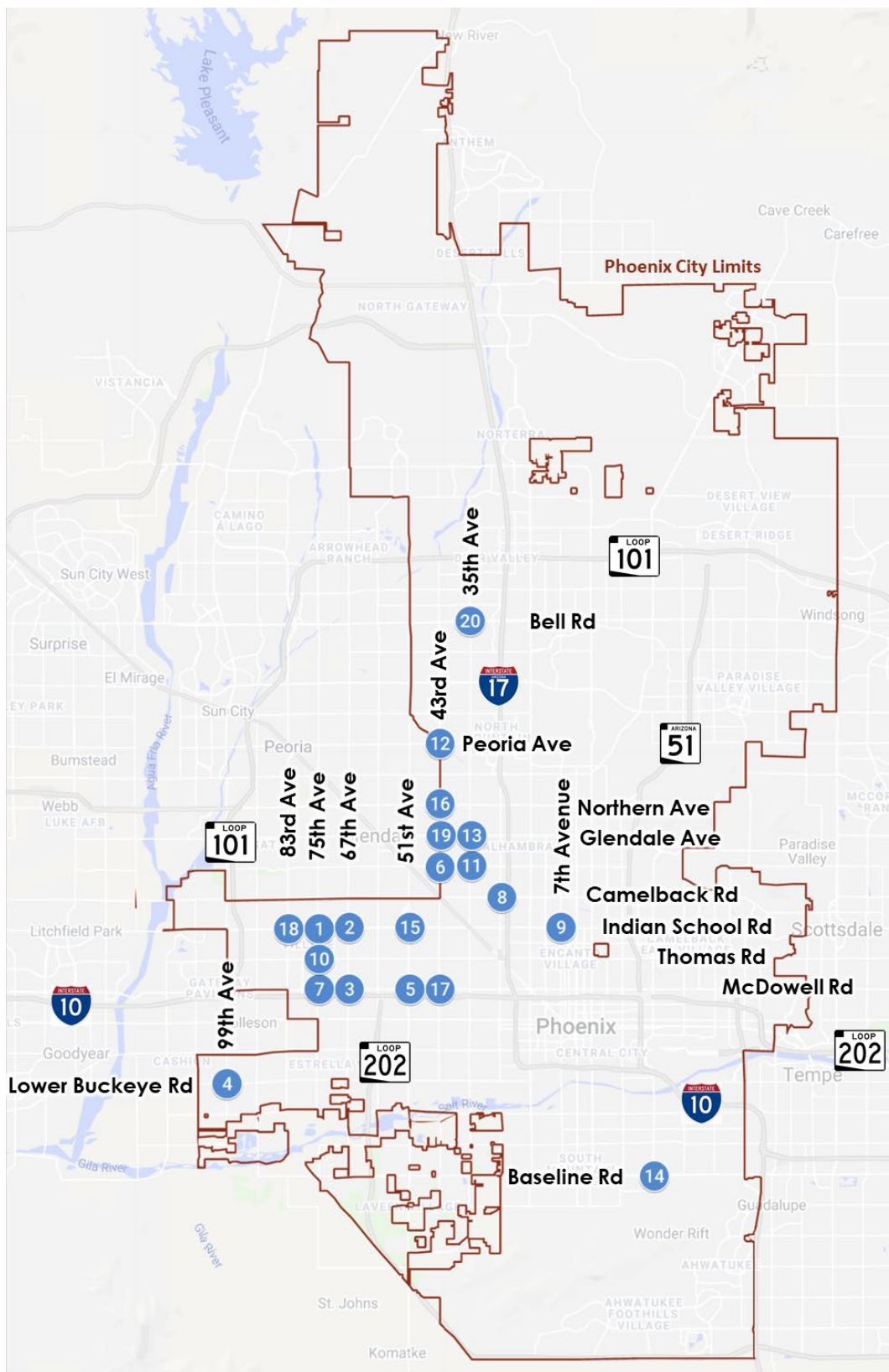


Figure 12: High-Crash Intersections (Top 20 Intersection Safety Score)

BEHAVIOR CHARACTERISTICS

In the period of 2015 to 2019, alcohol and drug-impaired drivers were responsible for 7,487 crashes, which represents 5% of all crashes on local and arterial roads in the City of Phoenix. However, of all 4,962 fatal and serious injury crashes, 1,117 (22%) were associated with impaired drivers. **Figure 13** shows the distribution of crashes involving impaired drivers (alcohol, drugs) by the hour of the day. Unlike the total number of crashes that show two distinct peaks of crashes over the AM and PM traffic peaks (**Figure 8**), crashes involving impaired drivers are mostly concentrated during the late hours of the night (7 PM to 3 AM).

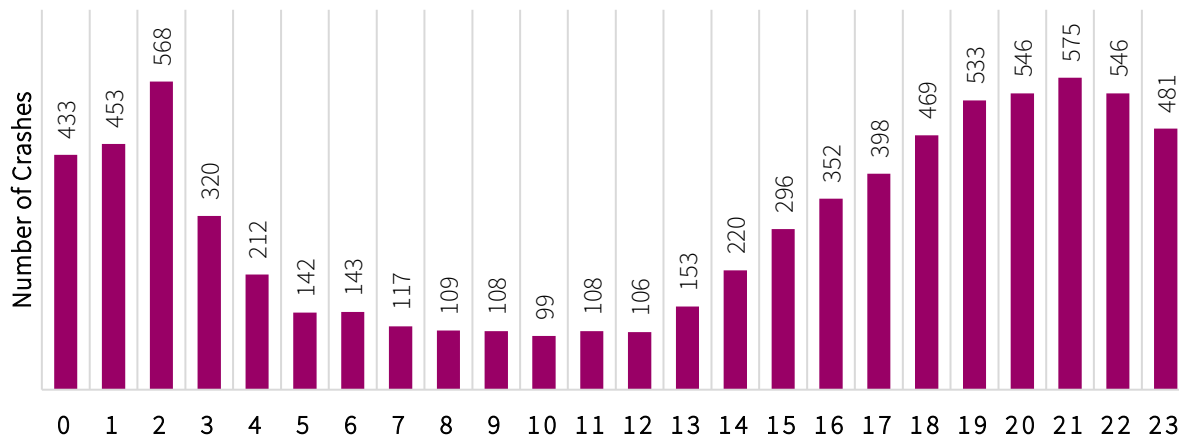


Figure 13: Number of Crashes Involving Impaired Drivers, by Hour

During the five years analyzed in this report, the total number of crashes involving unrestrained drivers show a steady decline. From 2015 to 2019, unrestrained driver crashes have reduced by approximately 20%. **Figure 14** shows the injury severity of such crashes over the years. On average, about 7% of unrestrained driver crashes are fatal crashes, which is a significantly larger share compared to all crashes.

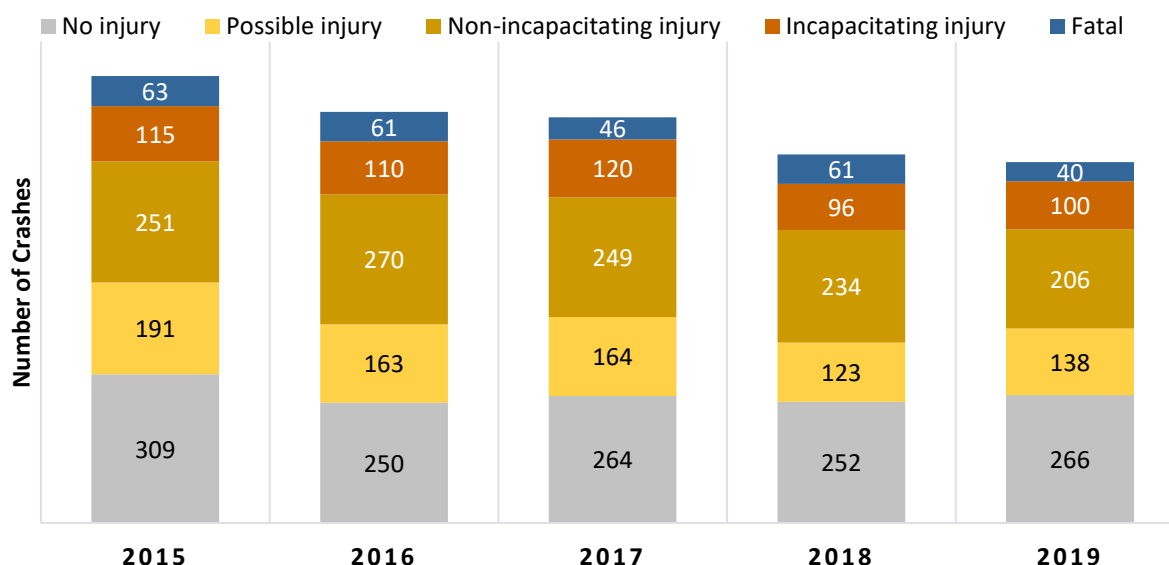


Figure 14: Number of Crashes Involving Unrestrained Drivers, by Year and Injury Severity

Figure 15 shows the severity associated with speed-related crashes across the study period. While on average about 70% of speed-related crashes result in no injury, close to 2% of such crashes result in serious injury or fatality.

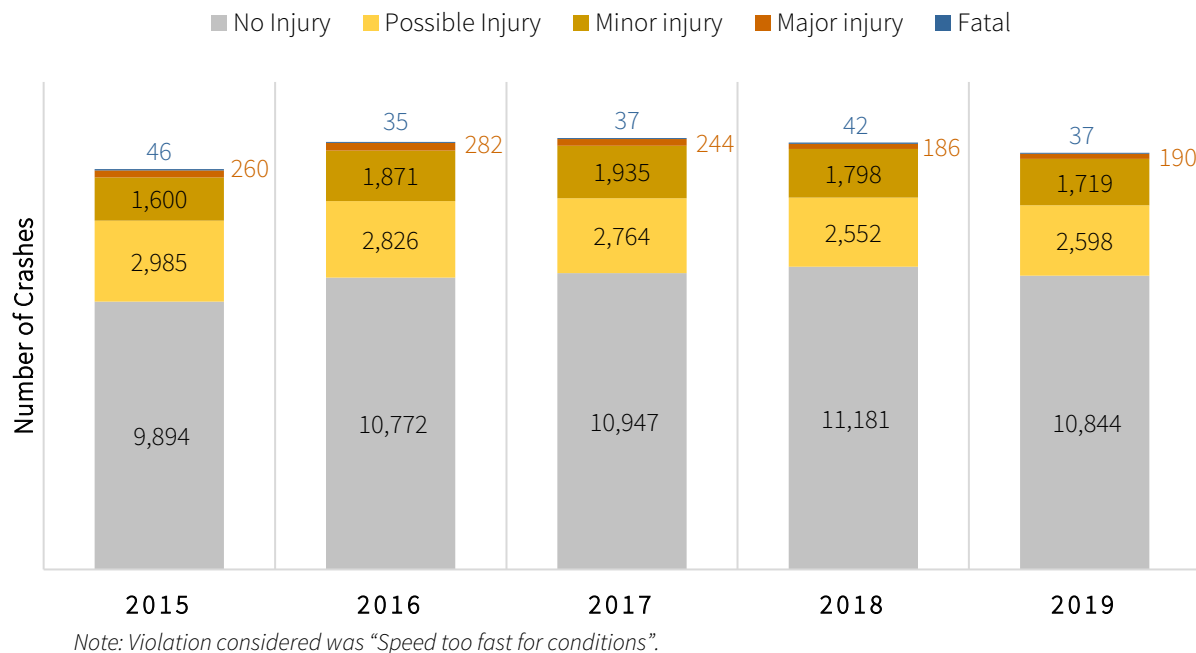


Figure 15: Speed-Related Collisions, by Year and Injury Severity

TRENDS BY PERSON TYPE

This sub-section of the report further explores crashes involving pedestrians, bicyclists, older drivers, and younger drivers. The analysis period is from 2015 to 2019. Pedestrian and bicyclists are considered to be vulnerable roadway users; as there is little to no protection in collisions with motor vehicles. Crashes involving pedestrians and bicyclists are more likely to result in critical injuries.

PEDESTRIANS

Figure 16 shows the injury severity of crashes involving pedestrians on the City of Phoenix's local and arterial roads from 2015 to 2019. While most (70%) motor-vehicle crashes result in no injury, that is not the case for crashes that involve pedestrians. Rather, 11% of crashes involving pedestrians were fatal and 22% resulted in serious injuries. In the five studied years, the number of crashes involving pedestrians trended upward, with 2019 crashes representing a 33% increase from 2015.

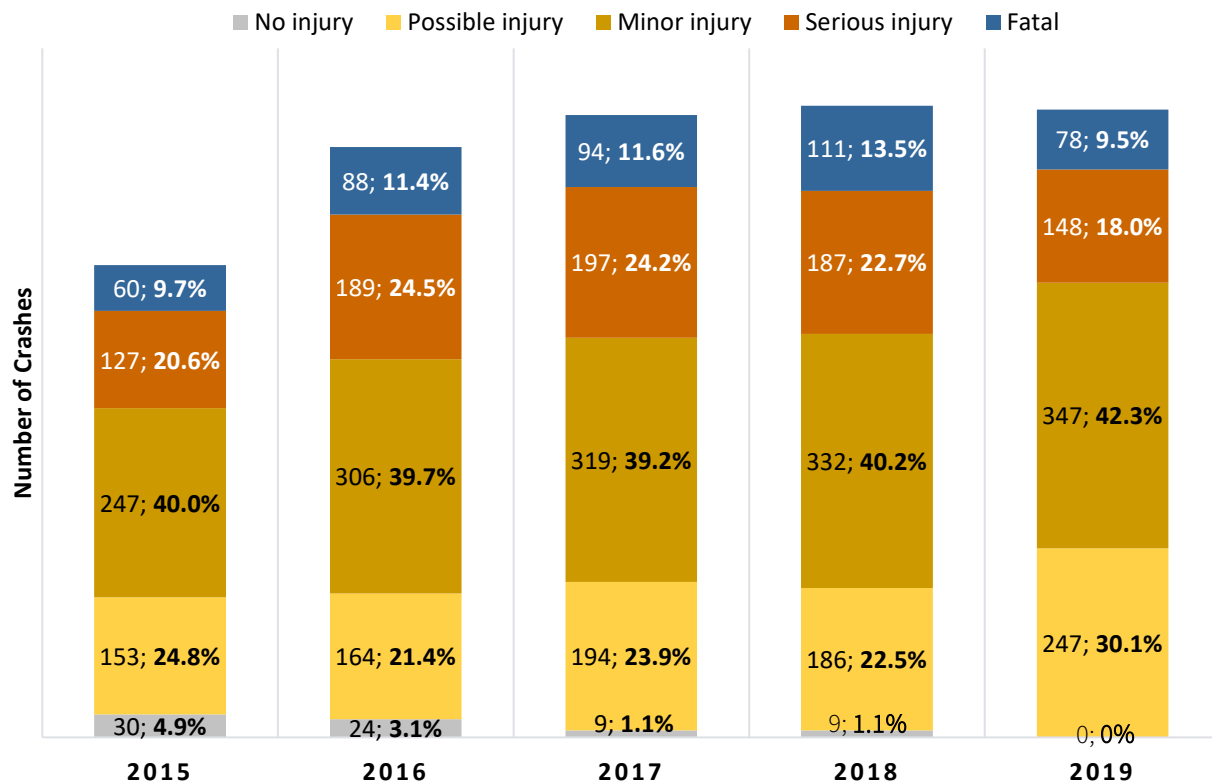


Figure 16: Injury Severity for Crashes Involving Pedestrians, by Year

Figure 17 shows the collision manner for the crashes involving pedestrians. As most of the collision manner categories developed for the Arizona Crash Report form are oriented towards motor vehicles, the most common collision manner reported on pedestrian crashes was “Other”, which is often selected by the responding police officer for crashes involving pedestrians or bicyclists.

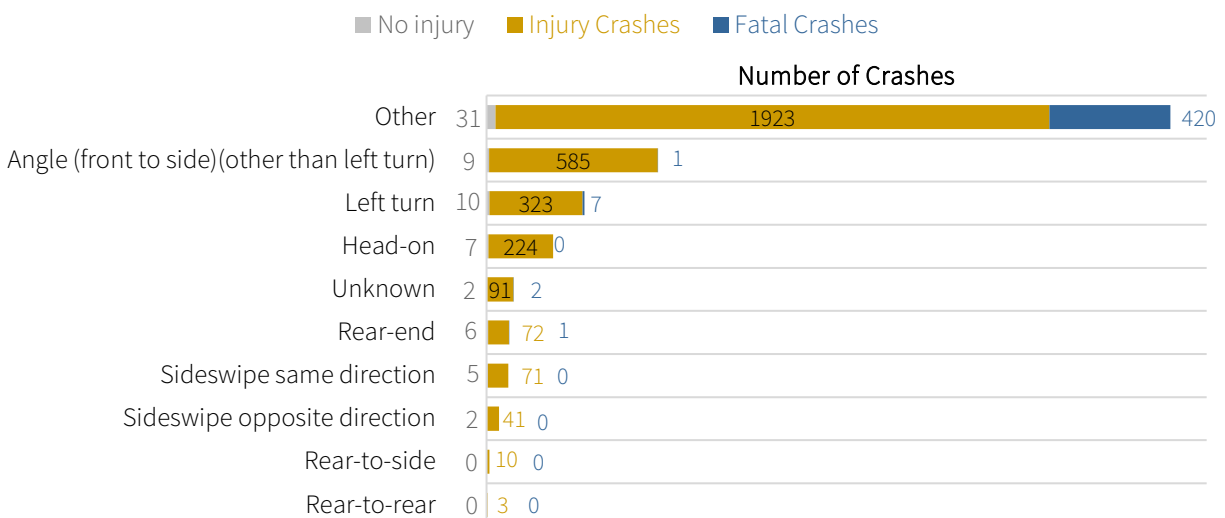


Figure 17: Collision Manner for Crashes Involving Pedestrians, by Year

Figure 18 and Figure 19 show the distribution of pedestrian crashes by month and by hour, respectively. The months with the highest frequency of crashes involving pedestrians are November and December. The hours with the highest frequency of crashes involving pedestrians occur in the evening, from 6:00 pm to 9:00 pm.

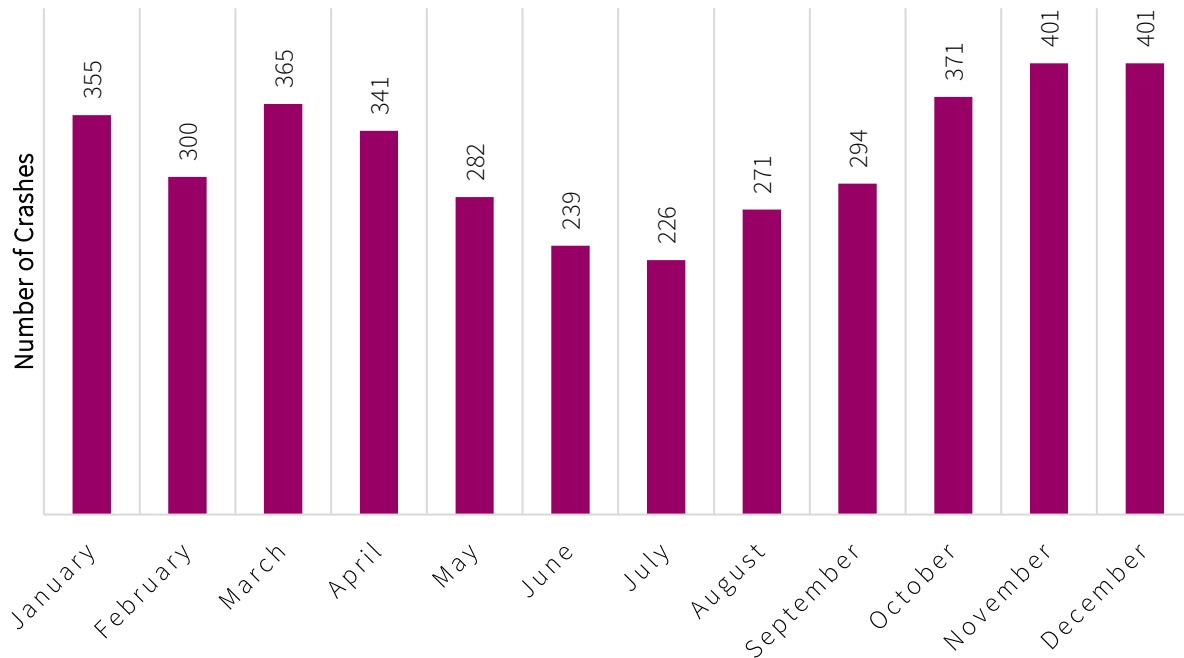


Figure 18: Number of Crashes Involving Pedestrians, by Month

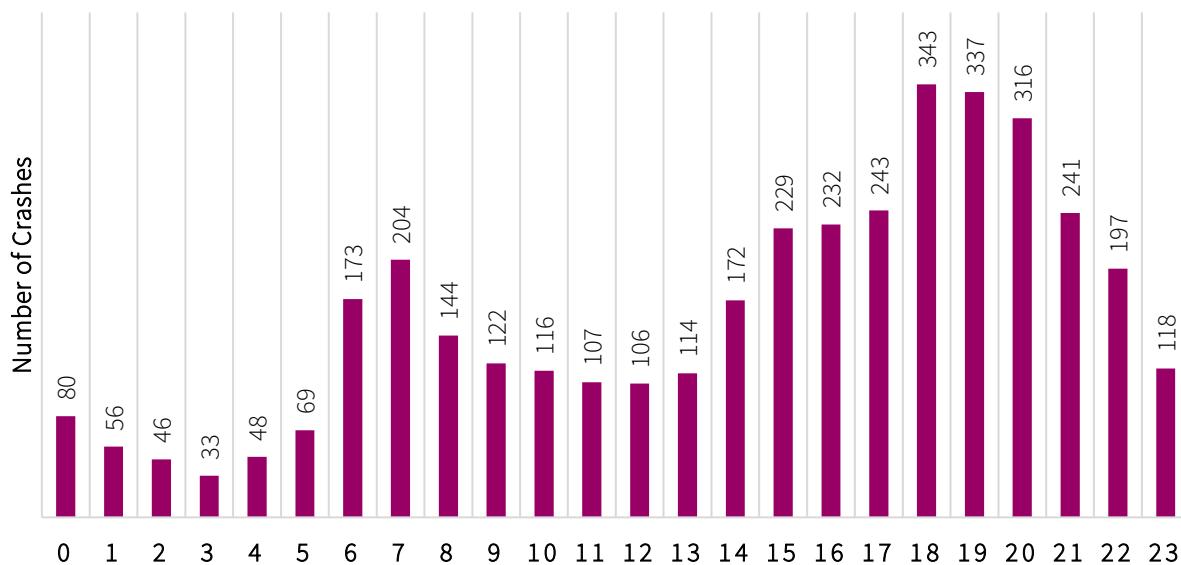


Figure 19: Number of Crashes Involving Pedestrians, by Hour

BICYCLISTS

Similar to pedestrian crashes, crashes involving bicyclists registered higher rates of fatalities and serious injuries, with virtually no crashes being reported as property damage only (Figure 20). During the past five years, the number of bicycle-related crashes have trended downward. From 2015 to 2019, the number of crashes involving bicyclists has reduced by 32%.

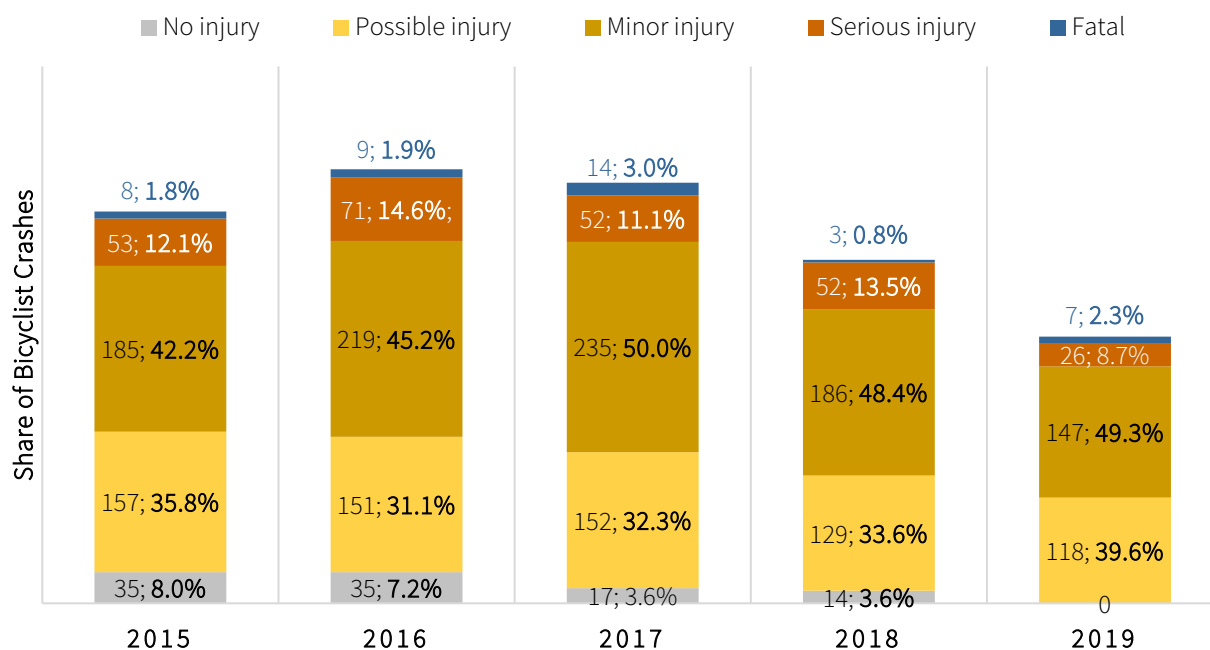


Figure 20: Injury Severity for Crashes Involving Bicyclists, by Year

Figure 21 shows the collision manner for crashes involving bicyclists. As it was observed for pedestrian crashes, the most common collision manner was “Other”. However, for crashes involving bicyclists, a significant share of crashes was a result of angle crashes.

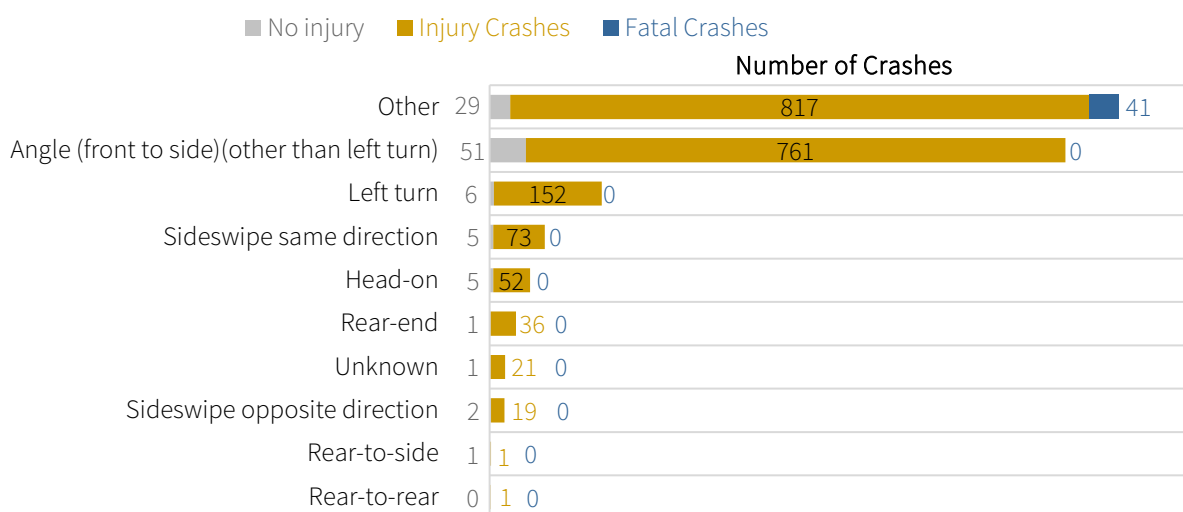


Figure 21: Injury Severity for Crashes Involving Bicyclists, by Collision Manner (2015-2019)

Figure 22 and Figure 23 show the distribution of crashes involving bicyclists by month and by hour, respectively. The month with the highest number of crashes involving bicyclists was March. The highest number of crashes involving bicyclists correlates with vehicular morning and afternoon peak hours.

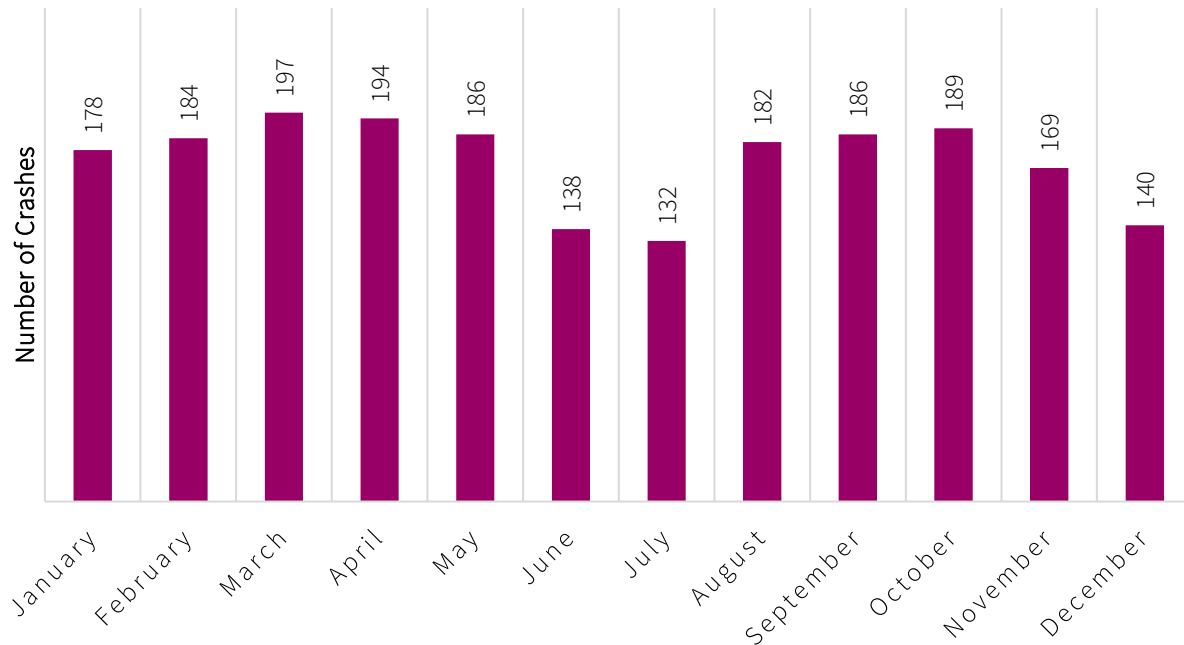


Figure 22: Number of Crashes Involving Bicyclists, by Month

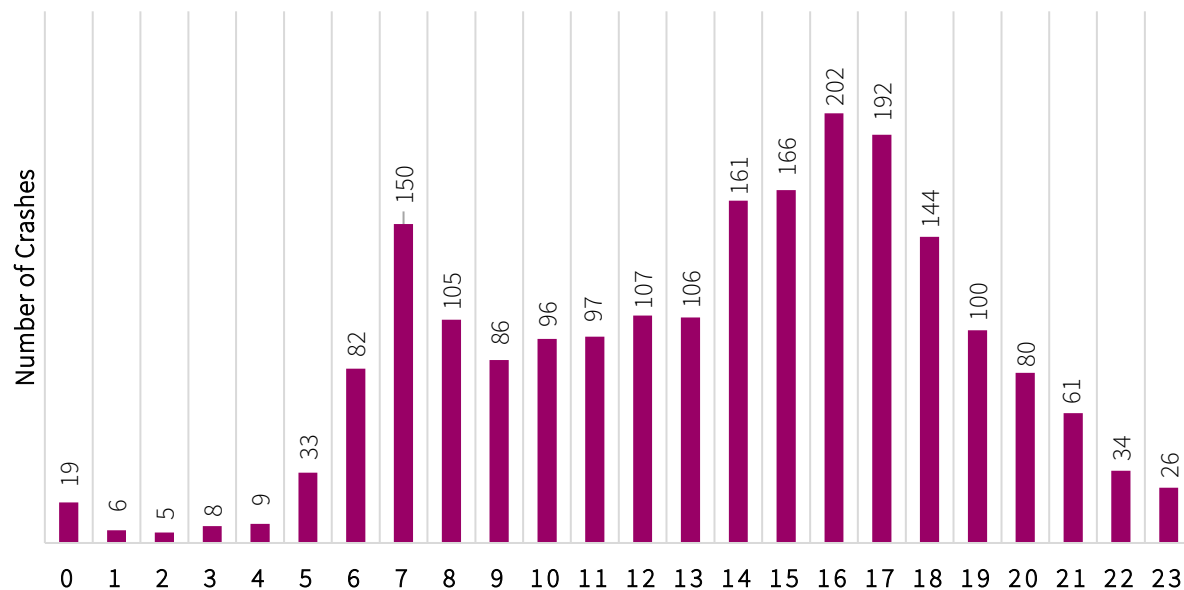


Figure 23: Number of Crashes Involving Bicyclists, by Hour

OLDER DRIVERS (Age 65 and Older)

Older drivers (age 65 and older) were involved in 20,425 (13%) of all incidents reported in the City of Phoenix's local and arterial roads from 2015 to 2019. **Figure 24** shows the injury severity of those crashes.

