



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

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

# An Overview of the Safe System Approach

Jeffrey Shaw  
USDOT Federal Highway Administration  
Office of Safety



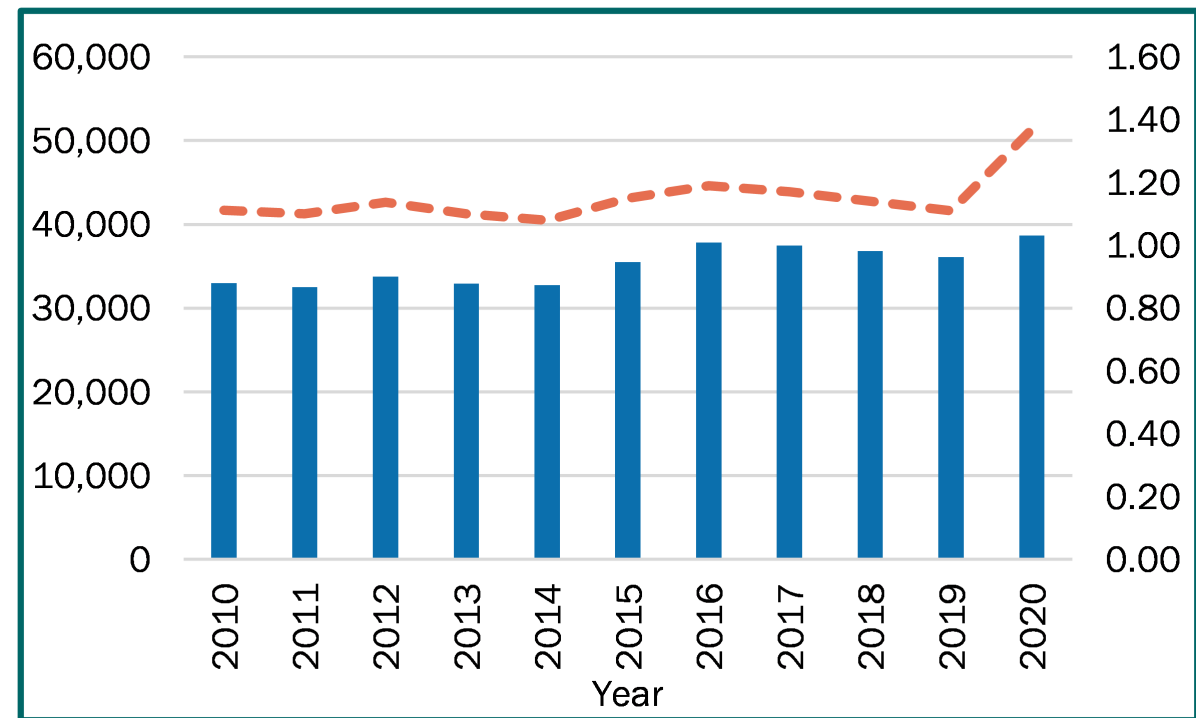
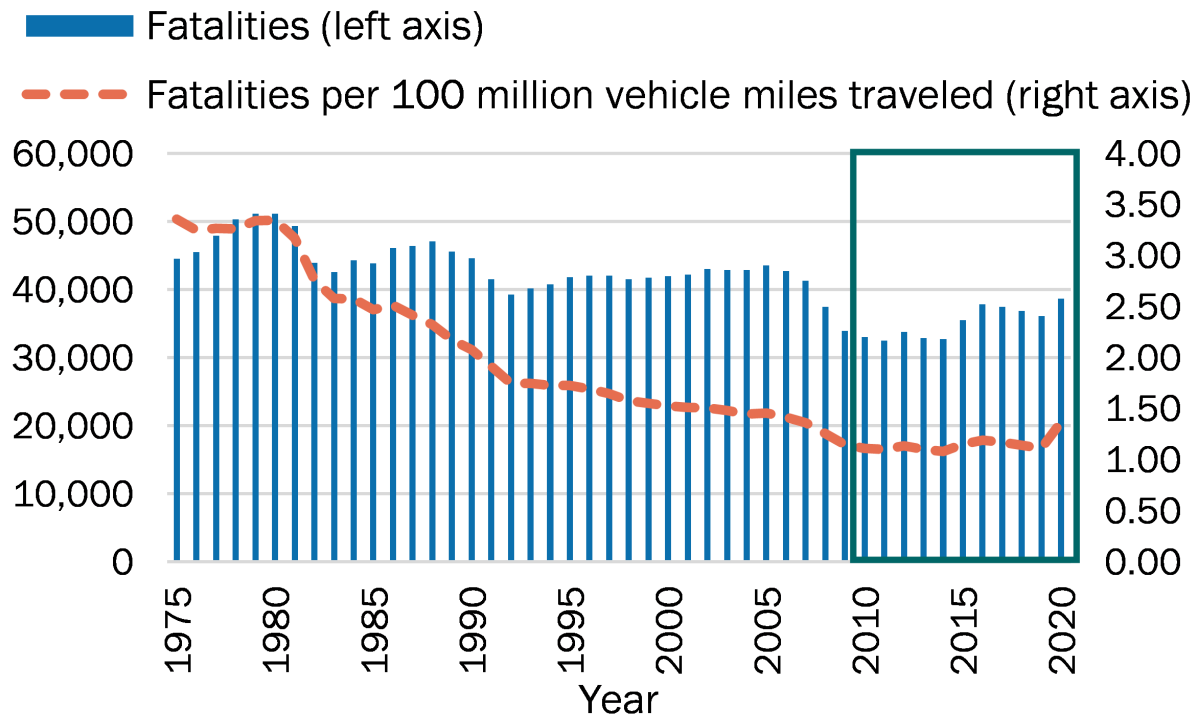
# Disclaimers



