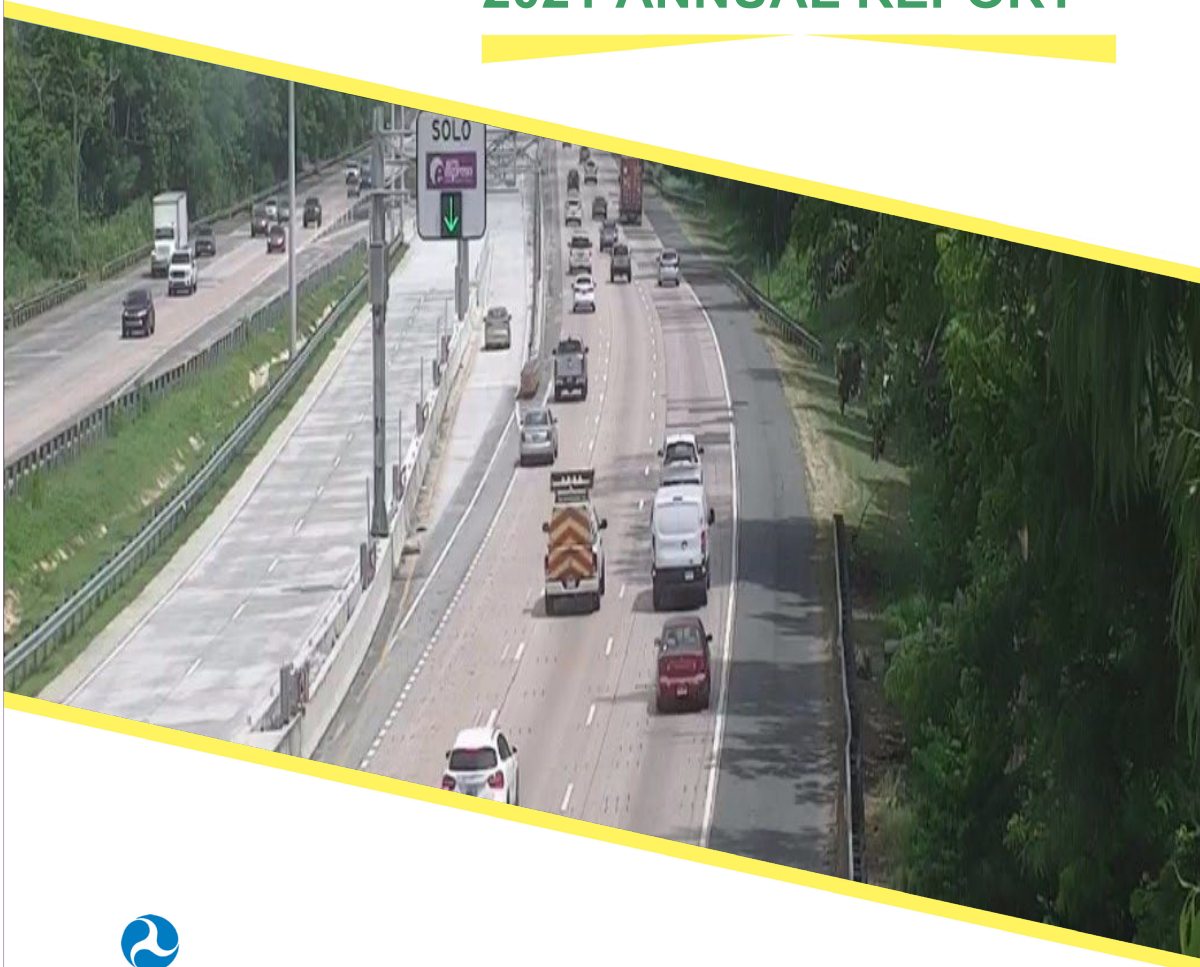




PUERTO RICO

# HIGHWAY SAFETY IMPROVEMENT PROGRAM 2021 ANNUAL REPORT



U.S. Department of Transportation  
Federal Highway Administration

**Photo Source:**  
PRHTA TMC

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## **Disclaimer**

### ***Protection of Data from Discovery Admission into Evidence***

23 U.S.C. 148(h)(4) states “Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for any purpose relating to this section[HSIP], shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location identified or addressed in the reports, surveys, schedules, lists, or other data.

23 U.S.C. 148(h)(4) states “Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for any purpose relating to this section[HSIP], shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location identified or addressed in the reports, surveys, schedules, lists, or other data.23 U.S.C. 409 states “Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway-highway crossings, pursuant to sections 130, 144, and 148 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.”

## Executive Summary

### Background

The Highway Safety Improvement Program (HSIP) is responsible for managing the 25% of federal funds allocated for Puerto Rico under the ZP-30 Fiscal Management Information System program code for highway safety improvement projects. This program does not have any subprogram. The Strategic Highway Safety Plan (SHSP) is a key element of the HSIP in Puerto Rico, being responsible of coordinating with internal and external safety stakeholders from all sectors the highway safety initiatives, performance measures, and targets for Puerto Rico.

Puerto Rico developed the first SHSP in 2014, for the 2014 to 2018 period, with the support of safety stakeholders from the Puerto Rico Highway and Transportation Authority (PRHTA), the Federal Highway Administration (FHWA), the National Highway Traffic Safety Administration (NHTSA), and the Federal Motor Carrier Safety Administration (FMCSA). This 5-year comprehensive plan met the requirements of the federal regulations (23 U.S. Code §148). The Puerto Rico SHSP targets for 2018 were satisfactory met, as certified by FHWA.

In 2019, the second SHSP was approved, for the 2019 to 2023 period, and is currently under implementation by the PRHTA, the Puerto Rico Traffic Safety Commission (PRTSC), and more than 80 safety stakeholders. It is through the SHSP that the main highway safety problems, and opportunities to achieve the purpose of the HSIP, have been identified and analyzed, as well as other transportation plans.

### Puerto Rico HSIP Funding

During FY 2020, the PRHTA invested \$34,881,624.52 of federal funds on a total of seventeen (17) projects at the following highways: PR-493 (Arecibo, Hatillo), PR-8 (San Juan, Carolina), PR-18 (San Juan), PR-52/PR-18 (Caguas, San Juan), PR-66 (Carolina, Canóvanas, Río Grande), PR-115 (Rincón, Aguada), PR-116 (Lajas), PR-152 (Barranquitas, Naranjito), PR-167 (Comerio, Naranjito, Bayamón), PR-173 (Cidra, Aibonito), PR-176 (San Juan), PR-181 (San Juan), PR-183 (Caguas, San Lorenzo), PR-203 (San Lorenzo, Gurabo), PR-119 (Las Marías), and PR-4413 (Rincón). These projects represent an 92% of the total federal investment of the Puerto Rico HSIP. All these projects were mainly focused on roadside improvements following the Manual of Assessing Safety Hardware (MASH) upgrades, such as metal safety barriers, signs and traffic control, rumble strips, among other roadside safety applications. The method used to select the projects was systematic, where some of the high crash locations were analyzed and the ones with the highest priority were chosen. The remaining 8% of the federal investment was used for the Highway Safety Patrol Program (SEGURO, by its Spanish Acronym), with a cost of \$2,084,750.00, for the Strategic Highway Safety Plan Consultant with a cost of \$221,179.20 and for the State Planning and Research Program 2019-2020 with \$500,000.00.

There are no funds allocated for local or tribal roads. Allocating federal funds to improve highway safety through the State highway system had been essential to stop the increase in the number of fatal and injury crashes in Puerto Rico. In addition, the PRHTA, together with the Puerto Rico Traffic Safety Commission (PRTSC) established the safety performance targets for 2022. These targets were based on the 2020 fatalities and serious injuries, and the National Transportation Performance Targets (NTPT) for Highway Safety. PRHTA is engaged in updating the next SHSP in 2024.

### 2020 Challenges

During 2020, like the rest of the world, Puerto Rico faced the negative effects of the COVID-19 pandemic; but this also led to some positive changes. The most important positive aspect during the pandemic has been the historical reduction in fatalities of 242 deaths during 2020. According to the 2019-2023 SHSP, the goal for

## 2021 Puerto Rico Highway Safety Improvement Program

2023 is to reduce deaths to less than 275, and during 2020, because of the government lockdown, the total amount was 242. The most important negative effect was the delay in the implementation of several PRHTA programs, including the 2019-2023 SHSP. One of the main purposes of the SHSP is to unify roadway safety efforts through safety stakeholders at public and private entities. This effort was undermined during 2020 due to strict government executive orders that required a general lockdown for entire population for several months without having any physical contact. During that period, many of the meetings and work plans were affected as not all the safety stakeholders were able to transition to remote work at the same time. In addition, many of the governmental priorities at the state and federal level were changed to strictly meet the needs of the population during this pandemic. This resulted in a low effectiveness in the general participation of the safety stakeholders, where many of these people were key to achieving some specific goals.

Another delay in the PRHTA efforts, and within the SHSP safety stakeholders, was a series of earthquakes that hit the island between December 2019 through January 2020. This natural disaster, although was mainly located at the south of the island, affected all the government services due to several collapses structures and entire communities leaving their home and living in tents. The negative effects of this event, in terms of ground transportation, were that several roads were closed and many of transportation professionals and governmental resources were focused to work with the damaged infrastructure. This event was declared as a natural disaster by FEMA (DR-4473-PR) on January 16, 2020, with an incident period from December 28, 2019, through July 3, 2020.

### **2019 and 2020 Safety Performance Targets**

In 2019, the Puerto Rico HSIP could not met four (4) out of five (5) safety performance measures. Having failed to meet or make significant progress in 2019, PRHTA is required to comply with provisions set forth in 23 U.S.C. 148(i) for the FY2022. For this purposes, Puerto Rico developed a HSIP Implementation Plan and will obligate an obligation authority equal to FY2019 HSIP apportionment in the amount of \$32,613,967.00. The Puerto Rico HSIP Implementation Plan will: 1) identify roadway features that constitute a hazard to road users; 2) identify highway safety improvement projects based on crash experience, crash potential, or other data supported means; 3) describe how HSIP funds will be allocated, including projects, activities, and strategies to be implemented; 4) describe how the proposed projects, activities, and strategies funded under the State HSIP will allow the State to make progress toward achieving the safety performance targets; and 5) describe the actions the State will undertake to achieve the performance targets.

During 2020, two (2) out of five (5) safety performance target were met. The number of fatalities and fatality rate met the targets, decreasing a 3.6% and 1.2%, respectively. On the other hand, the performance measures for serious injuries, serious injury rate, and non-motorized fatalities and serious injuries does not meet the target, increasing a 5.8%, 8.7%, and 18.7%, respectively.

## Introduction

The Highway Safety Improvement Program (HSIP) is a core Federal-aid program with the purpose of achieving a significant reduction in fatalities and serious injuries on all public roads. As per 23 U.S.C. 148(h) and 23 CFR 924.15, States are required to report annually on the progress being made to advance HSIP implementation and evaluation efforts. The format of this report is consistent with the HSIP Reporting Guidance dated December 29, 2016 and consists of five sections: program structure, progress in implementing highway safety improvement projects, progress in achieving safety outcomes and performance targets, effectiveness of the improvements and compliance assessment.