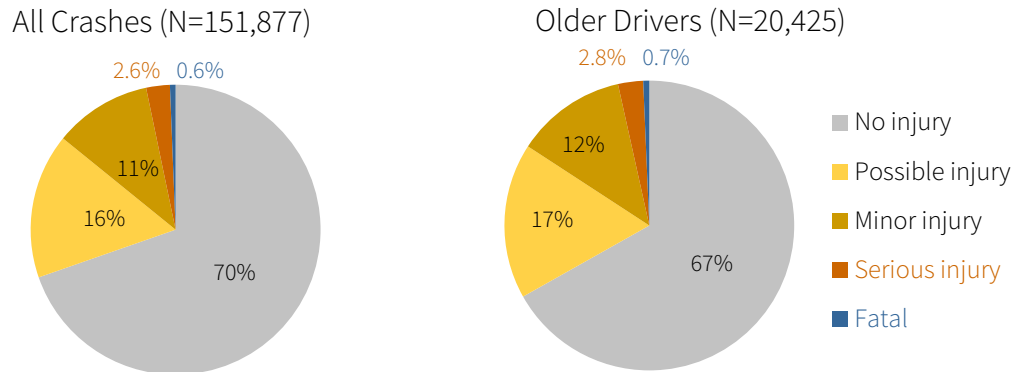


Figure 24: Injury Severity for Crashes Involving Older Drivers, 2015-2019

The most common collision manner of crashes involving older drivers were rear-end and left-turn crashes are shown in **Figure 25**. **Figure 26** shows the distribution of older driver crashes by month and **Figure 27** shows the distribution by hour of the day. The month with the highest number of crashes involving older drivers was March. The greatest frequency of older driver crashes occurs in the afternoon, from 2pm to 4pm.

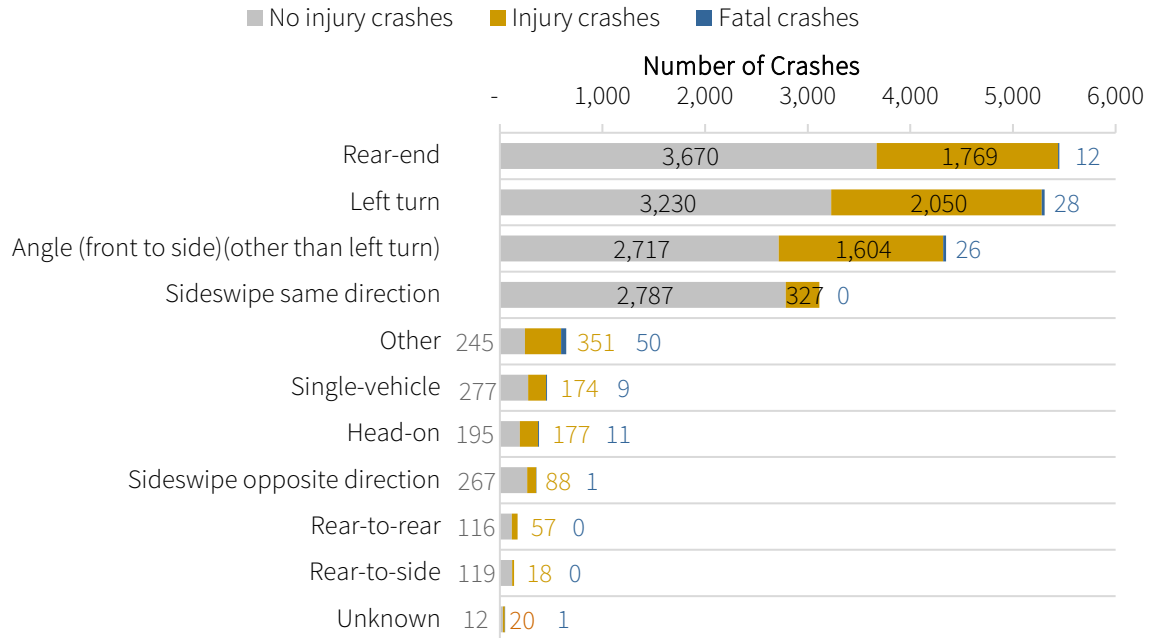


Figure 25: Collision Manner for Crashes Involving Older Drivers, by Year

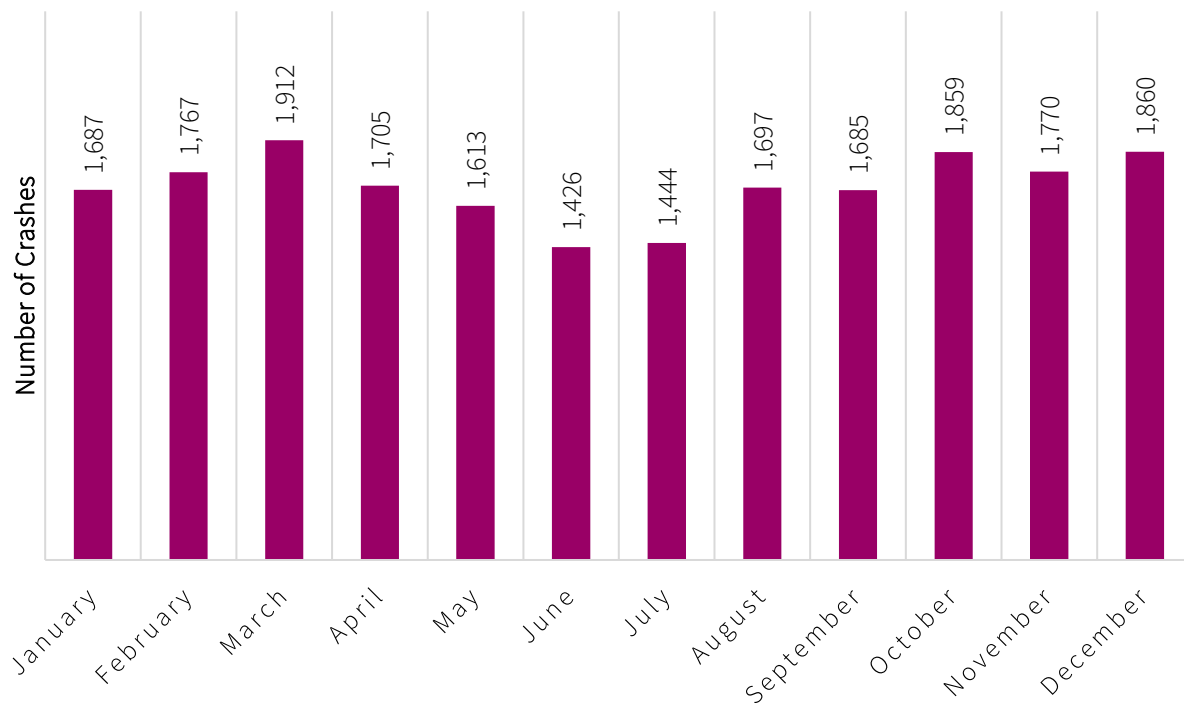


Figure 26: Number of Crashes Involving Older Drivers, by Month

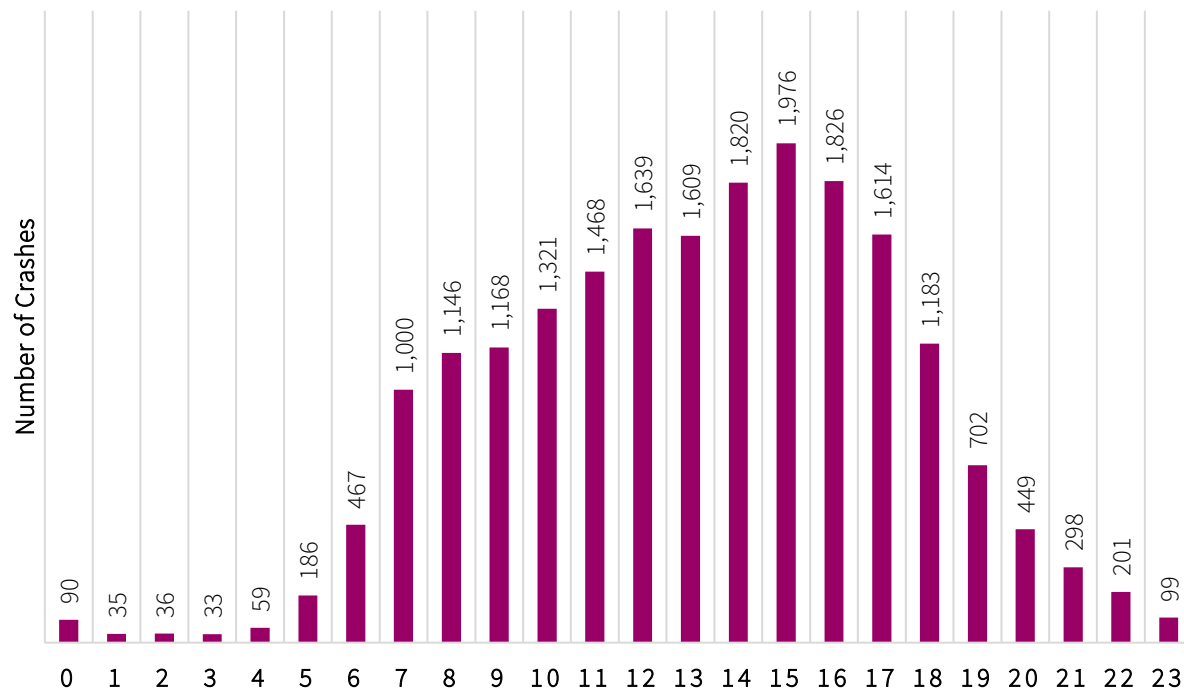


Figure 27: Number of Crashes Involving Older Drivers, by Hour

YOUNGER DRIVERS (Age 24 and Younger)

Younger drivers (age 24 and below) were involved in 62,512 (41%) of all incidents reported in the City of Phoenix's local and arterial roads from 2015-2019. **Figure 28** shows the injury severity of those crashes.

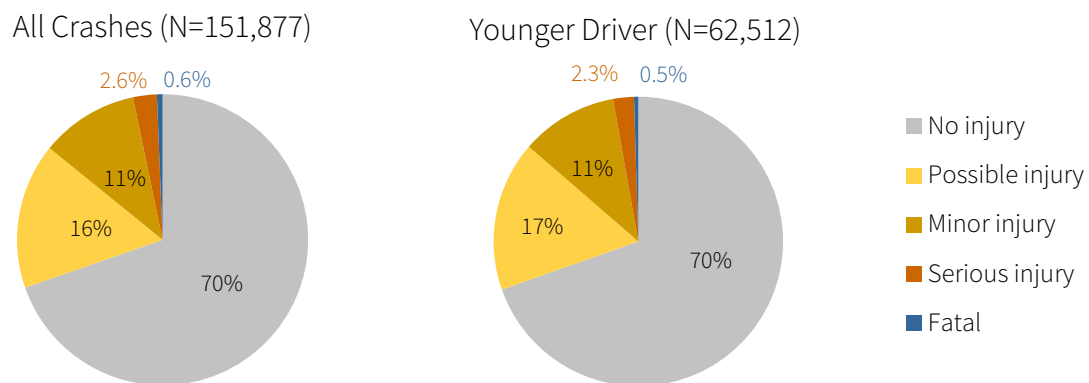


Figure 28: Injury Severity for Crashes Involving Younger Drivers, 2015-2019 (N=62,512)

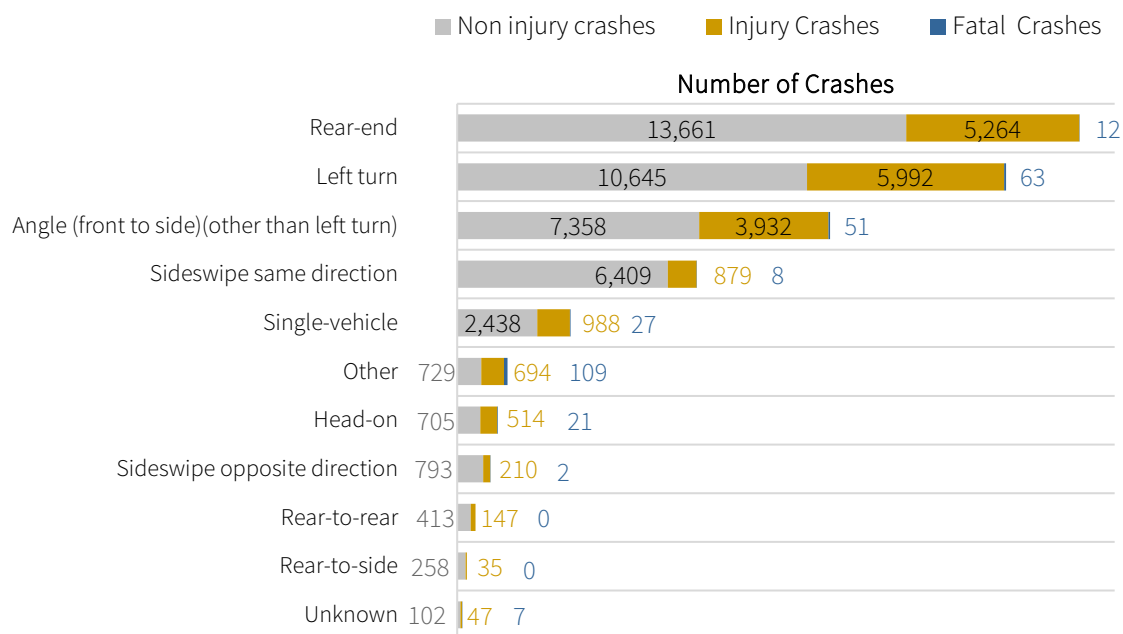


Figure 29: Collision Manner for Crashes Involving Younger Drivers, by Year

The most common collision manners of crashes involving younger drivers were rear-end and left-turn crashes (**Figure 29**). **Figure 30** shows the distribution of younger driver crashes by month and **Figure 31** shows the distribution by hour of the day. The month with the highest number of crashes involving younger drivers was March. An increase in crash frequency was associated with the AM and PM peaks of vehicular travel.

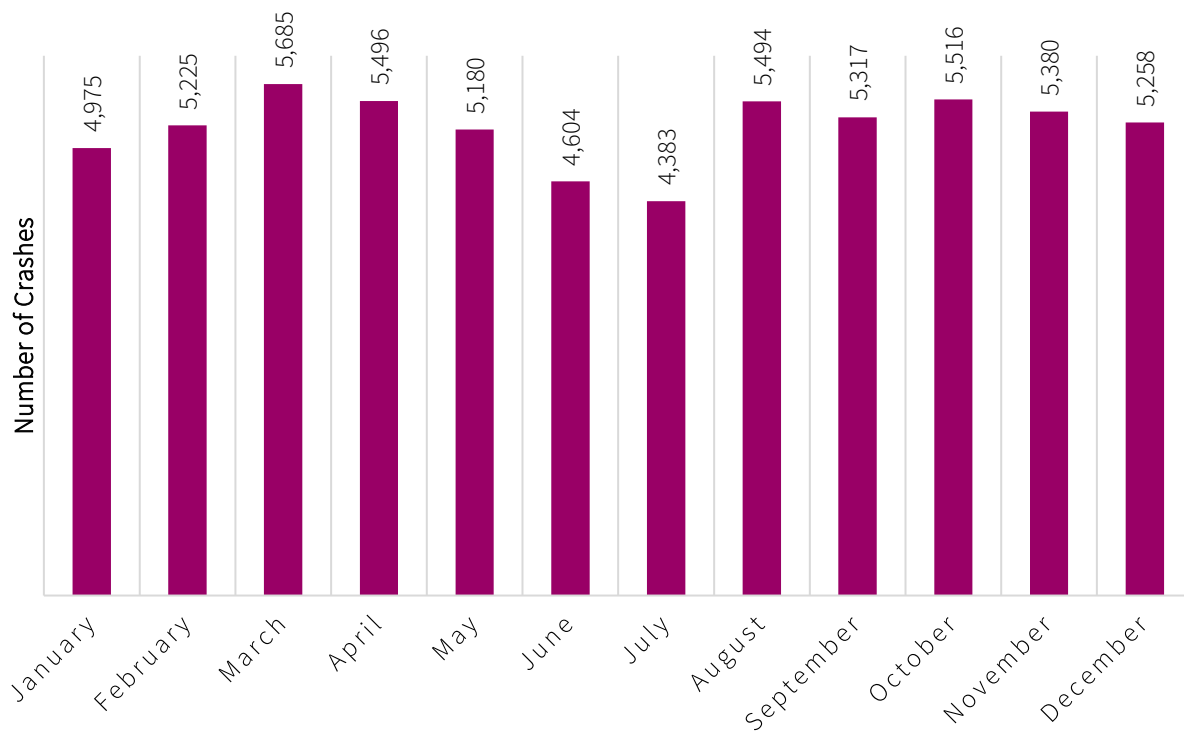


Figure 30: Number of Crashes Involving Younger Drivers, by Month

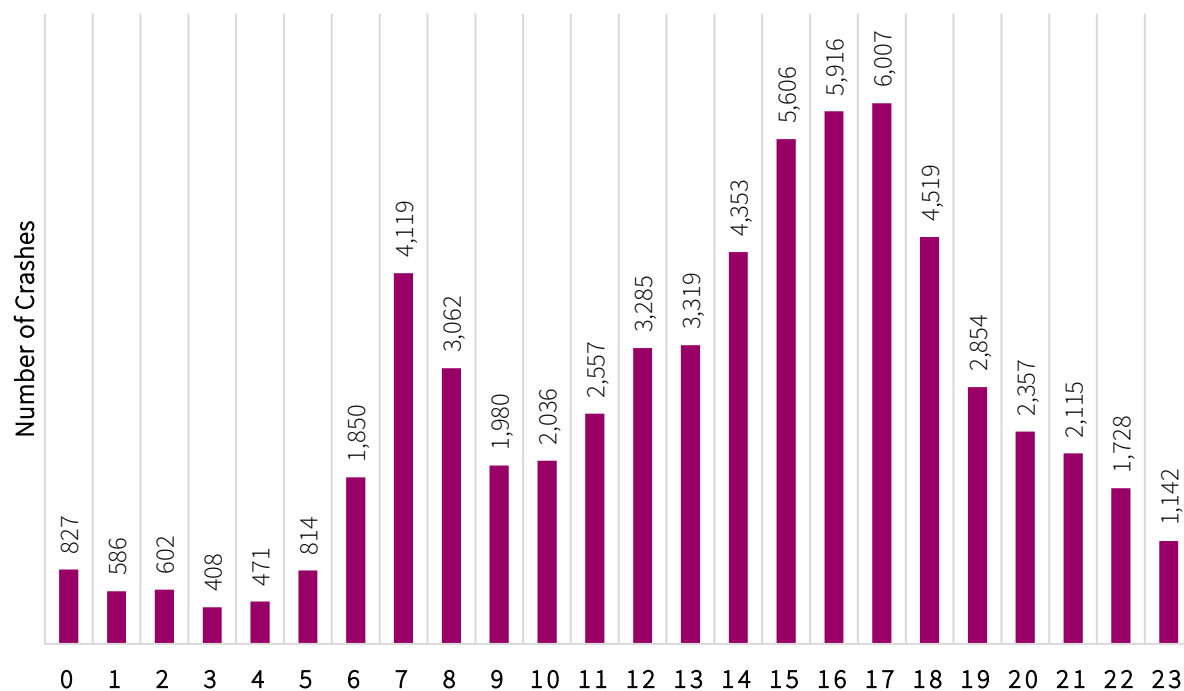


Figure 31: Number of Crashes Involving Younger Drivers, by Hour

TRENDS OF FATAL AND SERIOUS INJURY CRASHES

This analysis uses the KABCO scale of crash severity, where “K” denotes a fatal crash, “A” is a serious injury crash, “B” is a minor injury crash, “C” is a possible injury crash, and “O” is a property damage-only crash. This subsection of the report further details crashes that resulted in at least one serious injury or fatality, and this sub-set of crashes are referred to as “KA” or “KSI” Crashes. A review of critical crashes can identify key trends for further investigation. Compared to reviewing fatal crashes only, reviewing the combination of fatal and serious injury crashes provides a greater sample size and reduces the volatility between years.

KA CRASHES BY COLLISION MANNER

Figure 32 compares the collision manner of KA crashes with crashes that resulted in no injury, possible injury, or minor injuries (BCO crashes). The most common collision manner of BCO crashes is rear-end crashes, while the most common collision manner for KA crashes is “Other”. It is important here to note that the “Other” category is often used to describe the collision manner of crashes involving pedestrians (Figure 17) and crashes involving bicyclists (Figure 21). The second and third most common collision manners for KA crashes are left-turn and angle crashes, respectively.

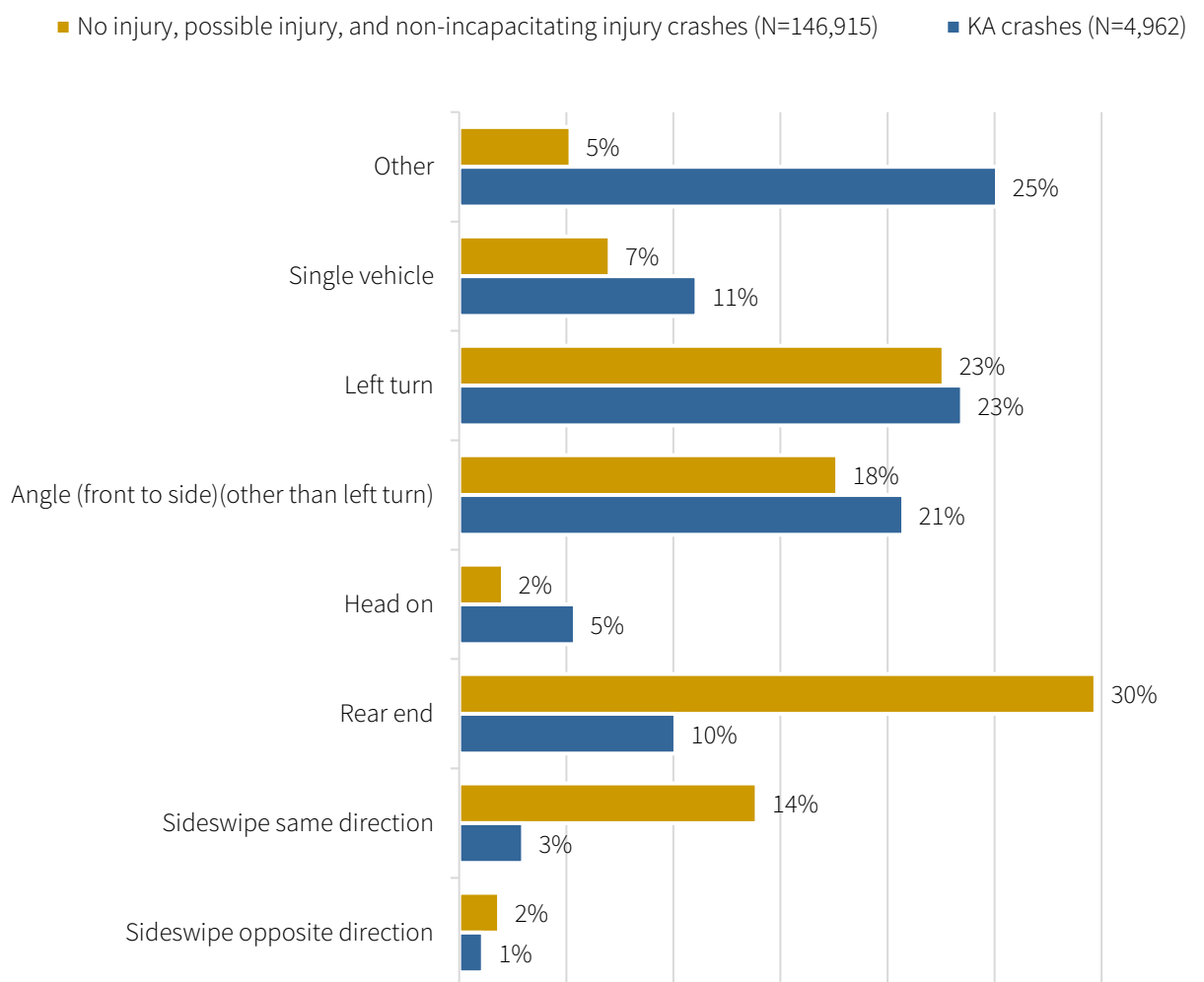


Figure 32: Crashes by Collision Manner and Severity, 2015-2019

KA CRASHES BY MONTH

Figure 33 shows the distribution of KA crashes by month in the period of 2015 to 2019. Consistent with overall crash trends, the month with the highest number of fatal crashes was March and the lowest number of fatal crashes was observed in July.

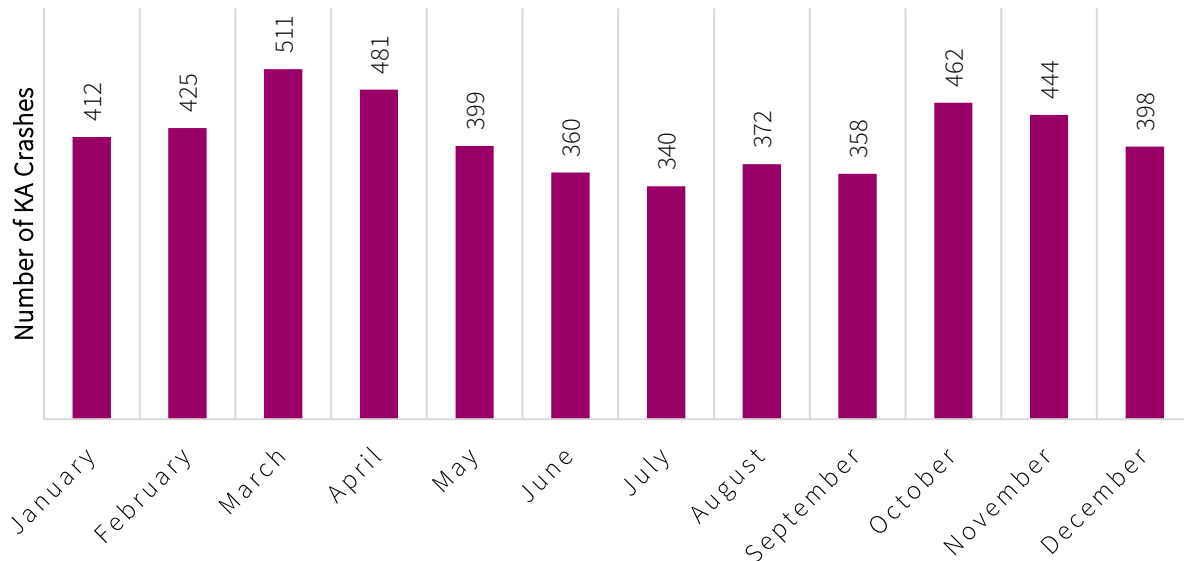


Figure 33: Number of Fatal and Serious Injury Crashes, by Month, 2015-2019

KA CRASHES BY DAY OF WEEK

Figure 34 shows the distribution of fatal and serious injury crashes by day of the week. The day with the highest frequency of serious crashes was Friday, and Sunday was the day with the lowest frequency of KA crashes.

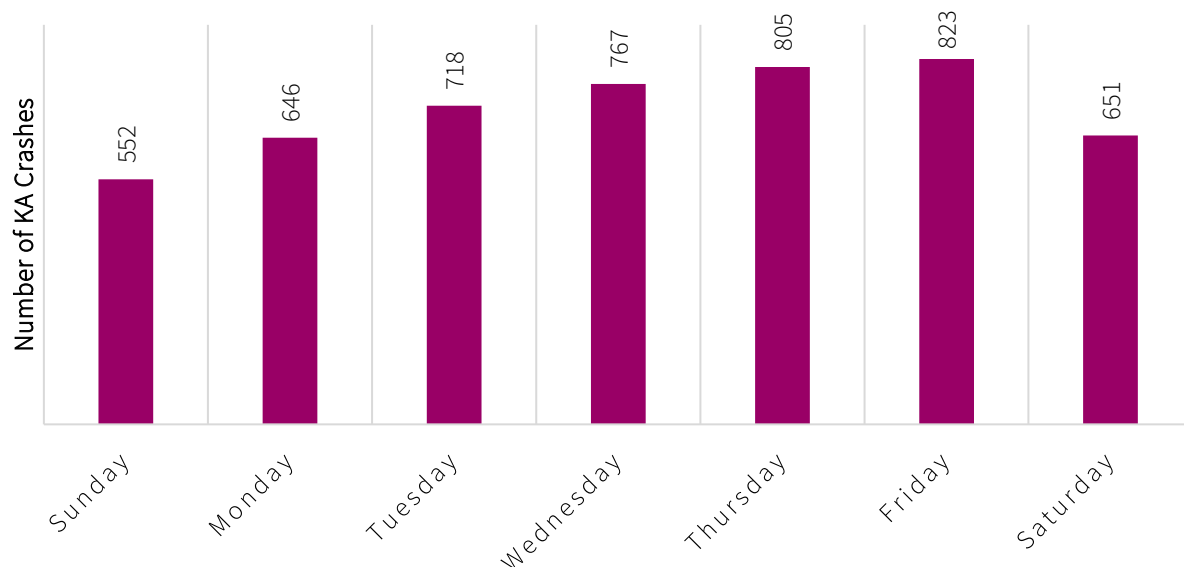


Figure 34: Number of Fatal and Serious Injuries Crashes, by Day of the Week

KA CRASHES BY TIME OF DAY

When analyzing all crashes in the City of Phoenix's local and arterial roads together, only 26% of them occur in dark conditions (Figure 7). However, 40% of KA crashes were reported to have occurred in dark conditions.

Figure 35 shows that KA crashes are overrepresented in non-daylight conditions.

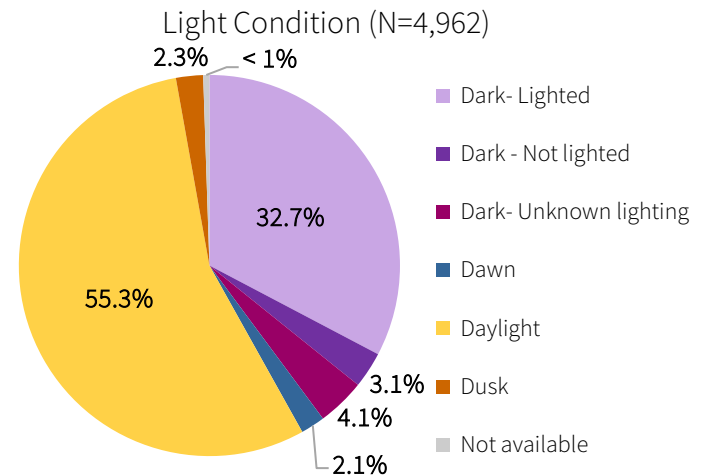


Figure 35: Share of Fatal and Serious Injuries Crashes by Light Condition, 2015-2019

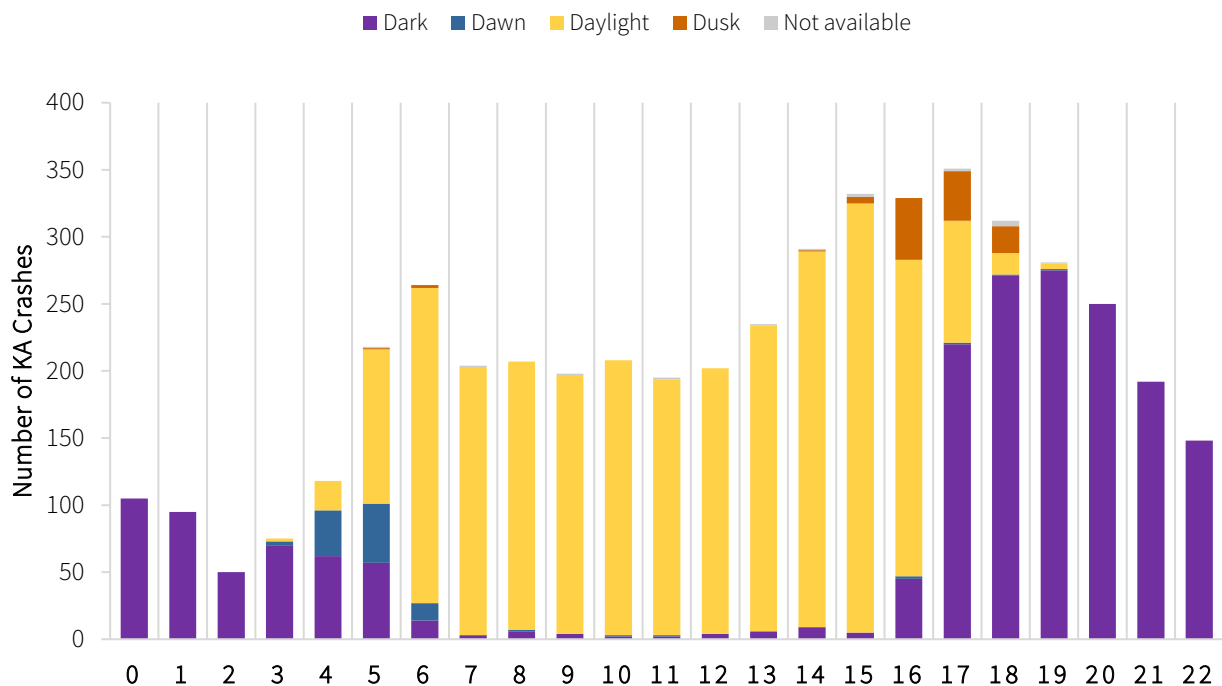


Figure 36: Number of Fatal and Serious Injuries Crashes, by Hour and Lighting Condition

KA CRASHES BY LOCATION

The same criteria to determine the relationship to the closest junction applied to all crashes was applied to KA crashes. Figure 37 shows the crash location by year; about 50% of KA crashes were related to intersections or interchanges.

