



COMMONWEALTH of VIRGINIA

Office of the

SECRETARY of TRANSPORTATION

# Transportation Performance Management 2021 Safety Measure Targets

Margie Ray

Performance Management Manager

May 20, 2020



Virginia Department of Rail and Public Transportation



# Safety Performance Management Background

---

- **MAP-21 federal law establishes performance targets for Safety (5 measures)**
- **Safety targets must be established annually**
- **VDOT and Governor's Highway Safety Office (DMV) must agree to targets for 3 of the 5 performance measures**
- **DMV must report targets to NHTSA by June 30**
- **VDOT must report targets to FHWA by July 31**

# Safety Performance Management Performance Measures

---

- **Number of fatalities\***
- **Number of serious injuries\***
- **Rate of fatalities per 100M vehicle miles traveled\***
- **Rate of serious injuries per 100M vehicles miles traveled**
- **Number of non-motorized fatalities and serious injuries**

\*Federal measures requiring coordination with the Governor's Highway Safety Office

# Safety Performance Measures Background

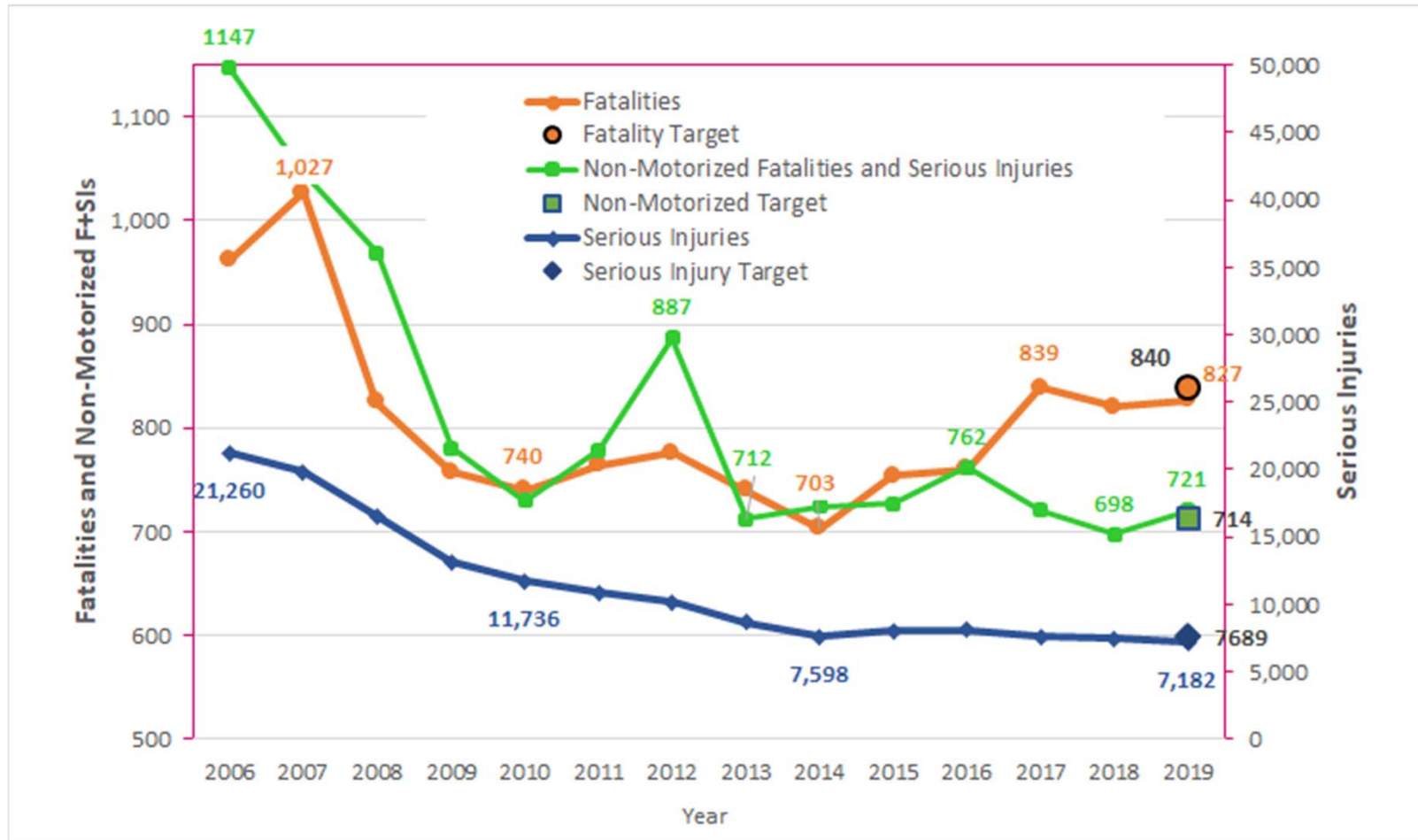
---

- Board adoption of 2020 targets in June 2019 utilizing new data-driven methodology
- Board adoption of HSIP Project Prioritization Policy in December 2019 to improve safety outcomes

Description	Fatalities	F Rate	Serious Injury	SI Rate	F & SI Ped/Bike
2020 Targets	950	1.08	7473	8.52	711

# Safety Performance Management

## How are we doing?



# FHWA Determination of Significant Progress

---

Annually, FHWA makes determination of significant progress towards meeting the safety performance targets

Significant progress determination - at least four of the five targets were met  
OR Target must be better than the baseline value

If significant progress is not made, the state must:

1. Prepare and Submit an Highway Safety Implementation Plan to FHWA by June 30 stating what the state is doing to meet targets, and
2. Must obligate 100% of HSIP funds for the year that the targets were set (i.e., 2017)

# 2018 FHWA Safety Target Determination

---

- **On April 24, 2020, received FHWA's safety target determination for 2018 safety targets**
- **Virginia did not make significant progress towards the 2018 targets**
  - **2018 fatalities and fatality rate both exceeded the 2018 target and baseline values**
- **The 2018 and 2019 targets were set using FHWA's methodology which has many limitations as compared to our new, industry leading target setting method**
- **Response sent on May 8, 2020 to communicate that this determination does not provide an accurate reflection of the actions taken by the Commonwealth to improve traffic safety**