## Program Structure

### *Program Administration*

#### **Describe the general structure of the HSIP in the State.**

The Puerto Rico Highways and Transportation Authority (PRHTA) manages a Highway Safety Improvement Program (HSIP) focused on the development of highway safety improvement projects along the entire roadway network. As part of this program, PRHTA is implementing a Strategic Highway Safety Plan (SHSP) since 2014 and, currently, the Puerto Rico SHSP 2019-2023. PRHTA uses local and federal funds to implement the SHSP and perform highway safety improvement projects.

Under the title 23 U.S.C. Section 165, Territorial and Puerto Rico Highway Program, Puerto Rico is authorized to receive \$158,000,000 annually for fiscal years 2016 through 2020. The responsible agency for receiving these funds is the PRHTA. From these funds, the Highway Safety Improvement Program (HSIP) is responsible for managing the 25% under the ZP-30 Fiscal Management Information System program code for highway safety improvement projects. Additionally, the PRHTA applies ZP-40 Section 154 Penalty (Open Container Requirements) and ZP-50 Section 164 Penalty (Minimum Penalties for Repeated Offenders) funds to HSIP eligible activities.

To strategically invest the HSIP funds, PRHTA use a project selection process with the following steps:

- Crash data collection in the Puerto Rico Department of Transportation and Public Works (PRDTPW).
- Application of the High Crash Location (HCL) methodology. This data-driven methodology helps PRHTA to identify the high crash locations by corridors, segments, and intersections.
- Evaluation of the high crash locations to determine the highway safety improvement projects to be included in the Statewide Transportation Improvement Program (STIP). (Those projects are divided using a systematic or hot-spot approach, and PRHTA is working to use a systemic safety approach. This evaluation considers the use of funds through to the five (5) PRHTA Regions.)
- Selection of consultants for the development of PS&E in compliance with the latest engineering standards in Puerto Rico.
- Inclusion of the highway safety improvement projects in the STIP for the evaluation and approval of the Metropolitan Planning Organization (MPO).
- Bidding and construction processes.

#### **Where is HSIP staff located within the State DOT?**

Engineering

## How are HSIP funds allocated in a State?

- Other-Allocated Programs

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- Evaluation of the high crash locations to determine the highway safety improvement projects to be included in the Statewide Transportation Improvement Program (STIP). (Those projects are divided using a systematic or hot-spot approach, and PRHTA is working to use a systemic safety approach. This evaluation considers the use of funds through to the five (5) PRHTA Regions.)
- Selection of consultants for the development of PS&E in compliance with the latest engineering standards in Puerto Rico.
- Inclusion of the highway safety improvement projects in the STIP for the evaluation and approval of the Metropolitan Planning Organization (MPO).
- Bidding and construction processes.

## Describe how local and tribal roads are addressed as part of HSIP.

**For local roads:** In Puerto Rico, local roads are addressed by municipalities. As part of the Strategic Highway Safety Plan (SHSP), all crashes are evaluated, and high crash locations are identified along the entire roadway network. If local streets resulted as prone to a high number of crashes, the PRHTA is engaged to provide technical support, perform Road Safety Audits (RSA), and develop highway safety improvement projects. In addition, the municipalities are invited to participate in the Emphasis Areas teams' meetings. This is very important because the meeting participants can receive the most recent crash and fatalities data analysis, discuss the main SHSP's strategies and action plan for the specific period of the year or according to increasing safety issues. Municipalities with the most roadway length of high crash locations are informed and PRHTA provide them with a municipal deep crash analysis to help them plan their local police mobilizations, educational programs, community outreach, emergency medical services, and engineering improvements. If there is a safety problem in the local roads, the PRHTA provide technical resources to find countermeasures and encourage a reduction in the severe crashes

**For tribal roads:** Puerto Rico does not have tribal roads, thus is not applicable.

## Identify which internal partners (e.g., State departments of transportation (DOTs) Bureaus, Divisions) are involved with HSIP planning.

- Design
- Local Aid Programs Office/Division
- Operations
- Planning
- Traffic Engineering/Safety
- Other-Driver Licensing Office (DISCO)

## Describe coordination with internal partners.

The PRHTA Area Directors continuously held coordination meetings for the selection and integration of their programs using a data driven oriented process. The State Transportation Improvement Program (STIP) is that

## 2021 Puerto Rico Highway Safety Improvement Program

data-driven program were all the program managers of PRHTA converge their necessities and ideas. Some of the internal partners are Planning and Programming Area, Design Area, and Traffic Engineering and Operations Area, among others.

### **Identify which external partners are involved with HSIP planning.**

- Academia/University
- FHWA
- Governors Highway Safety Office
- Law Enforcement Agency
- Local Government Agency
- Local Technical Assistance Program
- Regional Planning Organizations (e.g. MPOs, RPOs, COGs)
- Other-Non-profit organizations

### **Describe coordination with external partners.**

As part of the Puerto Rico SHSP, the external partners are continuously informed about the SHSP progress, and they actively participate in Emphasis Areas Quarterly Meetings (i.e., Pedestrians, Traffic Record Systems, Emergency Medical Services, Lane Departure, Negligent Driving, Personal Safety Gear, and Under the Influence of Alcohol and Other Substances), and Road Safety Audits (RSA), among other events. Through the Emphasis Areas Teams Meetings (i.e., pedestrians, lane departure, negligent driving, under the influence of alcohol and other substances, and personal safety gear) these partners collaborate in the progress of the Puerto Rico SHSP. In addition, some of them participate in the road safety evaluations supporting the decision-making processes of the highway safety improvement projects. The development and implementation of the Puerto Rico SHSP is funded through the HSIP.

The PRHTA-HSIP Team coordinates with the Puerto Rico Traffic Safety Commission (PRTSC) and the Automobile Accident Compensation Administration (ACAA, by its Spanish Acronym) the crash data used to establish performance measures and the data-driven highway safety improvement projects. The PRTSC is responsible of managing the Puerto Rico fatalities database through the Planning Area and for the software created to access and analyze the Puerto Rico crash data, called "Observatorio Vial", that is developed and managed by the Instituto Tercera Mision (San Juan, Puerto Rico). The ACAA provides the number of injured people that were transported in an ambulance because of a traffic crash.

The HSIP promotes the alliance among safety stakeholders by encouraging them, throughout the SHSP, to bring together efforts and providing technical references for their studies and activities (i.e., statistical crash analysis and profile of pedestrian crashes).

During this 2021 reporting period, the coordination with the external partners has been delayed due to several reasons. First, the COVID-19 pandemic has deprived the SHSP team to reach the external partners as has usually happened. The communication with the external partners were mainly at face-to-face meetings, helping to all these professionals to know each other and to listen to their needs. With the COVID-19 pandemic, a lot of this interaction has been on hold. Second, the PRHTA was amid finalizing the SHSP's contract award for the consultant, adding an administrative delay to the process.

### **Describe other aspects of HSIP Administration on which the State would like to elaborate.**

The Puerto Rico HSIP Administration is focused on update the current methodology for selecting the highway safety improvement projects by using the latest HPMS items, MIRE FDE, and fatalities, crashes, and serious injuries data. All these data sets have been updated for the last three years and the PRHTA will develop new



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strategies for using them. Also, the PRHTA team will enhance this methodology by combining the hot-spot, systematic, and systemic approach to ensure the best selection of projects and investments federal funds, as part of the HSIP Implementation Plan and adjustments to the HSIP Administration. In addition, the PRHTA has been implementing Before and After Studies as a mechanism to evaluate the effectiveness of the selected projects. Finally, Puerto Rico is fully engaged in the Every Day Counts (EDC) initiatives. Finally, the PRHTA-HSIP Team is actively participating in the Traffic Records Coordinating Committee (TRCC) helping in the implementation of the digital crash form PPR-621.4.

### ***Program Methodology***

**Select the programs that are administered under the HSIP.**

- HSIP (no subprograms)

### **Program: HSIP (no subprograms)**

***Date of Program Methodology:7/1/2017***

***What is the justification for this program?***

- Addresses SHSP priority or emphasis area
- FHWA focused approach to safety

***What is the funding approach for this program?***

Funding set-aside

***What data types were used in the program methodology?***

#### **Crashes**

- All crashes

#### **Exposure**

- Traffic
- Lane miles

#### **Roadway**

- Functional classification

***What project identification methodology was used for this program?***

- Crash frequency
- Other-High Crash Location Report
- Relative severity index

***Are local roads (non-state owned and operated) included or addressed in this program?***

Yes

***Are local road projects identified using the same methodology as state roads?***

Yes

***How are projects under this program advanced for implementation?***

- selection committee

**Select the processes used to prioritize projects for implementation. For the methods selected, indicate the relative importance of each process in project prioritization. Enter either the weights or numerical rankings. If weights are entered, the sum must equal 100. If ranks are entered, indicate ties by giving both processes the same rank and skip the next highest rank (as an example: 1, 2, 2, 4).**

**Relative Weight in Scoring**

Available funding:100

Total Relative Weight:100

**What percentage of HSIP funds address systemic improvements?**

92.3

**HSIP funds are used to address which of the following systemic improvements?**

- Add/Upgrade/Modify/Remove Traffic Signal
- Clear Zone Improvements
- Horizontal curve signs
- Install/Improve Pavement Marking and/or Delineation
- Install/Improve Signing
- Rumble Strips
- Safety Edge
- Traffic Control Device Rehabilitation
- Upgrade Guard Rails

**What process is used to identify potential countermeasures?**

- Crash data analysis
- Data-driven safety analysis tools (HSM, CMF Clearinghouse, SafetyAnalyst, usRAP)
- Engineering Study
- Road Safety Assessment
- SHSP/Local road safety plan
- Stakeholder input

**Does the State HSIP consider connected vehicles and ITS technologies?**

Yes

**Describe how the State HSIP considers connected vehicles and ITS technologies.**

The Puerto Rico HSIP considers connected vehicles and Intelligent Transportation Systems (ITS) as innovative technologies that will promote a reduction of crashes with its capabilities and performance. If a safety project recommends ITS technology as part of the proposed countermeasures, PRHTA will propose the use of HSIP funds for the development and implementation of the technology that will promote a reduction of crashes with its capabilities and performance (i.e., traffic signal, dynamic message sign, TMC). The implementation of connected vehicles is not as advanced as ITS technologies in Puerto Rico, but as these technologies are included in the Puerto Rico's Regional ITS Architecture the Puerto Rico HSIP will support their implementation. Many of these advanced technology applications can be found on the CMF Clearinghouse, or through other research papers, which provides additional tools for analysis. PRHTA's focus

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is to actively manage the transportation system to maximize safety, security, mobility, and return on investment for the benefit of customers.

### **Does the State use the Highway Safety Manual to support HSIP efforts?**

Yes

### **Please describe how the State uses the HSM to support HSIP efforts.**

The PRHTA used the HSM as a reference to develop current procedures to determine the high crash locations, perform the Before and After studies, and develop the Puerto Rico Crash Modification Factors database. The PRHTA methodology for determining the high crash locations (HCL Report) includes a Crash Cost Factor (CCF) and a Frequency Index (FI), corresponding to the Crash Rate and Severity Index presented in the HSM.