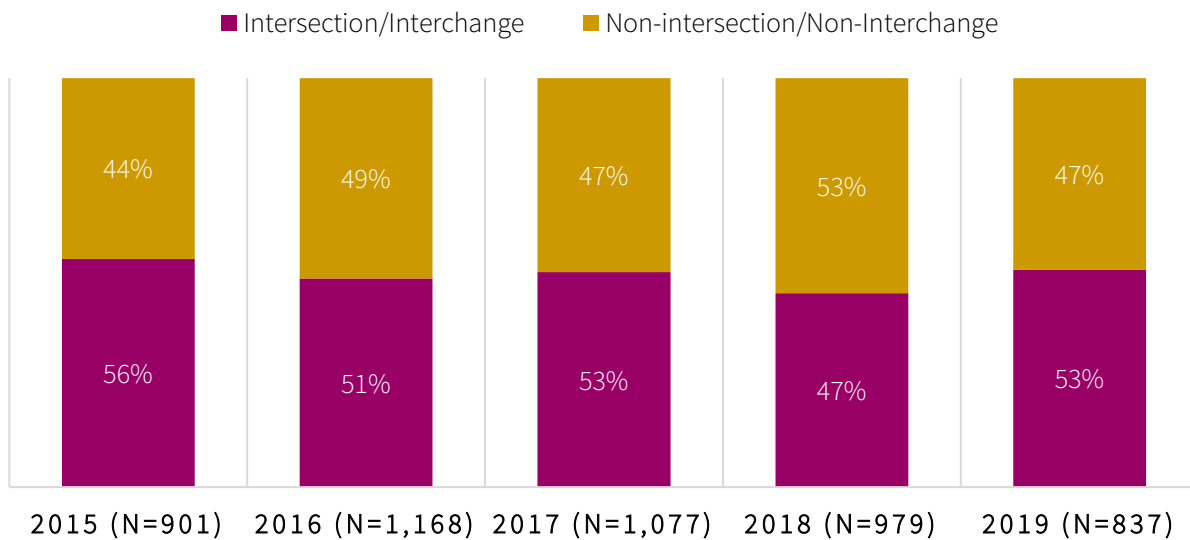


Figure 37: Number of Fatal and Serious Injuries Crashes, by Relation to the Intersection

When comparing the collision manner on intersection-related serious crashes (**Figure 38**) and all crashes (**Figure 11**), it can be seen that while rear-end crashes are the second most common intersection-related crashes, they represent less than 10% of serious crashes. The most common collision manner of intersection-related KA crashes were left-turn and angle crashes.

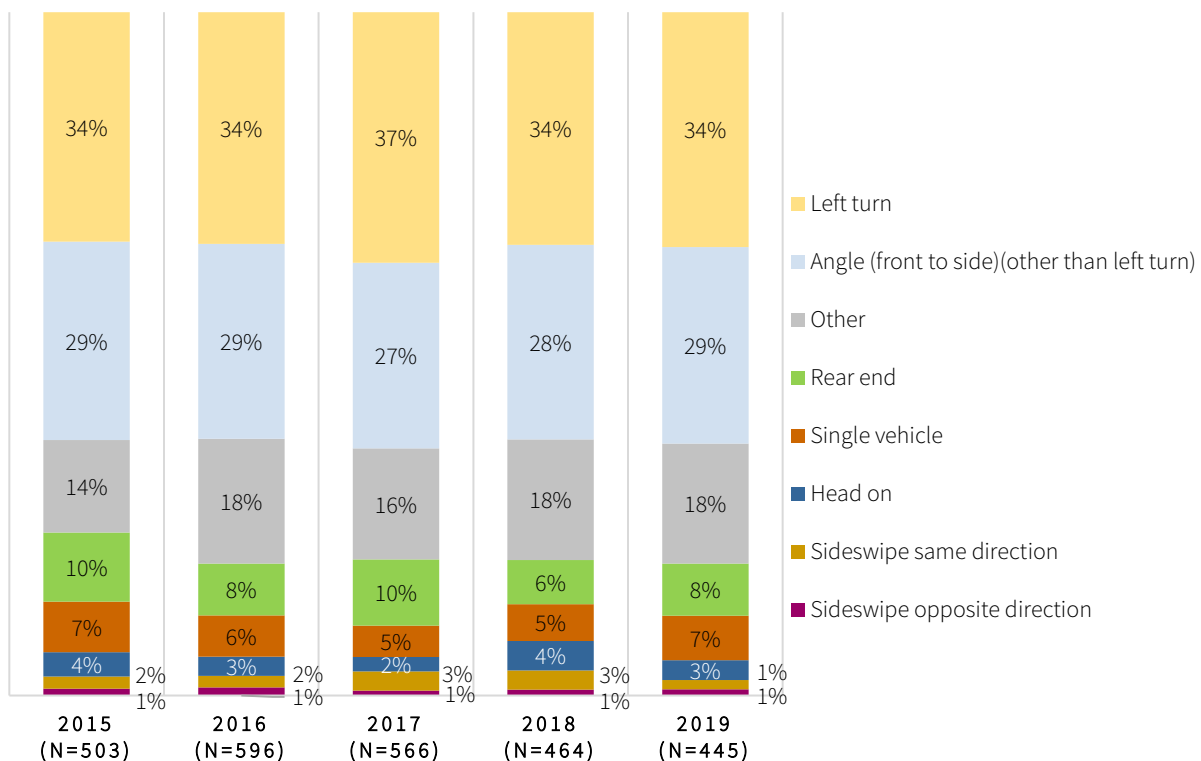


Figure 38: Number of Intersection/Interchange-Related Fatal and Serious Injuries Crashes, by Collision Manner

KA CRASHES BY BEHAVIOR

Figure 39 depicts the frequency of unrestrained driving and speed violation in serious injury and fatal injury crashes. Crashes involving unrestrained drivers represent 16% of KA crashes, and speed-related crashes represent 29% of KA crashes.

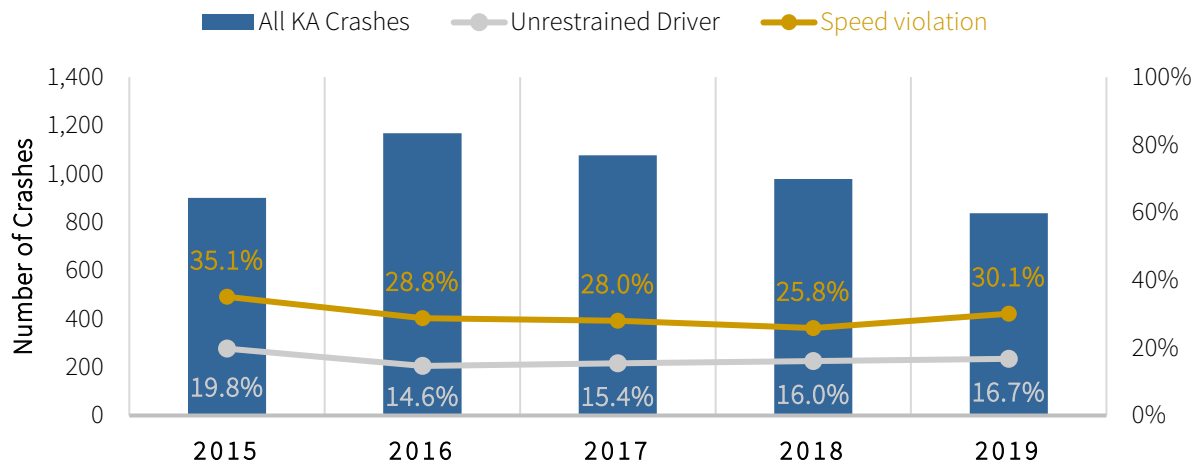


Figure 39: Frequency of Unrestrained Driving and Speed Violation in KA Crashes

COMPARISON TO STATEWIDE AND REGIONAL SAFETY TRENDS

Nationwide summaries of all crashes are available from the National Highway Traffic Safety Administration (NHTSA) Annual Report Tables. NHTSA reports on a yearly basis crash summaries by diverse aspects, such as injury severity, first harmful event, and collision manner.

The Arizona Strategic Traffic Safety Plan (ADOT STSP), published in October 2019, summarizes crash data from the ACIS database from 2009 to 2018. The crash statistics in the ADOT STSP are primarily reported at the person-level, which varies from the RTSIMS reporting, which is primarily at the crash-level. Furthermore, the ADOT STSP does not make any distinction between local roads and freeways while RTSIMS reports (for the purpose of this summary) focus on local and arterial roads only. For the purposes of this comparison, statewide data at the crash-level was retrieved from the ACIS database.

From 2015 to 2018, 43% of the MAG Region's local and arterial road collisions were registered in the City of Phoenix (**Figure 40**). In terms of population, City of Phoenix residents represent 36% of Maricopa County's population. **Figure 41** compares the injury severity of collisions reported in the state of Arizona, MAG Region local and arterial roads, and City of Phoenix local and arterial roads. The results indicate that the fatality rate (at the crash level) is rather similar among the geographies; from 2015 to 2018, 0.6% of all crashes reported on local and arterial roads were fatal crashes, both in the City of Phoenix and in the MAG Region, at the state level, about 0.7% of all reported crashes were fatal.

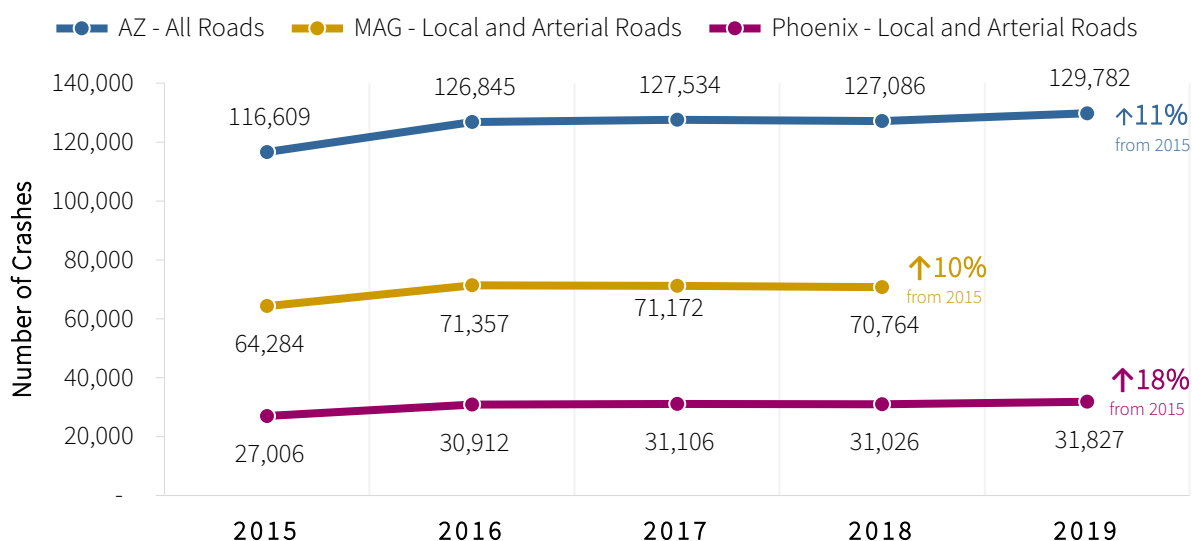


Figure 40: Total Crashes Comparison of State of Arizona, MAG Region, and City of Phoenix

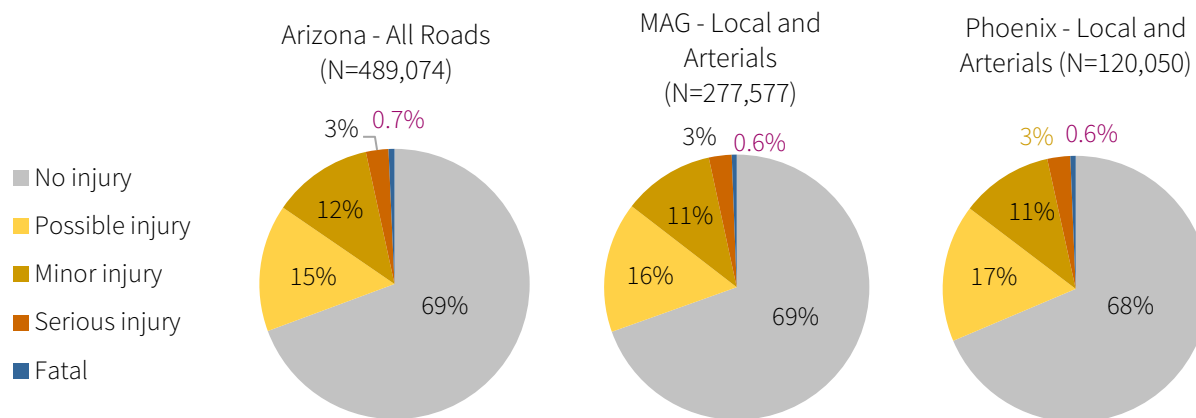
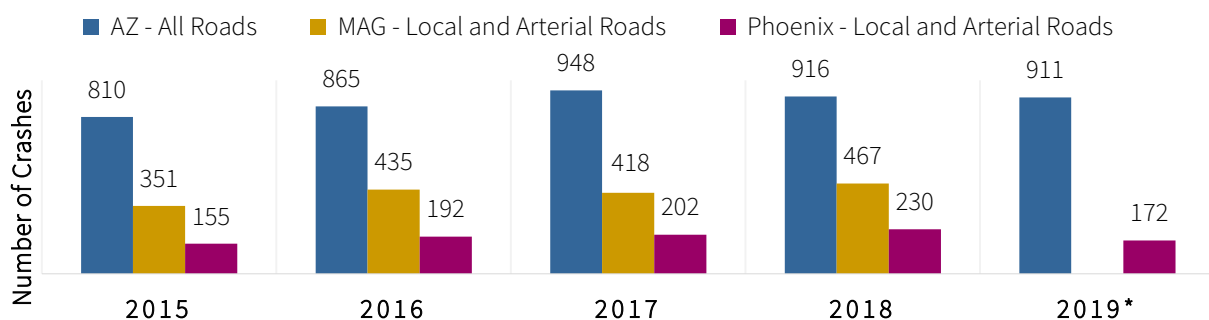


Figure 41: Crash Severity Comparison of State of Arizona, MAG Region, and City of Phoenix (2015-2018)

In the same period, fatal crashes in the City of Phoenix corresponded to 46.6% of the MAG Region's fatal crashes. **Figure 42** shows a similar comparison for fatal crashes registered on the two areas, in addition to the total crashes in the state of Arizona. **Figure 43** shows the number of fatalities (person-level) registered per year in the state of Arizona and the City of Phoenix. During the five years under study, fatalities on the City of Phoenix's local and arterial roads represented 21% of all Arizona's traffic-related fatalities. This percentage is slightly lower than the share of Arizona residents living in Phoenix in the same period (23%).



**Note: MAG data was sourced from the MAG Strategic Transportation Safety Plan, which analyzed data from 2009 to 2018. Data from 2019 was not available for comparison.*

Figure 42: Fatal Crashes Comparison of Arizona, Maricopa County, and City of Phoenix

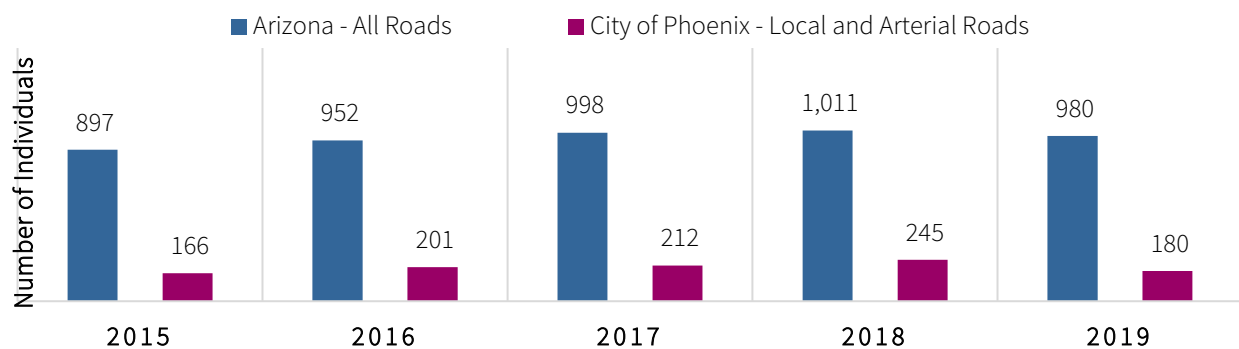
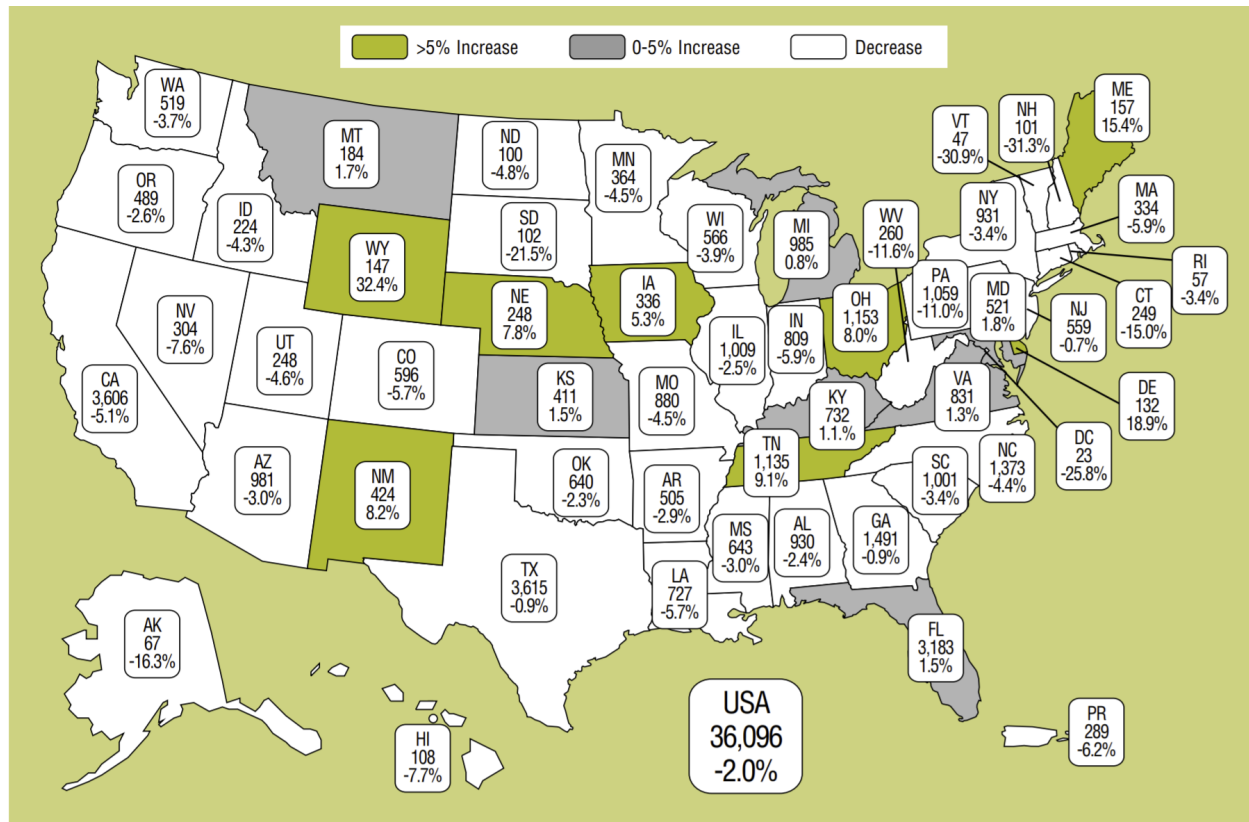


Figure 43: Total Number of Fatalities (Persons) per Year Comparison, Arizona and City of Phoenix

From 2018 to 2019, the number of fatalities in Arizona decreased by 3%. Fatalities in the City of Phoenix (local and arterial roads) decreased by 26% from 2018 to 2019 (Figure 43); however, the year-to-year fluctuation in this data does not indicate a clear trend. National statistics on 2019 fatalities and percent change trends from 2018 are shown in Figure 44.

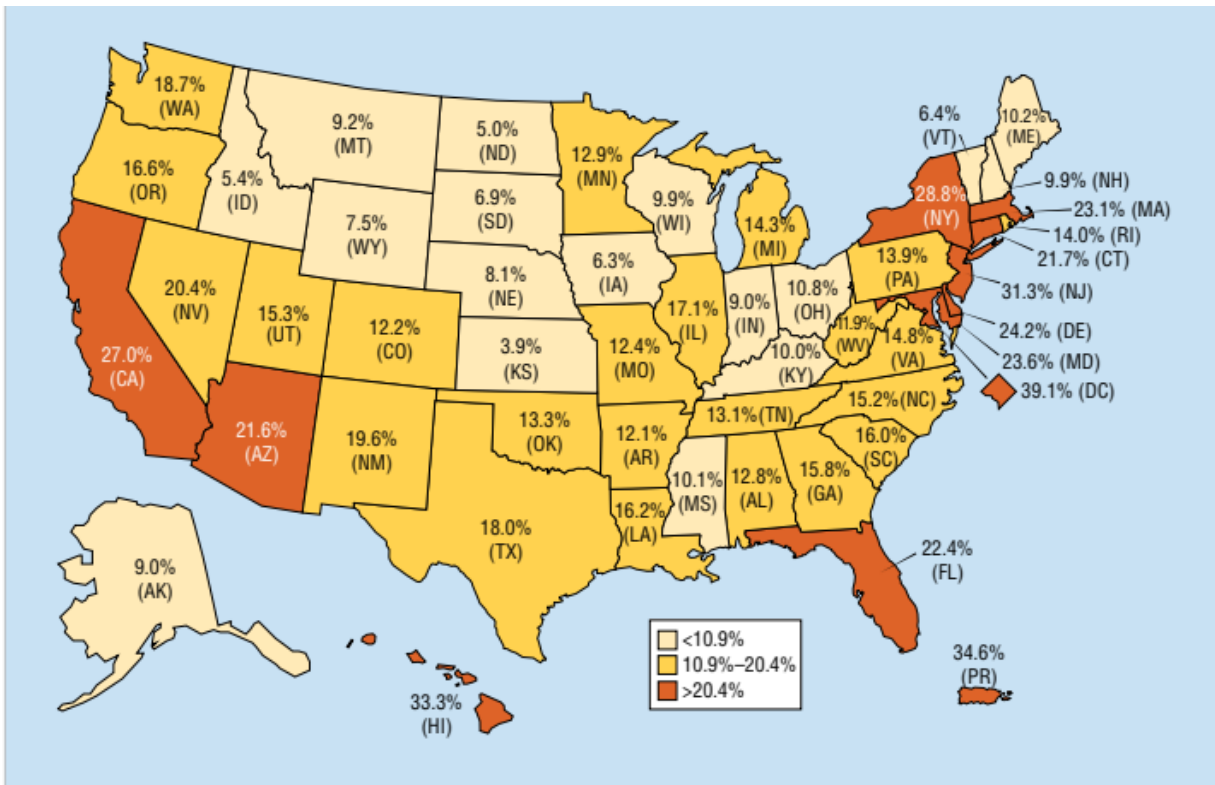


Source: FARS 2018 Final File, 2019 ARF
Note: Puerto Rico is not included in the USA total.

Figure 44: 2019 Fatalities and Percent Changes From 2018, by State (Person-Level).
(Source: FARS Data, NHTSA Graph)

PEDESTRIANS

A large share of traffic fatalities involve pedestrians. **Figure 45** shows that the State of Arizona was above the national average, with pedestrians accounting for approximately 22% of 2019 fatalities. In the City of Phoenix, the share of fatalities that is represented by pedestrians grew from 37% in 2015 to 44% in 2019 (Figure 46).

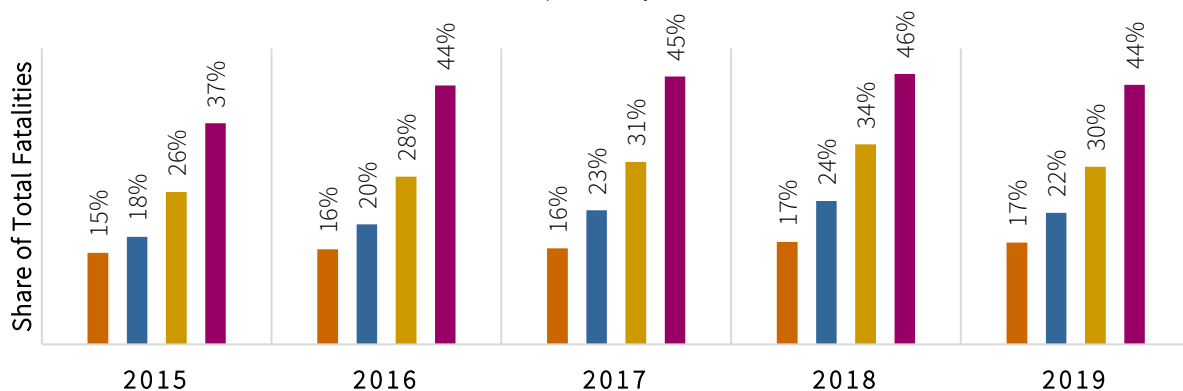


Source: FARS 2019 ARF

Figure 45: Percentage of Total Fatalities Involving Pedestrians, by State (Persons)

Source: FARS Data, NHTSA Graph

■ US - All Roads ■ Arizona - All Roads ■ Maricopa County* - All Roads ■ Phoenix - Local and Arterial Roads

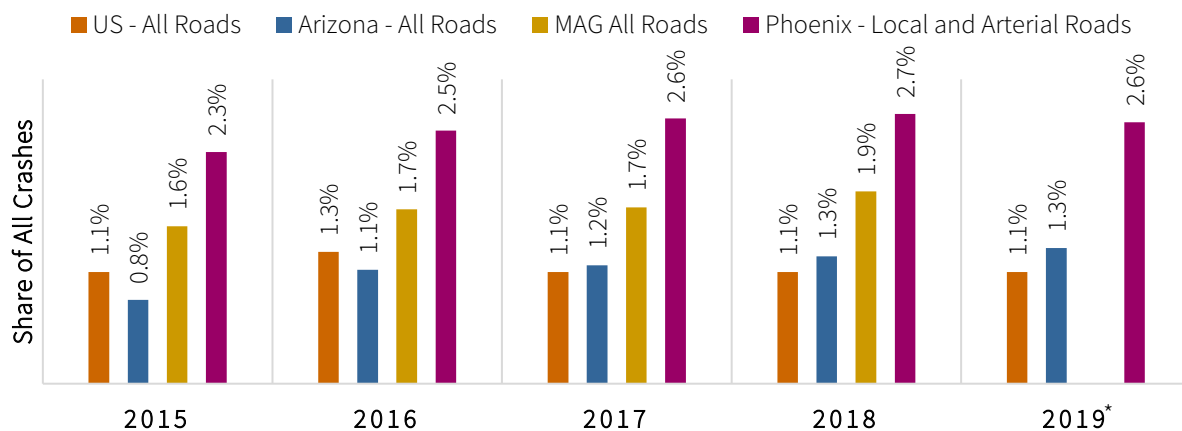


*Note: Maricopa County information obtained from ACIS database.

Figure 46: Share of Total Fatalities Who Were Pedestrians, Comparison across Geographies

Although the MAG STSP data does not exclude freeway crashes, an analysis of the data found that 98% of total pedestrian crashes in the 10-year studied period (2009-2018) occurred off-freeway, on the local and arterial roadway network. The analysis also found that the same percentage was true for bicycle-related crashes. Therefore; the MAG STSP and RTSIMS datasets are reasonably similar for comparison purposes. As shown in **Figure 47**, The percentage of pedestrian-related crashes was found to be 1.1% in all United States, 1.1% in the State of Arizona, 1.7% in the MAG region, and 2.5% in the City of Phoenix.

Phoenix represents 36% of the County's population and about 43% of local and arterial road crashes; however, 63% of Maricopa County's pedestrian-related crashes occurred in the City of Phoenix's local and arterial roads.



*Note: MAG data was sourced from the MAG Strategic Transportation Safety Plan, which analyzed data from 2009 to 2018. Data from 2019 was not available for comparison.

Figure 47: Pedestrian Crashes per Year, Comparison across Geographies

In terms of injury severity, the distribution of pedestrian-related crashes is very similar in the MAG Region and the City of Phoenix (**Figure 48**). The majority of crashes (63%) of both datasets result in possible or minor injury, while nearly one-quarter (22-23%) result in serious injury, and about 12% result in fatal injury. Only a very small portion of pedestrian-related crashes result in no injuries (2-3%).

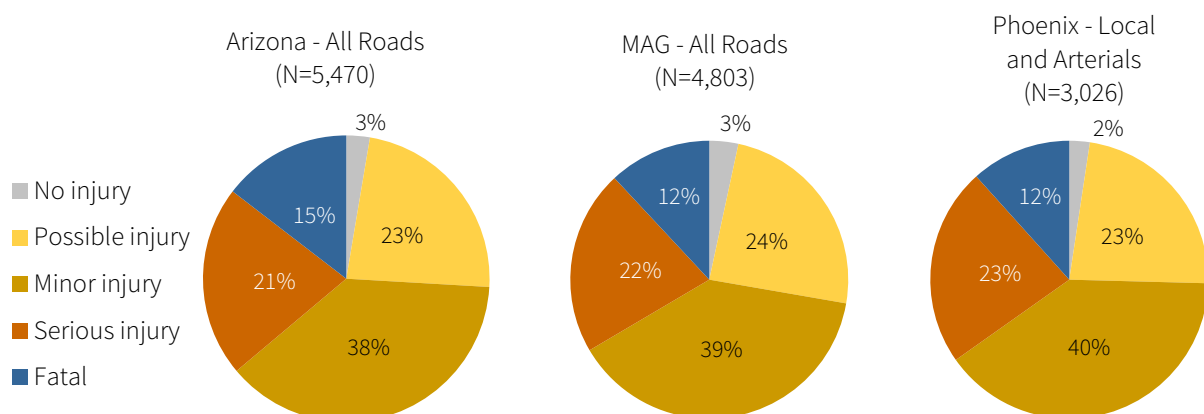
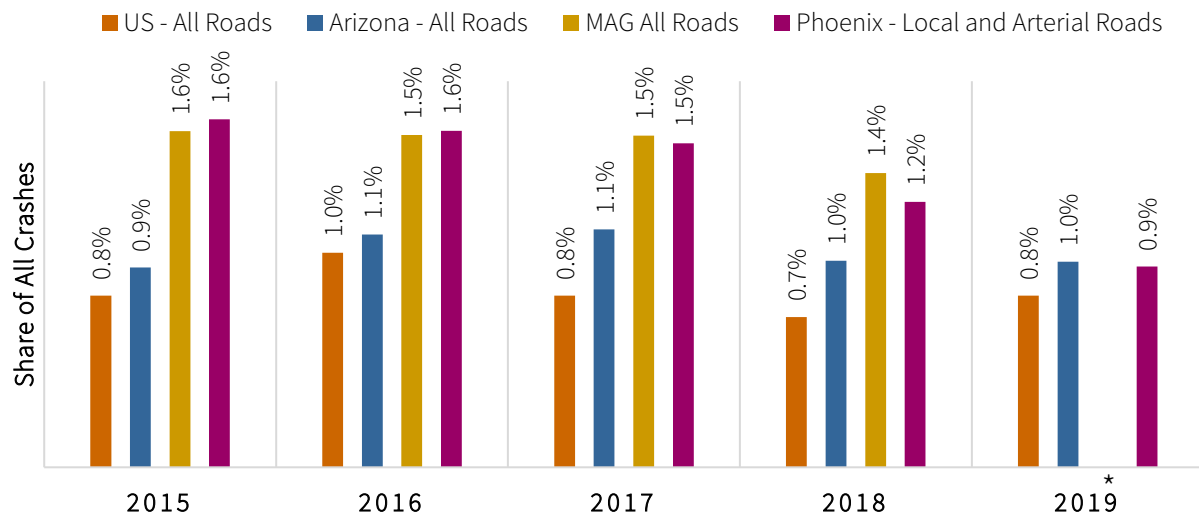


Figure 48: Severity of Pedestrian Crashes, Comparison across Geographies (2015-2018)

BICYCLISTS

As shown in **Figure 49**, the percentage of crashes involving bicyclists was similar between the two areas, with an average of 1.5% of total crashes in the MAG Region and 1.5% in the City of Phoenix. The injury severity distribution of bicyclist-related crashes is also similar between the two areas, as shown in **Figure 50**. The majority of crashes (78-79%) of both datasets result in possible or minor injury, 13% result in serious injury, and 2% result in fatal injury. About 6-7% of bicyclist-related crashes resulted in no injuries.



