



# SAFE SYSTEM

APPROACH

Zero is our goal. A Safe System is how we get there.



U.S. Department of Transportation  
**Federal Highway Administration**

**ZERO** IS OUR GOAL  
A SAFE SYSTEM IS HOW WE GET THERE



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**Imagine our country as a place where *nobody* has to die from vehicle crashes.**



Source: Fehr & Peers





# Presentation Overview

**1**

**Introduction**

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**Safe System  
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**Conclusion  
& Resources**



# Introduction

Assessment of our current situation and introduction to the Safe System approach

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**Safe System Principles**

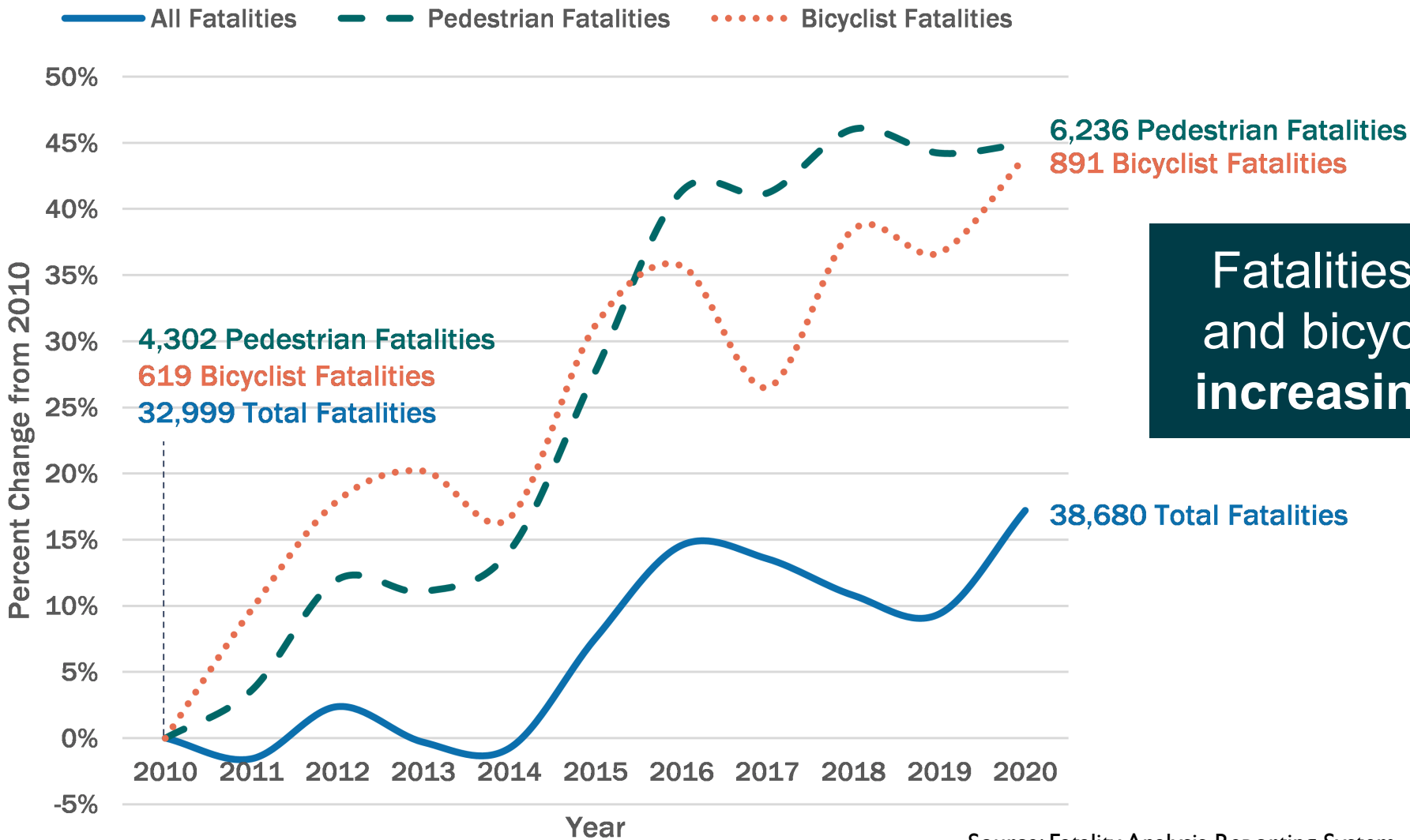
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# WE HAVE A NATIONAL ROADWAY SAFETY PROBLEM