# Determination of 2018 Safety Performance Targets

Performance Measure	2014-18 Average Target	2014-18 Average Outcome	2012-16 Average Baseline	Met Target	Better Than Baseline
Number of Fatalities	709	775	746	No	No
Rate of Fatalities	0.830	0.924	0.912	No	No
Number of Serious Injuries	7,570	7,751	8,488	No	Yes
Rate of Serious Injuries	8.720	9.262	10.366	No	Yes
Number of Non-motorized F + SI	681.0	732.4	764.0	No	Yes



# Safety Performance Management Commonwealth of Virginia Initiatives

---

**Legislative Actions** - passed by the 2020 General Assembly and signed into law by Governor Northam

- Prohibiting the driver from holding a personal handheld communication device
- Establishing and funding the Virginia Highway Safety Improvement Program to fund projects that address hazard roadway features and strategies to address behavioral causes of crashes with priority given to projects and strategies based on expected reduction in fatalities and severe injuries relative to cost
- Authorizing use of automated speed enforcement in work zones and school crossings
- Changing the Code of Virginia to require vehicles to yield right-of-way by "stopping and remaining stopped until such pedestrian has passed the lane in which the vehicle has stopped"

# Safety Performance Management Commonwealth of Virginia Initiatives

---

## 2020 Proposed Legislative Actions

- **Making seat belt use a primary offense and requiring use in all seats of a vehicle – passed by the House of Delegates but failed on the Senate floor during the 2020 General Assembly session;**
- **Prohibiting open containers of alcohol in the passenger area of vehicles – passed by the House but did not advance out of committee in the Senate during the 2020 General Assembly;**
- **Authorizing local governments to post speed limits below 25 miles per hour in business and residence districts – passed by the House but failed on the Senate floor during the 2020 General Assembly session**

# Safety Performance Management Commonwealth of Virginia Initiatives

---

## Administrative Actions

- Establishment of Governor's Leadership Team for Highway Safety
- Launch of "Driven to Protect" - developing technology to eliminate drunk driving through use of in-vehicle alcohol detection systems to determine when a driver is impaired - known as DADSS

## CTB Actions

- Development of data-driven safety target setting methodology and adoption of safety performance targets
- Adoption of policy for investment of federal HSIP funds and approval of first Systemic Implementation Plan