The PRHTA have not been able to use the HSM in the full extends because the KABCO injury classification was not implemented, and the traffic data was very limited. However, since 2019, the new crash form, PPR-621.4, provides the necessary fields for the police officer to fill out the form at the scene of a crash. PPR-621.4 allows the police officer to analyze and identify the severity of the crash and classify it in one (1) of the five (5) classifications according to KABCO. This effort has been led by the PRTSC and the Puerto Rico Police Department, where they have been able to obtain technical personnel for the analysis of the new digital crash form and its compliance with the MMUCC; They have also managed to obtain funds for the purchase of tablets for traffic patrols and the training of police officers for the proper use and implementation of this effort. This entire process has been implemented in a phased manner and it has taken time for the new processes to mature and the staff to get used to completing the new crash form. This being the case, the PRHTA-HSIP team is in constant communication with the TRCC to evaluate the accuracy and effectiveness of the classifications of crashes made by police officers. It is contemplated that during the SHSP 2019-2023 cycle, the PRHTA could use the crash severity data provided in PPR-621.4.

The crash costs used for determining the CCF and for the justification of highway safety improvement projects are those included in the HSM. Currently, the process for performing the Before and After studies was based on the process contained in the HSM, except for those elements that were limited by the local available data. PRHTA participated in the Data-Driven Safety Analysis FHWA Initiative.

### **Describe other aspects of the HSIP methodology on which the State would like to elaborate.**

As part of the methodology of the HSIP, the PRHTA's SHSP team has actively participated in meetings and technical events to integrate the effort among the 4Es of highway safety in the pasts 5 years. One of the main HSIP support to the safety stakeholders was related to the Puerto Rico Police digital crash form (PPR-621.4). During 2019, the goal of start implementing the digital form was achieved, thus during 2020, Puerto Rico is transitioning to a more accurate and modern crash data collection system. This effort will help the PRHTA to perform a faster and accurate crash data analysis. Also, the PRHTA had promoted the new SHSP 2019-2023 emphasizing in achieving an historical reduction in the percent of pedestrian fatalities of less than 30%. By providing technical support to the Puerto Rico Traffic Safety Commission (PRTSC or GHSA), a pedestrian safety task force is currently being developed. Other activities supported by the HSIP methodology includes following up on the SHSP Action Plan with the key safety stakeholders. In addition, the HSIP supports and shares, through the SHSP efforts, the educational campaigns of the PRTSC. In terms of technical activities, PRHTA performed a pedestrian RSA targeted to the Spectacular 7 initiatives of STEP.

## Project Implementation

### Funds Programmed

#### Reporting period for HSIP funding.

Calendar Year

Enter the programmed and obligated funding for each applicable funding category.

FUNDING CATEGORY	PROGRAMMED	OBLIGATED	% OBLIGATED/PROGRAMMED
HSIP (23 U.S.C. 148)	\$26,125,000	\$29,539,203	113.07%
HRRR Special Rule (23 U.S.C. 148(g)(1))	\$0	\$0	0%
Penalty Funds (23 U.S.C. 154)	\$1,900,000	\$1,901,423	100.07%
Penalty Funds (23 U.S.C. 164)	\$1,900,000	\$1,900,946	100.05%
RHCP (for HSIP purposes) (23 U.S.C. 130(e)(2))	\$0	\$0	0%
Other Federal-aid Funds (i.e. STBG, NHPP)	\$0	\$1,540,052	0%
State and Local Funds	\$0	\$900,683	0%
<b>Totals</b>	<b>\$29,925,000</b>	<b>\$35,782,307</b>	<b>119.57%</b>

**How much funding is programmed to local (non-state owned and operated) or tribal safety projects?**

\$0

**How much funding is obligated to local or tribal safety projects?**

\$0

**How much funding is programmed to non-infrastructure safety projects?**

\$3,362,500

**How much funding is obligated to non-infrastructure safety projects?**

\$2,805,929

The SEGURO program provides timely and proactive road assistance to improve highway safety in the San Juan Metropolitan Area. Since the inception of this program, the incident response time in their coverage area reduced due to the constant patrolling of these units. The SEGURO program is managed through the Traffic Management Center. SEGURO provides safety during traffic incidents by implementing safety devices, change tires and support first responders while assisting traffic incidents. One important aspect of the SEGURO

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Program is that it allowed the PRHTA's TSM&O Program to advance from the traffic incident monitoring stage to the response stage by providing a dedicated service for responding directly traffic incidents with equipped vehicles. There have been several accounts in which the SEGURO Program has saved the life of travelers that could have been impacted by vehicles while waiting on the side of the road for towing, and most of the time SEGURO units are the first responders to arrive at the scene to provide protection. By implementing programs such as SEGURO, which is part of the quick incident clearance strategies of PRHTA, the probability of the occurrence of a secondary crash decreases. The likelihood of a secondary crash increases by 2.8% for each minute the primary incident continues to be a hazard, a quick clearance means there will be less chance of secondary crashes occurring.

### **How much funding was transferred in to the HSIP from other core program areas during the reporting period under 23 U.S.C. 126?**

\$0

### **How much funding was transferred out of the HSIP to other core program areas during the reporting period under 23 U.S.C. 126?**

\$0

### **Discuss impediments to obligating HSIP funds and plans to overcome this challenge in the future.**

There were no major impediments to obligate the HSIP funds in this period.

### **Describe any other aspects of the State's progress in implementing HSIP projects on which the State would like to elaborate.**

PRHTA is developing a highway safety culture by including highway safety improvement in all projects independently of the project scope and the corresponding allocated program. This methodology includes: selecting several design consultants, develop PS&E in expedite manner, evaluate the division of projects in phases (as possible) to reduce construction time and risk, and promoted an aggressive bid program. Also, at the end of 2018, Puerto Rico selected the Every Day Counts' Safe Transportation for Every Pedestrian (STEP) initiative to identify countermeasures in order to reduce the pedestrian fatalities due to traffic crashes. This action will encourage the PRHTA to evaluate projects aimed at pedestrian facilities as part of the HSIP investment.

Also, the highway safety patrol program, known as SEGURO, for its Spanish acronym, provides to the Traffic Management Center reliable data in terms of traffic incidents and roadway conditions. Through this program it is collected incident timeline data, including incident response time, roadway clearance time, incident clearance time, among other data such as incident type, lanes blocked, incident location and responders on scene. All these data is analyzed to monitor the performance of the roadway safety and to promptly identify if there is a safety concern along the roadway system. The SEGURO program started in 2017 covering 45 miles on four freeways/expressways in the San Juan Metropolitan Area. Since then, the program has expanded and increased their coverage area to 75 miles. This service is part of the PRHTA's Traffic Incident Management Program, which is regulated by FHWA.

**General Listing of Projects**

List the projects obligated using HSIP funds for the reporting period.

PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
State Planning and Research Program 2019-2020	Miscellaneous	Miscellaneous - other	1	Environmental Planning and Support	\$500000	\$16046960.73	Other Federal-aid Funds (i.e. STBG, NHPP)	N/A	N/A	0	0	State Highway Agency	Systematic Approach	Not Aplicable	Not Aplicable
ITS Field Devices for Incident Management Traveler at PR-52, PR-18 Municipalities of Caguas and San Juan	Advanced technology and ITS	Advanced technology and ITS - other	13.4	Miles	\$1570245.35	\$12779595.35	HSIP (23 U.S.C. 148)	Urban	Principal Arterial- Interstate	100,142	65	State Highway Agency	Systematic Approach	Negligent Driving	Promote the use of ITS to support negligent driving enforcement.
Safety Improvements Highway PR-66, Kilometers: 0.00 to 20.00, Carolina, Canovanas and Rio Grande	Roadside	Roadside - other	12.4	Miles	\$185654.7	\$11983522.5	HSIP (23 U.S.C. 148)	Rural	Principal Arterial- Interstate	30,050	65	State Highway Agency	Systematic Approach	Lane Departure	Implement engineering measures to remove and/or shield fixed-objects located within roadside clear recovery area in accordance with current standards.
Highway Safety Improvements PR-115 from Km 10.84 to Km 20.4, Muicipalities of Rincón-Aguada	Roadside	Roadside - other	5.9	Miles	\$1423.4	\$2795100	Penalty Funds (23 U.S.C. 154)	Urban	Minor Arterial	8,850	30	State Highway Agency	Systematic Approach	Lane Departure	Implement engineering measures to remove and/or shield fixed-objects located within roadside clear recovery area in accordance with current standards.
Highway Safety Improvements PR-116 from Km 3.00 to 14.00, Municipality of Lajas	Roadside	Roadside - other	6.8	Miles	\$946	\$6696999.1	Penalty Funds (23 U.S.C. 164)	Rural	Principal Arterial- Other	6,800	25	City or Municipal Highway Agency	Systematic Approach	Lane Departure	Implement engineering measures to remove and/or shield fixed-objects located within roadside clear recovery

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PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
															area in accordance with current standards.
Scenic Walk for Bicycle and Pedestrian Route PR-4413, Municipality of Rincón	Pedestrians and bicyclists	On road bicycle lane	3.8	Miles	\$49846.75	\$6522791.95	HSIP (23 U.S.C. 148)	Urban	Local Road or Street	500	25	State Highway Agency	Systematic Approach	Pedestrians	Improve the highway infrastructure to accommodate people who are walking.
Highway Safety Improvement Program PR-183 From Km. 0.00 to Km. 10.00, Municipalities of Caguas and San Lorenzo	Roadside	Roadside - other	6.21	Miles	\$818872.47	\$8532071.9	Other Federal-aid Funds (i.e. STBG, NHPP)	Urban	Minor Arterial	13,169	35	State Highway Agency	Systematic Approach	Lane Departure	Implement engineering measures to remove and/or shield fixed-objects located within roadside clear recovery area in accordance with current standards.
Highway Safety Improvement Program PR-203 From Km. 0.00 to Km. 7.10, Municipalities of San Lorenzo and Gurabo	Roadside	Roadside - other	4.4	Miles	\$8573468.58	\$13661645.14	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	21,400	25	State Highway Agency	Systematic Approach	Lane Departure	Implement engineering measures to remove and/or shield fixed-objects located within roadside clear recovery area in accordance with current standards.
Safety Improvements PR-152 Kilometers: 0.00 to 11.25, Barranquitas Naranjito	Roadside	Roadside - other	6.9	Miles	\$1977980.67	\$1980001	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	11,760	25	State Highway Agency	Systematic Approach	Lane Departure	Implement engineering measures to remove and/or shield fixed-objects located within roadside clear recovery area in accordance with current standards.