Fatalities of pedestrians and bicyclists have been increasing even greater

Source: Fatality Analysis Reporting System

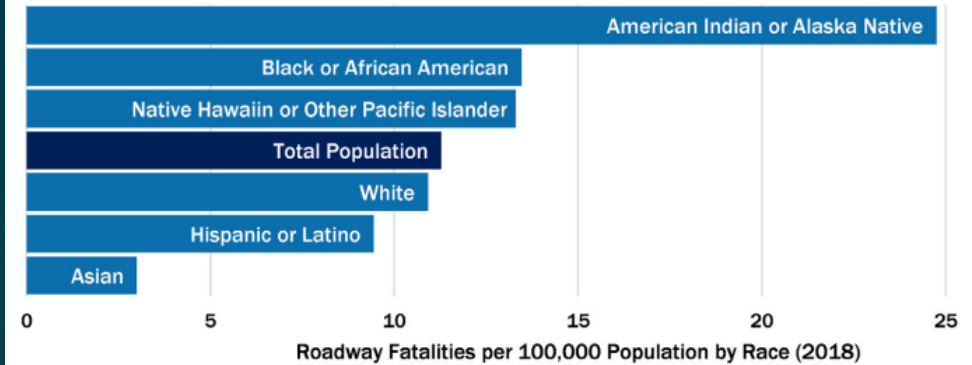
Source: US DOT

# EQUITY

Opportunities to Simultaneously Address Safety, Equity, and Climate  
Safety is and will always be the Department's top priority. Roadway safety is also a foundational prerequisite to our success in addressing two other major priorities: equity and climate.

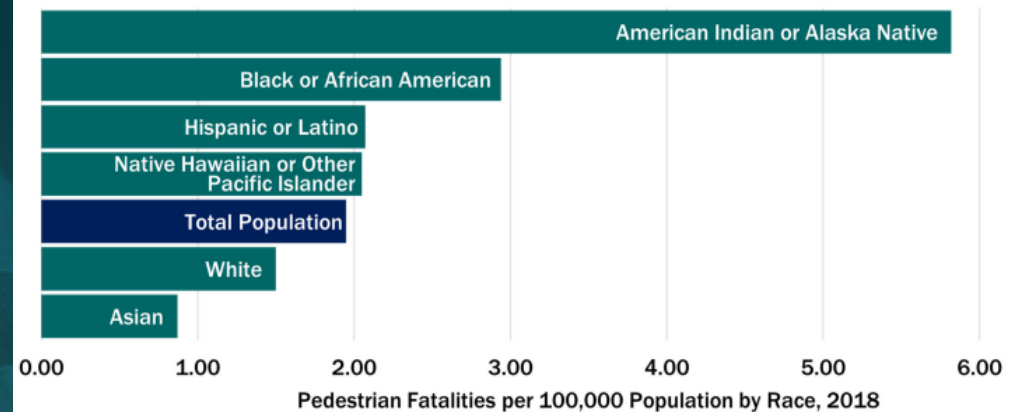
***“Traffic crashes are a leading cause of death for teenagers in America, and disproportionately impact people who are Black, American Indian, and live in rural communities. We face a crisis on our roadways; it is both unacceptable and solvable.”***

Fatalities impact communities differently...



...particularly for people not in a vehicle.