## Innovation

- Received National Roadway Safety Award for the Pedestrian Safety Action Plan (2019)

# FHWA Method of Target Setting

---

**FHWA target setting method used to set 2018 and 2019 targets. Limitations:**

- **Over reliance on crash data alone instead of including other factors and does not adequately account for annual fluctuations or trend changes**
- **Relies on five-year rolling average**
  - **2018 targets incorporated data back to 2007, the year with the most Virginia traffic deaths in a generation.**
  - **Virginia's traffic deaths reduced considerably after 2007, the numbers have remained relatively flat since 2015.**
  - **Straight-line projection gives greater influence to crash data from 2007 through 2014, appears Virginia experiencing a steeper decline than actual data demonstrated.**
- **Does not consider important demographic, socio-economic, infrastructure spending, and other environmental factors that were changing drastically over the five-year period**

# Safety Performance Management Refining Target Setting - Data-Driven Method

---

## Key steps to develop 2021 targets:

1. Evaluate anticipated benefits of recent (or soon to be completed) infrastructure projects
2. Analyze external factors to predict 2019 baseline crash safety measure counts for validation
  - assess new factors
  - update and refine model for 2021 predictions
3. Combine the baseline predictions with project benefits to establish data-driven targets

# Step 1: Expected Benefits of Spot and Corridor Projects

- Reviewed 107 SMART SCALE and HSIP projects constructed or to be completed between January 2019 and March 2021
  - 64 SS projects = \$354.5 M
  - 43 HSIP\* projects = \$61.0 M
- Project influence areas consistent with SMART SCALE safety scoring methodology

Projects	F+SI Crashes	F People	SI People	F Ped/Bike People	SI Ped/Bike People
107	593	42	730	7	32

\* Several HSIP projects are larger projects with a small portion of HSIP funds

# Spot and Corridor Projects Expected Reductions

Description	F People	SI People	F Ped/Bike People	SI Ped/Bike People
2010-2018 Totals	42	730	7	32
Final Projection (w/ Factors)	34	642	4	25
Reduction	8 (1.0 / Yr)	88 (11.2 / Yr)	3 (0.4 / Yr)	7 (0.9 / Yr)
Percent Reduction	19%	12%	48%	22%
<b>Spot Cost / Annual Reduction</b>	<b>\$415.5 M</b>	<b>\$37.1 M</b>	<b>\$193.1 M</b>	

**Investment Cost = \$415.5 M**

# Step 1: Expected Benefits of Hybrid Projects

- Reviewed 16 Hybrid projects constructed or to be completed between January 2018 and March 2020
  - 3 SS projects = \$7.9 M
  - 13 HSIP projects = \$28.7 M
- Project influence areas consistent with SMART SCALE safety scoring methodology

Projects	F+SI Crashes	F People	SI People	F Ped/Bike People	SI Ped/Bike People
16	541	67	664	10	12



# Hybrid Projects Expected Reductions

Description	F People	SI People	F Ped/Bike People	SI Ped/Bike People
2010-2018 Totals	67	664	10	12
Final Projection (w/ Factors)	56	607	8	10
Reduction	11 (1.5 / Yr)	57 (7.8 / Yr)	2 (0.3 / Yr)	2 (0.3 / Yr)
Percent Reduction	16%	9%	23%	18%
<b>Hybrid Cost / Annual Reduction</b>	<b>\$24.4 M</b>	<b>\$4.7 M</b>	<b>\$20.8 M</b>	

**Investment Cost = \$36.6 M**

# Step 1: Expected Benefits of Systemic HSIP Projects

- **Low cost improvements systemically spread on network at intersections and curves or on the pavement**
  - 18 HSIP projects = \$21.8 M
- **HSIP projects constructed between January 2019 and March 2021**

Projects	F+SI Crashes	F People	SI People	F Ped/Bike People	SI Ped/Bike People
18	881	62	1,068	13	109

# Systemic Projects Expected Reductions

Description	F People	SI People	F Ped/Bike People	SI Ped/Bike People
2010-2017 Totals	62	1,068	13	109
Final Projection (w/ Factors)	54	963	7	63
Reduction	8 (1.1 / Yr)	105 (15 / Yr)	6 (0.9 / Yr)	46 (6.6 / Yr)
Percent Reduction	13%	10%	46%	42%
<b>Systemic Cost / Annual Reduction</b>	<b>\$19.8 M</b>	<b>\$1.5 M</b>	<b>\$1.85 M</b>	