*Note: MAG data was sourced from the MAG Strategic Transportation Safety Plan, which analyzed data from 2009 to 2018. Data from 2019 was not available for comparison.

Figure 49: Bicycle Crashes per Year, Comparison across Geographies

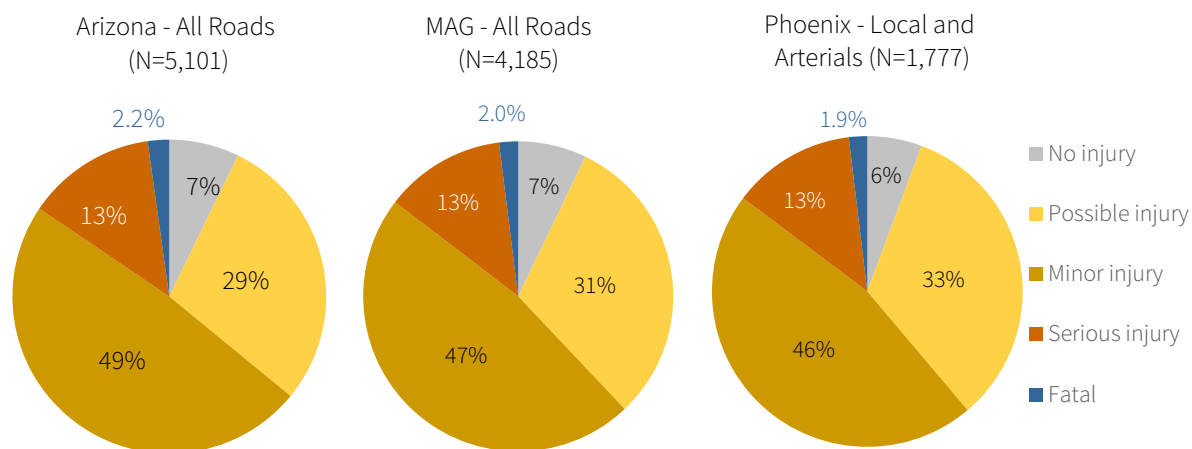
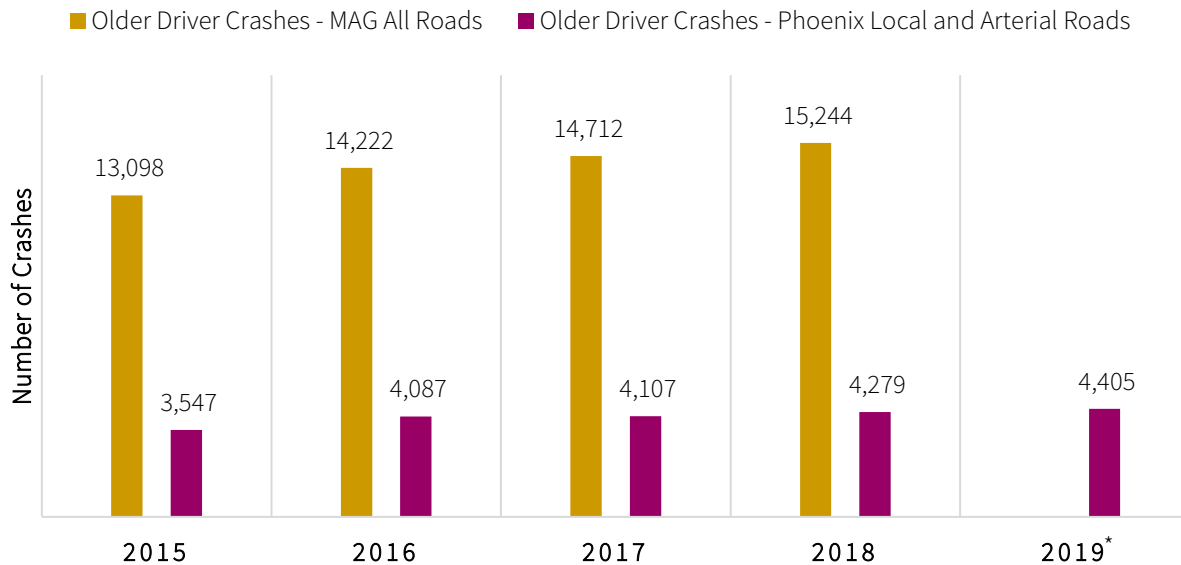


Figure 50: Severity of Bicycle Crashes, Comparison across Geographies (2015-2018)

OLDER DRIVERS (65 and older)

Other vulnerable user groups were also analyzed, including older drivers and younger drivers. **Figure 51** compares the number of crashes involving older drivers on all roads of the MAG Region and City of Phoenix's local and arterial roads. Approximately 28% of the older driver crashes in the MAG Region were registered on City of Phoenix's local and arterial roads.



*Note: 2019 data was not available for the MAG Region per its Strategic Transportation Safety Plan.

Figure 51: Older Driver Crashes per Year, MAG Region, and City of Phoenix

Figure 52 shows a breakdown by injury severity for crashes on local and arterial roads involving older drivers in the period of 2015-2018. Compared to crashes involving all age groups, the percentage of fatal and serious injury crashes remained the same, with a slight shift from no injury to possible and minor injury crashes. The trends of older drivers are quite similar between the MAG Region and City of Phoenix.

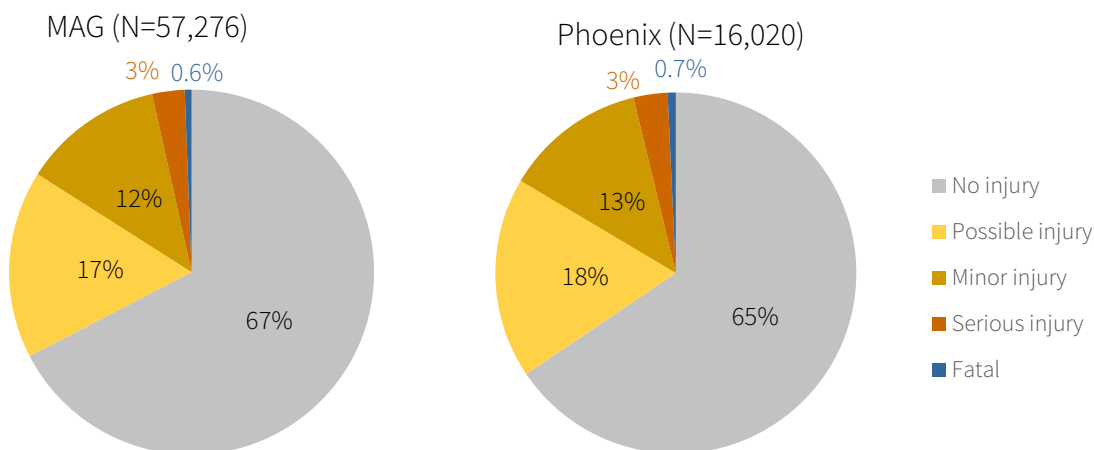
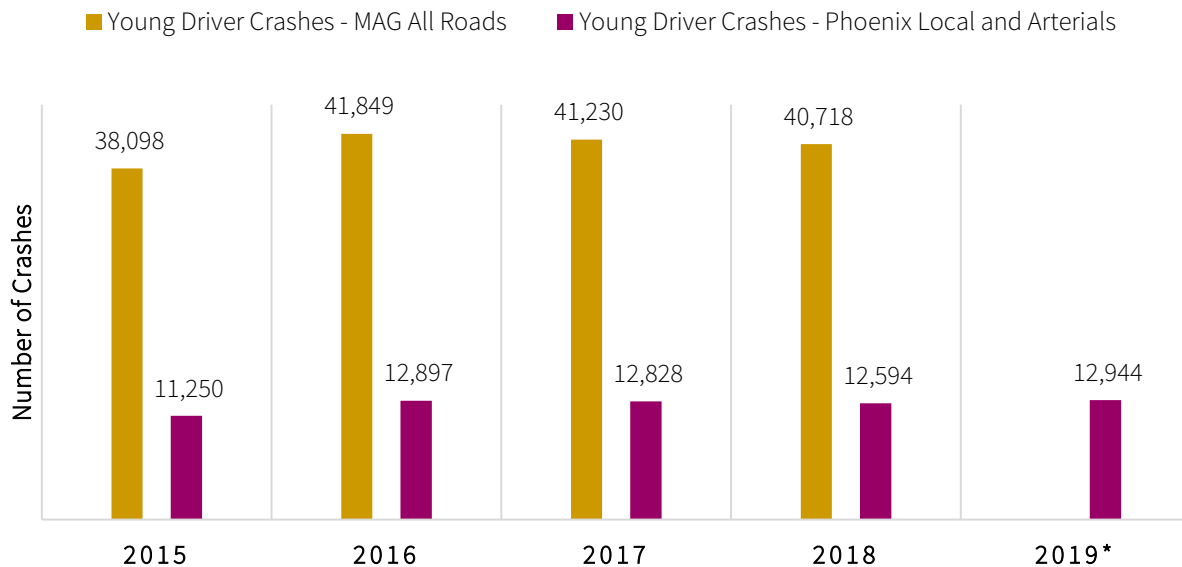


Figure 52: Severity of Older Driver Crashes, MAG Region and Phoenix (2015-2018)

YOUNGER DRIVERS (24 and below)

Figure 53 compares the number of crashes involving younger drivers on all roads of the MAG Region and City of Phoenix's local and arterial roads. Younger driver crashes on the City of Phoenix's local and arterial roads represented about 31% of crashes involving younger drivers in the MAG Region.



*Note: MAG data was sourced from the MAG Strategic Transportation Safety Plan, which analyzed data from 2009 to 2018. Data from 2019 was not available for comparison.

Figure 53: Younger Driver Crashes per Year, MAG Region, and City of Phoenix

Figure 54 shows that the severity of crashes on local and arterial roads involving younger drivers was similar in both geographies. In addition, the younger driver crashes are generally consistent with the overall crash summaries of each area for all age groups.

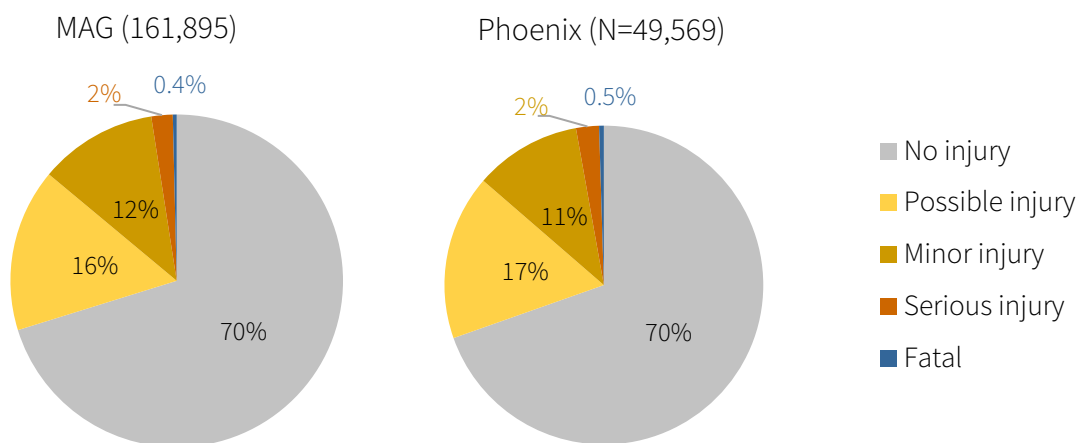


Figure 54: Severity of Younger Driver Crashes, MAG Region and Phoenix (2015-2018)

CONCLUSION

Crash queries were obtained through the Maricopa Association of Governments (MAG) software tool for crash analysis, the Regional Transportation Safety Information Management System (RTSIMS). This report used existing tools to conduct a safety analysis of the past five years, and compared trends to regional and statewide data. The following key findings are based on a review of RTSIMS crash data from 2015 to 2019:

- An annual average 30,376 crashes per year were reported during the five year study period. This equates to 83 crashes per day.
- Crashes on arterial and local roadways in the City of Phoenix increased by a rate of about 4.4% per year. This trend suggests that the crash frequency increased at a higher rate than the City's population, which in the same period grew 1.5% per year, on average.
- Most crashes result in no injury (70%), approximately one-quarter result in possible or minor injury (27%), 2.6% result in serious injury, and 0.6% result in fatal injury. This equates to two serious injury crashes occurring each day, and one fatal crash occurring every other day.
- The percentage of fatal and serious injury crashes has remained generally consistent over the past five years; however the percentage of no injury crashes has steadily increased over time.
- Rear end crashes were the most common collision manner, followed by left-turn crashes. These two crash types account for about half of all crashes.
- For fatal and serious injury crashes, the "Other" collision manner was reported most frequent (25%), which is commonly selected for crashes involving pedestrians and bicyclists. Other frequent crash types for fatal and serious injury crashes were left-turn (23%) and angle (21%).
- Crashes involving unrestrained drivers (i.e, lack of seatbelt, helmet use) have reduced in frequency.
- Due to lack of protection on impact, pedestrians and bicyclists (vulnerable users) are more frequently seriously injured when involved in motor vehicle crashes. In the City of Phoenix, crashes involving bicyclists and pedestrians represent nearly half (48%) of all fatal crashes.
- A greater share of pedestrian crashes is occurring in Phoenix compared to other agencies within the MAG Region. Phoenix represents 36% of Maricopa County's population and about 43% of the County's local and arterial road crashes; however, 63% of County crashes involving pedestrians occurred on City of Phoenix's local and arterial roads.
- Bicyclist crashes are occurring at a greater rate in Phoenix than in other agencies within the MAG Region. About 43% of all crashes involving bicyclists in Maricopa County occurred on City of Phoenix's local and arterial roads.
- For all crash severities, the majority of crashes occur during daylight hours (71%), with the remaining 29% of crashes occurring during dawn, dusk, or dark conditions.
- A correlation exists between injury severity and lighting condition; fatal and serious injury crashes occurred more frequently during dawn, dusk, and dark conditions (45%) compared to daylight conditions (55%).

The MAG RTSIMS tool provided the ability to retrieve data quickly for numerous Citywide statistics. During the analysis process, several discrepancies were identified when comparing to past Phoenix data, which is common when comparing different datasets. The City of Phoenix conducts a robust data scrubbing process each year, which confirms crashes exist within the City of Phoenix boundaries, omits freeway crashes, and reviews characteristics of crashes in detail to correct the manner of collision if originally mis-coded. The RTSIMS crash data is not scrubbed, and comes directly from ADOT ACIS. These differences, along with variations in the querying process, are acknowledged as part of this report. This data contained in this

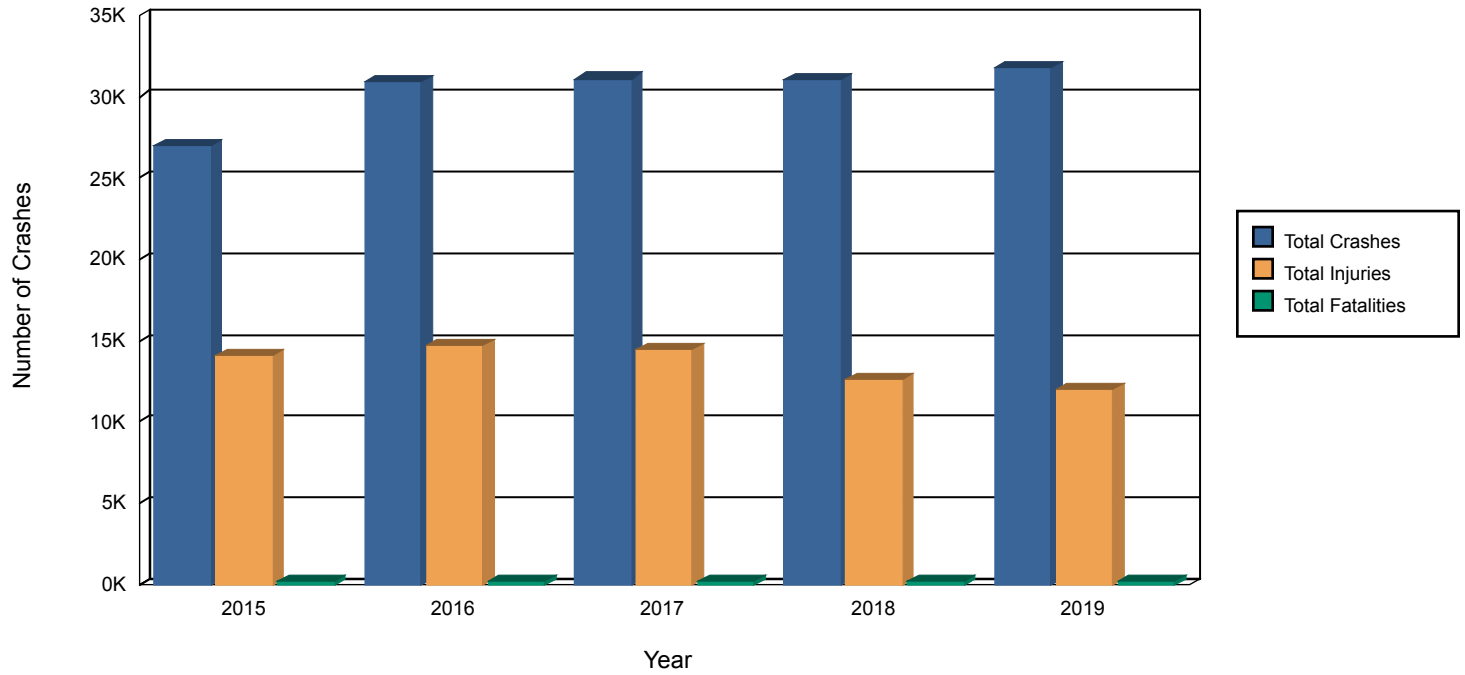
report is intended to provide preliminary information; later stages of this project will modernize the existing City of Phoenix crash analysis process to improve and enhance data analytics and visualization.

APPENDIX A: RTSIMS QUERY OUTPUTS

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Crashes by Year (Phoenix)

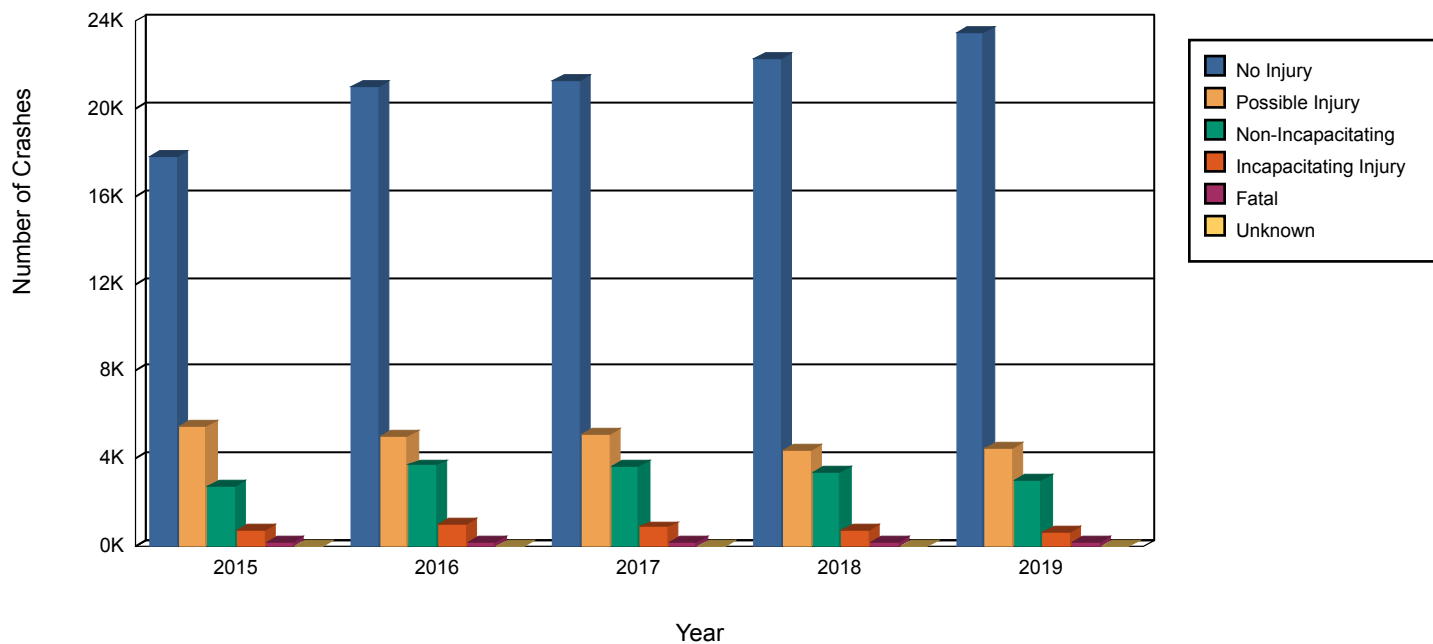


Year	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
2015	27,006	9,023	155	14,120	166
2016	30,912	9,701	192	14,688	201
2017	31,106	9,641	202	14,463	212
2018	31,026	8,527	230	12,637	245
2019	31,827	8,232	172	12,008	180

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Crashes by Year (Phoenix)

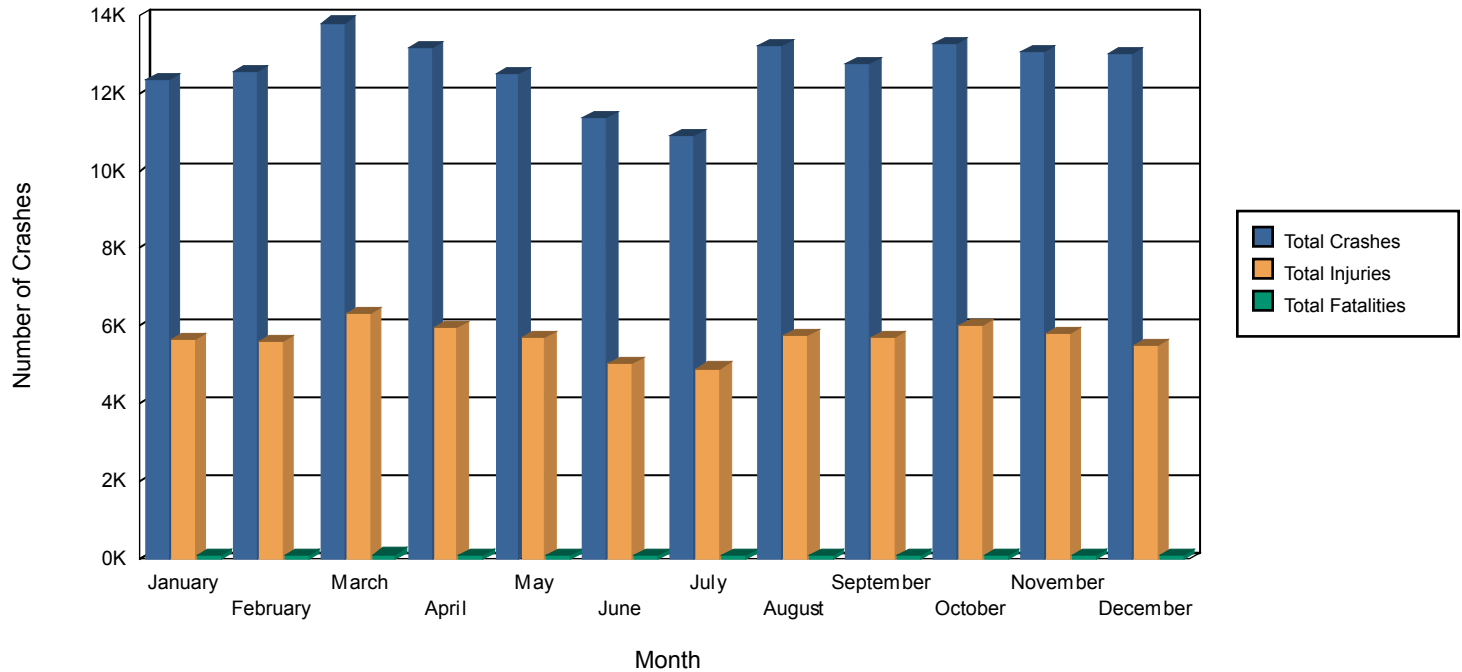


Year	No Injury	Possible Injury	Non Incapacitating	Incapacitating Injury	Fatal	Unknown	Total
2015	17,828	5,508	2,769	746	155	0	27,006
2016	21,019	5,018	3,707	976	192	0	30,912
2017	21,263	5,139	3,627	875	202	0	31,106
2018	22,269	4,400	3,378	749	230	0	31,026
2019	23,423	4,509	3,058	665	172	0	31,827

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Crashes by Month (Phoenix)

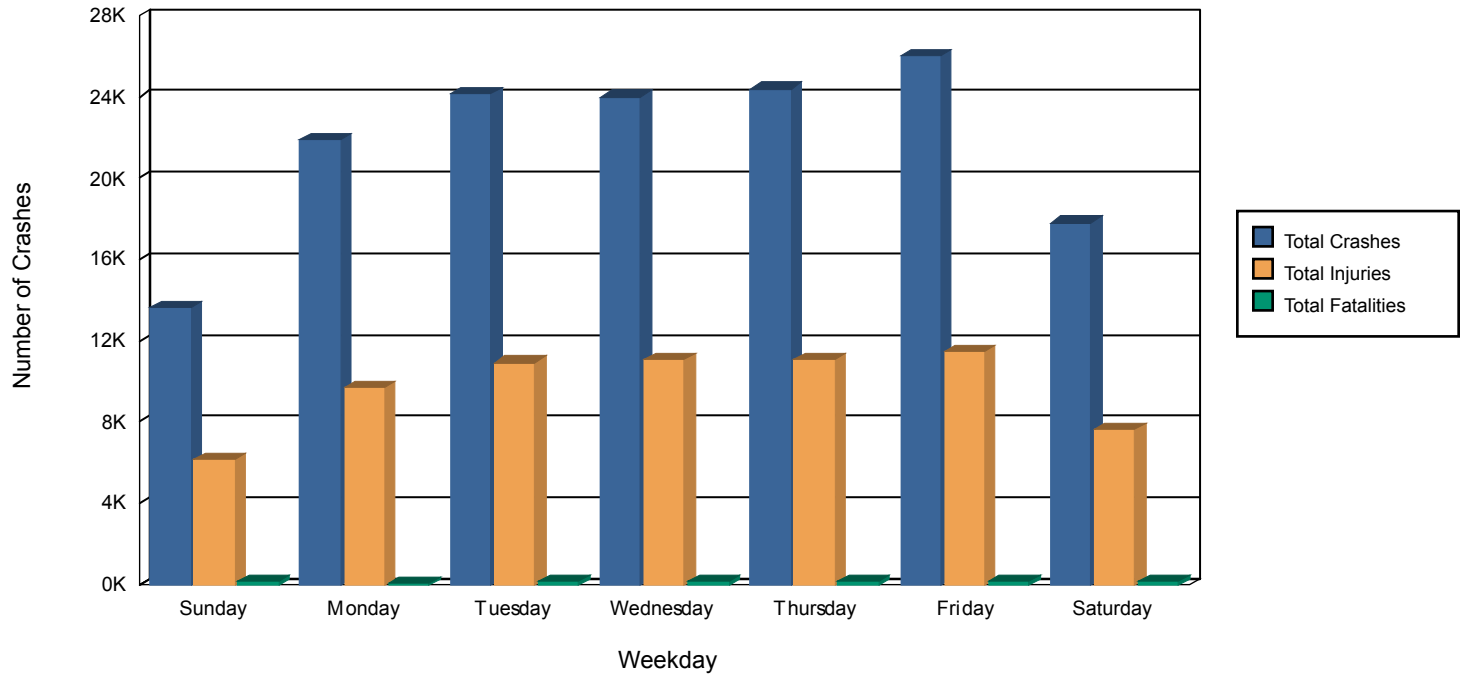


Month	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
January	12,337	3,781	80	5,668	87
February	12,553	3,726	77	5,602	83
March	13,809	4,188	102	6,320	107
April	13,146	3,948	83	5,978	88
May	12,474	3,761	71	5,679	75
June	11,359	3,334	84	5,035	86
July	10,920	3,239	65	4,901	67
August	13,199	3,800	78	5,732	83
September	12,736	3,786	67	5,698	68
October	13,267	4,028	85	6,009	93
November	13,065	3,825	75	5,789	80
December	13,012	3,708	84	5,505	87

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Crashes by Weekday (Phoenix)

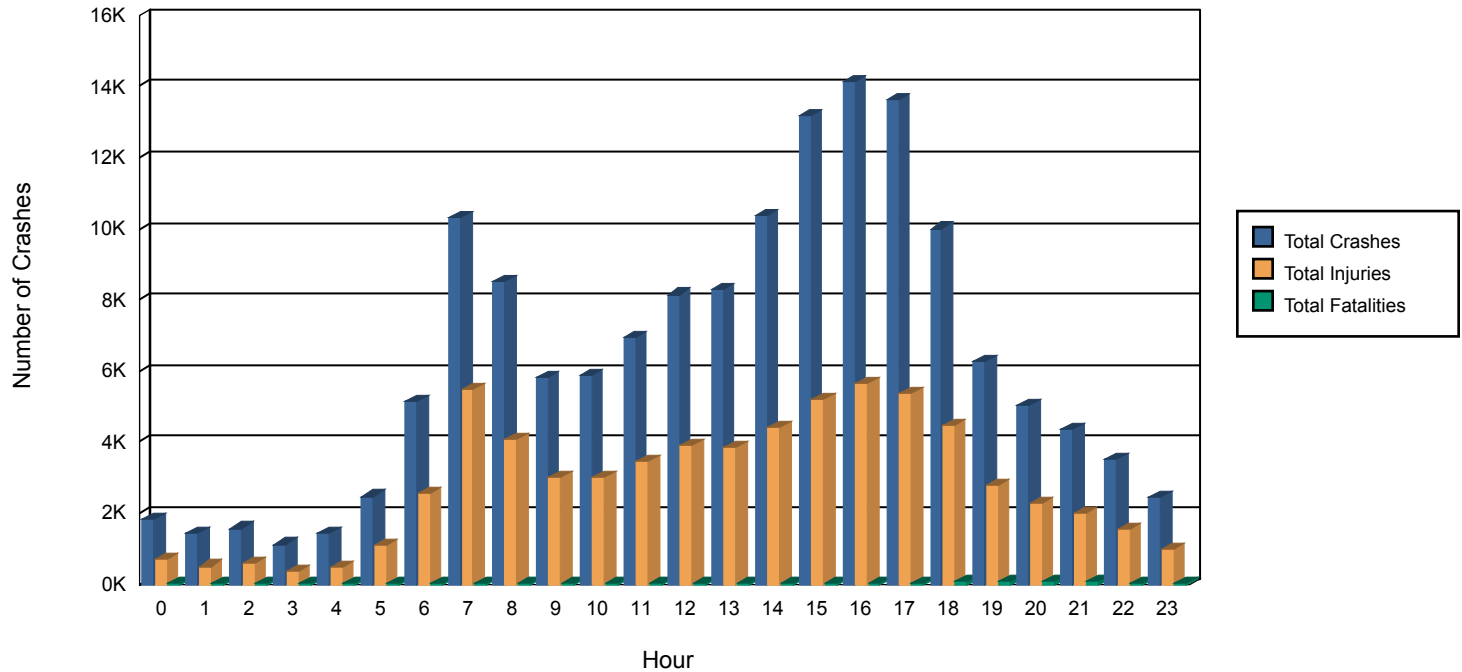


Weekday	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
Sunday	13,603	3,924	148	6,163	165
Monday	21,920	6,501	97	9,677	104
Tuesday	24,139	7,352	128	10,925	128
Wednesday	23,994	7,462	115	11,067	124
Thursday	24,394	7,367	151	11,059	162
Friday	26,020	7,533	153	11,430	157
Saturday	17,807	4,985	159	7,595	164