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PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
Highway Safety Improvements PR-152 from km 11.50 to 13.65, Municipalities of Barranquitas-Naranjito	Roadside	Roadside - other	1.3	Miles	\$1407166.2	\$1418716.2	HSIP (23 U.S.C. 148)	Rural	Minor Arterial	12,800	35	State Highway Agency	Systematic Approach	Lane Departure	Implement engineering measures to remove and/or shield fixed-objects located within roadside clear recovery area in accordance with current standards.
Connector between Highway PR-119 and Ramón Rivera Street, Municipality of Las Marias	Roadway	Roadway - other	1	Locations	\$622039.25	\$13340000	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	17,243	25	State Highway Agency	Systematic Approach	Not Aplicable	Not Aplicable
Highway Safety Improvements PR-167 from Km 0.0 to 9.0, Municipalities of Comerío-Naranjito-Bayamón	Roadside	Roadside - other	5.6	Miles	\$1185990.47	\$5233795.77	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	6,800	25	State Highway Agency	Systematic Approach	Lane Departure	Implement engineering measures to remove and/or shield fixed-objects located within roadside clear recovery area in accordance with current standards.
Highway Safety Improvements PR-173, Km. 0.0 to Km. 9.0 Municipalities of Cidra - Aibonito	Roadside	Roadside - other	5.6	Miles	\$417002.75	\$3428062.45	HSIP (23 U.S.C. 148)	Rural	Major Collector	9,125	35	State Highway Agency	Systematic Approach	Lane Departure	Implement engineering measures to remove and/or shield fixed-objects located within roadside clear recovery area in accordance with current standards.
Highway Safety Improvements on PR-176 from Km 0 to Km 4	Roadway signs and traffic control	Roadway signs and traffic control - other	2.5	Miles	\$3165451	\$4943160	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	17,800	35	State Highway Agency	Systematic Approach	Lane Departure	Implement engineering measures to remove and/or shield fixed-objects located



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PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
															within roadside clear recovery area in accordance with current standards.
Traffic Congestion Management Project Dynamic Toll Lanes Phase III, Unit 2, PR-18 Municipality of San Juan	Roadway	Roadway widening - travel lanes	0.9	Miles	\$505332	\$5836533.84	HSIP (23 U.S.C. 148)	Urban	Principal Arterial- Interstate	35,775	55	State Highway Agency	Systematic Approach	Not Aplicable	Not Aplicable
Highway Safety Improvements on PR-8 from Km 0.0 to Km 4.6	Roadside	Roadside - other	3	Miles	\$265495.25	\$13425580.87	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial- Other Freeways & Expressways	35,775	45	State Highway Agency	Systematic Approach	Pedestrians	Improve the highway infrastructure to accommodate people who are walking.
Highway Safety Improvements on PR-8 from Km 0.0 to Km 4.6	Roadside	Roadside - other	3	Miles	\$2414714.18	\$13425580.87	HSIP (23 U.S.C. 148)	Urban	Principal Arterial- Other	35,775	40	State Highway Agency	Systematic Approach	Lane Departure	Implement engineering measures to remove and/or shield fixed-objects located within roadside clear recovery area in accordance with current standards.
Highway Safety Improvements on PR-8 from Km 0.0 to Km 4.6	Roadside	Roadside - other	3	Miles	\$1900000	\$13425580.87	Penalty Funds (23 U.S.C. 154)	Urban	Principal Arterial- Other	35,775	40	State Highway Agency	Systematic Approach	Lane Departure	Implement engineering measures to remove and/or shield fixed-objects located within roadside clear recovery area in accordance with current standards.
Highway Safety Improvements	Roadside	Roadside - other	3	Miles	\$1634504.75	\$13425580.87	Penalty Funds (23 U.S.C. 164)	Urban	Principal Arterial- Other	35,775	40	State Highway Agency	Systematic Approach	Lane Departure	Implement engineering measures to

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PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
on PR-8 from Km 0.0 to Km 4.6															remove and/or shield fixed-objects located within roadside clear recovery area in accordance with current standards.
Traffic Signal System Highway PR-2, From PR-493 to Antonio Gonzalez Street, Arecibo-Hatillo	Roadway signs and traffic control	Roadway signs and traffic control - other	3.8	Miles	\$328482.5	\$5165283.7	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other	18,914	45	State Highway Agency	Systematic Approach	Negligent Driving	Include engineering countermeasures that discourage speeding and other negligent driving actions.
Highway Safety Improvement Program PR-183 From Km. 0.00 to Km. 10.00, Municipalities of Caguas and San Lorenzo	Roadside	Roadside - other	6.21	Miles	\$2756472.4	\$8532071.9	HSIP (23 U.S.C. 148)	Urban	Minor Arterial	13,169	35	State Highway Agency	Systematic Approach	Lane Departure	Implement engineering measures to remove and/or shield fixed-objects located within roadside clear recovery area in accordance with current standards.
Construction of Pedestrian Bridge at Highway PR-181 Kilometer: 0.50 Intersection with Julio Andino Street, Los Prados Development, San Juan	Pedestrians and bicyclists	Pedestrian bridge	1	Bridge	\$2294606.65	\$7041216.97	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other Freeways & Expressways	16,300	45	State Highway Agency	Systematic Approach	Pedestrians	Improve the highway infrastructure to accommodate people who are walking.
RFP for Consultant Services for Puerto Rico Strategic Highway	Miscellaneous	SHSP Development	1	SHSP Contract	\$221179.2	\$4985679.2	Other Federal-aid Funds (i.e. STBG, NHPP)	N/A	N/A	0	0	State Highway Agency	Systematic Approach	SHSP	Implement engineering measures to remove and/or shield fixed-objects located within roadside

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PROJECT NAME	IMPROVEMENT CATEGORY	SUBCATEGORY	OUTPUTS	OUTPUT TYPE	HSIP PROJECT COST(\$)	TOTAL PROJECT COST(\$)	FUNDING CATEGORY	LAND USE/AREA TYPE	FUNCTIONAL CLASSIFICATION	AADT	SPEED	OWNERSHIP	METHOD FOR SITE SELECTION	SHSP EMPHASIS AREA	SHSP STRATEGY
Safety Plan (SHSP)															clear recovery area in accordance with current standards.
Highway Service Patrol Operation and Incident Data Collection and Reporting for Highways PR-18, PR-26, PR-52 and PR-30	Miscellaneous	Miscellaneous - other	75	Miles	\$2084750	\$11564593.74	HSIP (23 U.S.C. 148)	Urban	Principal Arterial-Other Freeways & Expressways	207,440	55	State Highway Agency	Crashes and Incidents Management	Emergency Medical Services	Continue the educational programs and training to enforcement and emergency response personnel for crashes and incident management.

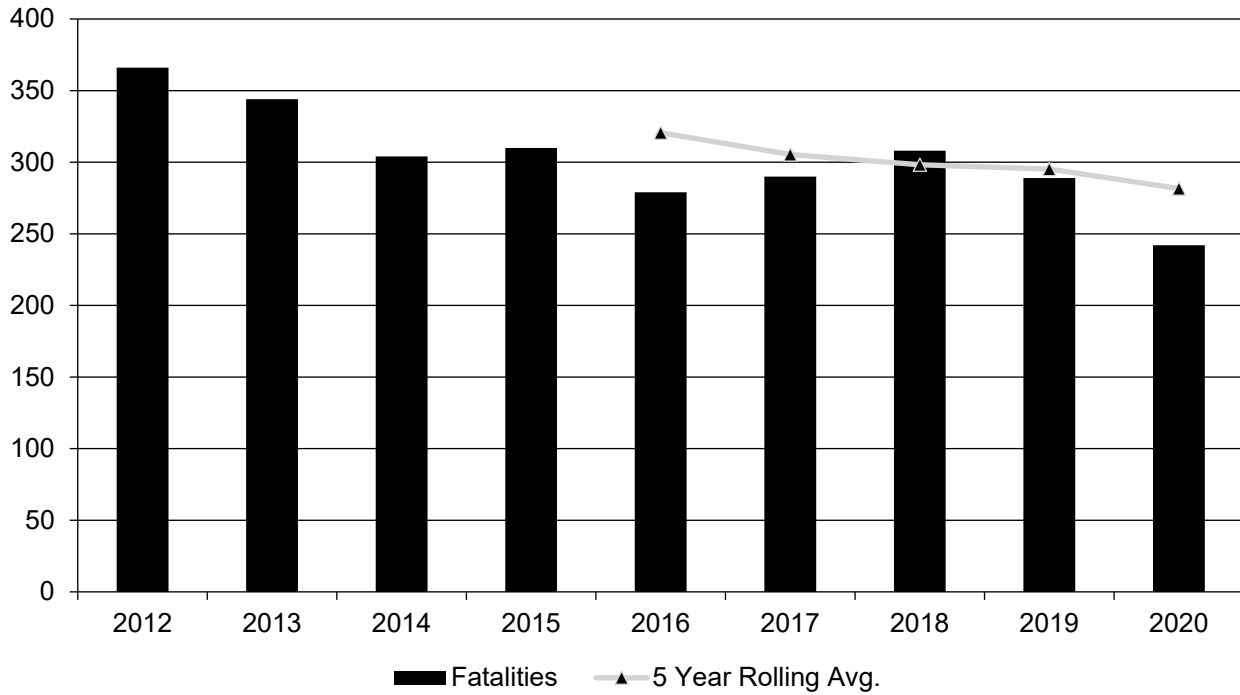
## Safety Performance

### *General Highway Safety Trends*

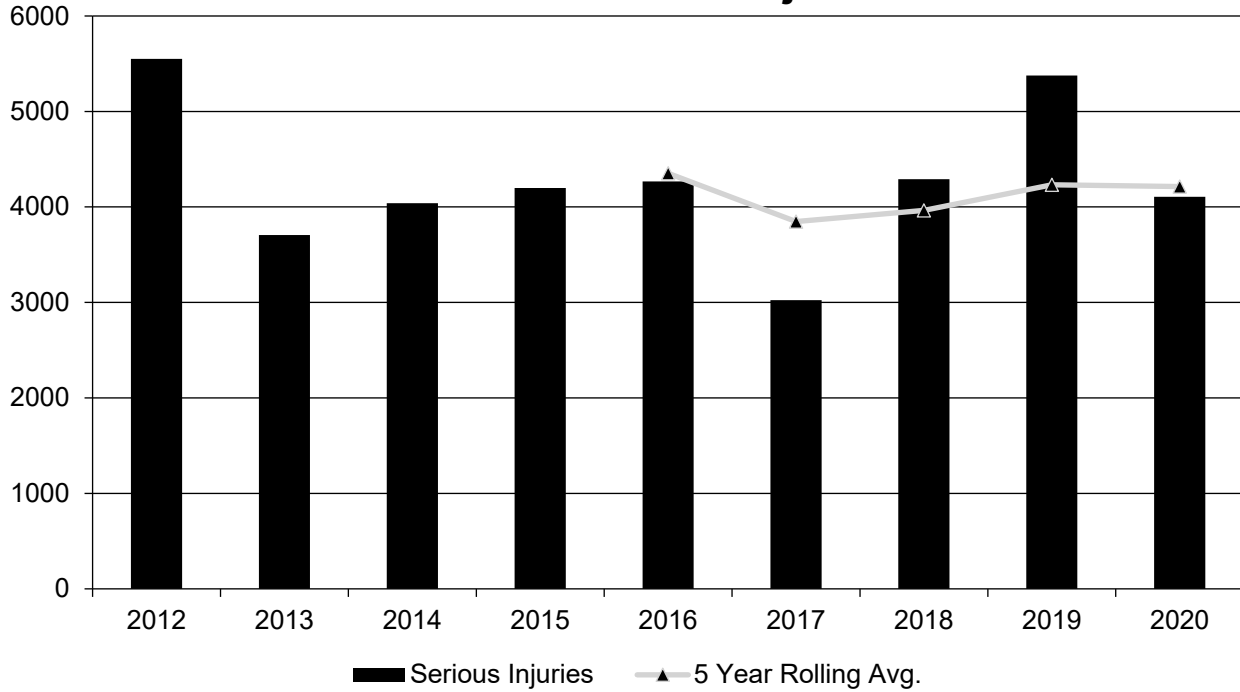
**Present data showing the general highway safety trends in the State for the past five years.**