**Investment Cost = \$21.8 M**

# Step 1: All Projects Expected Reductions and Cost per Annual Reduction

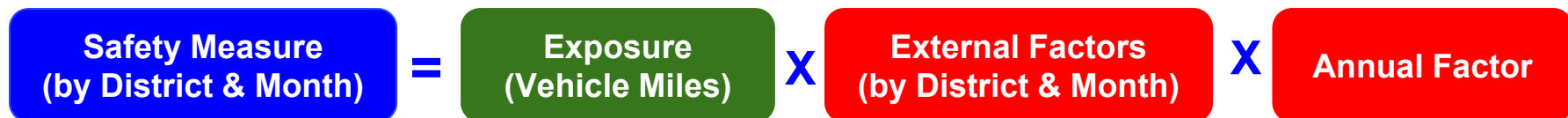
Description	F People	SI People	F + SI Ped/Bike People
Spot/Corridor Reduction	1.0 / Yr	11.2 / Yr	1.3 / Yr
Spot Cost / Annual Reduction	\$415.5 M	\$37.1 M	\$193.1 M
Hybrid Reduction	1.5 / Yr	7.8 / Yr	0.6 / Yr
Hybrid Cost / Annual Reduction	\$24.4 M	\$4.7 M	\$20.8 M
Systemic Reduction	1.1 / Yr	15 / Yr	7.5 / Yr
Systemic Cost / Annual Reduction	\$19.8 M	\$1.5 M	\$1.85 M
<b>Total Expected Annual Reductions</b>	<b>3.6 / Yr</b>	<b>33.9 / Yr</b>	<b>9.4 / Yr</b>

# Step 2: Analyze External Factors to Predict 2021 Baseline

---

Refining the predictive baseline models includes three steps:

1. Assess past and new external factors with annual factors to calibrate the models
2. Validate the model external and annual factors with 2019 data
3. Forecast external and annual factors for 2021 measure predictions



# Step 2: Analyze External Factors to Predict 2021 Baseline

Assessed models for Fatalities and Serious Injuries using the following external factors:

## Social Economic Data

- Annual Total Population by Age
- Annual Labor Force
- Monthly Unemployed
- Median Household Income
- Statewide Annual GDP
- Liquor Licenses by Type
- ABC Stores – Gallons Sold
- Average Gas Price
- Percent Drive Alone
- Percent Uninsured

## Veh. Miles Travelled

- Urban and Rural VMT
- Monthly VMT

## Transportation Spending

- VDOT Infrastructure Programs
- DMV HSO Behavioral Spending

## Weather

- Average Precipitation
- Average Snowfall

## Annual Calibration Factor

Factor data compiled by VDOT District and, when available, by month.

## Step 2 - Findings From the 2020 Prediction Models and 2021 Additions

External Factor	Effect on Fatal Crashes	Effect on Serious Injury crashes	Effect on Bike/Ped crashes
VMT growth	↑	↑	↑
Increasing local functional class % of VMT	↑	↑	↑
Increasing young population (15-24)	↑	↑	↑
Increasing aging population (75+)	↑	↑	
Gallons Liquor Sold		↑	
Liquor licenses			↑
Increased highway resurfacing spending	↓		
Increased emergency/incident management spending	↓		
Increased total behavioral programs spending	↓	↓	
Increased roadway maintenance spending		↓	
Increased average snowfall per month		↓	↓
Increased rural functional class % of VMT			↓
Increased non-motorized behavioral program spending			↓
Increased gas prices			↓