Fatalities Among Pedestrians





# How does the United States *reach zero deaths?*



Source: Fehr & Peers



## THE SAFE SYSTEM APPROACH AS A GUIDING PRINCIPLE

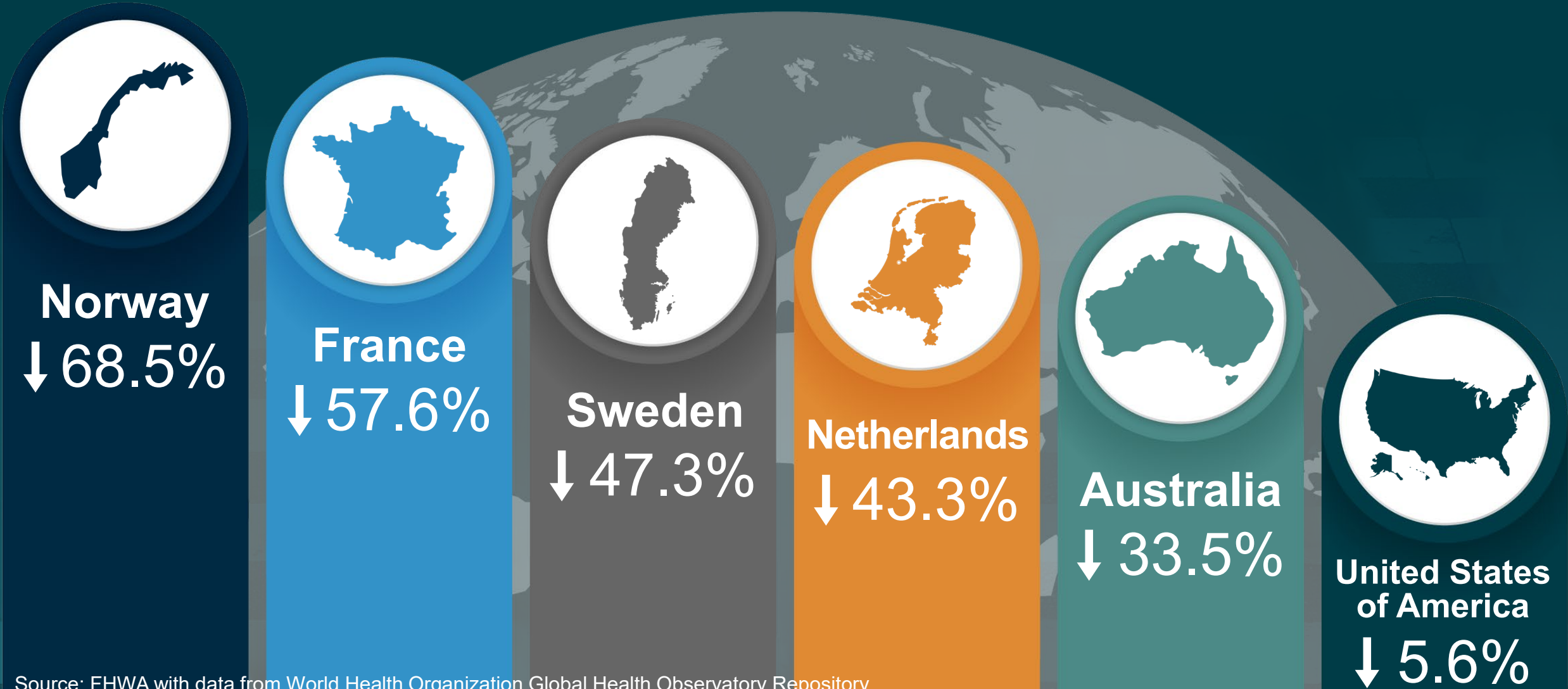
**PARADIGM SHIFT**



It involves a paradigm shift to improve safety culture, increase collaboration across all safety stakeholders, and refocus transportation system design and operation on anticipating human mistakes and lessening impact forces to reduce crash severity and save lives.