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Crashes by Hour (Phoenix)



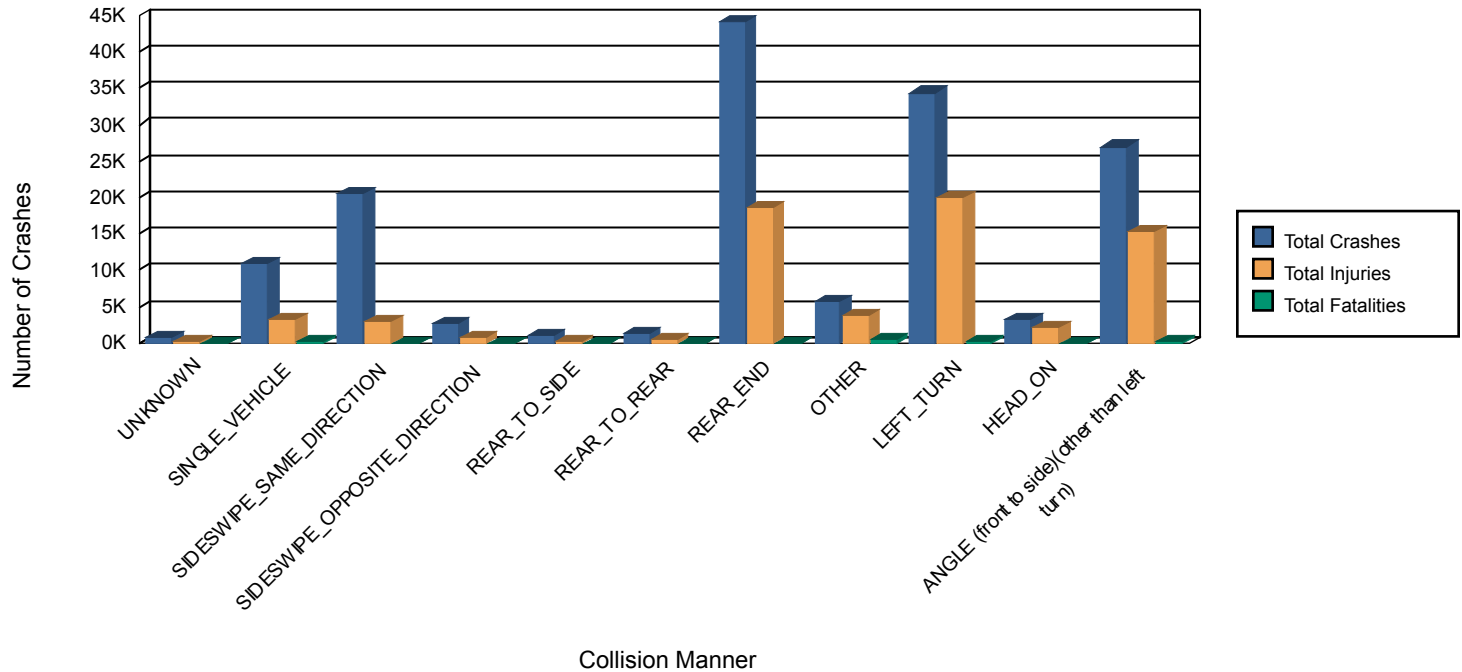
Hour	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
0	1,846	492	43	686	45
1	1,438	357	43	515	49
2	1,581	415	31	603	34
3	1,133	282	15	384	15
4	1,424	367	24	492	26
5	2,481	791	24	1,123	24
6	5,128	1,709	46	2,551	48
7	10,326	3,447	22	5,498	22
8	8,515	2,684	17	4,081	18
9	5,832	1,949	21	3,008	27
10	5,866	1,962	20	2,995	21
11	6,934	2,247	23	3,454	24
12	8,150	2,553	22	3,902	22
13	8,296	2,485	28	3,847	28
14	10,377	2,924	30	4,396	32
15	13,166	3,529	33	5,222	34
16	14,120	3,817	48	5,662	50
17	13,608	3,668	47	5,387	48
18	10,005	2,944	67	4,493	68
19	6,286	1,875	81	2,799	88

Hour	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
20	5,054	1,584	88	2,270	91
21	4,345	1,332	81	1,994	88
22	3,508	1,027	51	1,553	56
23	2,458	684	46	1,001	46

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Crashes by Collision Manner (Phoenix)

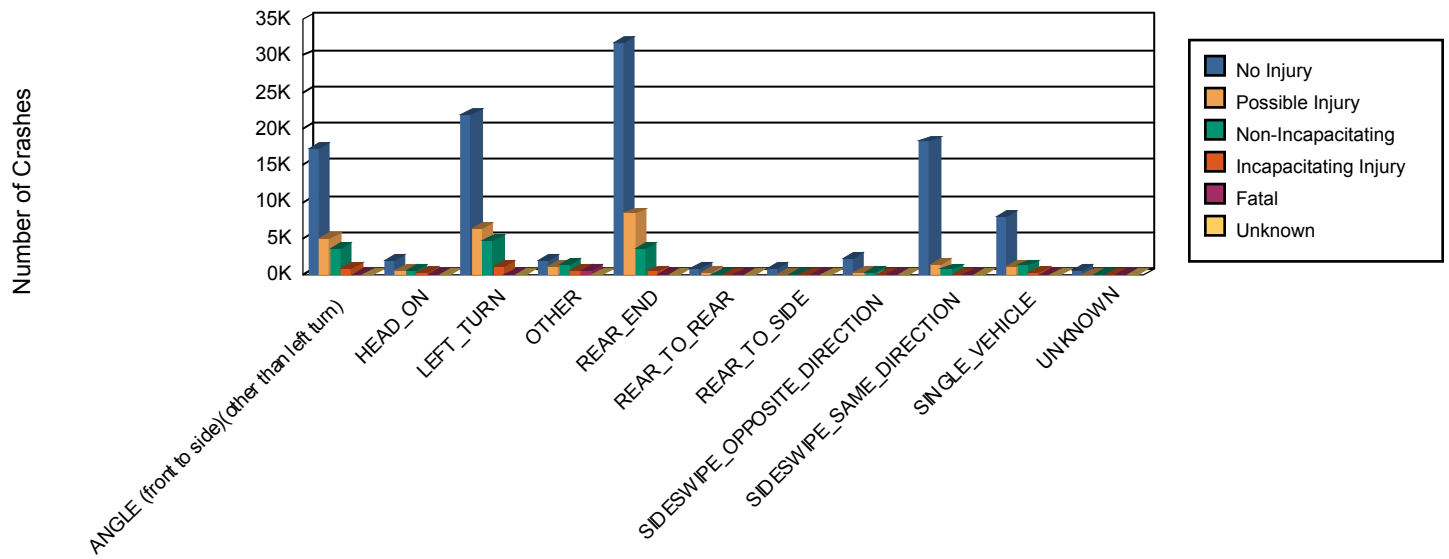


Collision Manner	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
UNKNOWN	853	208	21	267	23
SINGLE_VEHICLE	10,875	2,824	114	3,301	129
SIDESWIPE_SAME_DIRECTION	20,560	2,312	11	3,071	13
SIDESWIPE_OPPOSITE_DIRECTION	2,791	530	4	801	5
REAR_TO_SIDE	938	88	0	123	0
REAR_TO_REAR	1,295	315	0	483	0
REAR_END	44,146	12,372	42	18,618	43
OTHER	5,797	3,264	491	3,718	504
LEFT_TURN	34,390	12,247	117	20,044	123
HEAD_ON	3,266	1,340	43	2,226	50
ANGLE (front to side)(other than left turn)	26,966	9,624	108	15,264	114

Safety Analysis Report

 Years:
 2015,2016,2017,2018,2019

All Arterials and Local Roads Crashes by Collision Manner (Phoenix)



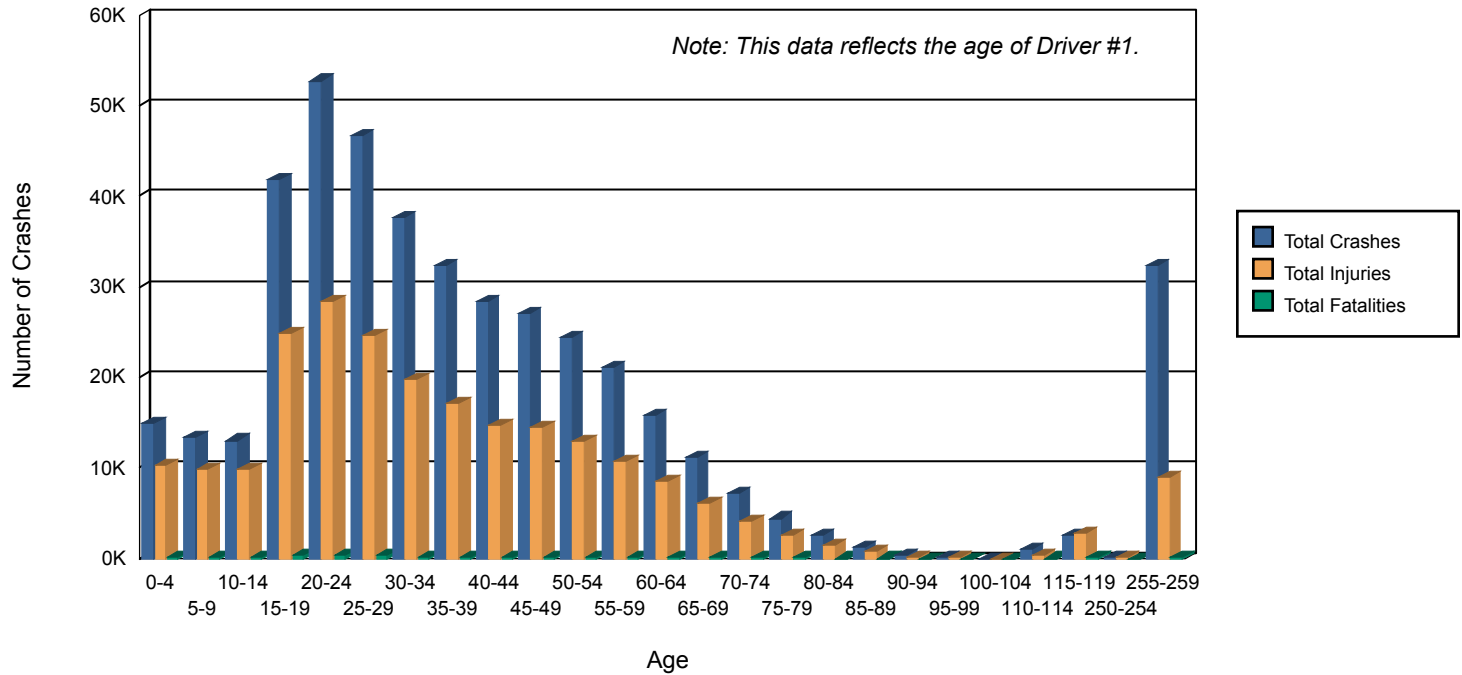
Collision Manner

Collision Manner	No Injury	Possible Injury	Non Incapacitating	Incapacitating Injury	Fatal	Unknown	Total
UNKNOWN	624	92	83	33	21	0	853
SINGLE_VEHICLE	7,937	1,092	1,296	436	114	0	10,875
SIDESWIPE_SAME_DIRECTION	18,237	1,434	741	137	11	0	20,560
SIDESWIPE_OPPOSITE_DIRECTION	2,257	273	206	51	4	0	2,791
REAR_TO_SIDE	850	51	32	5	0	0	938
REAR_TO_REAR	980	214	87	14	0	0	1,295
REAR_END	31,732	8,394	3,519	459	42	0	44,146
OTHER	2,042	1,118	1,464	682	491	0	5,797
LEFT_TURN	22,026	6,375	4,824	1,048	117	0	34,390
HEAD_ON	1,883	547	568	225	43	0	3,266
ANGLE (front to side) (other than left turn)	17,234	4,984	3,719	921	108	0	26,966

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Crashes by Age (Phoenix)

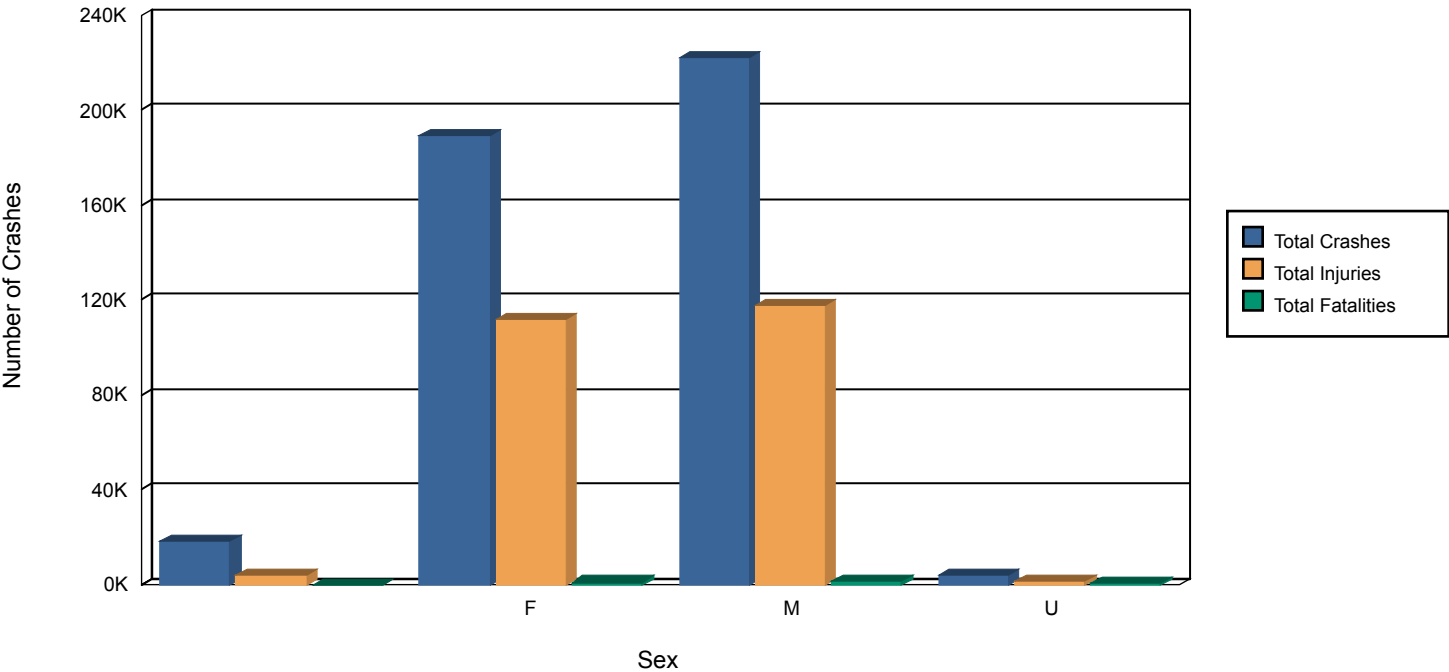


Age	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
0-4	15,012	5,044	58	10,327	79
5-9	13,433	4,610	57	9,807	72
10-14	13,047	4,686	66	9,808	74
15-19	41,762	13,697	216	24,805	275
20-24	52,790	16,849	312	28,302	352
25-29	46,706	14,698	255	24,645	283
30-34	37,610	12,038	194	19,859	212
35-39	32,390	10,307	189	17,208	207
40-44	28,351	9,012	150	14,790	159
45-49	27,132	8,924	146	14,531	153
50-54	24,501	8,072	186	13,036	192
55-59	21,184	6,869	148	10,821	153
60-64	15,723	5,305	136	8,482	138
65-69	11,171	3,798	91	6,159	93
70-74	7,282	2,520	64	4,168	64
75-79	4,441	1,567	55	2,594	57
80-84	2,528	887	31	1,510	31
85-89	1,327	465	20	755	21
90-94	386	134	8	225	9
95-99	60	23	1	40	1

Age	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
100-104	4	2	1	8	1
110-114	1,088	260	22	441	22
115-119	2,525	1,137	163	2,842	178
250-254	151	38	0	58	0
255-259	32,424	6,618	43	8,987	45

Safety Analysis Report

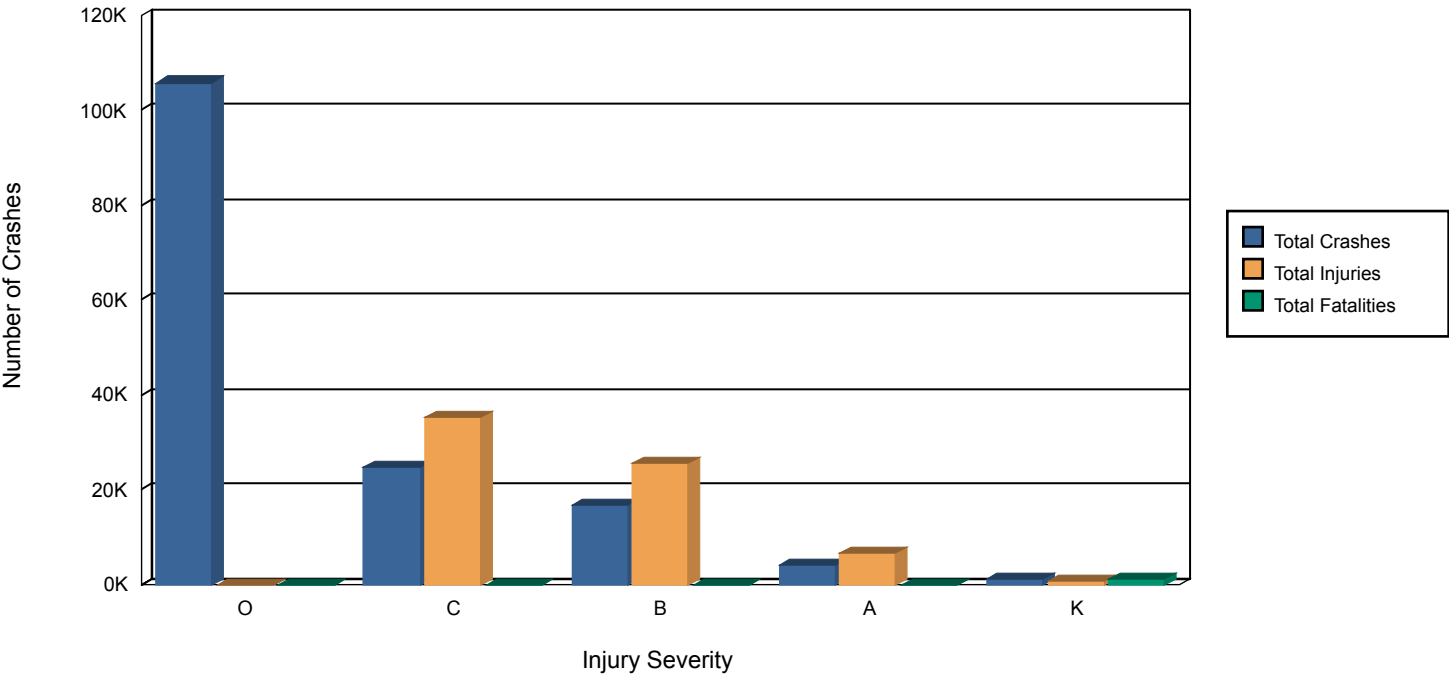
All Arterials and Local Roads Crashes by Sex (Phoenix)



Sex	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
	18,466	3,093	43	3,885	45
F	188,984	63,102	841	111,383	937
M	221,819	70,564	1,581	117,777	1,731
U	3,759	801	147	1,163	158

Safety Analysis Report

All Arterials and Local Roads Crashes by Injury Severity (Phoenix)

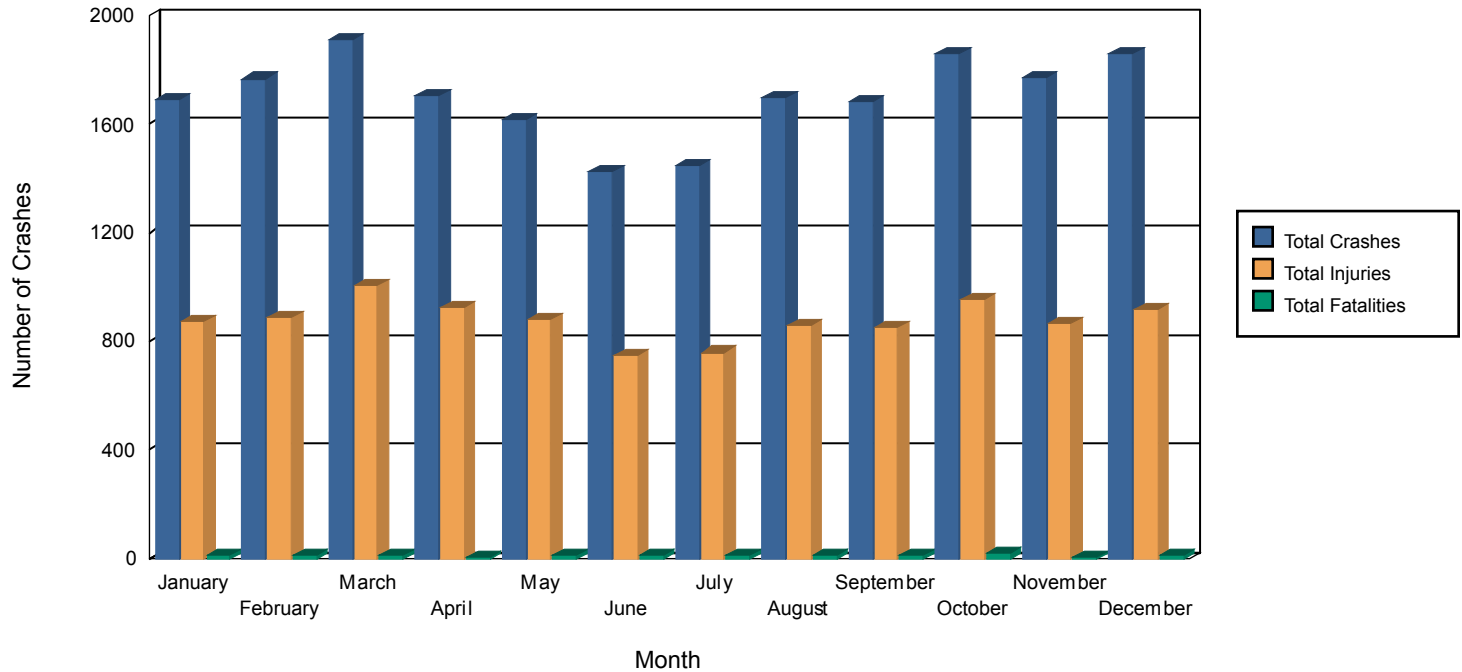


Injury Severity	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
O	105,802	0	0	0	0
C	24,574	24,574	0	35,153	0
B	16,539	16,539	0	25,533	0
A	4,011	4,011	0	6,710	0
K	951	0	951	520	1,004

Safety Analysis Report

 Years:
 2015,2016,2017,2018,2019

All Arterials and Local Roads Older Driver Crashes by Month (Phoenix)

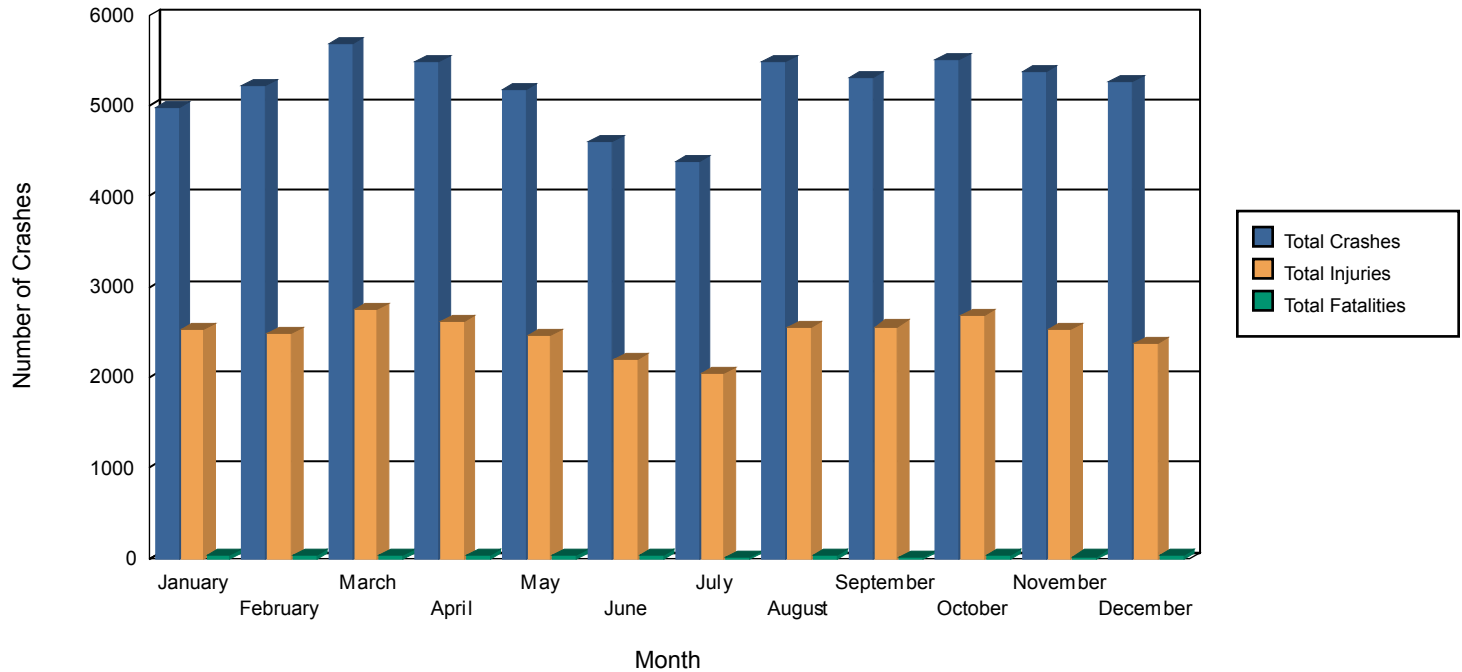


Month	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
January	1,687	556	11	874	11
February	1,767	575	14	885	14
March	1,912	619	12	1,004	14
April	1,705	590	7	925	7
May	1,613	556	11	881	11
June	1,426	457	12	748	13
July	1,444	463	9	759	9
August	1,697	536	9	856	9
September	1,685	539	14	854	14
October	1,859	595	18	955	18
November	1,770	560	7	864	7
December	1,860	589	14	914	14

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Younger Driver Crashes by Month (Phoenix)

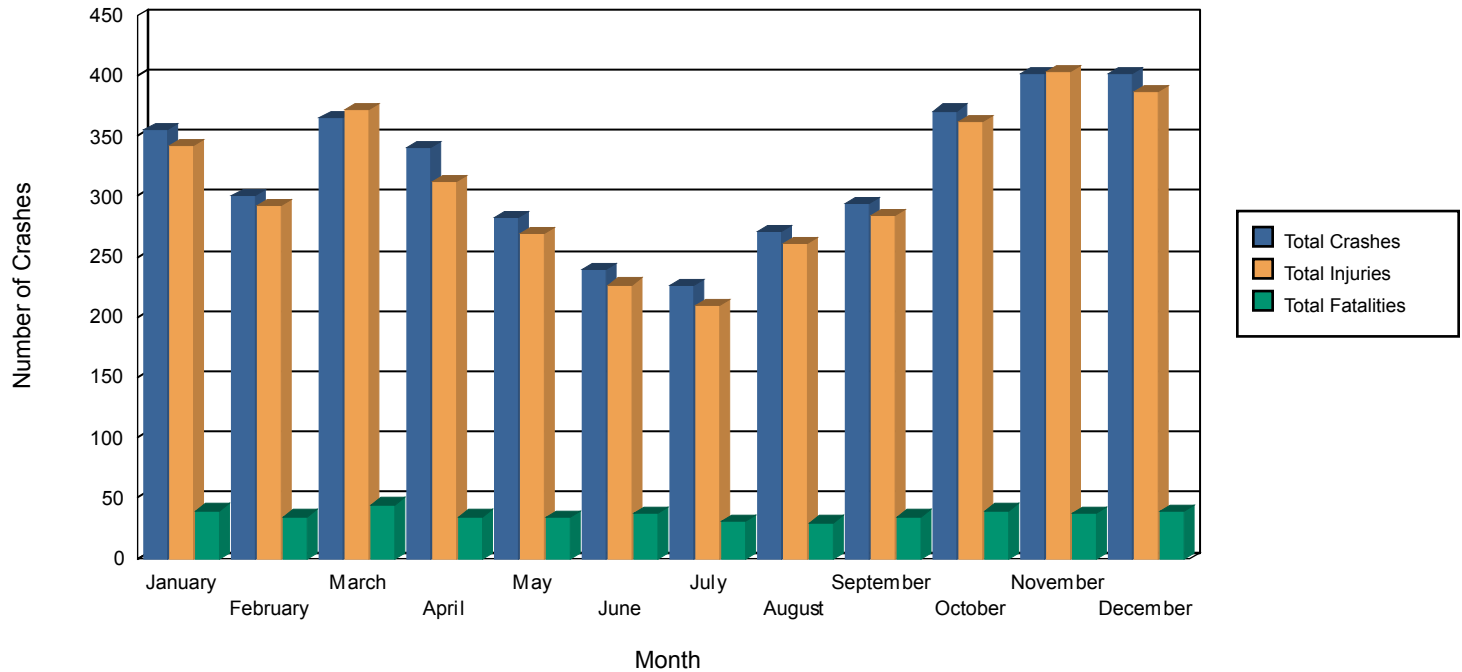


Month	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
January	4,975	1,579	31	2,538	33
February	5,225	1,567	23	2,477	29
March	5,685	1,724	35	2,749	38
April	5,496	1,607	29	2,627	30
May	5,180	1,557	28	2,471	30
June	4,604	1,386	26	2,195	28
July	4,383	1,297	15	2,053	17
August	5,494	1,587	26	2,556	29
September	5,317	1,618	15	2,563	15
October	5,516	1,703	22	2,686	30
November	5,380	1,576	24	2,536	26
December	5,258	1,501	26	2,375	28

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Pedestrian Crashes by Month (Phoenix)

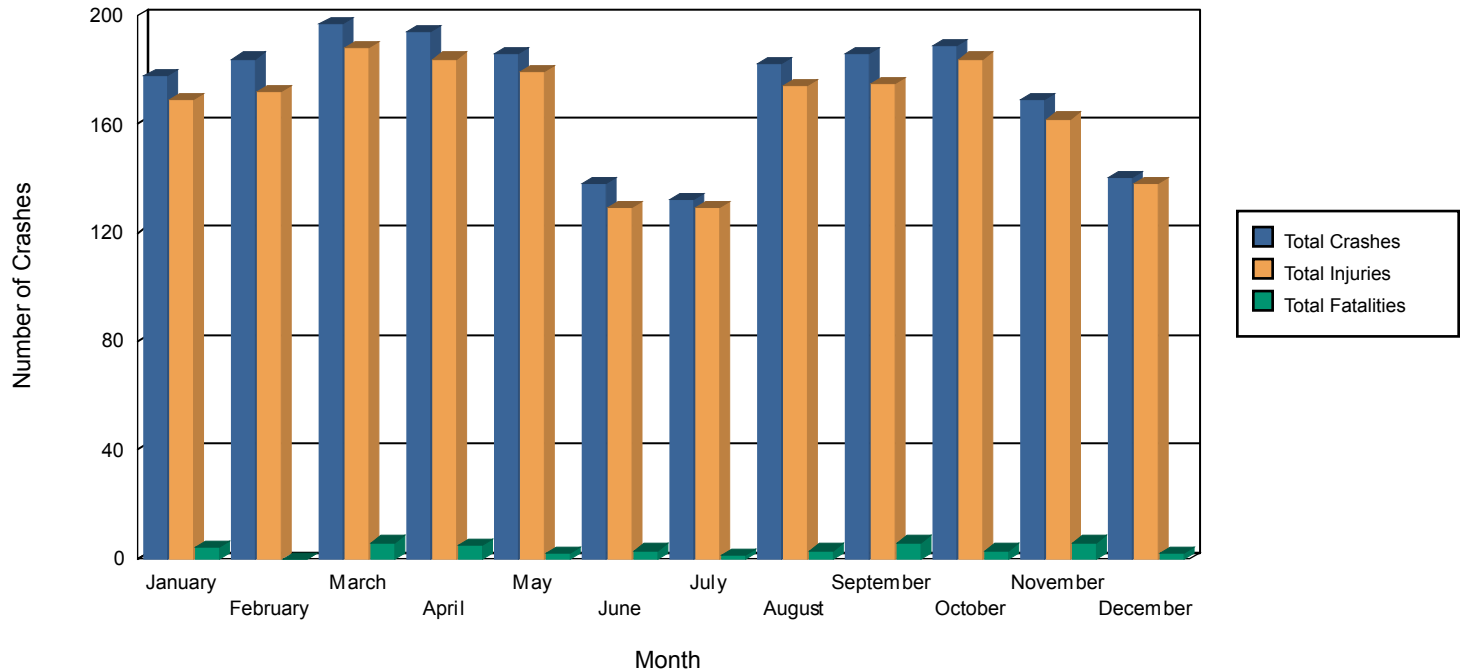


Month	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
January	355	310	40	342	40
February	300	260	35	293	35
March	365	314	44	372	45
April	341	294	35	313	35
May	282	240	32	269	34
June	239	200	36	227	37
July	226	192	30	209	31
August	271	237	29	261	30
September	294	254	34	284	35
October	371	325	40	362	40
November	401	361	37	403	38
December	401	356	39	387	39