 = Additional factor in 2021 model

## Step 2 - Key Model Assumptions

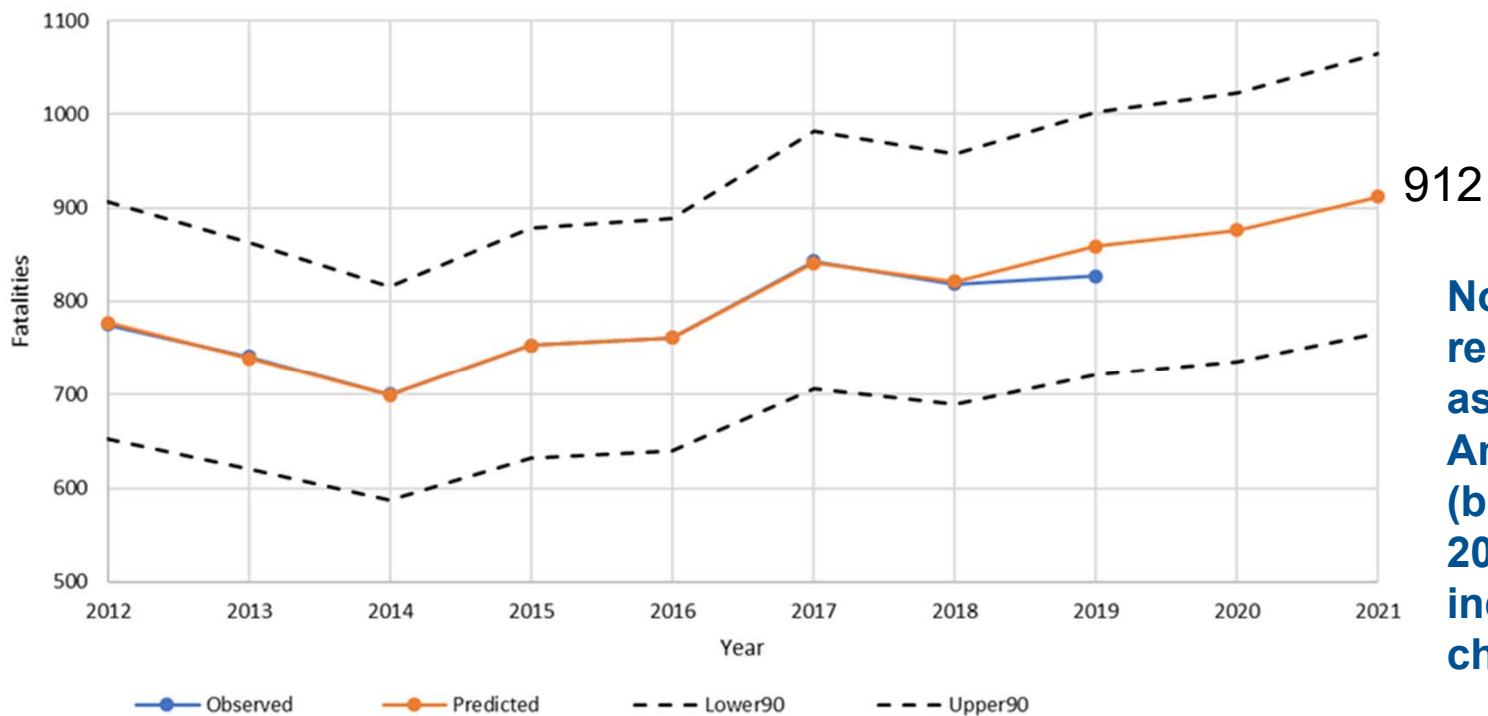
---

- **Model updated per new or modified external factors mentioned above**
- **External Factors and Annual Calibration Factor Trends assumed to continue**
- **Scheduled projects and additional funding assumed to continue**