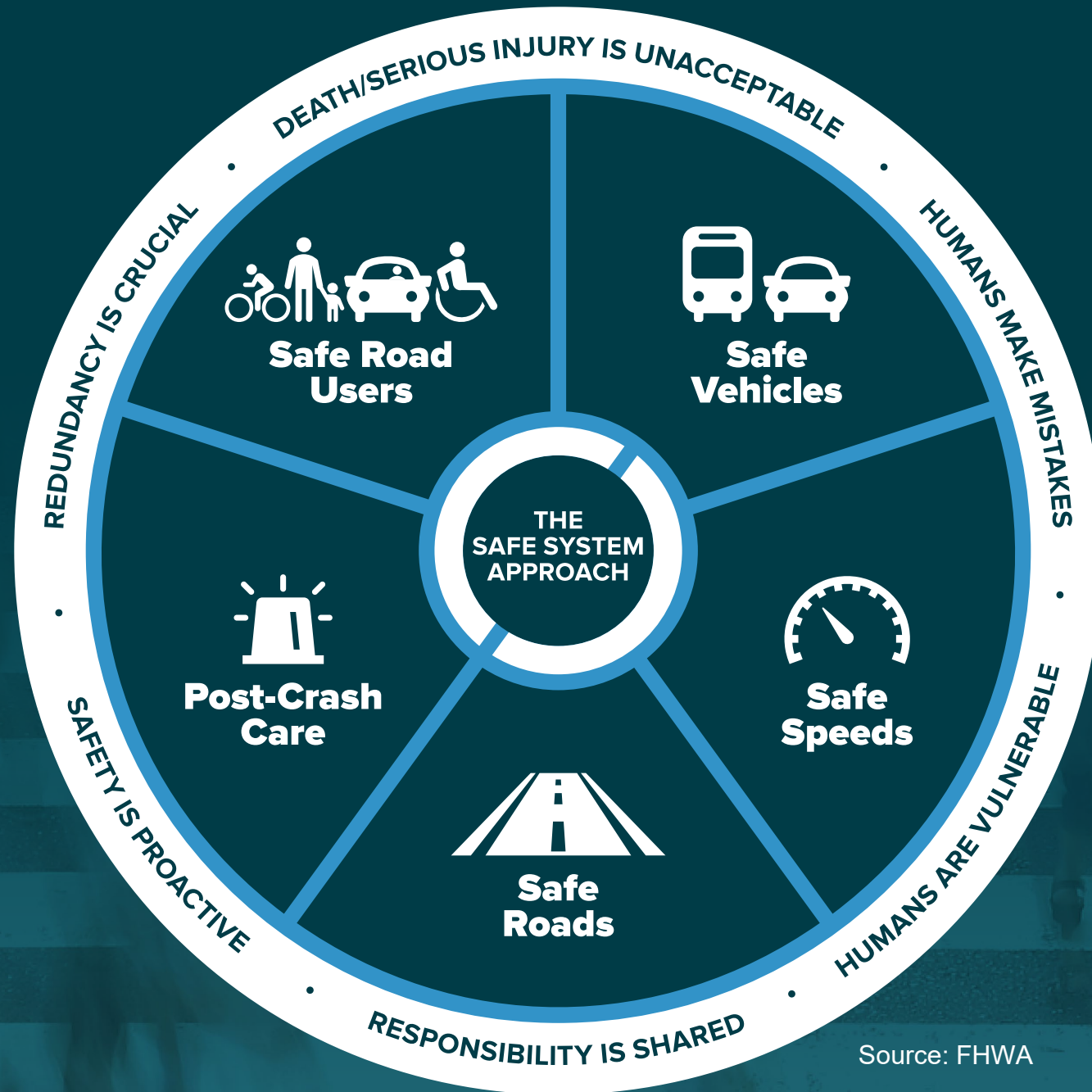
# SUCCESSFUL SAFE SYSTEM ADOPTERS

Changes from 2000 to 2019.



Source: FHWA with data from World Health Organization Global Health Observatory Repository

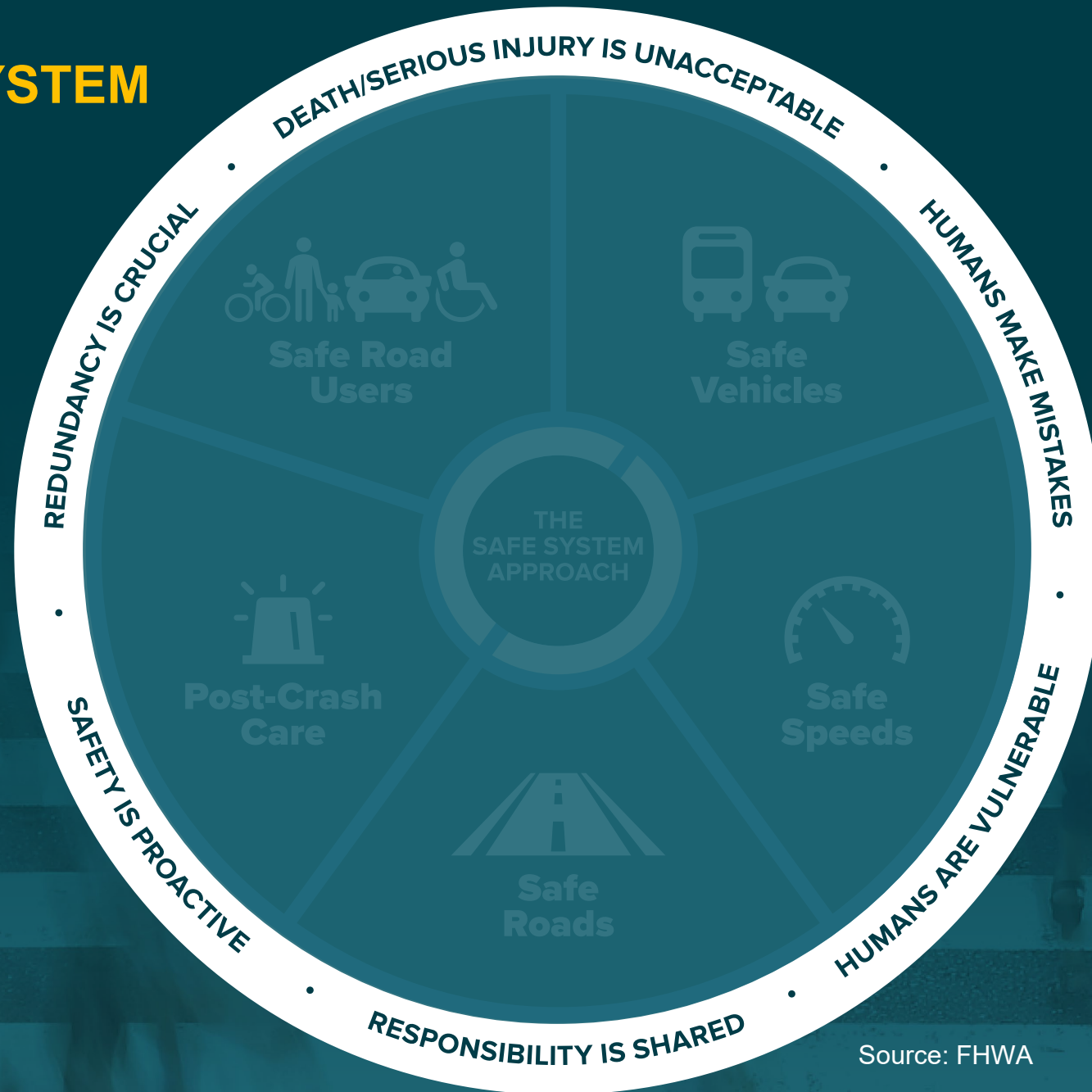
# THE SAFE SYSTEM APPROACH



Source: FHWA



# THE 6 SAFE SYSTEM PRINCIPLES



Death/serious injury is unacceptable



Humans make mistakes



Humans are vulnerable



Responsibility is shared



Safety is proactive



Redundancy is crucial

# THE 5 SAFE SYSTEM ELEMENTS



Source: FHWA



# Safe System Principles

Overview of the 6 principles of the Safe System approach

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# THE 6 SAFE SYSTEM PRINCIPLES