<b>PERFORMANCE MEASURES</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
Fatalities	366	344	304	310	279	290	308	289	242
Serious Injuries	5,551	3,705	4,040	4,199	4,267	3,024	4,290	5,377	4,106
Fatality rate (per HMVMT)	1.970	1.850	2.090	2.130	1.920	1.930	1.950	1.968	1.675
Serious injury rate (per HMVMT)	29.878	19.925	27.775	28.851	29.298	20.147	28.562	36.610	28.419
Number non-motorized fatalities	128	98	107	112	98	108	125	109	72
Number of non-motorized serious injuries	631	431	478	400	369	248	418	662	493

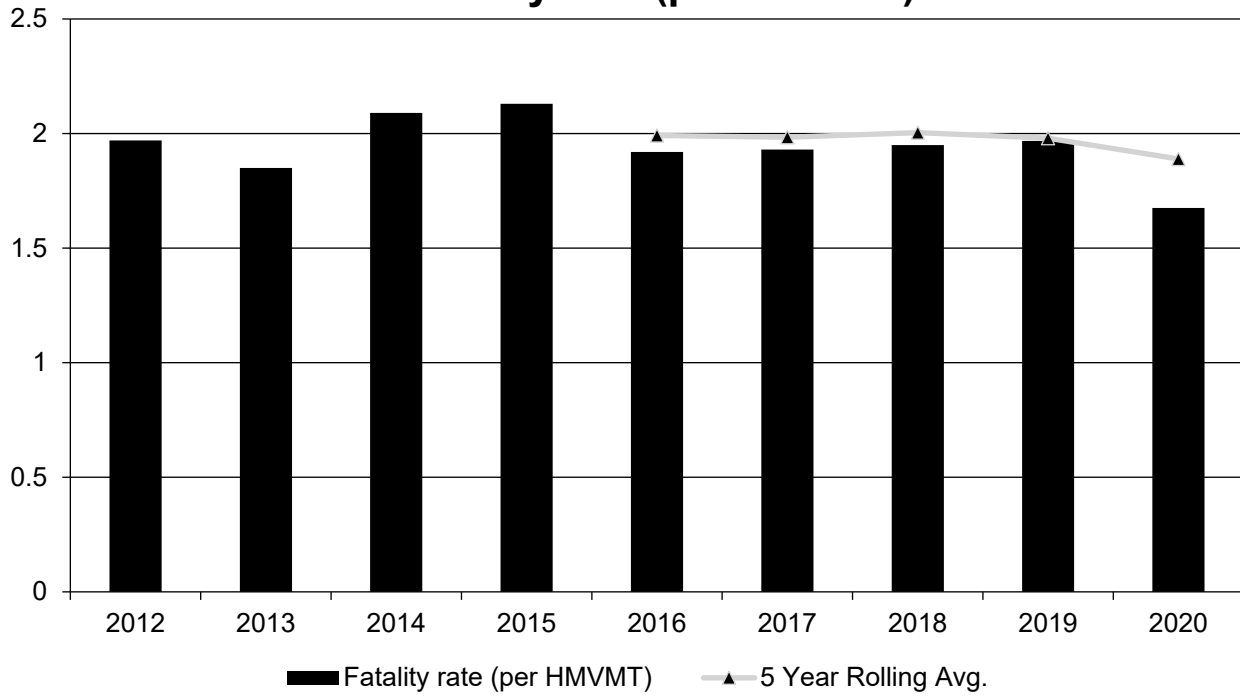
### Annual Fatalities



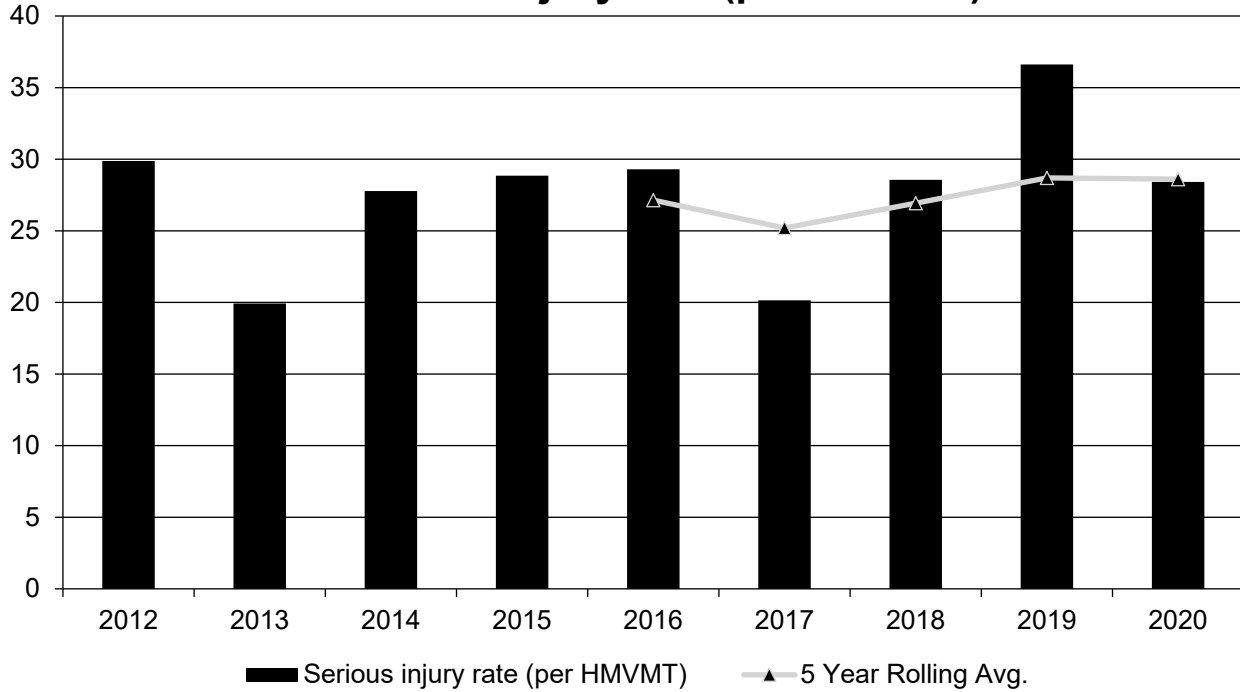
### Annual Serious Injuries



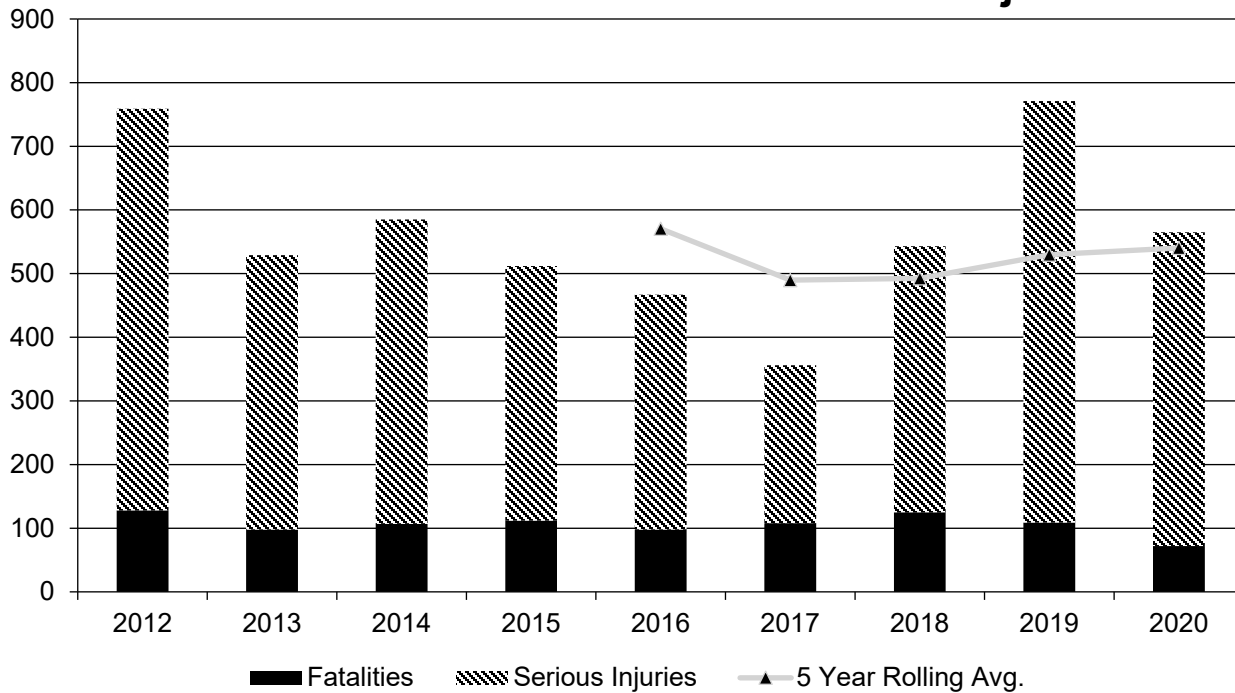
### Fatality rate (per HMVMT)



### Serious injury rate (per HMVMT)



### Non Motorized Fatalities and Serious Injuries



**Describe fatality data source.**

FARS

The Puerto Rico HSIP Administration uses the Puerto Rico FARS database, provided by the PRTSC. This database is monitored and administered by the TRCC work team within the PRTSC, who in turn coordinate with the Puerto Rico Police Bureau and the Institute of Forensic Sciences. This coordination occurs daily, where the status of deaths due to traffic crashes is updated and it seeks to comply with parameters established by NHTSA.

**To the maximum extent possible, present this data by functional classification and ownership.**

**Year 2020**

Functional Classification	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Rural Principal Arterial (RPA) - Interstate	0	0	0	0
Rural Principal Arterial (RPA) - Other Freeways and Expressways				
Rural Principal Arterial (RPA) - Other				

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<b>Functional Classification</b>	<b>Number of Fatalities (5-yr avg)</b>	<b>Number of Serious Injuries (5-yr avg)</b>	<b>Fatality Rate (per HMVMT) (5-yr avg)</b>	<b>Serious Injury Rate (per HMVMT) (5-yr avg)</b>
Rural Minor Arterial				
Rural Minor Collector				
Rural Major Collector				
Rural Local Road or Street				
Urban Principal Arterial (UPA) - Interstate				
Urban Principal Arterial (UPA) - Other Freeways and Expressways				
Urban Principal Arterial (UPA) - Other				
Urban Minor Arterial				
Urban Minor Collector				
Urban Major Collector				
Urban Local Road or Street				



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**Year 2020**

<b>Roadways</b>	<b>Number of Fatalities (5-yr avg)</b>	<b>Number of Serious Injuries (5-yr avg)</b>	<b>Fatality Rate (per HMVMT) (5-yr avg)</b>	<b>Serious Injury Rate (per HMVMT) (5-yr avg)</b>
State Highway Agency	281.6	4,212.8	1.89	28.35
County Highway Agency				
Town or Township Highway Agency				
City or Municipal Highway Agency				
State Park, Forest, or Reservation Agency				
Local Park, Forest or Reservation Agency				
Other State Agency				
Other Local Agency				
Private (Other than Railroad)				
Railroad				
State Toll Authority				
Local Toll Authority				
Other Public Instrumentality (e.g. Airport, School, University)				
Indian Tribe Nation				

**Provide additional discussion related to general highway safety trends.**

General highway safety trends in Puerto Rico have shown a decrease in traffic fatalities during the past 30 years. This decrease has been achieved thanks to constant and consistent road safety education among all safety stakeholders. However, in the past years Puerto Rico has faced many challenges in keeping up the momentum of the actions.