- Except for any statutes or regulations cited, the contents of this presentation do not have the force and effect of law and are not meant to bind the public in any way. This presentation is intended only to provide information regarding existing requirements under the law or agency policies.
- The U.S. Government does not endorse products, manufacturers, or outside entities. Names/logos appear in this presentation only because they are considered essential to the objective of the presentation. They are included for informational purposes only and not intended to reflect a preference, approval, or endorsement of any one product or entity.
- Unless noted otherwise, FHWA is the source for all images in this presentation.

# The National Roadway Safety Problem...

Roadway fatalities and the fatality rate declined consistently for 30 years...



*...but progress has stalled over the last decade...*

# ...Continues to Worsen

The crisis on our roadways **continues to worsen** based on estimated roadways fatalities in 2021:

| Estimates of Motor Vehicle Traffic Fatalities, 2020 vs. 2021 |                       |   |
|--|-----------------------|---|
| <u>2020 Estimates</u>  | <u>2021 Estimates</u> | <b>Percent Increase</b> from 2020 to 2021 |
| 38,824   | 42,915                | <b>10.5%</b>                              |

The largest number of projected fatalities since 2005.



# The Roadway Safety Vision



**Zero** is the only acceptable number of deaths on our highways, roads, and streets.

*The United States Department of Transportation is committed to taking substantial, comprehensive action to significantly reduce serious and fatal injuries on the Nation's roadways.*

At USDOT, we support all efforts to achieve **zero**.

# The Strategy

U.S. DOT's comprehensive approach to significantly reducing serious injuries and deaths on our Nation's highways, roads, and streets.

- ❖ Sets a Department-wide vision and goal
- ❖ **Adopts the Safe System Approach**
- ❖ Identifies new priority actions and notable changes to existing practices
- ❖ Leverages new funding and policies in the Bipartisan Infrastructure Law to bring this strategy to life
- ❖ Advances equity and climate goals
- ❖ **Calls others to action**