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Bicyclist Crashes by Month (Phoenix)

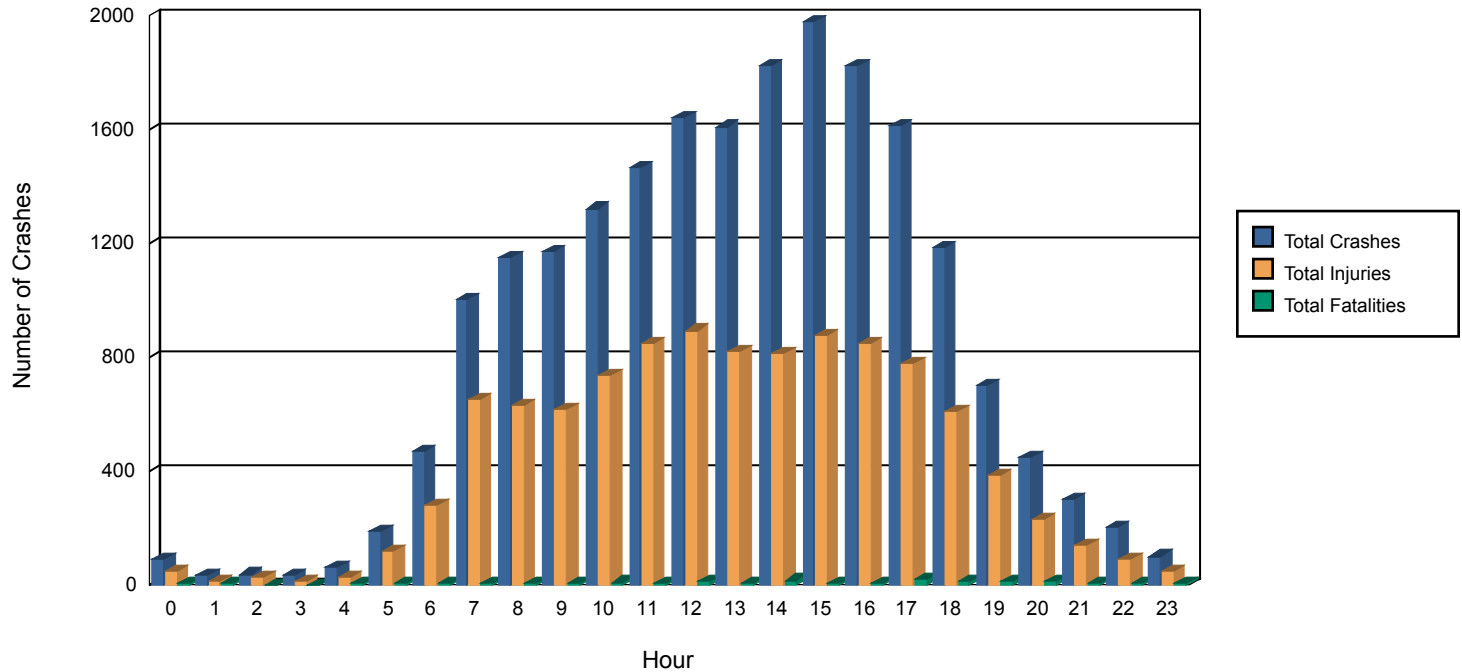


Month	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
January	178	163	4	169	4
February	184	169	0	172	0
March	197	182	6	188	6
April	194	179	5	184	5
May	186	175	2	179	2
June	138	128	3	129	3
July	132	128	1	129	1
August	182	169	3	174	3
September	186	171	6	175	6
October	189	177	3	184	3
November	169	158	6	162	6
December	140	134	2	138	2

Safety Analysis Report

 Years:
 2015,2016,2017,2018,2019

All Arterials and Local Roads Older Driver Crashes by Hour (Phoenix)



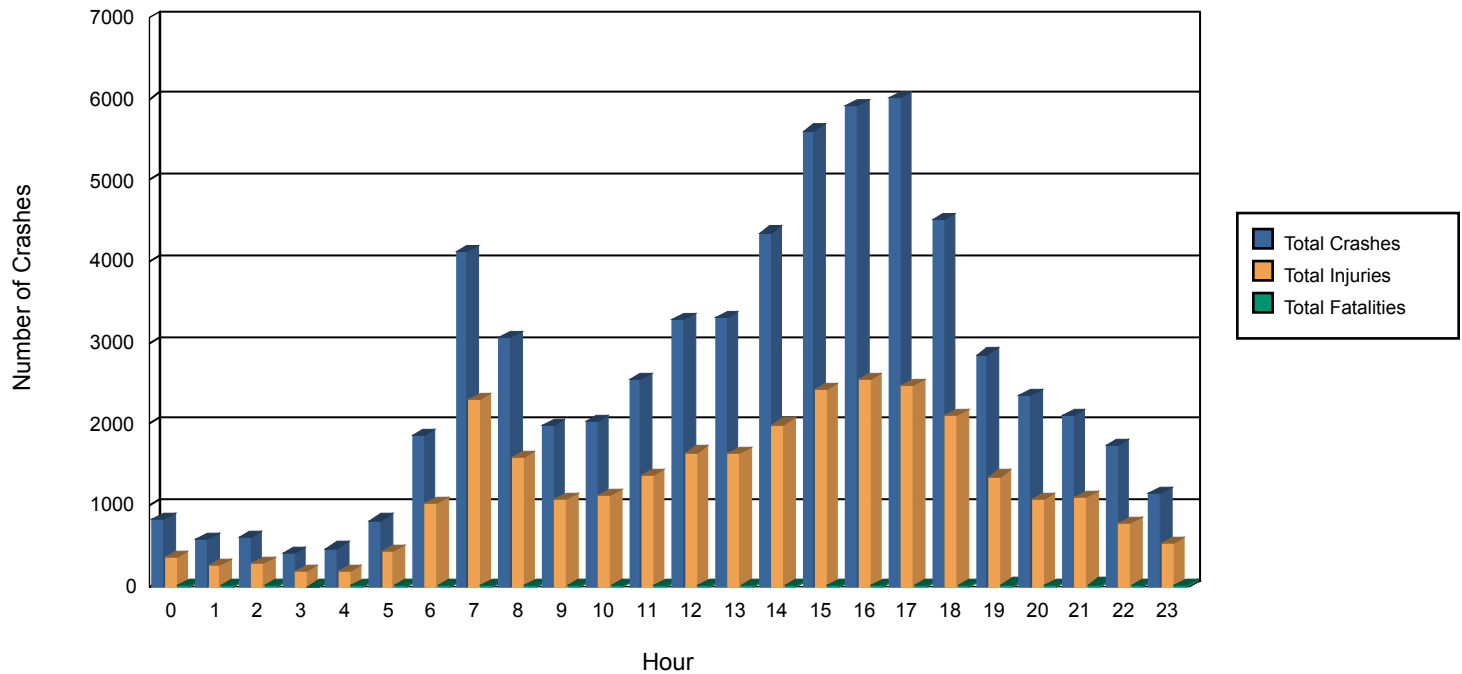
Hour	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
0	90	30	2	46	2
1	35	10	2	14	2
2	36	19	0	25	0
3	33	10	0	14	0
4	59	15	4	24	4
5	186	72	2	117	2
6	467	170	4	280	4
7	1,000	373	3	652	3
8	1,146	399	5	629	5
9	1,168	408	4	616	4
10	1,321	468	8	734	8
11	1,468	504	4	849	5
12	1,639	569	9	893	9
13	1,609	501	4	818	4
14	1,820	521	14	811	15
15	1,976	571	6	877	6
16	1,826	535	7	848	7
17	1,614	471	17	777	17
18	1,183	402	11	611	12
19	702	246	11	386	11

Hour	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
20	449	153	10	226	10
21	298	96	5	138	5
22	201	61	2	88	2
23	99	31	4	46	4

Safety Analysis Report

 Years:
 2015,2016,2017,2018,2019

All Arterials and Local Roads Younger Driver Crashes by Hour (Phoenix)



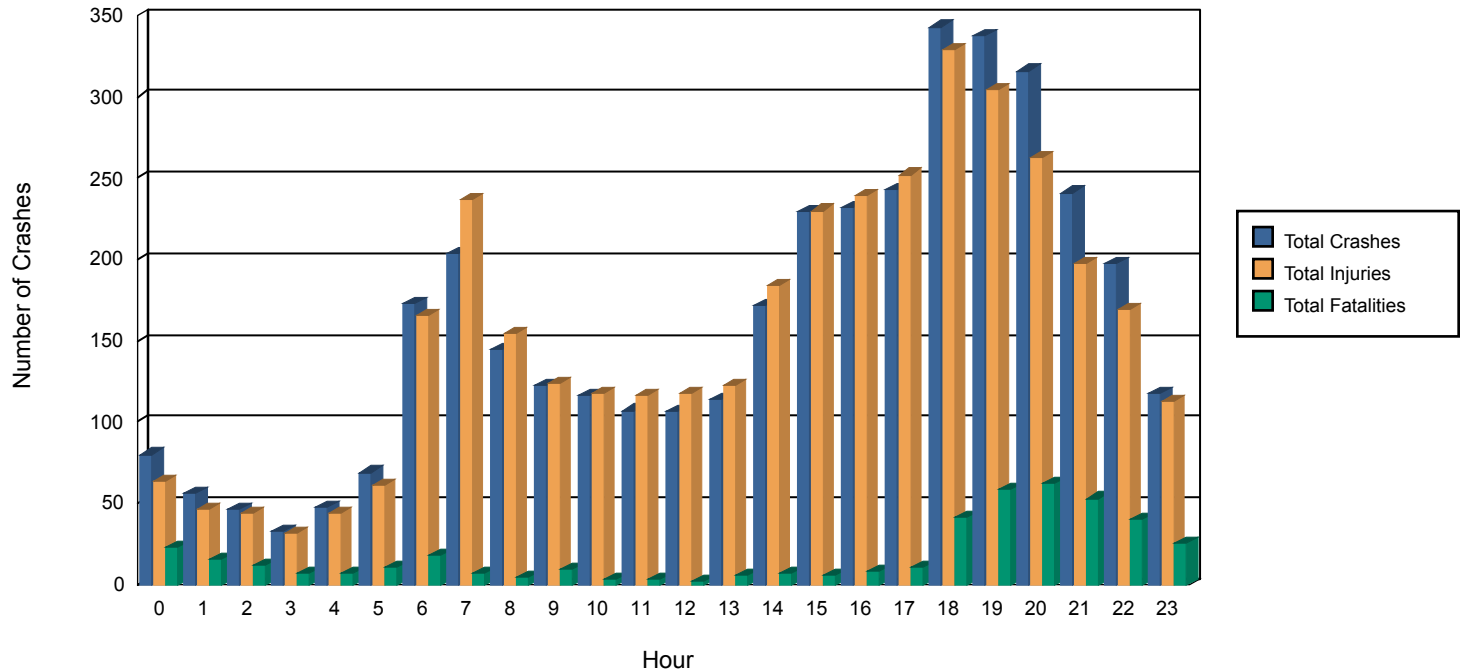
Hour	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
0	827	233	16	359	18
1	586	165	14	266	20
2	602	180	8	282	11
3	408	123	3	179	3
4	471	138	6	193	8
5	814	274	7	428	7
6	1,850	654	11	1,022	12
7	4,119	1,383	8	2,294	8
8	3,062	990	6	1,599	7
9	1,980	660	10	1,078	14
10	2,036	696	10	1,122	10
11	2,557	846	11	1,359	12
12	3,285	1,031	10	1,649	10
13	3,319	1,015	10	1,634	10
14	4,353	1,212	12	1,995	13
15	5,606	1,547	11	2,417	12
16	5,916	1,634	12	2,542	12
17	6,007	1,592	9	2,468	10
18	4,519	1,310	15	2,114	15
19	2,854	824	23	1,356	27

Hour	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
20	2,357	703	21	1,066	24
21	2,115	672	28	1,089	28
22	1,728	484	21	786	24
23	1,142	336	18	529	18

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Pedestrian Crashes by Hour (Phoenix)



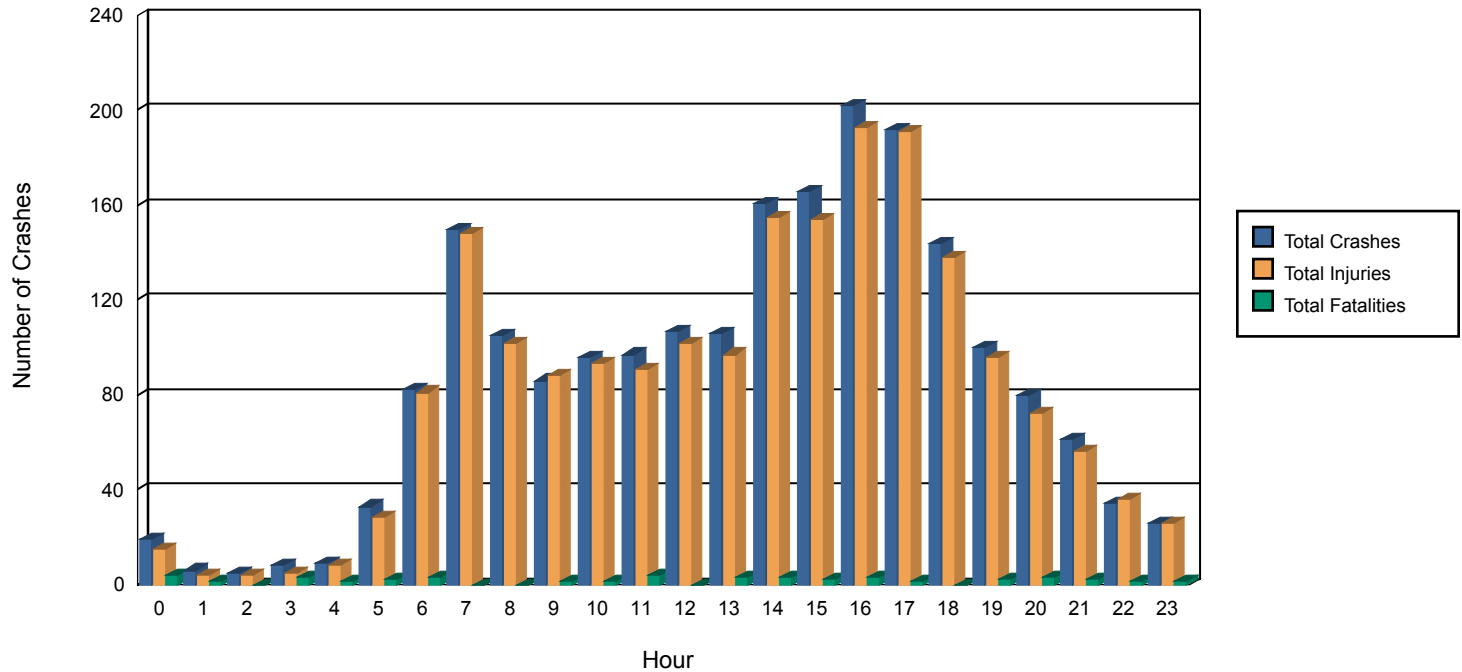
Hour	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
0	80	57	23	63	23
1	56	39	16	46	16
2	46	34	12	44	12
3	33	26	7	31	7
4	48	41	7	44	7
5	69	58	11	61	11
6	173	152	18	165	18
7	204	194	7	237	7
8	144	139	4	154	4
9	122	113	9	124	9
10	116	113	2	118	3
11	107	97	3	116	3
12	106	101	2	117	2
13	114	106	6	122	6
14	172	163	6	184	7
15	229	218	6	230	6
16	232	216	8	239	8
17	243	224	11	252	11
18	343	296	41	329	41
19	337	278	56	304	58

Hour	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
20	316	245	60	263	62
21	241	184	53	197	53
22	197	156	38	169	40
23	118	93	25	113	25

Safety Analysis Report

 Years:
 2015,2016,2017,2018,2019

All Arterials and Local Roads Bicyclist Crashes by Hour (Phoenix)



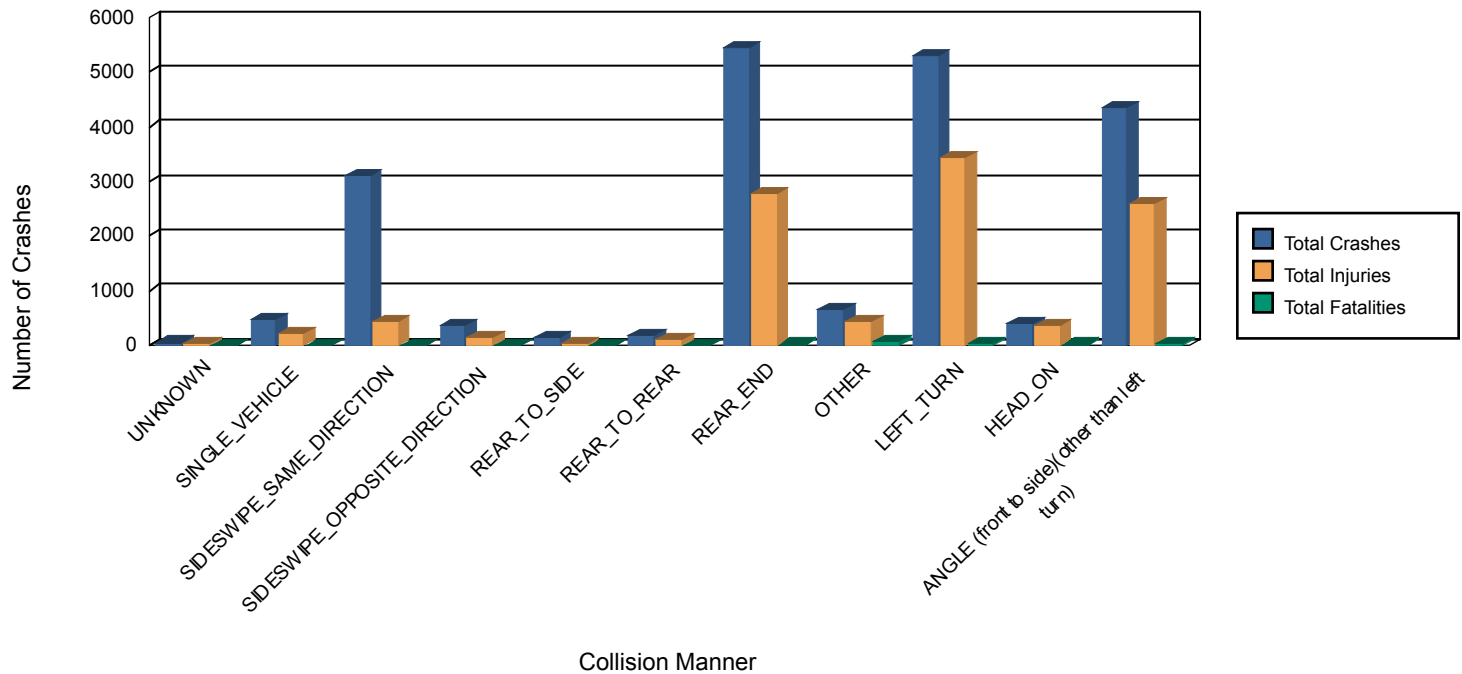
Hour	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
0	19	15	4	15	4
1	6	4	1	4	1
2	5	4	0	4	0
3	8	5	3	5	3
4	9	8	1	8	1
5	33	28	2	28	2
6	82	76	3	81	3
7	150	141	0	148	0
8	105	101	0	102	0
9	86	85	1	88	1
10	96	92	1	93	1
11	97	89	4	91	4
12	107	102	0	102	0
13	106	96	3	97	3
14	161	152	3	155	3
15	166	153	2	154	2
16	202	190	3	193	3
17	192	183	1	191	1
18	144	137	0	138	0
19	100	91	2	96	2

Hour	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
20	80	70	3	72	3
21	61	55	2	56	2
22	34	31	1	36	1
23	26	25	1	26	1

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Older Driver Crashes by Collision Manner (Phoenix)

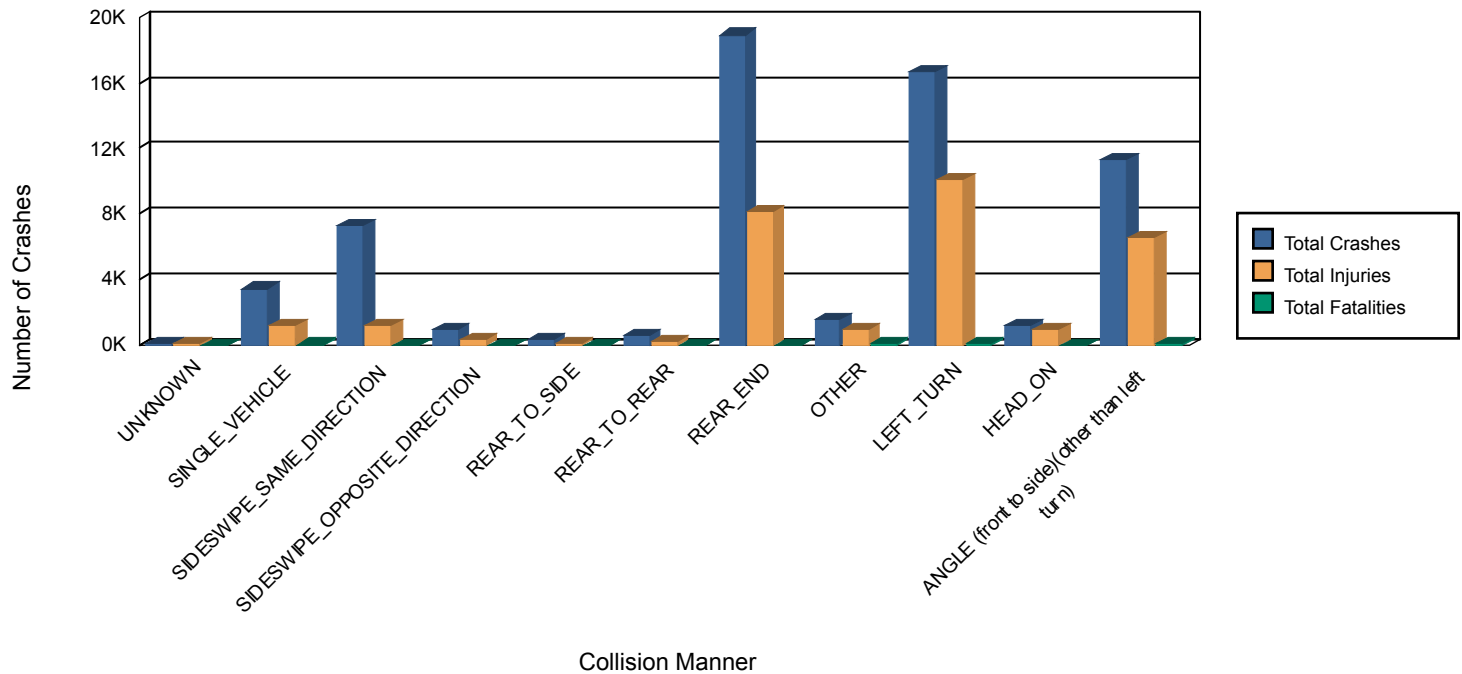


Collision Manner	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
UNKNOWN	50	20	1	26	1
SINGLE_VEHICLE	460	174	9	198	10
SIDESWIPE_SAME_DIRECTION	3,114	327	0	431	0
SIDESWIPE_OPPOSITE_DIRECTION	356	88	1	155	1
REAR_TO_SIDE	137	18	0	27	0
REAR_TO_REAR	173	57	0	96	0
REAR_END	5,451	1,769	12	2,774	12
OTHER	646	351	50	441	51
LEFT_TURN	5,308	2,050	28	3,430	28
HEAD_ON	383	177	11	346	11
ANGLE (front to side)(other than left turn)	4,347	1,604	26	2,595	27

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Younger Driver Crashes by Collision Manner (Phoenix)

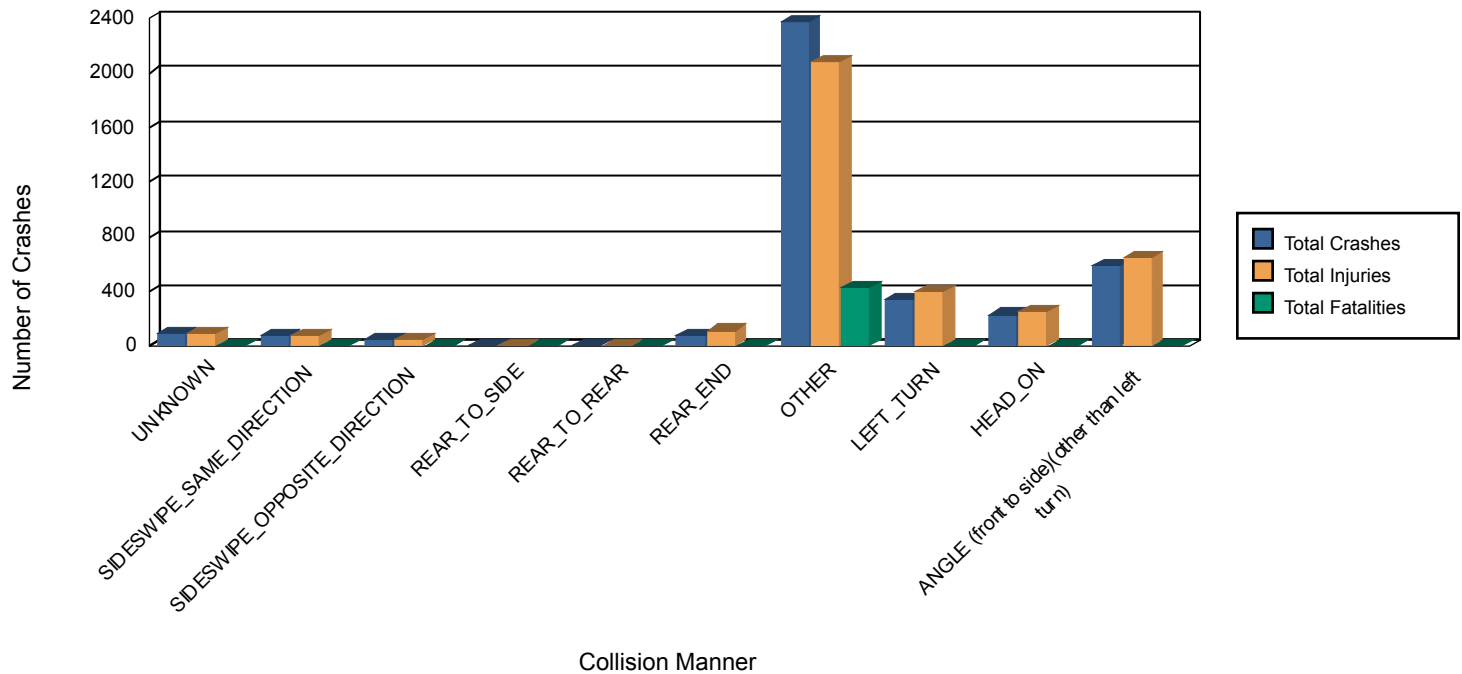


Collision Manner	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
UNKNOWN	156	47	7	75	9
SINGLE_VEHICLE	3,453	988	27	1,210	36
SIDESWIPE_SAME_DIRECTION	7,296	879	8	1,240	10
SIDESWIPE_OPPOSITE_DIRECTION	1,005	210	2	344	3
REAR_TO_SIDE	293	35	0	50	0
REAR_TO_REAR	560	147	0	240	0
REAR_END	18,937	5,264	12	8,162	13
OTHER	1,532	694	109	902	116
LEFT_TURN	16,700	5,992	63	10,079	66
HEAD_ON	1,240	514	21	915	25
ANGLE (front to side)(other than left turn)	11,341	3,932	51	6,609	55

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Pedestrian Crashes by Collision Manner (Phoenix)

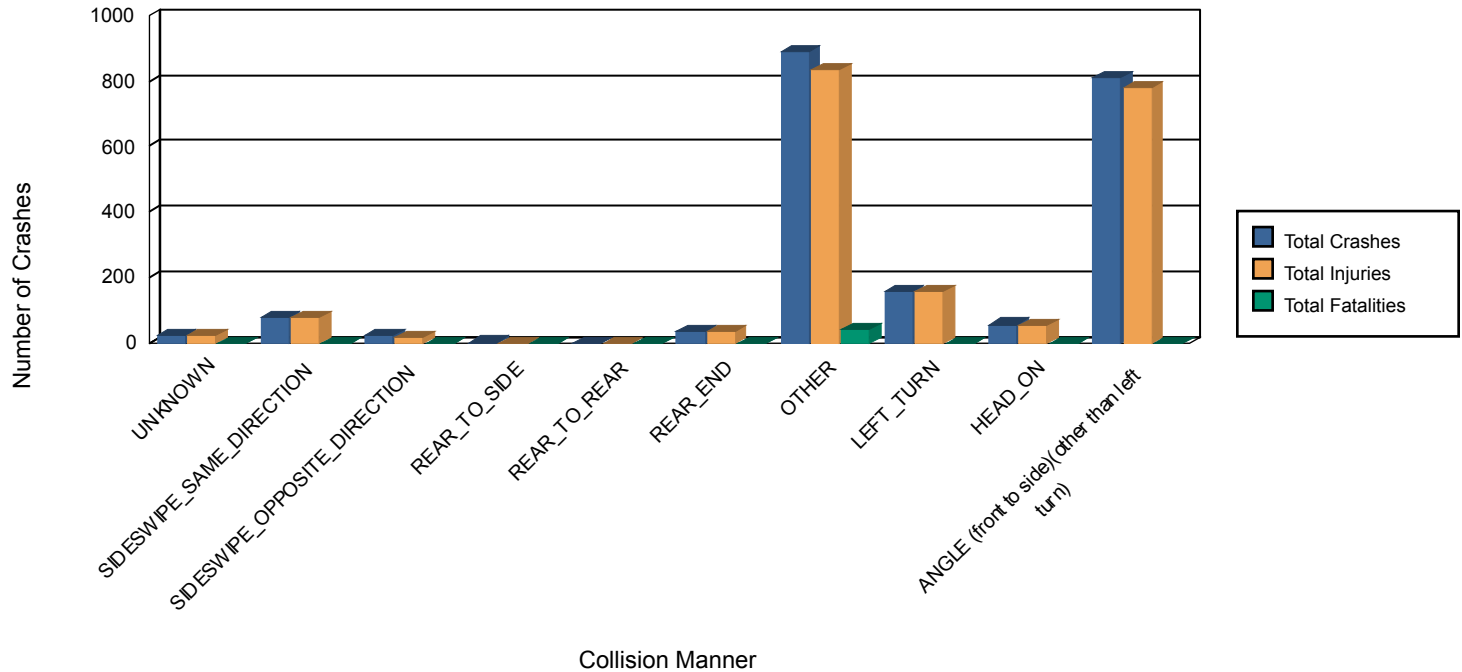


Collision Manner	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
UNKNOWN	95	91	2	98	2
SIDESWIPE_SAME_DIRECTION	76	71	0	82	0
SIDESWIPE_OPPOSITE_DIRECTION	43	41	0	47	0
REAR_TO_SIDE	10	10	0	10	0
REAR_TO_REAR	3	3	0	3	0
REAR_END	79	72	1	113	1
OTHER	2,374	1,923	420	2,076	427
LEFT_TURN	340	323	7	394	8
HEAD_ON	231	224	0	250	0
ANGLE (front to side)(other than left turn)	595	585	1	649	1

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Bicyclist Crashes by Collision Manner (Phoenix)



Collision Manner	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
UNKNOWN	22	21	0	21	0
SIDESWIPE_SAME_DIRECTION	78	73	0	77	0
SIDESWIPE_OPPOSITE_DIRECTION	21	19	0	19	0
REAR_TO_SIDE	2	1	0	1	0
REAR_TO_REAR	1	1	0	1	0
REAR_END	37	36	0	38	0
OTHER	887	817	41	836	41
LEFT_TURN	158	152	0	159	0
HEAD_ON	57	52	0	54	0
ANGLE (front to side)(other than left turn)	812	761	0	777	0