During 2020, although there was a dramatic drop in fatalities, it was a year where many of the problems that affect road safety worsened and were more latent than ever. Things like the loss of police officers patrolling the roads and enforcing traffic laws; the lack of education for the application of new technologies that improve police enforcement; an enhanced structure for road safety education that helps citizens to support traffic laws instead of challenging and disobeying them; and the lack of trained medical response personnel for traffic

## 2021 Puerto Rico Highway Safety Improvement Program

crashes and the decrease in the ambulance coverage area. Many of these challenges interfere with the proposed goals of the road safety delegates in Puerto Rico. However, the different allies in road safety continue to fight against traffic crashes.

### ***Safety Performance Targets***

#### **Safety Performance Targets**

#### **Calendar Year 2022 Targets \***

***Number of Fatalities:284.8***

#### ***Describe the basis for established target, including how it supports SHSP goals.***

The database used to forecast the number of fatalities was the Puerto Rico FARS Database. The years considered during the analysis were from 2008 to 2020. To obtain the safety performance target of the number of fatalities for 2022, several trendline options were evaluated (i.e., exponential, linear, logarithmic, polynomial, and power). A new step to analyze the traffic fatalities was implemented. The new step was to perform a regression analysis using the total of traffic fatalities per year versus the traffic fatalities per month per year and find what coefficients had more correlation to the total traffic fatalities based on historic data. This regression analysis was performed with Minitab and Microsoft Excel software. The main reason to take this additional step was to have a more accurate prediction of the traffic fatalities in 2021 and 2022 due to several outliers in the data from 2020. This analysis has the following parameters:

- Total number of traffic fatalities:  $y = 87.9 + 2.532 \times \text{February fatalities} + 2.181 \times \text{March fatalities} + 1.463 \times \text{July fatalities} + 0.757 \times \text{October fatalities} + 1.108 \times \text{November fatalities} + 0.958 \times \text{December fatalities}$ 
  - The P-Value for each coefficient in the regression formula was less of 5%, inside the parameter of confidence.
  - The P-Values for each parameter were: February = 0.000; March = 0.000; July = 0.002; October = 0.036; November = 0.008; and December = 0.007.
- The regression analysis was performed using a stepwise selection of terms;  $\alpha$ ; to enter = 0.15 and  $\alpha$ ; to remove = 0.15.
- It was used a 95% of confidence.
- R-Square = 98.99%

After having selected the linear regression detailed in the last paragraph, the forecast of the number of fatalities for 2021 is 306 and for 2022 is 279. This represents a reduction of 3.5% from 2019 to 2022. Thus, the 5-year moving average safety performance target is 284.8 for 2021. For the FY 2022, the Puerto Rico HSIP Implementation Plan is aiming to be more cautious in the identification and selection of project locations.

***Number of Serious Injuries:4883.4***

#### ***Describe the basis for established target, including how it supports SHSP goals.***

The databases used to forecast the serious injuries were from the Automobile Accident Compensation Administration (ACAA, by its Spanish acronym). The years considered during the analysis were from 2008 to 2020, for the ACAA Database. The Serious Injury forecast was based on the forecasted number of people transported in ambulance from the crash scene, using the 5-year moving average. After having selected a polynomial (2 degree) trendline of  $y = 52.254x^2 - 987.85x + 8646.3$  serious injuries, the 2022 Serious Injury was forecasted to 5,586. Thus, the 5-year moving average safety performance target for 2022 is 4,883.4.

**Fatality Rate:1.949**

***Describe the basis for established target, including how it supports SHSP goals.***

The vehicles miles traveled (VMT) in Puerto Rico has been decreasing since 2013 until 2020 (except 2015), at a rate of 1.6% per year. The PRHTA had had some challenges in the traffic data collection. But this steady decrease is currently being evaluated by the PRHTA officials and performing an aggressive traffic data collection statewide to enhance the available data. The databases used to forecast the fatality rate were from the Puerto Rico FARS Database and the values of the Vehicle Miles Traveled (VMT) reported by the PRHTA. The years considered during the analysis were from 2013 to 2020 for the Puerto Rico FARS Database and for the VMT. The fatality rate forecast was based on the forecasted number of HMVMT for 2021 and 2022, using several trend line options (i.e., exponential, linear, logarithmic, polynomial, and power). After having selected a logarithmic trend line of a logarithmic trend line of  $y=-2 \times 10^5 \ln(x)+4 \times 10^7$  with a  $R^2=3.4\%$  for the VMT, the 2021 and 2022 fatality rate was forecasted to 2.119 and 1.933, respectively. This represents a reduction of 1.8% from 2019 to 2022. Thus, the 5-year moving average safety performance target is 1.949 for 2022.

**Serious Injury Rate:33.465**

***Describe the basis for established target, including how it supports SHSP goals.***

The vehicles miles traveled (VMT) in Puerto Rico has been decreasing since 2013 until 2020 (except 2015), at a rate of 1.6% per year. The PRHTA had had some challenges in the traffic data collection. But this steady decrease is currently being evaluated by the PRHTA officials and performing an aggressive traffic data collection statewide to enhance the available data. The databases used to forecast the serious injuries rate were from the Automobile Accident Compensation Administration (ACAA, by its Spanish acronym) and the values of the Vehicle Miles Traveled (VMT) reported by the PRHTA. The years considered during the analysis were from 2011 to 2020, for the ACAA Database, and from 2013 to 2020, for the VMT, as shown in Figure 11. The Serious Injury rate forecast was based on the forecasted number of people transported in ambulance from the crash scene, using the 5-year moving average, and VMT for 2022. Also, it was analyzed several trendline options (i.e., exponential, linear, logarithmic, polynomial, and power) to forecast the 2022 Serious Injury rate. After having selected a logarithmic trendline of  $y=-2 \times 10^5 \ln(x)+4 \times 10^7$  with a  $R^2=3.4\%$  for the VMT, the 2021 and 2022 Serious Injury rate was forecasted to 35.03 and 38.70, respectively. Thus, the 5-year moving average safety performance target is 33.465 for 2022.

**Total Number of Non-Motorized Fatalities and Serious Injuries:672.2**

***Describe the basis for established target, including how it supports SHSP goals.***

The databases used to forecast the non-motorized fatalities and serious injuries were from the Puerto Rico FARS Database and from the Automobile Accident Compensation Administration (ACAA, by its Spanish acronym). The years considered during the analysis were from 2008 to 2020, for both databases. For the number of fatalities, a linear regression was chosen (this trendline is detailed at the beginning of this section) and, for the number of serious injuries, a polynomial (2 degree) trendline of  $y = 52.254x^2 - 987.85x + 8646.3$  was selected. Then, using those forecasts (trendlines), it was analyzed the average annual distribution between the non-motorized serious injuries; founding that, in average, they represent a 12% of the total serious injuries. Thus, after having analyzed all the annual distribution and overall behavior, the 2021 and 2022 forecast for the non-motorized fatalities and serious injuries are set to 710 and 772, respectively. The 2022 forecast for the 5-year moving average non-motorized fatalities and serious injuries is 672.2.

**Describe efforts to coordinate with other stakeholders (e.g. MPOs, SHSO) to establish safety performance targets.**

During this reporting period, the COVID-19 pandemic has delayed most coordination efforts with the stakeholders to establish the safety performance targets. Nevertheless, the PRHTA Safety Division, along with the new consultant’s team, coordinate with the PRTSC Federal Program Manager to analyze and defined the safety performance targets for the 2022. This coordination took place in June 2021. These coordination efforts basically consisted on several meetings where the PRTSC discussed its goals and targets of their Highway Safety Plan (HSP) with the PRHTA team, and discussed every single performance measure to be reported to the NHTSA. Then, the PRHTA team perform a thorough statistical analysis with the crash data reported from the PRDTPW and the fatalities from the Puerto Rico FARS (provided by the PRTSC). The results of the statistical analysis were discussed between all the teams and decide the values to submit in the HSP and the HSIP. PRHTA will coordinate in 2022 with the Puerto Rico MPO the approval of the 2022 safety performance targets.

**Does the State want to report additional optional targets?**

No

Not Applicable.

**Describe progress toward meeting the State’s 2020 Safety Performance Targets (based on data available at the time of reporting). For each target, include a discussion of any reasons for differences in the actual outcomes and targets.**

PERFORMANCE MEASURES	TARGETS	ACTUALS
Number of Fatalities	292.0	281.6
Number of Serious Injuries	3983.0	4212.8
Fatality Rate	1.913	1.889
Serious Injury Rate	26.082	28.607
Non-Motorized Fatalities and Serious Injuries	445.0	540.4

During 2020, two (2) out of five (5) safety targets were met. The number of fatalities and fatality rate met the targets, decreasing a 3.6% and 1.2%, respectively. On the other hand, the performance measures for serious injuries, serious injury rate, and non-motorized fatalities and serious injuries does not meet the target, increasing a 5.8%, 8.7%, and 18.7%, respectively.

**Number of fatalities**

The annual number of fatalities for the 2020 was reduce to 242, representing a 16.3% decrease from 2019, this being the lowest number in the history of fatalities due to car crash events. In addition, comparing the 5-year moving average, there was a change from 295.2 in 2019 to 281.6 in 2020, representing a decrease of 4.6%.

This outcome was not expected nor contemplated in any internal analysis. However, the 2020 results are directly related to the repercussions due to the COVID-19 pandemic. One of the main reasons for this drastic

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reduction in fatalities is that the government of Puerto Rico promoted through executive orders the total lockdown of public and private establishments during the months of April and May. Then, the executive orders were made more flexible during the rest of 2020, creating a de-escalation effect for the lockdown restrictions. The overall effect of the lockdown was that far fewer people were driving on the country's highways; therefore, the chances of crashes were drastically reduced.

### Number of Serious Injuries

The annual number of serious injuries for 2020 reported from the ACAA was 4,106, representing a 23.6% decrease from 2019 to 2020. But, when comparing the 5-year moving average from 2017 to 2020, it was observed an increase in serious injuries of  $\pm 3.0\%$  between 2017 and 2018, an increase of  $\pm 6.7\%$  between 2018 and 2019, and a reduction of  $-0.4\%$  between 2019 and 2020. These numbers show us that the serious injuries in Puerto Rico are on the rise at a steady pace since 2017.