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Death/serious injury  
is unacceptable



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Humans make  
mistakes



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Humans are  
vulnerable



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Responsibility is  
shared



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Safety is proactive



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Redundancy  
is crucial

# DEATH/SERIOUS INJURY IS UNACCEPTABLE





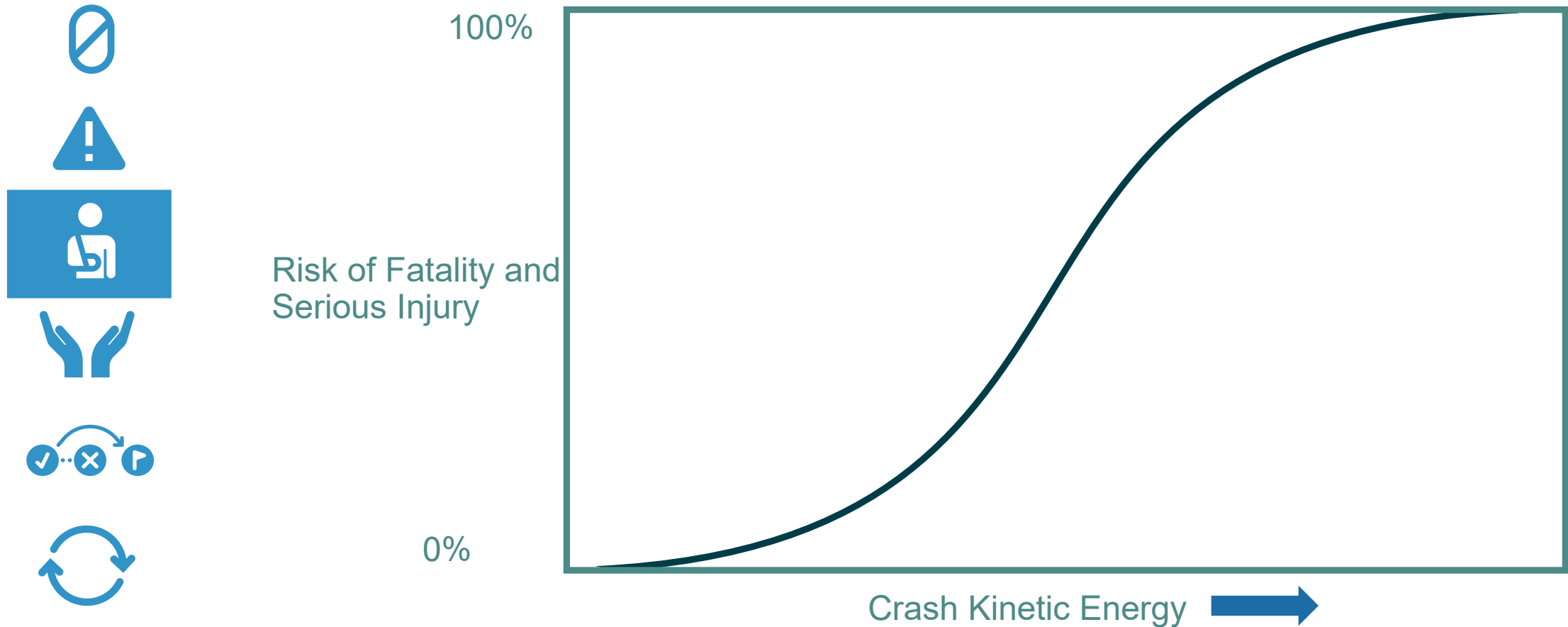
# HUMANS MAKE MISTAKES



Source: Fehr & Peers



# HUMANS ARE VULNERABLE



# RESPONSIBILITY IS SHARED



- **System managers**

- Planners, designers, builders, operators, maintenance workers



- **Vehicle manufacturers**



- **Law enforcement personnel**

- **Traffic Incident Management personnel**



- **System users**



# SAFETY IS PROACTIVE



**Identify risks**



**Mitigate risks**



# REDUNDANCY IS CRUCIAL



**Safe road  
users**



**Safe  
vehicles**



**Safe  
speeds**



**Safe  
roads**



**Post-crash  
care**



# Safe System Elements

Overview of the 5 elements of the Safe System approach

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# THE 5 SAFE SYSTEM ELEMENTS