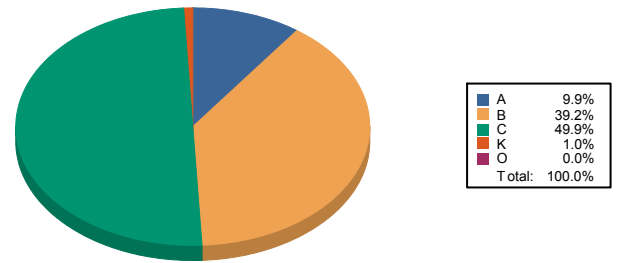
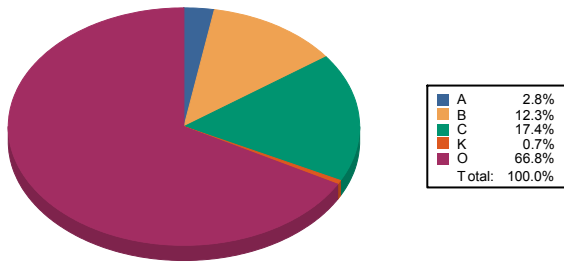
Safety Analysis Report

All Arterials and Local Roads Older Driver Crashes by

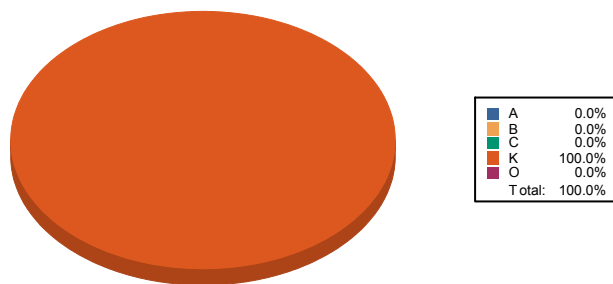
All Crashes

Injury Severity (Phoenix)

Injury Crashes



Fatal Crashes

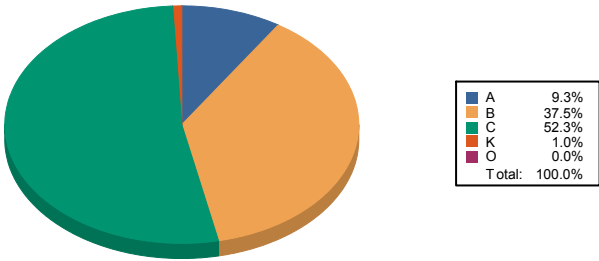
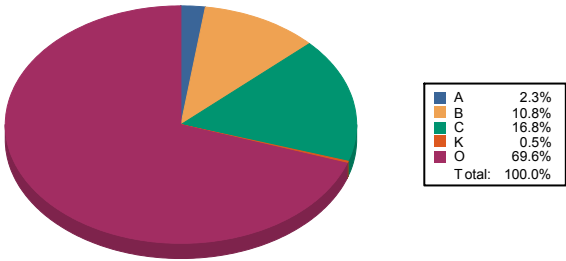


Injury Severity	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
O	13,652	0	0	0	0
C	3,545	3,545	0	5,248	0
B	2,518	2,518	0	4,127	0
A	572	572	0	1,044	0
K	138	0	138	100	141

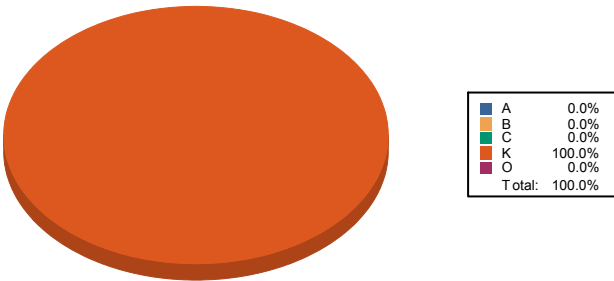
Safety Analysis Report

All Arterials and Local Roads Younger Driver Crashes by

All Crashes Injury Severity (Phoenix) Injury Crashes



Fatal Crashes

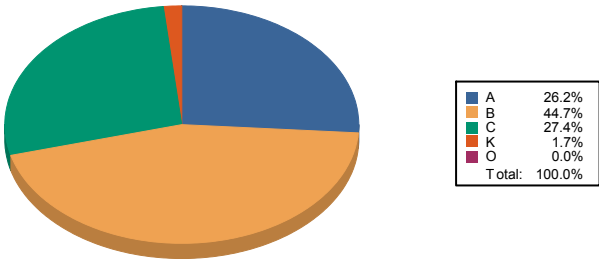
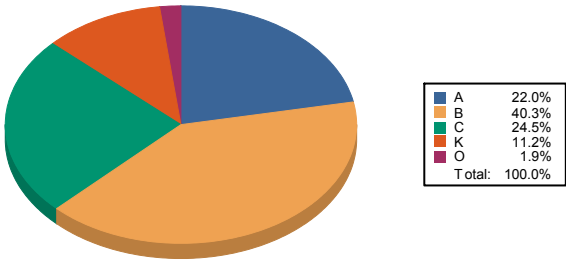


Injury Severity	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
O	43,511	0	0	0	0
C	10,472	10,472	0	15,597	0
B	6,776	6,776	0	11,170	0
A	1,454	1,454	0	2,773	0
K	300	0	300	286	333

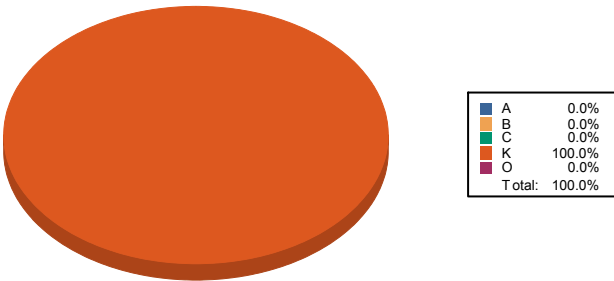
Safety Analysis Report

All Arterials and Local Roads Pedestrian Crashes by

All Crashes Injury Severity (Phoenix) Injury Crashes



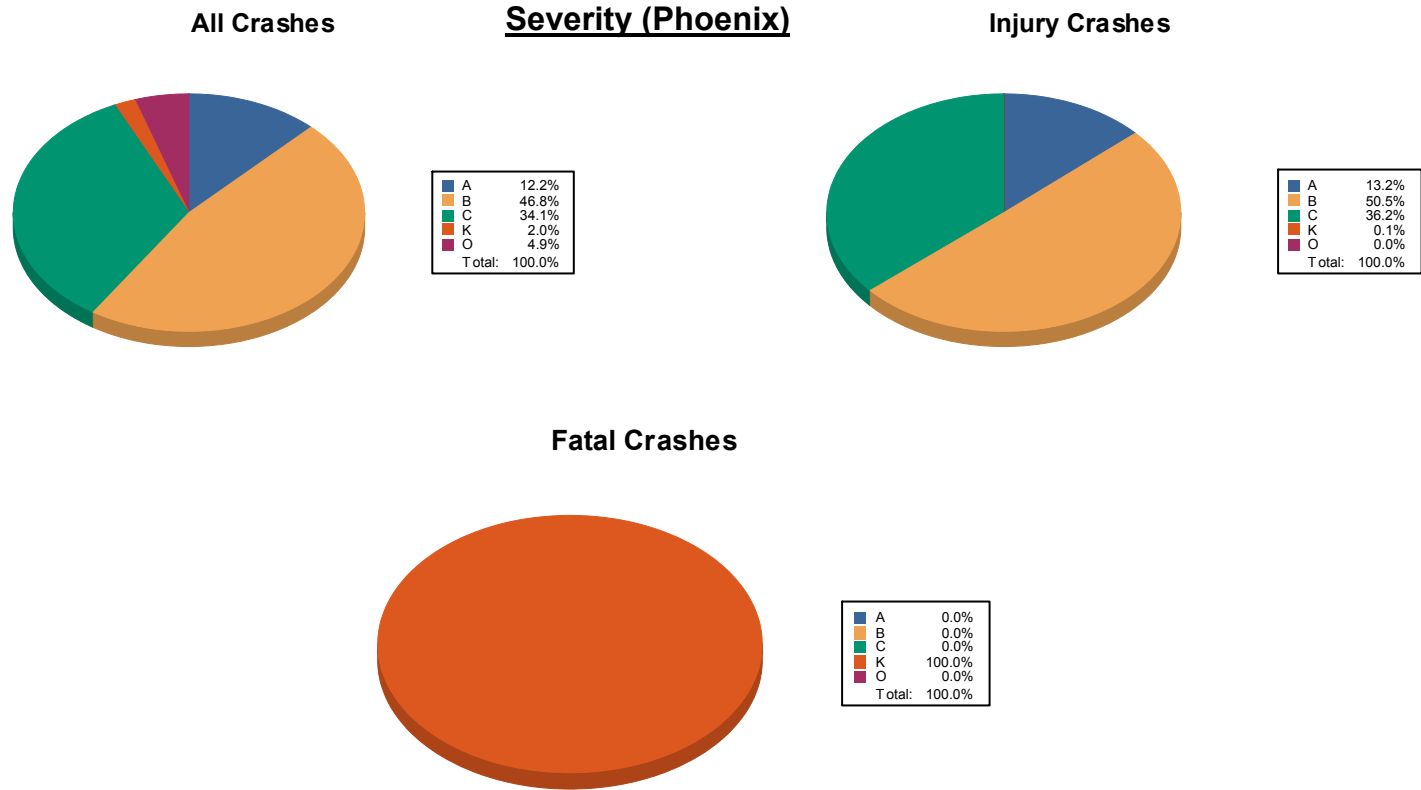
Fatal Crashes



Injury Severity	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
O	72	0	0	0	0
C	944	944	0	1,021	0
B	1,551	1,551	0	1,664	0
A	848	848	0	974	0
K	431	0	431	63	439

Safety Analysis Report

All Arterials and Local Roads Bicyclist Crashes by Injury

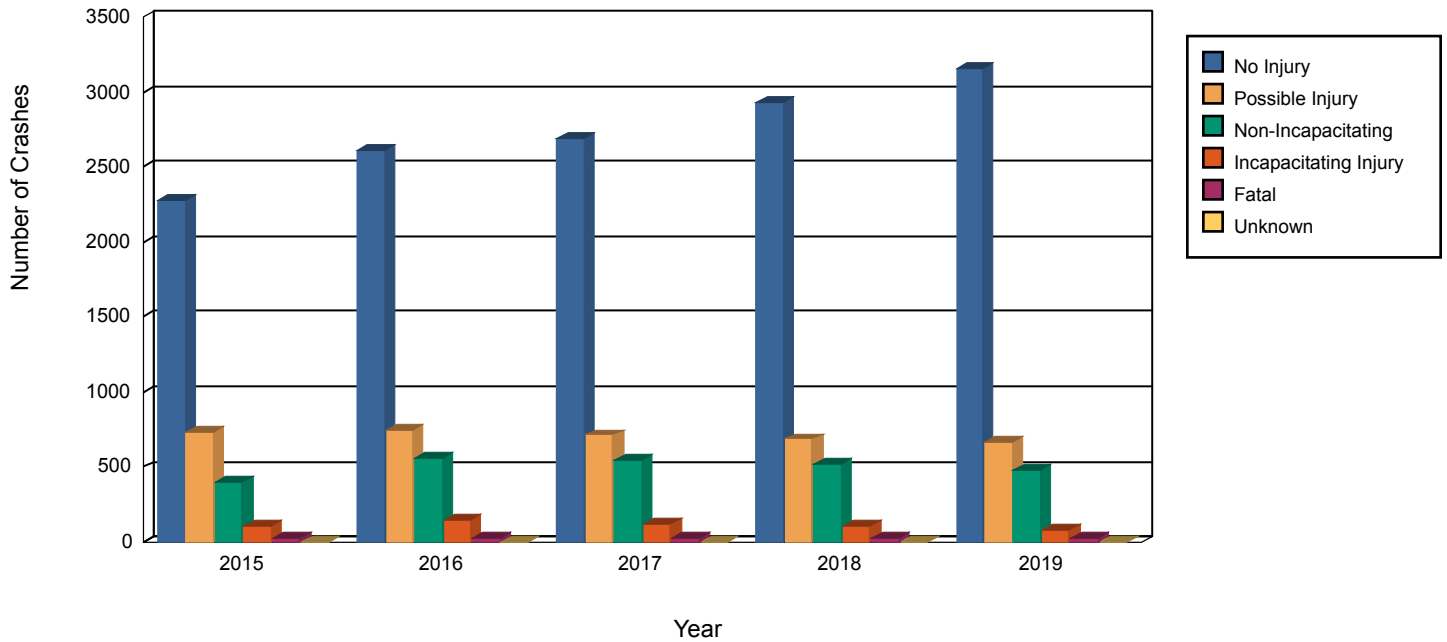


Injury Severity	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
O	101	0	0	0	0
C	707	707	0	718	0
B	972	972	0	1,001	0
A	254	254	0	262	0
K	41	0	41	2	41

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Older Driver Crashes by Year (Phoenix)

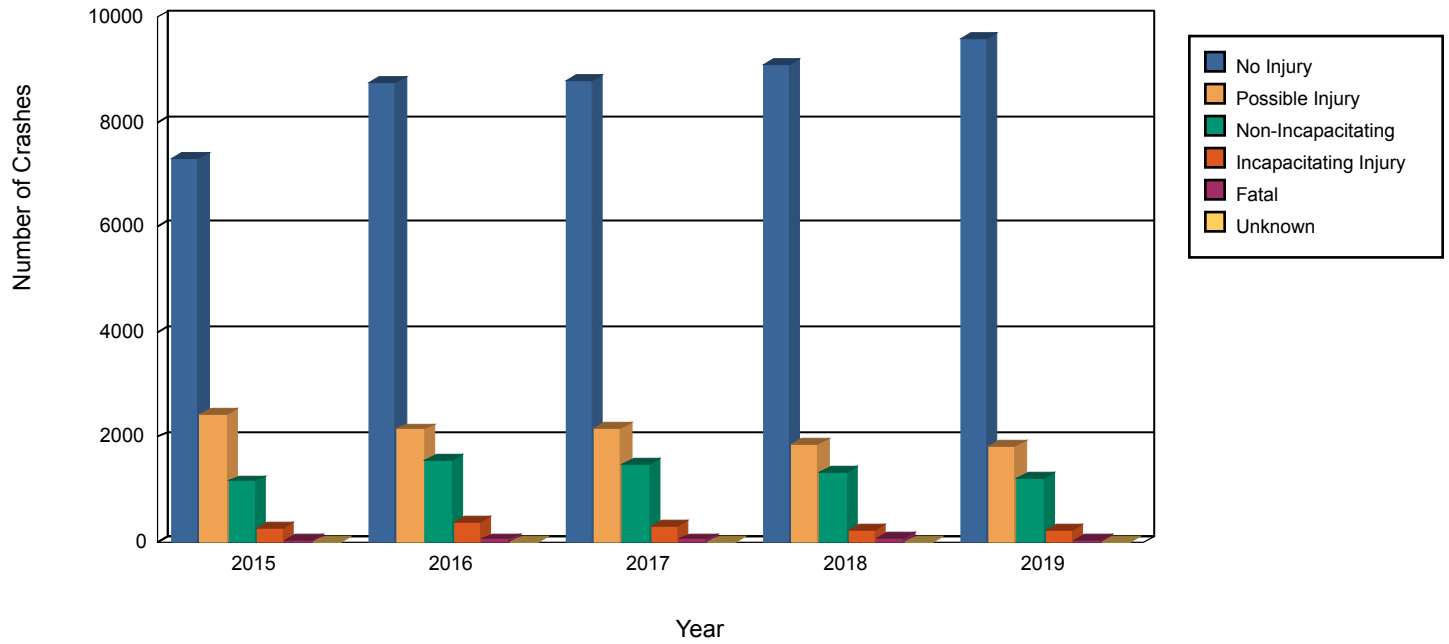


Year	No Injury	Possible Injury	Non Incapacitating	Incapacitating Injury	Fatal	Unknown	Total
2015	2,273	732	403	112	27	0	3,547
2016	2,604	750	559	146	28	0	4,087
2017	2,691	713	552	120	31	0	4,107
2018	2,932	687	519	111	30	0	4,279
2019	3,152	663	485	83	22	0	4,405

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Younger Driver Crashes by Year (Phoenix)

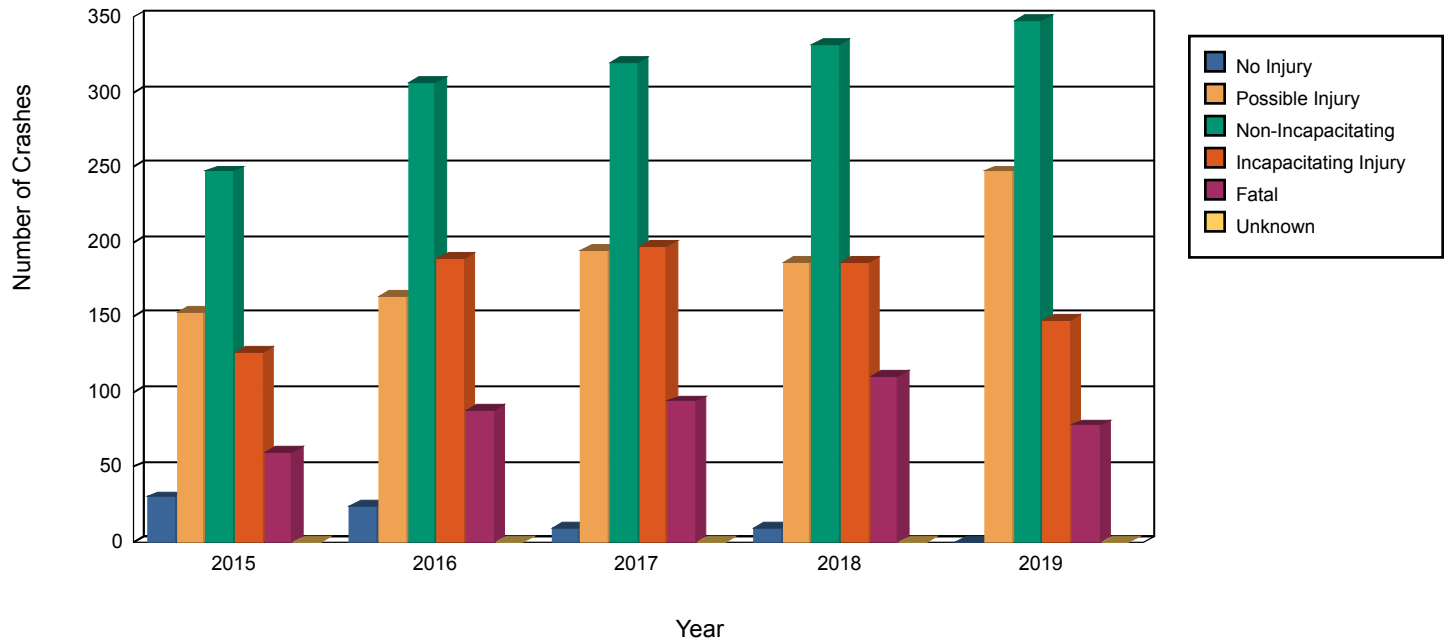


Year	No Injury	Possible Injury	Non Incapacitating	Incapacitating Injury	Fatal	Unknown	Total
2015	7,302	2,448	1,163	285	52	0	11,250
2016	8,758	2,150	1,552	378	59	0	12,897
2017	8,773	2,179	1,501	313	62	0	12,828
2018	9,089	1,859	1,334	240	72	0	12,594
2019	9,589	1,836	1,226	238	55	0	12,944

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Pedestrian Crashes by Year (Phoenix)

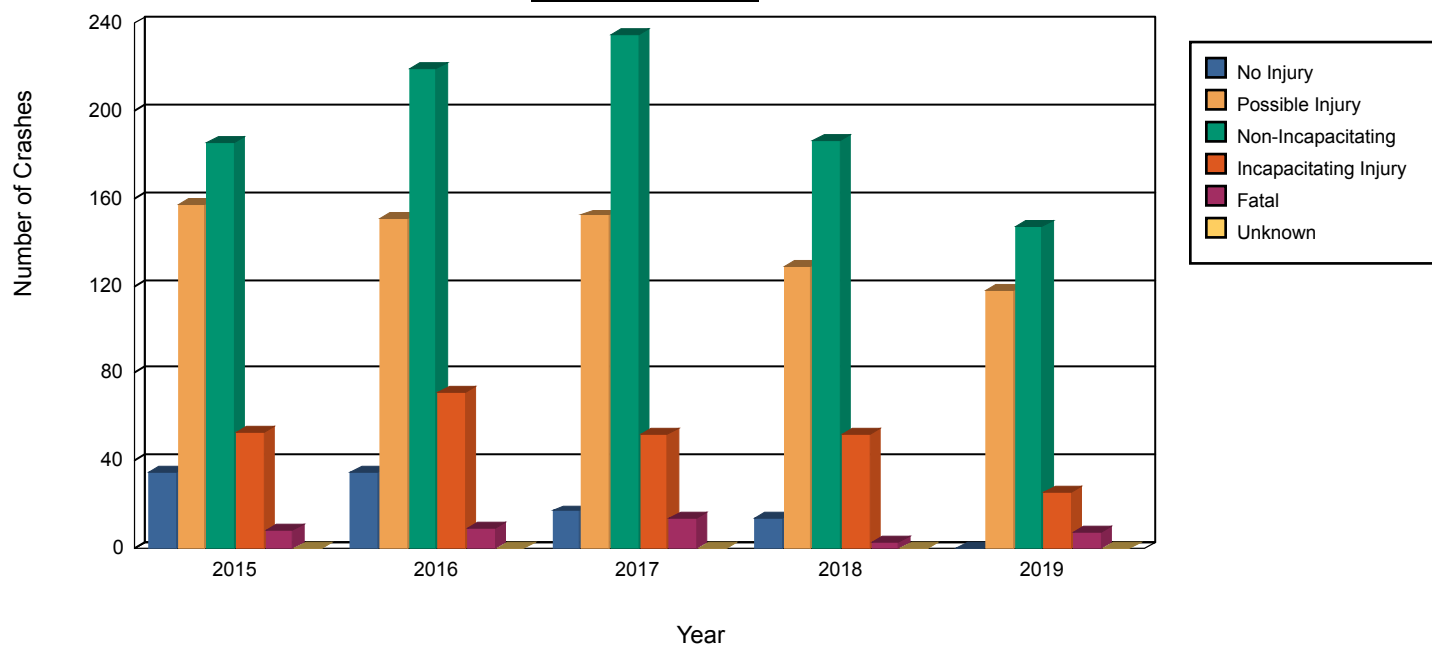


Year	No Injury	Possible Injury	Non Incapacitating	Incapacitating Injury	Fatal	Unknown	Total
2015	30	153	247	127	60	0	617
2016	24	164	306	189	88	0	771
2017	9	194	319	197	94	0	813
2018	9	186	332	187	111	0	825
2019	0	247	347	148	78	0	820

Safety Analysis Report

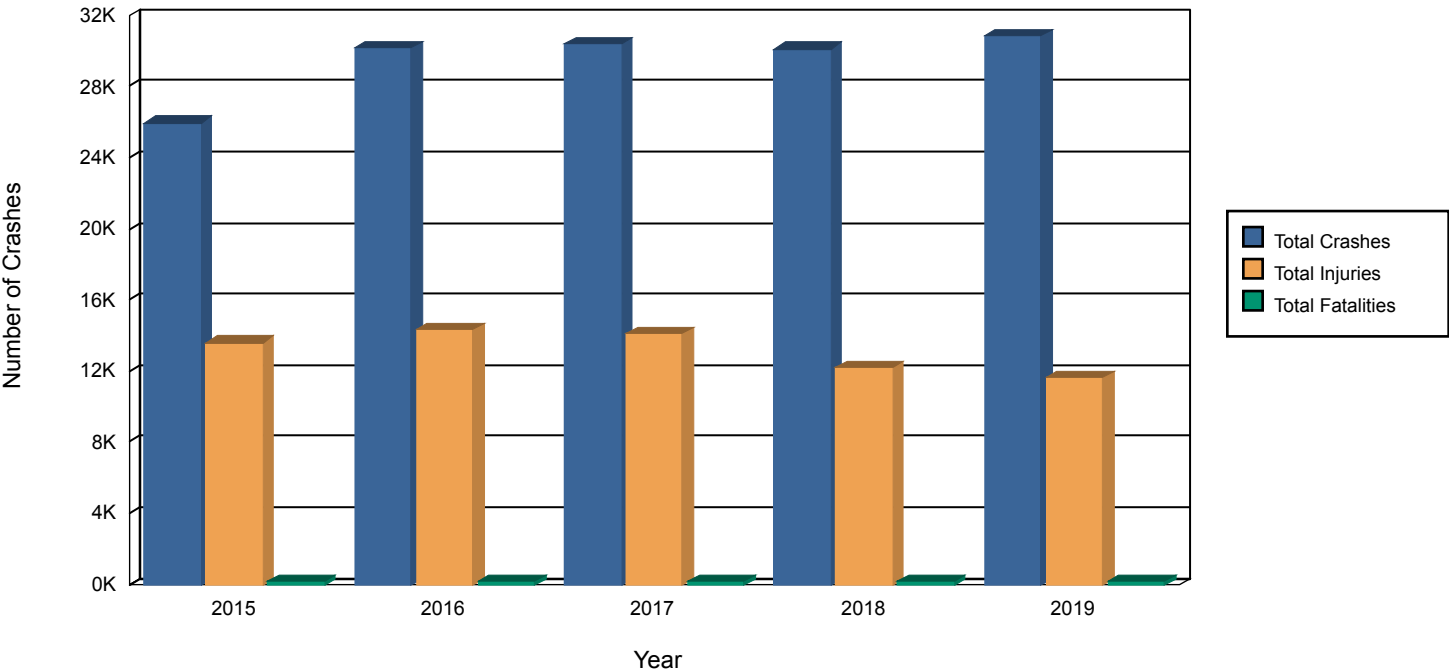
Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Bicyclist Crashes by Year (Phoenix)



Year	No Injury	Possible Injury	Non Incapacitating	Incapacitating Injury	Fatal	Unknown	Total
2015	35	157	185	53	8	0	438
2016	35	151	219	71	9	0	485
2017	17	152	235	52	14	0	470
2018	14	129	186	52	3	0	384
2019	0	118	147	26	7	0	298

All Arterials and Local Roads Car Involved Crashes by Year (Phoenix)

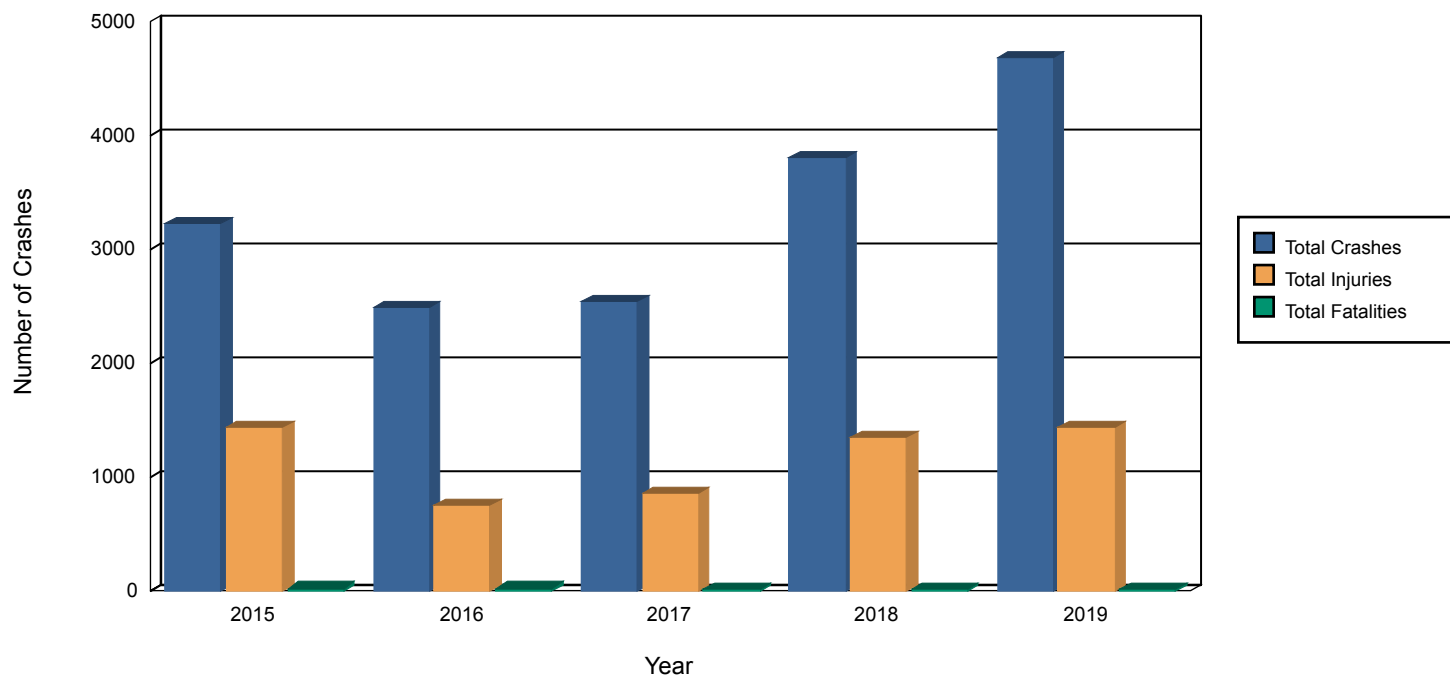


Year	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
2015	25,962	8,605	137	13,604	147
2016	30,195	9,393	167	14,343	175
2017	30,426	9,330	175	14,120	185
2018	30,130	8,148	182	12,196	197
2019	30,847	7,897	147	11,620	155

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

All Arterials and Local Roads Truck Involved Crashes by Year (Phoenix)

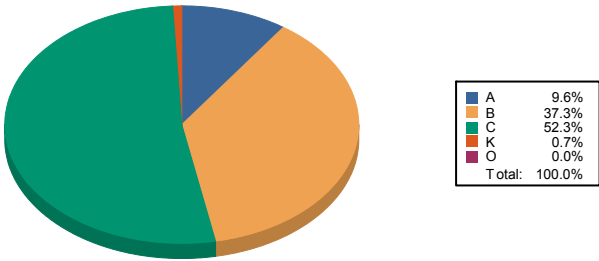
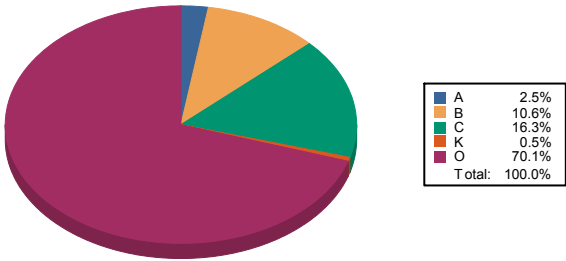


Year	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
2015	3,218	884	17	1,433	19
2016	2,487	511	19	746	19
2017	2,543	557	15	847	15
2018	3,807	905	18	1,347	18
2019	4,683	986	15	1,431	18