The reasons for the annual decrease in number of serious injuries between 2019 and 2020 are basically the same as for the number of fatalities. But for the past years, the increase in serious injuries may have different reasons that are affecting the compliance with the Safety Performance Targets, such as:

- **More drivers are speeding.** Due to recent highways safety improvements projects (i.e., pavement rehabilitation, update of guardrails, replacement of traffic signing, etc.), drivers are more comfortable speeding and hence disobey traffic laws. This has an effect of increasing the driver's probabilities to have a crash with serious injuries.
- **The trendline analysis selected in the 2019 HSIP Annual Report described a logarithmic behavior, and the forecast was set to a decrease of serious injuries.** The logarithmic trendline analysis was performed using data from 2008 to 2018. This set of data included the serious injuries of 2013 (3,705) and 2017 (3,024), but those results should had been adjusted to reflect the effects of several events (i.e., Hurricane María). This is because, for several months in 2017, the crashes decreased due to the aftermath of Hurricane María. Then, in 2018 (4,290) and 2019 (5,377) the number of serious injuries increased. These could be related to the regression-to-the-mean behavior of the data, but most importantly, the possible appearance of a new traffic crash behaviors. When the data from 2008 to 2020 are analyzed, it seems that a polynomial trendline forecast could fit better
- **The prevention of crashes and law enforcement are more difficult to implement.** This can be due to several reasons. First, there is a need to reinforce road safety education for the general population. It is important to educate drivers on why they should respect, promote, and protect traffic laws rather than challenge and discredit them. This lack of education makes the job much more difficult for the police trying to enforce traffic laws, which leads to the second point: the lack of resources of the state and municipal police. Many of the solutions and/or responses to the high incidence of crashes is the enforcement by the police. But police personnel have been on the decline over the past years, causing officers to be overworked and unavailable for crash prevention. And third, the use and implementation of intelligent transportation system (ITS) technologies promotes civic responsibility in drivers and partly relieves police officers of the time and effort of patrolling and crash prevention. The PRHTA is extending their ITS program and Traffic Management Center operations, and by having these tools, the PRHTA will aid in providing traffic monitoring and management services to provide a safer roadway system.

### Fatality rate and serious injury rates

The fatality rate and the serious injury rates were estimated based on HMVMTs reported until 2020. However, the PRHTA corrected the units of the HMVMT data from 2015 to 2017. The combined influence of the number of fatalities and serious injuries that were registered and the changes in the HMVMT affected the actual results, that leads to a non-compliance of the safety targets.

### Non-motorized Fatalities and Serious Injuries

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The non-motorized fatalities and serious injuries (F&#43;SI) were estimated based on same methodologies explain in Question 34. Statistically, the reason for the difference between the targets and actual numbers is directly proportional to the results of the trendlines (regressions) chosen. The number of non-motorized fatalities decreased from 109 (2019) to 72 (2020), representing a reduction of 33.9%. And the non-motorized serious injuries decreased from 662 (2019) to 493 (2020), representing a reduction of 25.5%. On the other hand, the 5-year moving average increased from 529.8 (2019) to 540.4 (2020), representing an increase of 2.0%. After all the numerical comparison, and reviewing the behavior in 2019 and 2020, the main reason for differences in the actual outcome and target is mainly related to the trendline analysis selected in the 2019 HSIP Annual Report. That trendline described a logarithmic behavior and the forecast was set to a decrease of serious injuries, but the actual numbers behaved as a polynomial trendline.

### ***Applicability of Special Rules***

**Does the HRRR special rule apply to the State for this reporting period?**

No

**Provide the number of older driver and pedestrian fatalities and serious injuries 65 years of age and older for the past seven years.**

<b>PERFORMANCE MEASURES</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
Number of Older Driver and Pedestrian Fatalities	49	42	55	76	50	96	52
Number of Older Driver and Pedestrian Serious Injuries	337	402	457	495	514	624	493

## Evaluation

### *Program Effectiveness*

#### How does the State measure effectiveness of the HSIP?

- Other-Comparison in the number of fatalities and serious injuries

#### Based on the measures of effectiveness selected previously, describe the results of the State's program level evaluations.

Even when three out of five safety targets for 2020 were not met, the PRHTA worked hard to implement the safety improvement projects. The number of serious injuries was not met by 5.8%, the number of non-motorized fatalities and serious injuries by 18.7%, and the rate of serious injuries by 8.7%. It is our best understanding that after hurricanes Irma and María in 2017, the earthquakes and COVID-19 pandemic in 2020, the Puerto Rico historical crash, fatalities, and serious injuries data patterns changed. Thus, there is a before and after September 20, 2017, in terms of highway safety, as well as other impacted areas of the society. That is why PRHTA will perform a special HCLR in 2021 to identify specific changes in the pattern of high crash locations in Puerto Rico.

#### What other indicators of success does the State use to demonstrate effectiveness and success of the Highway Safety Improvement Program?

- # miles improved by HSIP
- # RSAs completed
- HSIP Obligations
- Increased awareness of safety and data-driven process

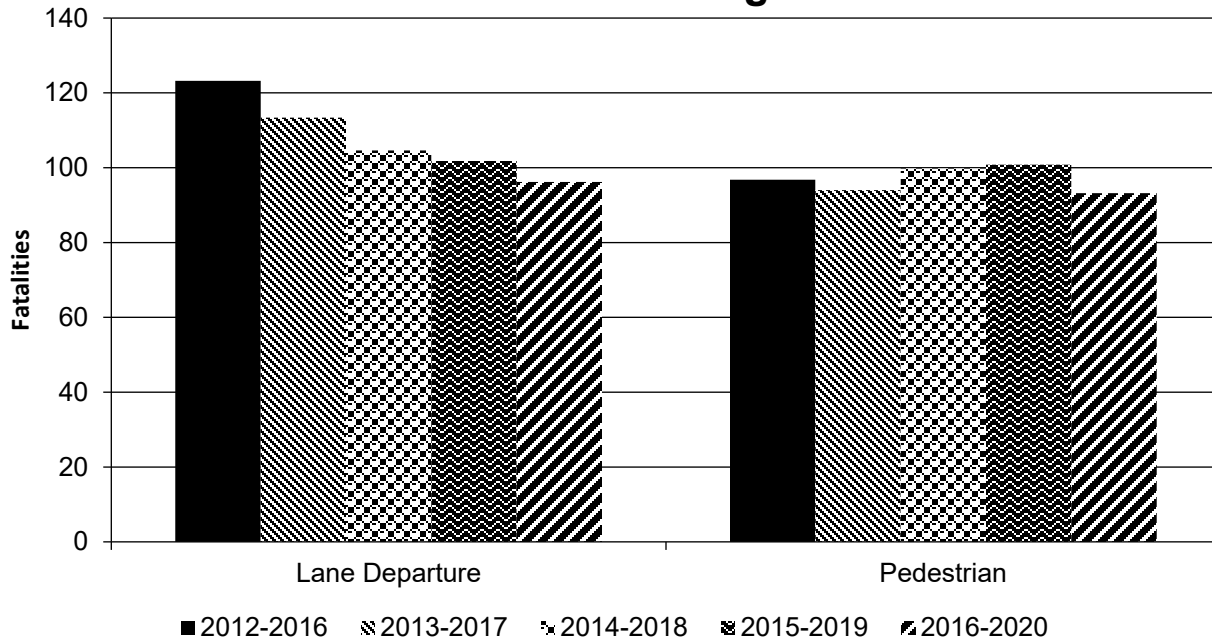
### *Effectiveness of Groupings or Similar Types of Improvements*

#### Present and describe trends in SHSP emphasis area performance measures.

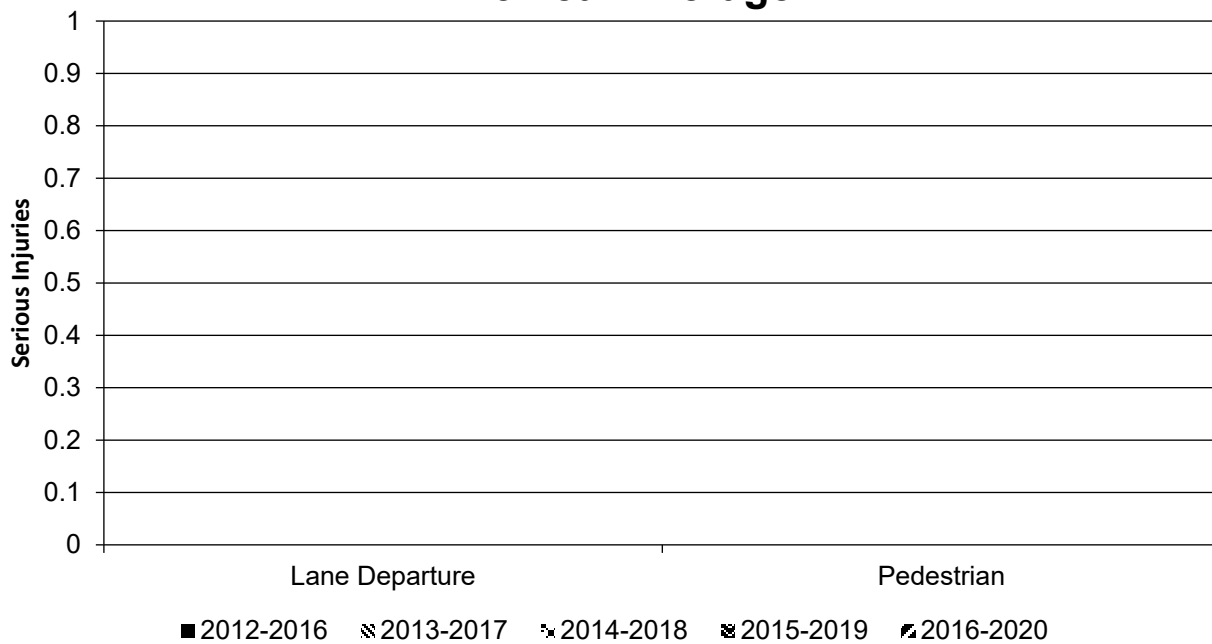
Year 2020

SHSP Emphasis Area	Targeted Crash Type	Number of Fatalities (5-yr avg)	Number of Serious Injuries (5-yr avg)	Fatality Rate (per HMVMT) (5-yr avg)	Serious Injury Rate (per HMVMT) (5-yr avg)
Lane Departure	All	96.2		0.65	
Pedestrian	All	93.2		0.63	