**Note: Annual Calibration Factor Trends suggest that there is a “flattening” of the curve**

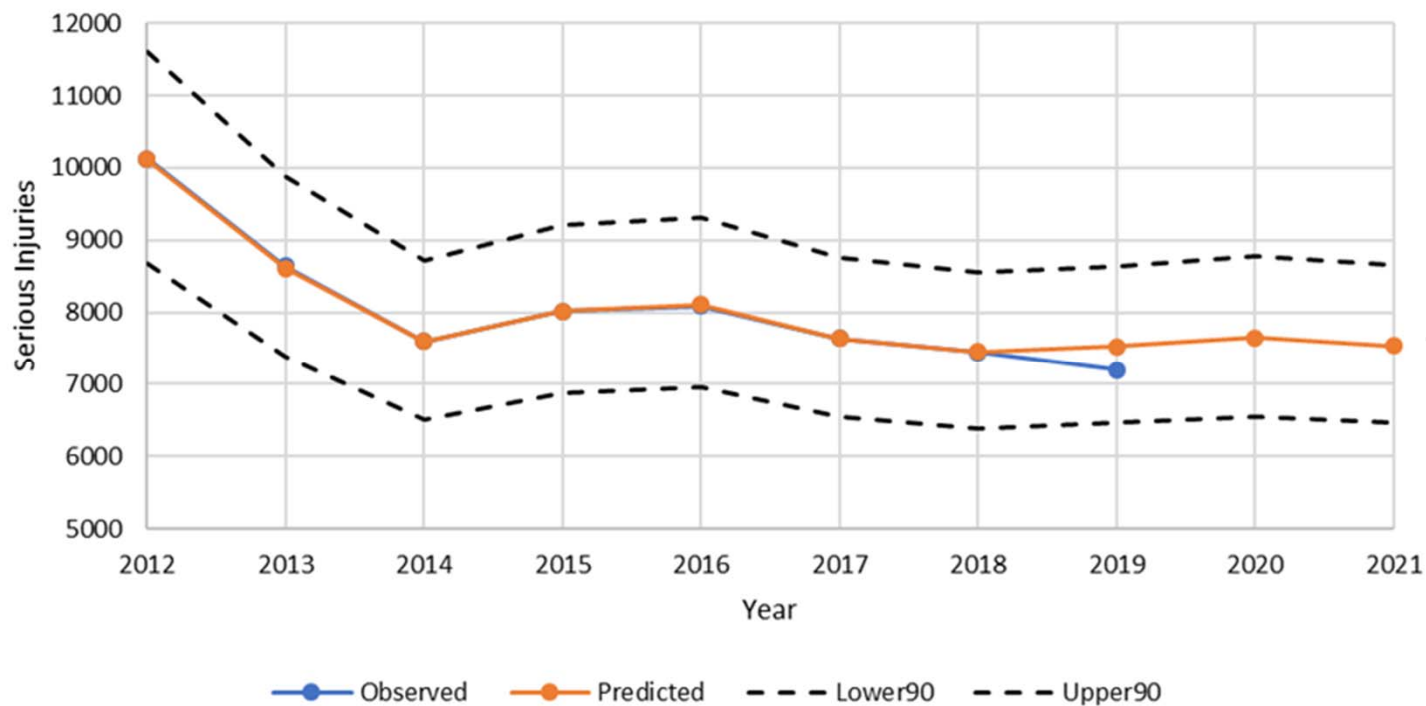


# Predicted and Observed Fatalities: Previous trends continue in 2020-2021



**Note: Based on recent years, assumed flattening Annual Factor trend (but still increasing). 2019 was key indicator of changes.**