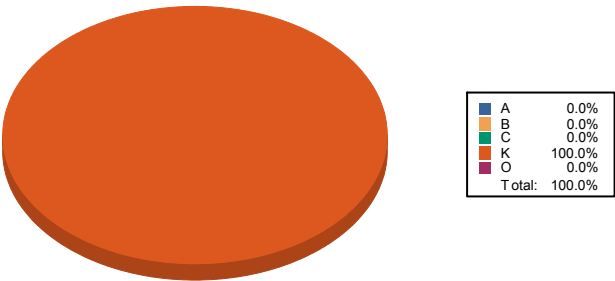
Safety Analysis Report

All Arterials and Local Roads Car Involved Crashes by

All Crashes Injury Severity (Phoenix) Injury Crashes



Fatal Crashes

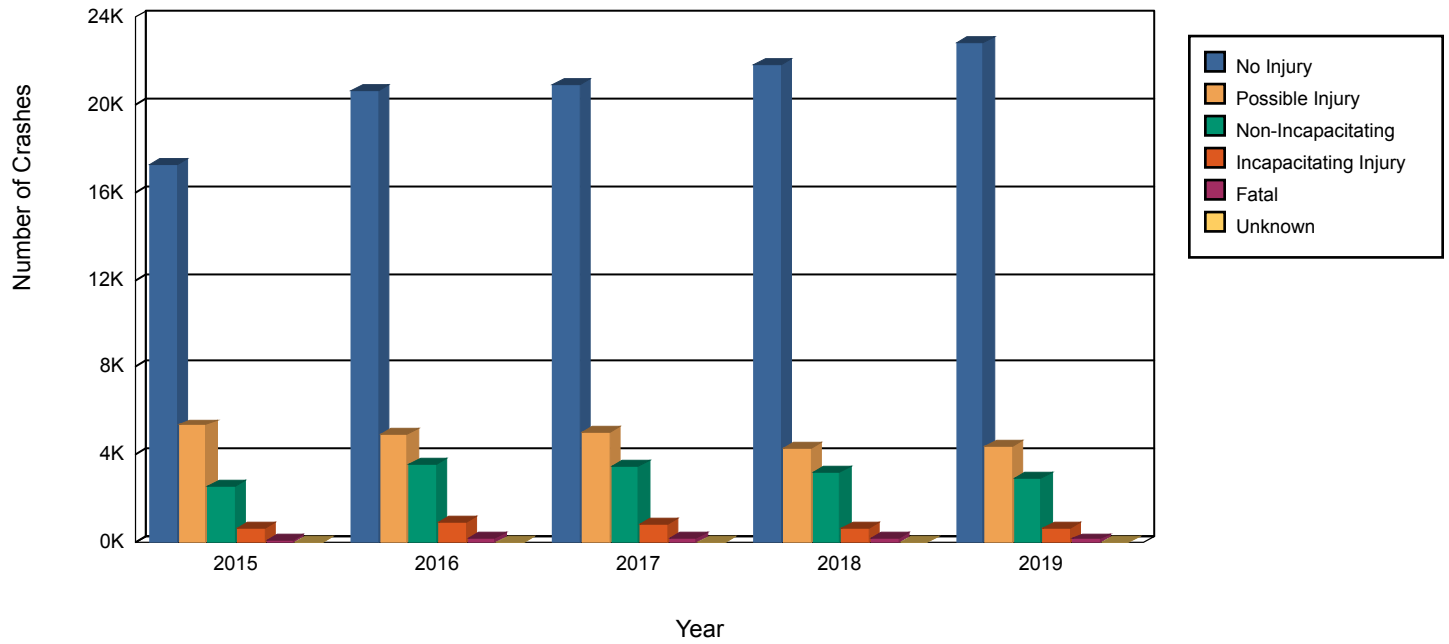


Injury Severity	All Crashes	Injury Crashes	Fatal Crashes	Total Injuries	Total Fatalities
O	103,379	0	0	0	0
C	23,984	23,984	0	34,446	0
B	15,709	15,709	0	24,602	0
A	3,680	3,680	0	6,343	0
K	808	0	808	492	859

Safety Analysis Report

Years:
2015,2016,2017,2018,2019

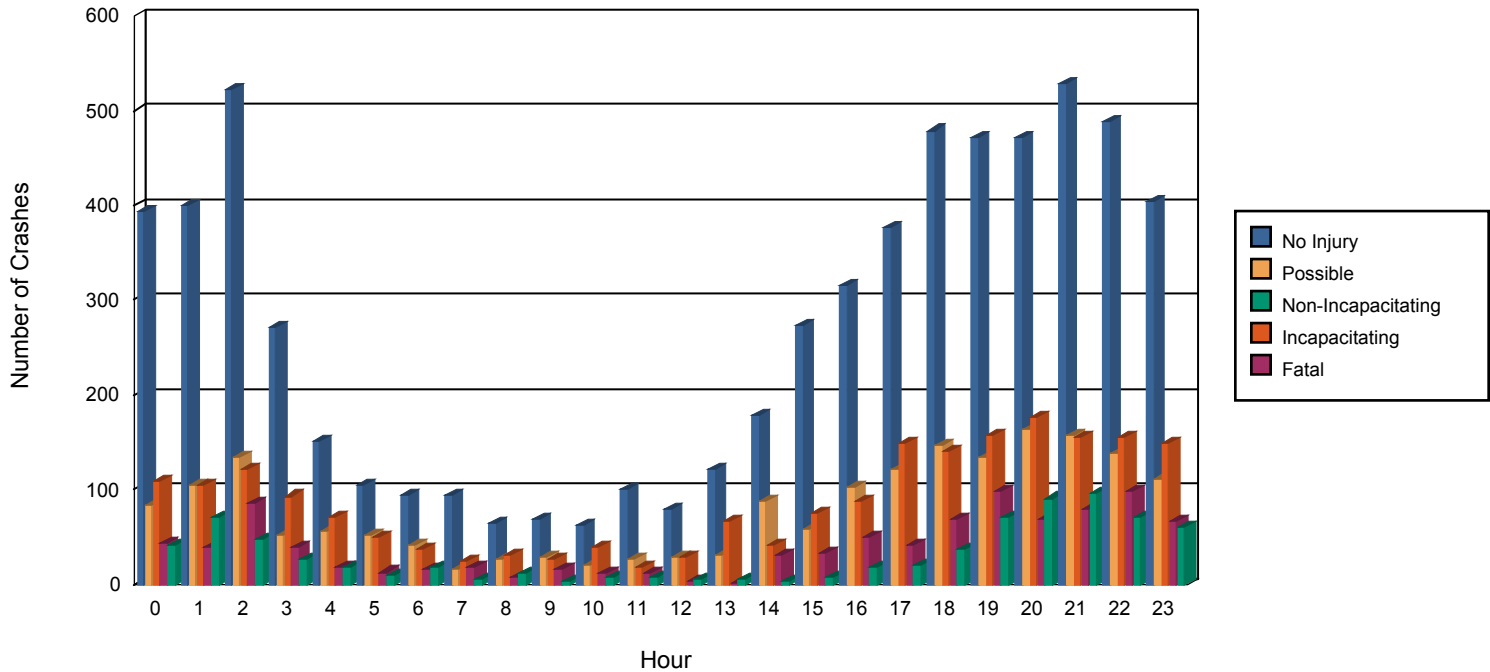
All Arterials and Local Roads Car Involved Crashes by Year (Phoenix)



Year	No Injury	Possible Injury	Non Incapacitating	Incapacitating Injury	Fatal	Unknown	Total
2015	17,220	5,347	2,589	669	137	0	25,962
2016	20,635	4,930	3,558	905	167	0	30,195
2017	20,921	5,051	3,468	811	175	0	30,426
2018	21,800	4,275	3,200	673	182	0	30,130
2019	22,803	4,381	2,894	622	147	0	30,847

Safety Analysis Report

Alcohol Impaired Drivers, 2015-2019 (Phoenix)



Hour	No Injury	Possible Injury	Non-Incapacitating	Incapacitating	Fatal	Unknown	Total	Total
0	394	83	108	43	42	0	670	
1	399	105	104	39	71	0	718	
2	522	135	122	86	47	0	912	
3	271	52	93	40	27	0	483	
4	151	56	70	18	19	0	314	
5	104	51	49	13	10	0	227	
6	95	41	37	16	18	0	207	
7	95	17	25	18	5	0	160	
8	65	26	30	7	11	0	139	
9	69	28	26	16	4	0	143	
10	63	20	39	11	7	0	140	
11	100	27	19	11	7	0	164	
12	79	29	29	4	6	0	147	
13	121	30	67	2	6	0	226	
14	179	87	42	30	4	0	342	
15	273	59	76	33	7	0	448	
16	316	103	87	50	19	0	575	
17	376	121	148	42	21	0	708	
18	479	147	140	68	38	0	872	

Hour	No Injury	Possible Injury	Non-Incapacitating	Incapacitating	Fatal	Unknown	Total <u>Total</u>
19	472	135	158	99	70	0	934
20	472	164	176	69	91	0	972
21	529	158	155	80	96	0	1,018
22	489	139	156	99	70	0	953
23	404	112	149	67	61	0	793

Filters:

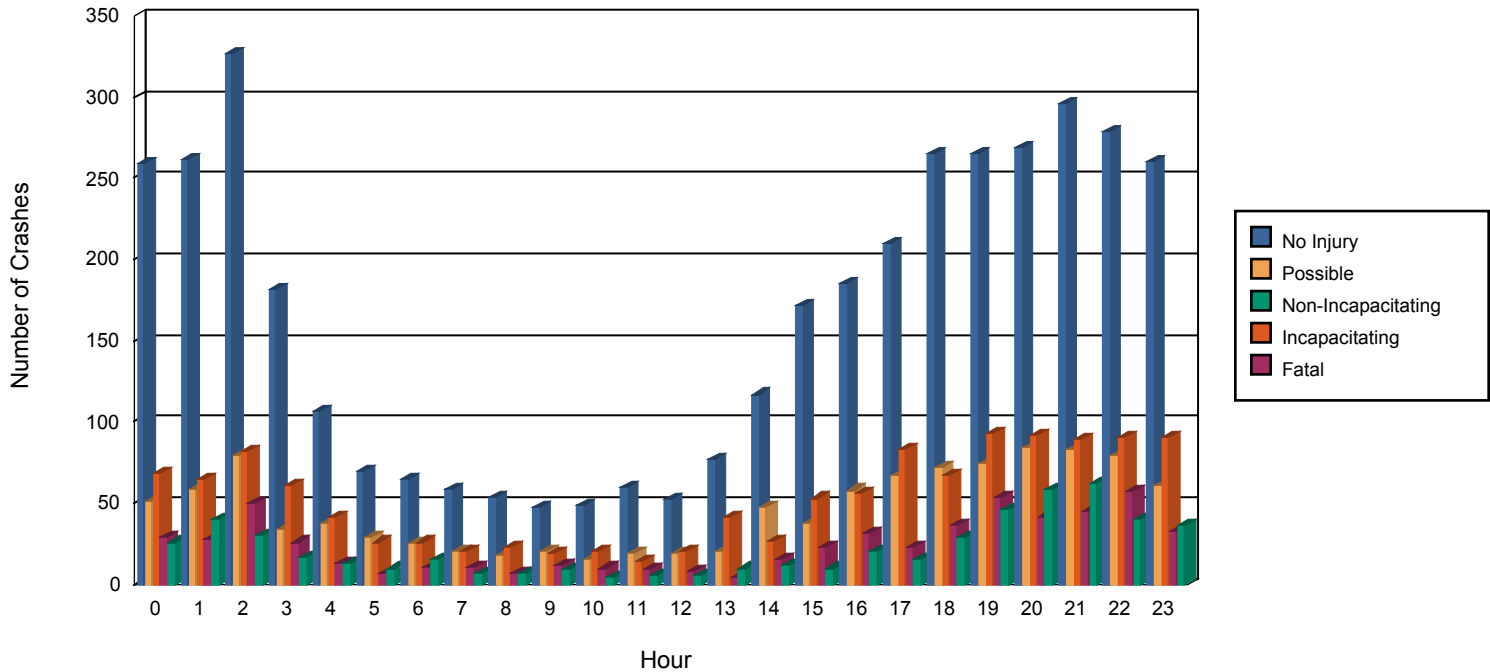
TrafficUnit.UnitType = DRIVER

Person.Physical = ALCOHOL

Year Between 2015 2019

Safety Analysis Report

Impaired Drivers 2015 - 2019 (Phoenix)



Hour	No Injury	Possible Injury	Non-Incapacitating	Incapacitating	Fatal	Unknown	Total	Total
0	259	51	68	29	26	0	433	
1	261	59	65	28	40	0	453	
2	327	79	82	50	30	0	568	
3	182	34	61	26	17	0	320	
4	107	38	41	13	13	0	212	
5	70	29	26	7	10	0	142	
6	65	25	26	11	16	0	143	
7	59	20	20	11	7	0	117	
8	54	18	23	7	7	0	109	
9	48	20	19	12	9	0	108	
10	49	16	20	10	4	0	99	
11	60	19	14	9	6	0	108	
12	52	19	21	8	6	0	106	
13	77	21	41	4	10	0	153	
14	117	48	27	16	12	0	220	
15	172	38	53	23	10	0	296	
16	185	58	56	32	21	0	352	
17	210	67	83	23	15	0	398	
18	265	72	67	36	29	0	469	

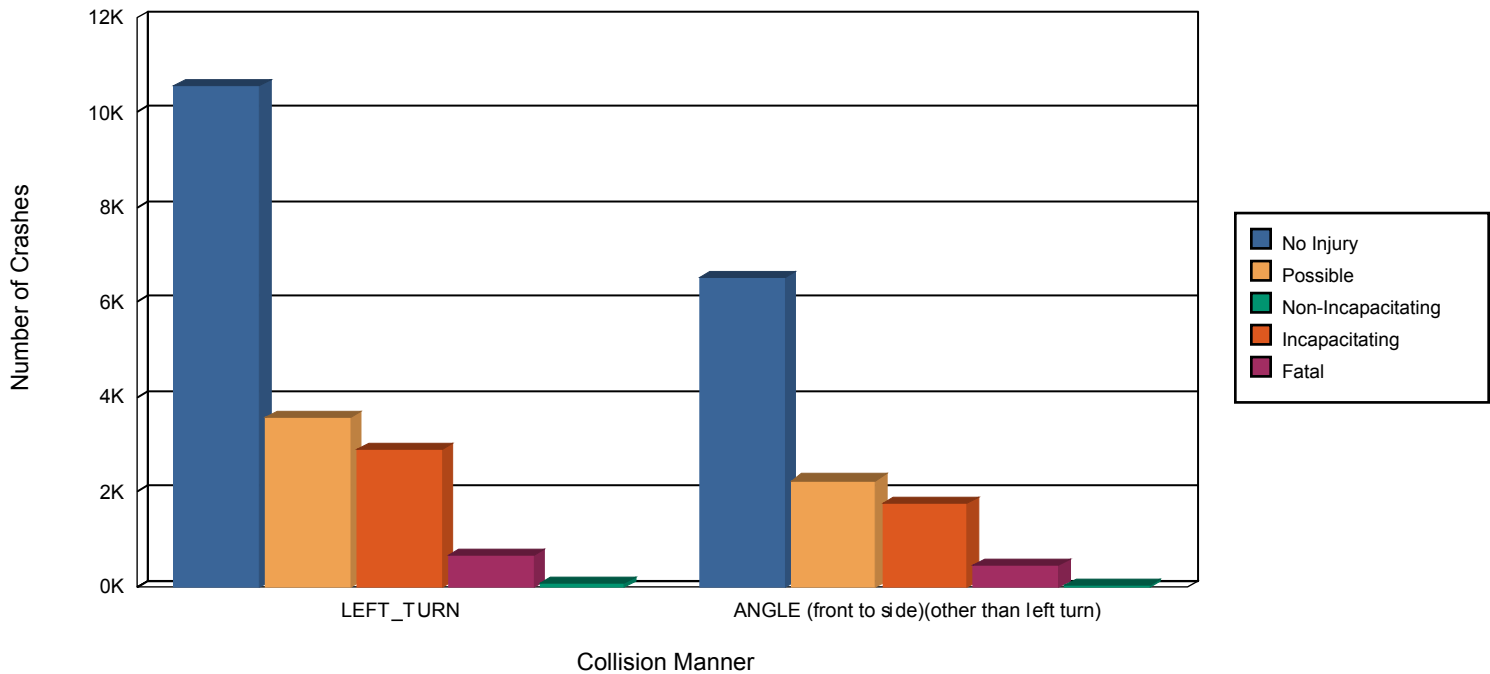
Hour	No Injury	Possible Injury	Non- Incapacitating	Incapacitating	Fatal	Unknown	Total <u>Total</u>
19	265	75	93	54	46	0	533
20	269	84	92	42	59	0	546
21	296	83	89	45	62	0	575
22	279	79	91	57	40	0	546
23	260	61	91	33	36	0	481

Filters:

Person.PersonType = DRIVER
 Year Between 2015 2019
 Person.Physical = ALCOHOL,DRUGS

Safety Analysis Report

Signalized Intersection Left Turn and Angle Collisions 2015 - 2019 (Phoenix)



Collision Manner	No Injury	Possible Injury	Non-Incapacitating	Incapacitating	Fatal	Unknown	Total
LEFT_TURN	10,555	3,555	2,880	656	72	0	17,718
ANGLE (front to side)(other than left turn)	6,523	2,244	1,751	445	44	0	11,007

Filters:

Incident.CollisionManner = ANGLE (front to side)(other than left turn),LEFT_TURN

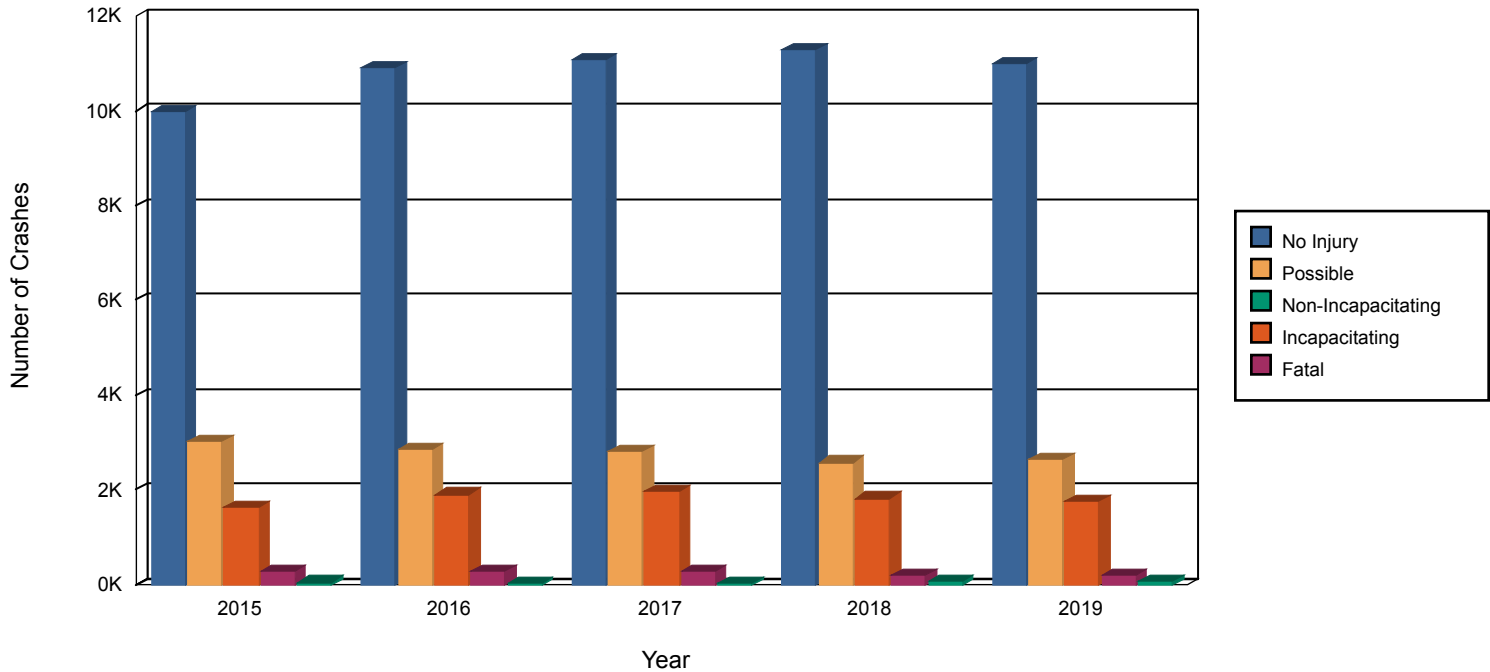
TrafficUnit.ControlType =

TRAFFIC_CONTROL_SIGNAL,FLASHING_TRAFFIC_CONTROL_SIGNAL,SIGNAL

Year Between 2015 2019

Safety Analysis Report

Speed-Related Collisions 2015 - 2019 (Phoenix)



Year	No Injury	Possible Injury	Non-Incapacitating	Incapacitating	Fatal	Unknown	Total
2015	9,974	3,017	1,631	268	48	0	14,938
2016	10,894	2,860	1,902	297	39	0	15,992
2017	11,084	2,795	1,967	261	41	0	16,148
2018	11,282	2,580	1,818	199	54	0	15,933
2019	10,980	2,623	1,743	201	51	0	15,598

Filters:

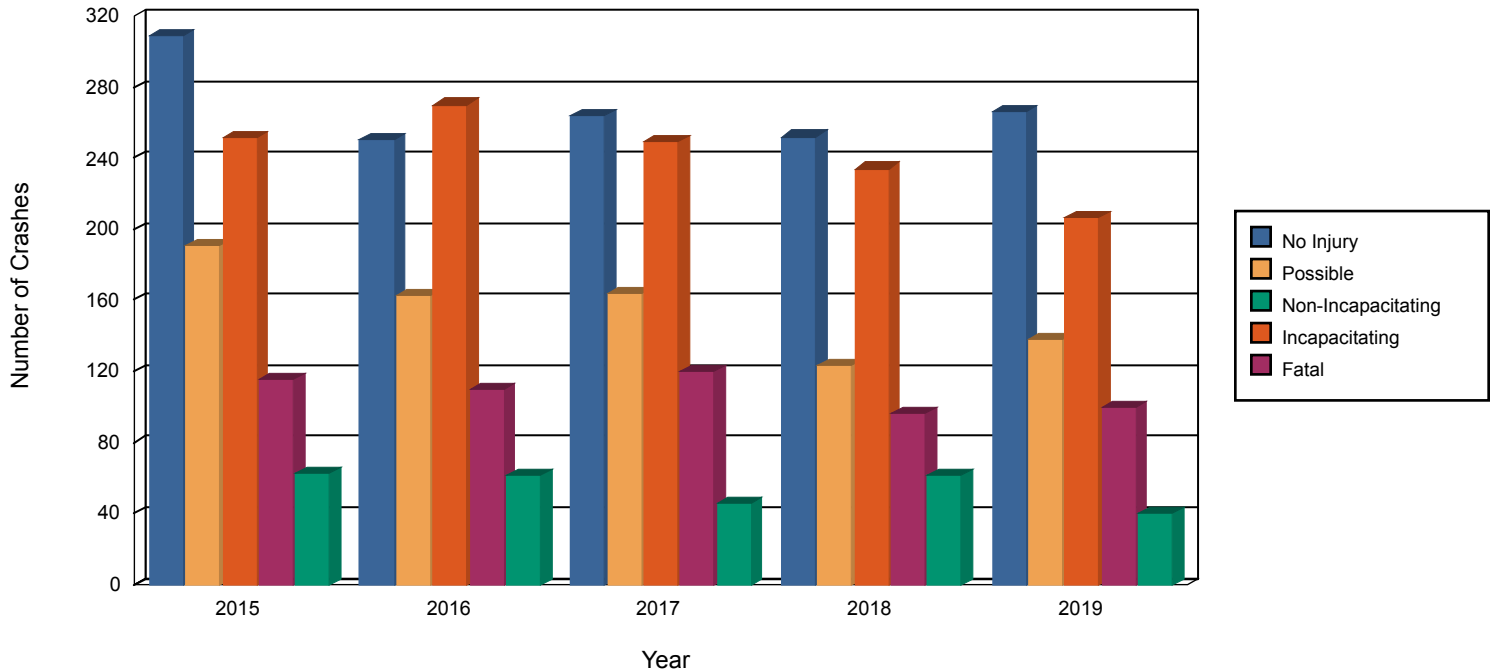
Person.Violation = SPEED_TO_FAST_FOR_CONDITIONS,EXCEEDED_LAWFUL_SPEED

Person.PersonType = DRIVER

Year Between 2015 2019

Safety Analysis Report

Unrestrained Driver Collisions 2015 - 2019 (Phoenix)



Year	No Injury	Possible Injury	Non-Incapacitating	Incapacitating	Fatal	Unknown	Total	Total
2015	309	191	251	115	63	0	929	
2016	250	163	270	110	61	0	854	
2017	264	164	249	120	46	0	843	
2018	252	123	234	96	61	0	766	
2019	266	138	206	100	40	0	750	

Filters:

Year Between 2015 2019

Person.PersonType = DRIVER

Person.SafetyDevice = None Used

PHOENIX

ARIZONA

High-Injury Network

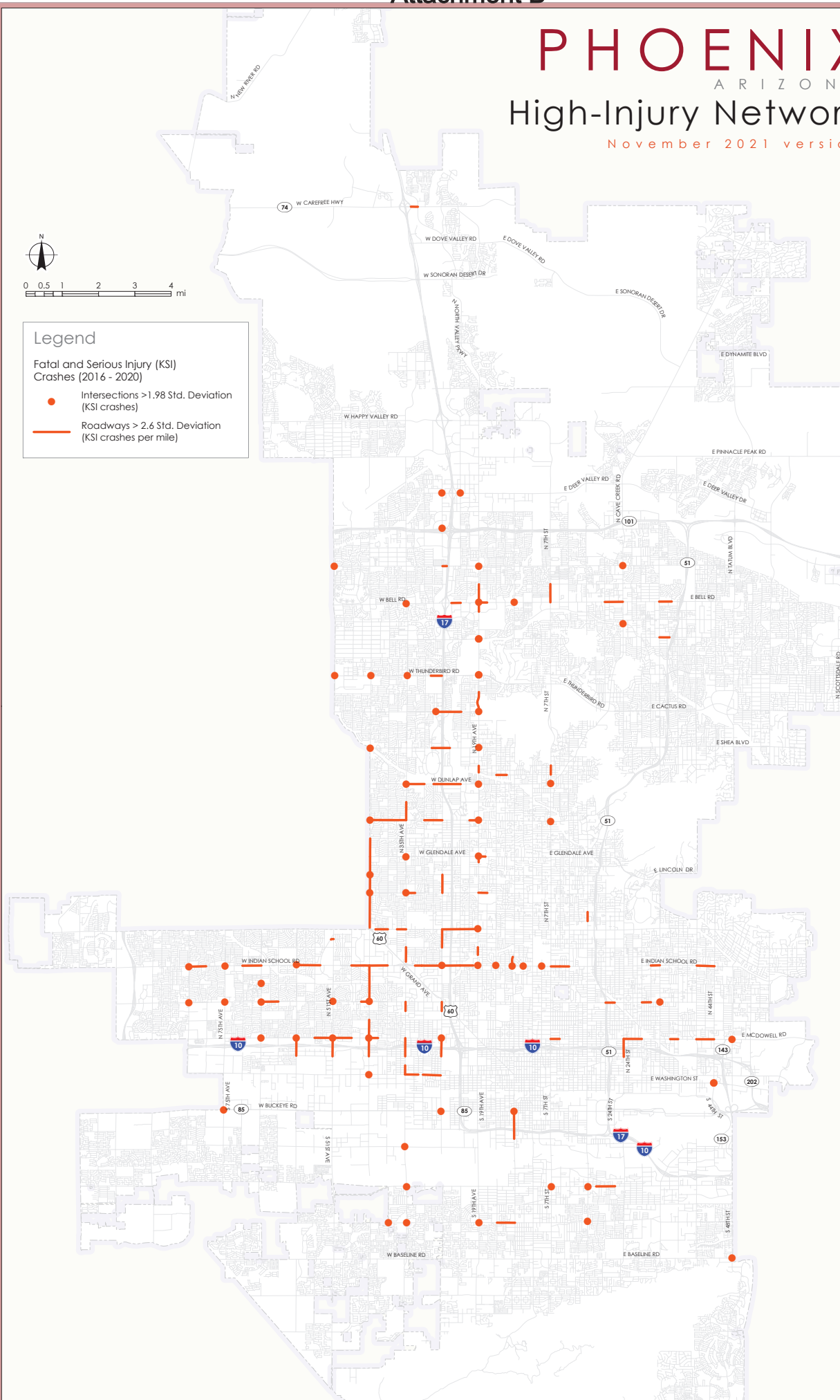
November 2021 version



Legend

Fatal and Serious Injury (KSI)
Crashes (2016 - 2020)

- Intersections >1.98 Std. Deviation
(KSI crashes)
- Roadways > 2.6 Std. Deviation
(KSI crashes per mile)



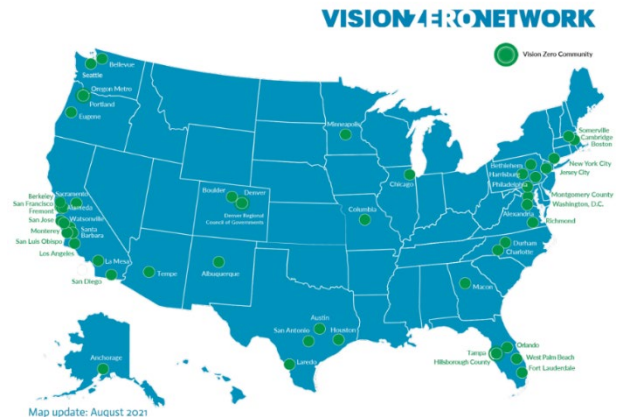
ATTACHMENT C

VISION ZERO BACKGROUND

What is the Vision Zero Network?

The Vision Zero Network is a non-profit organization with a goal to eliminate the over 40,000 traffic fatalities that occur each year in the United States. The Vision Zero Network promotes a shift of thinking from traffic deaths are not inevitable to traffic deaths being preventable. The non-profit requires city partners to commit to the following strategies:

- Building and sustaining leadership, collaboration, and accountability – especially among a diverse group of stakeholders to include transportation professionals, policymakers, public health officials, police, and community members.
- Collecting, analyzing, and using data to understand trends and potential disproportionate impacts of traffic deaths on certain populations.
- Prioritizing equity and community engagement.
- Managing speed to safe levels.
- Setting a timeline to achieve zero traffic deaths and serious injuries, which brings urgency and accountability, and ensuring transparency on progress and challenges.



The scope of the Roadway Safety Action Plan (RSAP) closely aligns with these concepts.

As of August 2021, 51 cities have been recognized as part of the Vision Zero Network. This network consists of leaders in public health, transportation planning and engineering, police, and the community. Recognized Vision Zero cities will receive support and resources from the network including: informational webinars, in-person meetings, conference panels, case studies, hands-on resources, and peer exchange opportunities. Recognized Vision Zero Network cities will also be added to the Vision Zero Map.

What is the Recognition Process (Application)?

To be recognized by the Vision Zero Network, key city staff members and the Mayor must commit to the minimum criteria below:

- Setting a clear goal of eliminating traffic deaths and serious injuries among all road users within.
- An explicit timeframe, to be identified with the RSAP.

- The Mayor (or top elected official) publicly, officially committing to Vision Zero within the set.
- Timeframe and directing appropriate city staff to prioritize the work.
- A Vision Zero Action Plan or Strategy is in place, or the Mayor and key departments have committed to creating one in a specified time frame and which includes a focus on being data driven, equitable, and including community input.
- Key city departments, including Transportation, Public Health, Mayor's Office, and Police, are actively engaged as leaders and partners in the process of developing the Vision Zero Plan, implementing it, and evaluating and sharing progress.
- A Vision Zero Task Force (including the agencies listed above, as well as key community stakeholders, and others) meets regularly to lead and evaluate efforts.

For a City to further pursue recognition as a Vision Zero Community, an online questionnaire must also be submitted. Vision Zero Network does not offer meetings prior to this action.

What do we Know About Other Vision Zero Cities?

As stated above, there are 51 cities within the United States that are part of the Vision Zero Network, which includes leaders in public health, transportation planning and engineering, police, and community advocacy groups.

Tempe, Arizona

Tempe's Vision Zero Timeline

March, 2018	Vision Zero Resolution approved by Council
June, 2018	Vision Zero workshop held with community members
January, 2019	Continued Work
February, 2019	Vision Zero Network recognizes the City of Tempe
March, 2019	Distracted driving ordinance updated
March – April, 2019	Public Comment on draft plan
May, 2019	Tempe approves Vision Zero Action Plan

The City of Tempe has completed several Vision Zero strategy efforts since adoption of the action plan including:

- Making school crosswalks more noticeable like repainting elementary schools in bright yellow and installing timed, flashing speed signs around high schools.
- Improved intersections at Rural Rd. and University Dr. as well as Rural Rd. and Rio Salado Pkwy. By adding turn lanes, new traffic signals, ADA sidewalk ramps, and improved transit stops.

ATTACHMENT D
DRAFT RESOLUTION

**A RESOLUTION ADOPTING
THE VISION ZERO STRATEGY
FOR THE CITY OF PHOENIX**

WHEREAS, Phoenix aspires to reduce the number of fatal and serious injury crashes on its streets to zero;

WHEREAS, Vision Zero is a traffic safety policy that takes an ethical approach toward achieving safety for all road users;

WHEREAS, in the past five years more than 900 people have lost their lives and more than 4,000 people were seriously injured on Phoenix streets;

WHEREAS, traffic-related deaths and serious injuries are preventable;

WHEREAS, the severity of motor vehicle-related crashes can be reduced;

WHEREAS, transportation safety is everybody's responsibility;

WHEREAS, the Street Transportation and Phoenix Police departments are actively employing programs to improve safety and response time; and

WHEREAS, Vision Zero builds upon those existing programs with new strategies to help meet the Council's adopted performance measure to achieve a reduction in the number of fatal and serious injury crashes to zero.

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF PHOENIX as follows:

The Phoenix City Council hereby makes a commitment that the City of Phoenix will adopt the Vision Zero strategy with the goal of eliminating all traffic fatalities for all users on Phoenix roadways.

PASSED by the Council of the City of Phoenix this 25th day of January 2022.