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Safe road users



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Safe vehicles



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Safe speeds



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Safe roads



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Post-crash care



# SAFE ROAD USERS



**Walk**



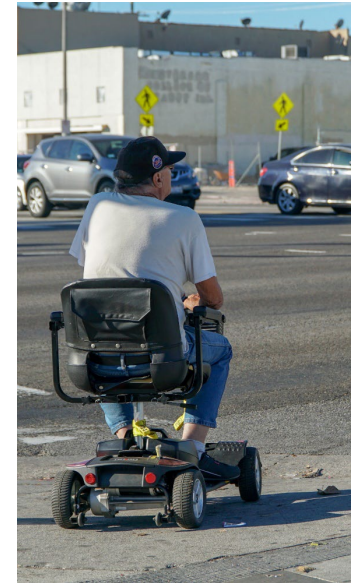
**Bike**



**Drive**



**Transit**



**Other**

# SAFE VEHICLES



## Active safety

Measures to reduce the chance of a crash occurring

- Lane departure warning
- Autonomous emergency braking

## Passive safety

Protective systems for when crashes do occur

- Seatbelts and airbags
- Crash-absorbing vehicle crumple zones

# SAFE SPEEDS

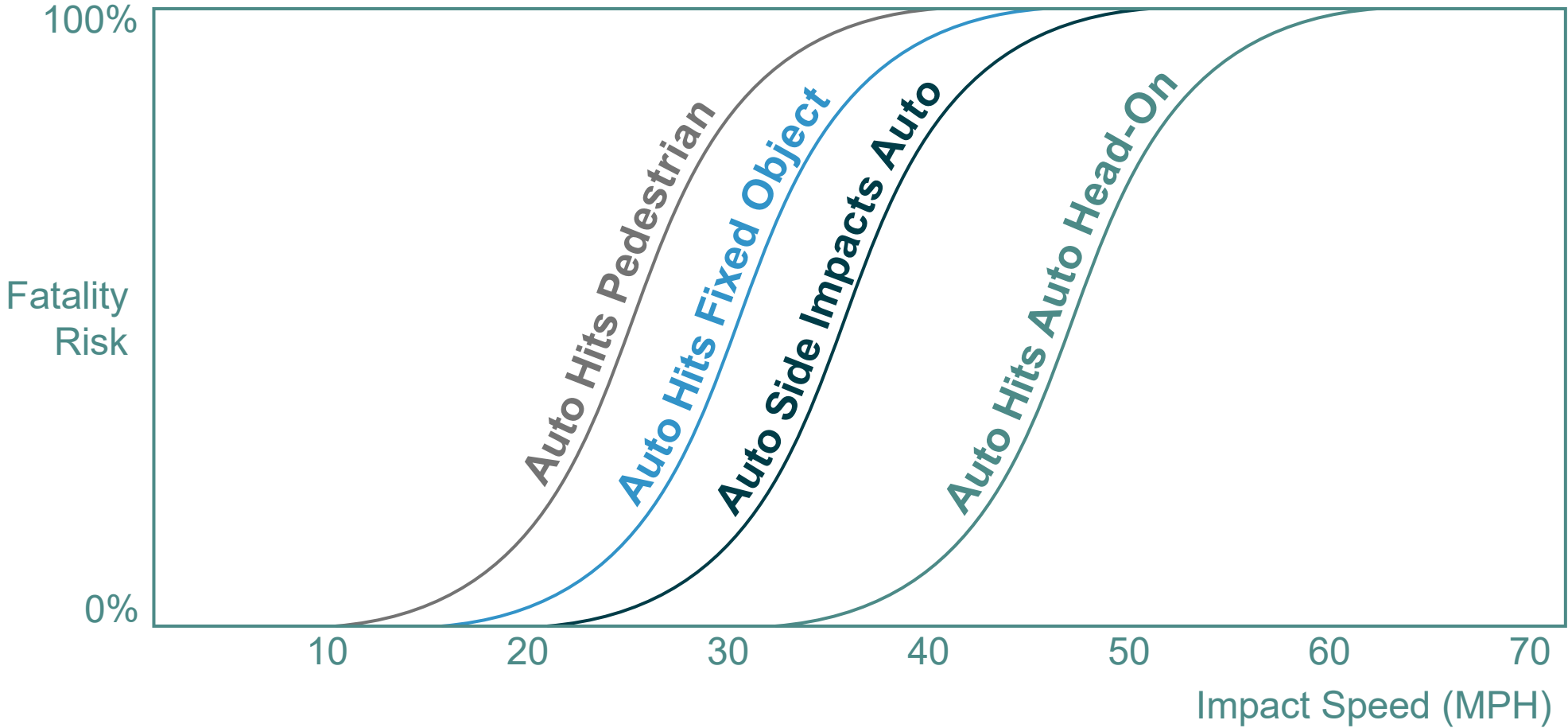


“ Speed is at the heart of a forgiving road transport system. It transcends all aspects of safety: without speed there can be no movement, but with speed comes kinetic energy and with kinetic energy and human error come crashes, injuries, and even deaths.”