### Number of Fatalities 5 Year Average

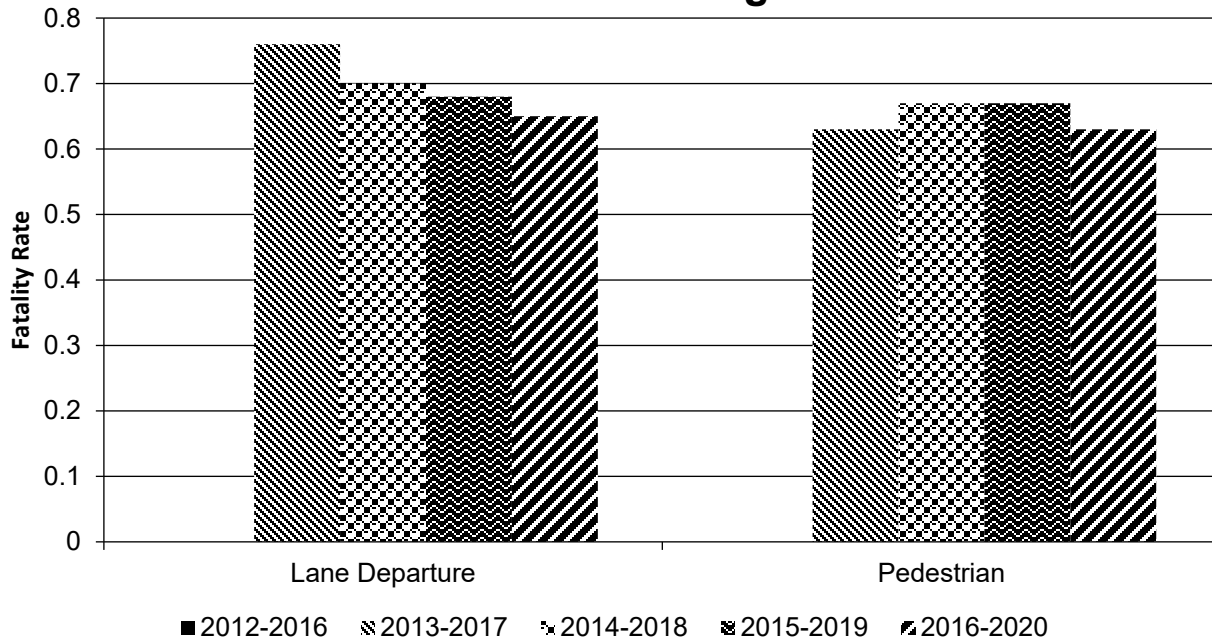


### Number of Serious Injuries 5 Year Average

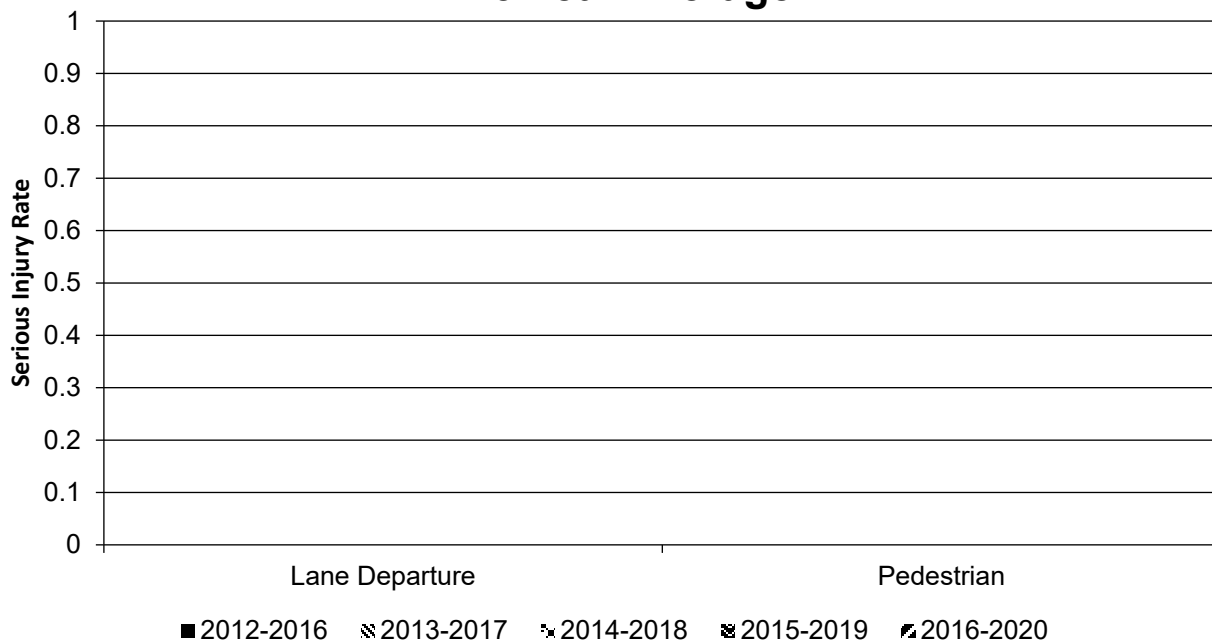




### Fatality Rate (per HMVMT) 5 Year Average



### Serious Injury Rate (per HMVMT) 5 Year Average



***Project Effectiveness***

**Provide the following information for previously implemented projects that the State evaluated this reporting period.**

## Compliance Assessment

**What date was the State’s current SHSP approved by the Governor or designated State representative?**

07/22/2019

**What are the years being covered by the current SHSP?**

From: 2019 To: 2023

**When does the State anticipate completing it’s next SHSP update?**

2024

**Provide the current status (percent complete) of MIRE fundamental data elements collection efforts using the table below.**

\*Based on Functional Classification (MIRE 1.0 Element Number) [MIRE 2.0 Element Number]

ROAD TYPE	*MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
ROADWAY SEGMENT	Segment Identifier (12) [12]	100						1.7			
	Route Number (8) [8]	100									
	Route/Street Name (9) [9]	100									
	Federal Aid/Route Type (21) [21]	100									
	Rural/Urban Designation (20) [20]	100						1.7			
	Surface Type (23) [24]	100						1.7			
	Begin Point Segment Descriptor (10) [10]	100						1.7			
	End Point Segment Descriptor (11) [11]	100						1.7			
	Segment Length (13) [13]	100									
	Direction of Inventory (18) [18]	100									
Functional Class (19) [19]	100							1.7			

2021 Puerto Rico Highway Safety Improvement Program

ROAD TYPE	*MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
	Median Type (54) [55]	100									
	Access Control (22) [23]	100									
	One/Two Way Operations (91) [93]	100									
	Number of Through Lanes (31) [32]	100						1.7			
	Average Annual Daily Traffic (79) [81]	100						1.7			
	AADT Year (80) [82]	100									
	Type of Governmental Ownership (4) [4]	100						1.7			
	<b>INTERSECTION</b>	Unique Junction Identifier (120) [110]									
	Location Identifier for Road 1 Crossing Point (122) [112]										
	Location Identifier for Road 2 Crossing Point (123) [113]										
	Intersection/Junction Geometry (126) [116]										
	Intersection/Junction Traffic Control (131) [131]										
	AADT for Each Intersecting Road (79) [81]										
	AADT Year (80) [82]										
	Unique Approach Identifier (139) [129]										
<b>INTERCHANGE/RAMP</b>	Unique Interchange Identifier (178) [168]										
	Location Identifier for Roadway at										

ROAD TYPE	*MIRE NAME (MIRE NO.)	NON LOCAL PAVED ROADS - SEGMENT		NON LOCAL PAVED ROADS - INTERSECTION		NON LOCAL PAVED ROADS - RAMPS		LOCAL PAVED ROADS		UNPAVED ROADS	
		STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE	STATE	NON-STATE
	Beginning of Ramp Terminal (197) [187]										
	Location Identifier for Roadway at Ending Ramp Terminal (201) [191]										
	Ramp Length (187) [177]										
	Roadway Type at Beginning of Ramp Terminal (195) [185]										
	Roadway Type at End Ramp Terminal (199) [189]										
	Interchange Type (182) [172]										
	Ramp AADT (191) [181]										
	Year of Ramp AADT (192) [182]										
	Functional Class (19) [19]										
	Type of Governmental Ownership (4) [4]										
<b>Totals (Average Percent Complete):</b>		<b>100.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>1.70</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

\*Based on Functional Classification (MIRE 1.0 Element Number) [MIRE 2.0 Element Number]

**Describe actions the State will take moving forward to meet the requirement to have complete access to the MIRE fundamental data elements on all public roads by September 30, 2026.**

Over the past 3 years, PRHTA has been able to substantially increase its traffic data collection capacity by hiring two consultants with expertise in traffic data collection. The hiring of these two consultants was the first of multiple efforts that PRHTA is making to meet the September 2026 deadline. Currently, with the work of these consultants, some MIRE FDE data has been collected on state highways (i.e., non-local roads) as part of data collection support for HPMS compliance. This means that more than 30% for the MIRE FDE had been already collected through the HPMS.

Another of PRHTA's effort has been the development of the Roads Information Management System (RIMS) to comply with the data of the HPMS and with those of MIRE FDE. The RIMS project has been working for the past two years with the integration of GIS data of the Puerto Rico highway system. One of the end results of this project will be to have most of the MIRE FDEs available for intersections and ramps. This effort is expected to be completed and available by 2022.

Currently the PRHTA is identifying funds to collect the MIRE FDEs that it has not been able to obtain through the efforts of the traffic data consultants and the RIMS project. On June 2021, personnel of the Federal Liaison Office and Road Systems Office, both form the PRHTA, had an internal meeting with the Puerto Rico FHWA Puerto Rico Division to discuss the status of the MIRE FDE. In this meeting, the PRHTA informed FHWA that they are in the process of identifying all ramps in Puerto Rico with their Unique Identifier. Additionally, the PRHTA established a Data Governance team (known as the Integrated Technical Committee (ITC)). Recently, the ITC completed a Discovery Phase assessment. This assessment has information on the different programs that are implemented in PRHTA and their correlation with each other, including MIRE.

## 2021 Puerto Rico Highway Safety Improvement Program

The actions defined in the MIRE FDE Puerto Rico Action Plan are presented below. Some of them which have been partially fulfilled, while others are still being worked on.

- Perform roadway data gaps assessment.
- Collect vehicle traffic flow data (AADT), and other MIRE FDE, on state (non-local) and local highways, including ramps and intersections. (Consultants)
- Classify road segments, ramps, and intersections according to their AADT.
- Develop a roadway data warehouse or database within the PRHTA, including HPMS and MIRE, among others (i.e., MIRE datasets, data sharing protocols, GIS layers for different highway programs, etc.).
- Integration of the MIRE FDE data sets with other databases (i.e., crash database).
- Review the MIRE Action Plan according to the information obtained in this meeting and subsequent agreements.

## **Optional Attachments**

Program Structure:

Project Implementation:

Safety Performance:

Evaluation:

Compliance Assessment:

## Glossary

**5 year rolling average:** means the average of five individuals, consecutive annual points of data (e.g. annual fatality rate).

**Emphasis area:** means a highway safety priority in a State's SHSP, identified through a data-driven, collaborative process.

**Highway safety improvement project:** means strategies, activities and projects on a public road that are consistent with a State strategic highway safety plan and corrects or improves a hazardous road location or feature or addresses a highway safety problem.

**HMVMT:** means hundred million vehicle miles traveled.

**Non-infrastructure projects:** are projects that do not result in construction. Examples of non-infrastructure projects include road safety audits, transportation safety planning activities, improvements in the collection and analysis of data, education and outreach, and enforcement activities.

**Older driver special rule:** applies if traffic fatalities and serious injuries per capita for drivers and pedestrians over the age of 65 in a State increases during the most recent 2-year period for which data are available, as defined in the Older Driver and Pedestrian Special Rule Interim Guidance dated February 13, 2013.

**Performance measure:** means indicators that enable decision-makers and other stakeholders to monitor changes in system condition and performance against established visions, goals, and objectives.

**Programmed funds:** mean those funds that have been programmed in the Statewide Transportation Improvement Program (STIP) to be expended on highway safety improvement projects.

**Roadway Functional Classification:** means the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide.

**Strategic Highway Safety Plan (SHSP):** means a comprehensive, multi-disciplinary plan, based on safety data developed by a State Department of Transportation in accordance with 23 U.S.C. 148.

**Systematic:** refers to an approach where an agency deploys countermeasures at all locations across a system.

**Systemic safety improvement:** means an improvement that is widely implemented based on high risk roadway features that are correlated with specific severe crash types.

**Transfer:** means, in accordance with provisions of 23 U.S.C. 126, a State may transfer from an apportionment under section 104(b) not to exceed 50 percent of the amount apportioned for the fiscal year to any other apportionment of the State under that section.