# Predicted and Observed Serious Injuries – Previous trends continue in 2020-2021

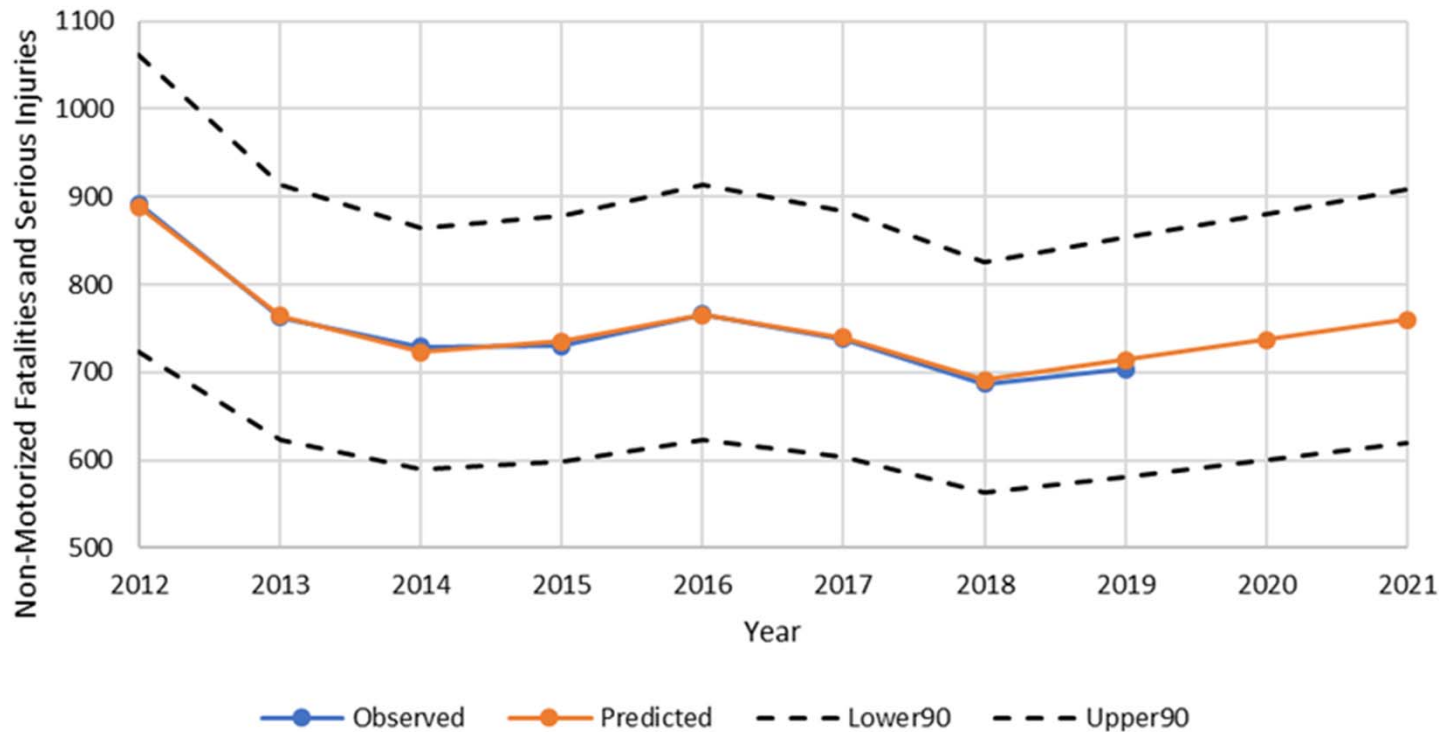


7,533

**Note: Annual Factor trend continues to stay flat, so predictions are generally consistent leveling since 2017.**

# Predicted and Observed Non-Motorized F and SI

## Previous trends continue in 2020-2021



760

**Note: Annual Factor continues to stay flat, however prediction grows due to other external factors.**

## 2020 Legislation Estimated Safety Effects

Description	Opportunity	Expected Reduction in Fatalities	Expected Reduction in Serious Injuries
Handheld phone ban	Jan 2021	10-17	114-194
Primary seat belt offense	<b>Missed</b>	37	421
Local authority to lower speed limit below 25 MPH	<b>Missed</b>	5-14 pedestrians	25-69
Camera speed enforcement in Highway Safety Corridors	<b>Missed</b>	2-5	23-56
Open (Alcohol) Container compliance	<b>Missed</b>	7-15	79-170
<b>Estimate of missed opportunities</b>		<b>51 - 71</b>	<b>548-716</b>

## Step 3: Proposed 2021 Safety Measures Targets With Previous Trends in Baseline Predictions

Description	F People	F Rate	SI People	SI Rate	F & SI Ped/Bike People
STEP 2: 2021 Target Baseline (Model)	912		7,533		760
STEP 1: Expected Project Annual Reductions	4	---	34	---	10
<b>New: Expected Reductions Handheld Ban</b>	<b>10</b>		<b>114</b>		<b>**</b>
<b>STEP 3: Proposed 2021 Targets (Model)</b>	<b>898</b>	<b>1.012</b>	<b>7,385</b>	<b>8.325</b>	<b>750</b>
CTB 2020 Adopted Targets (Model)	950	1.08	7,473	8.52	711

\*\* Some of the Fatal and Severe Injuries reduced by the handheld ban will impact the Bike/Ped outcomes, but there is not a method to estimate the proportion.

## Next Steps

---

- **Provide feedback on proposed targets**
- **Adopt targets at the June meeting to meet the Federal reporting deadlines**
- **Evaluate the impacts to the target setting model based on current travel patterns and report back to the CTB, especially as to impacts in**
  - meeting adopted targets and
  - affecting 2022 model predictions
- **Evaluate impacts to implementation of new legislation**



COMMONWEALTH of VIRGINIA  
*Office of the*  
SECRETARY of TRANSPORTATION