Organization for Economic Co-operation and Development



# SAFE SPEEDS: FATALITY RISKS



Source: FHWA. Adapted from graphic created by Australian Roads and Traffic Authority of New South Wales.

# SAFE SPEED: TREATMENTS THAT MINIMIZE INJURIES

Speed through typical intersection



Source: Fehr & Peers

Speed through Safe System intersection



Source: City of Carmel, IN



# SAFE ROADS



Safe roads are designed and operated to:

- 1. Prevent crashes among all users**
- 2. Keep impacts on the human body at tolerable levels**

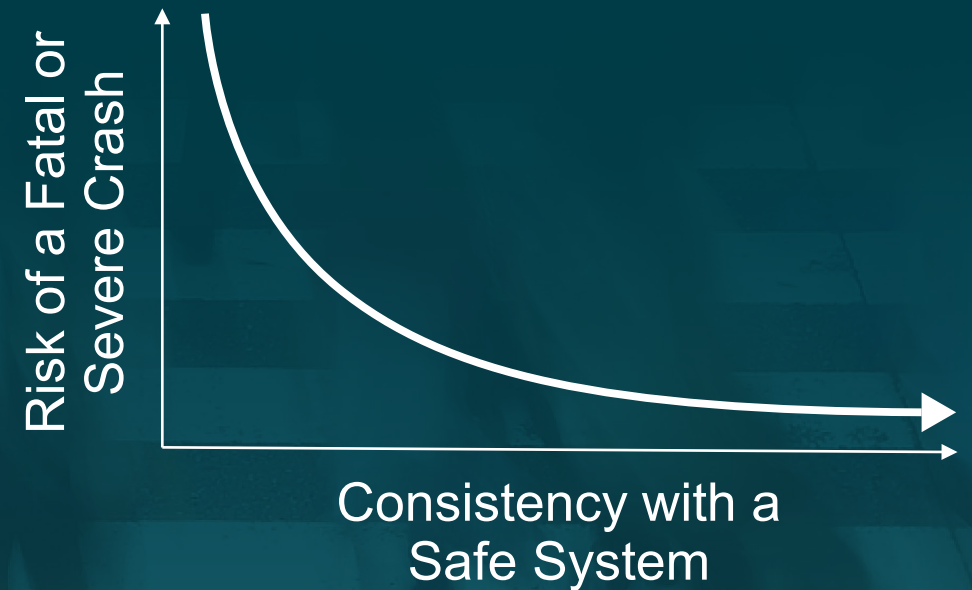


# THOUGHTS ON THE SAFE ROADS ELEMENT



Think of “Safe Roads” as a continuum – not an absolute

- The aim is to design and operate roads to continuously approach toward creating a Safe System by implementing features appropriate for the intended and actual road use and speed environment
  - Reduce the likelihood of error
  - Reduce the consequences of error



Source: FHWA



# POST-CRASH CARE: TRAFFIC INCIDENT MANAGEMENT



**First responders**



**Crash investigation**



**Medical care**



**Media**



**Engineering**



**Justice**



# POST-CRASH CARE: OTHER ASPECTS



Post-crash care extends to actions after TIM returns a crash scene to normal conditions:



Media



Engineering



Justice





# Conclusion & Resources

Tools to bring the Safe System approach to your community

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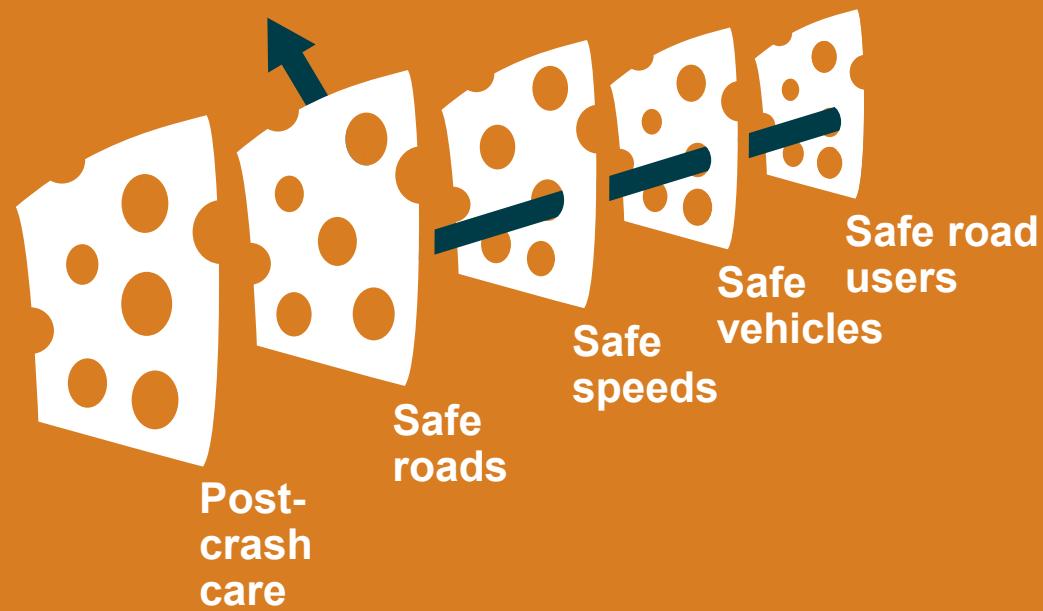
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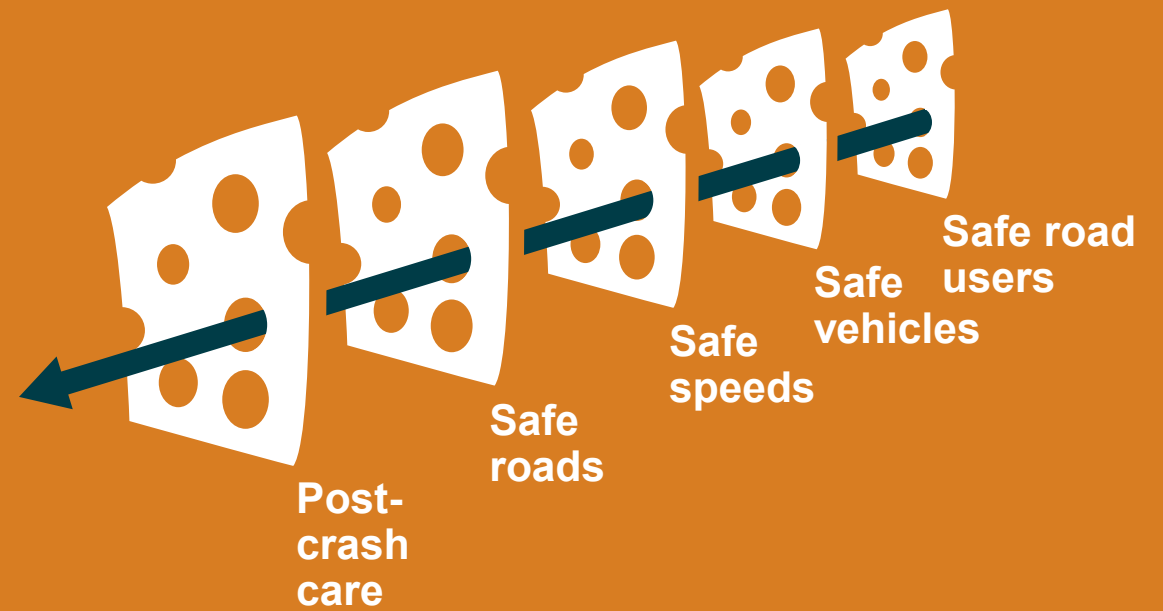



# THE 5 SAFE SYSTEM ELEMENTS CREATE REDUNDANCY

The “Swiss Cheese Model” of redundancy creates layers of protection




Death and serious injuries only happen when all layers fail





**MAKING OUR ROADS SAFER** | One Countermeasure at a Time

28 Proven Safety Countermeasures that offer significant and measurable impacts to improving safety

 U.S. Department of Transportation  
Federal Highway Administration

**ZERO IS OUR GOAL**  
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<https://safety.fhwa.dot.gov/>

**“Double-Down” on what works**

*Transportation agencies are strongly encouraged to consider widespread implementation of PSCs to accelerate the achievement of local, State, and National safety goals.*

# WHERE ARE YOU ON THE SAFE SYSTEM JOURNEY?

## Traditional approach

Prevent crashes →

Improve human behavior →

Control speeding →

Individuals are responsible →

React based on crash history →

## Safe System approach

Prevent death and serious injuries

Design for human mistakes/limitations

Reduce system kinetic energy

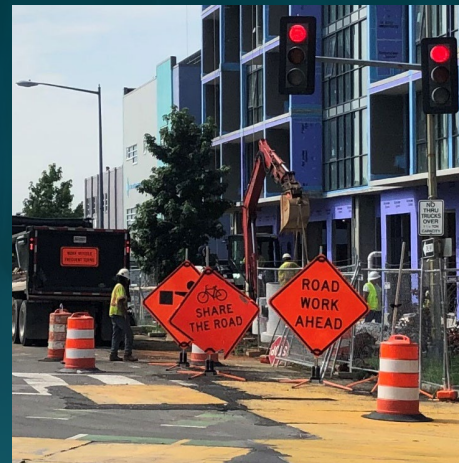
Share responsibility

Proactively identify and address risks



# Implementing the Safe System approach is our shared responsibility, *and we all have a role.*

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Source: Fehr & Peers



Source: Fehr & Peers