# THE SAFE SYSTEM APPROACH





# Top 3 Takeaways

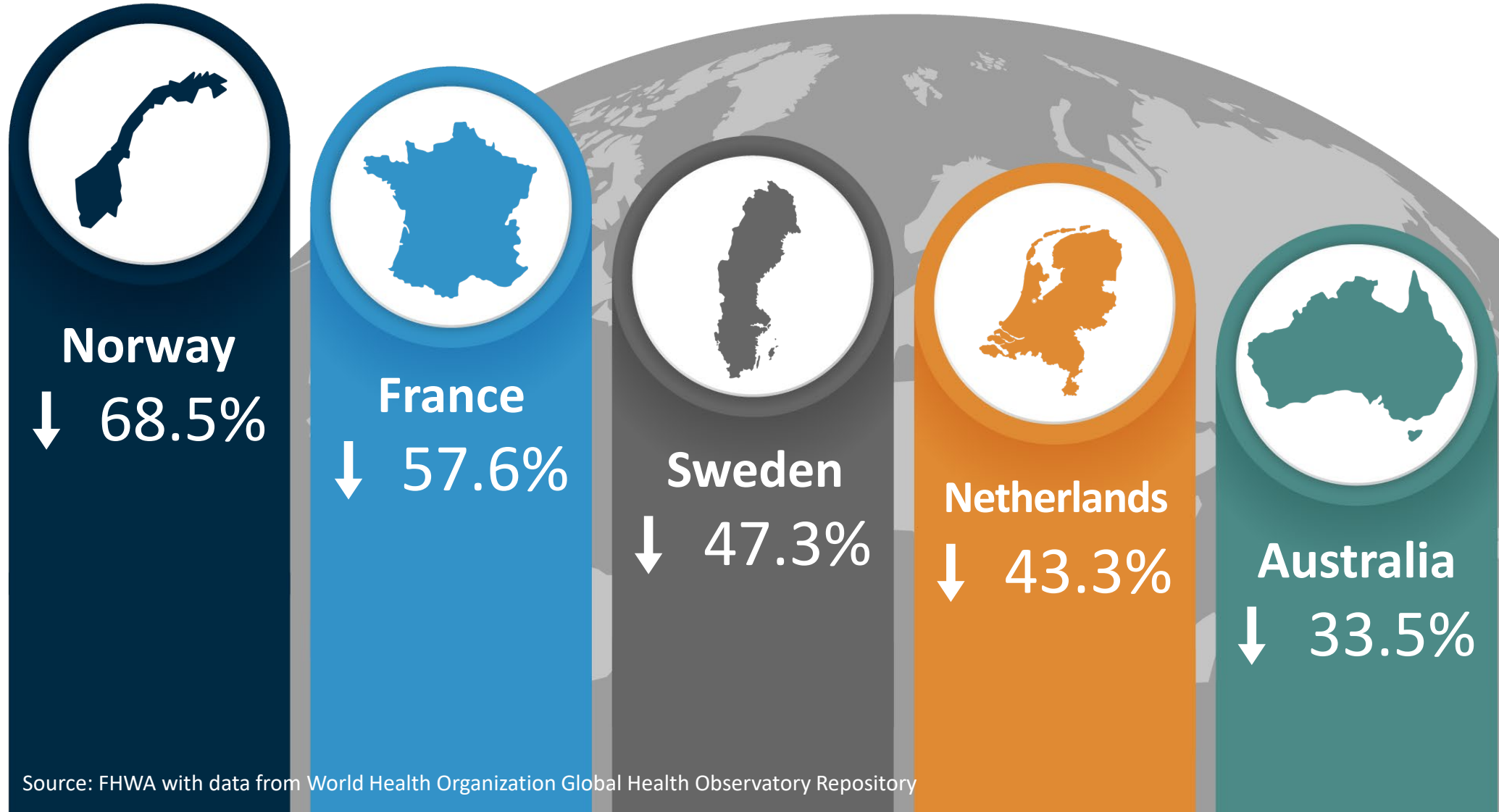


- The Safe System Approach is “Principles Based”
- Achieving a Safe System requires all five elements to be strengthened
- Safe Roads is a continuum, not an absolute

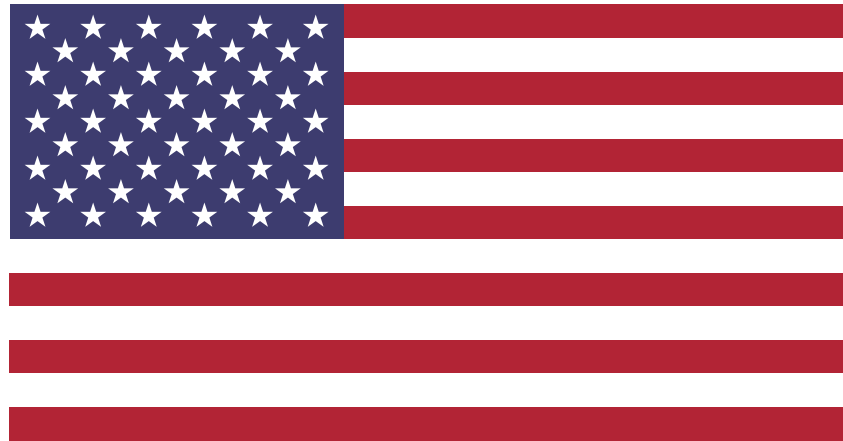


# Successful Safe System Adopters

Changes from 2000 to 2019.



# Safe System in the U.S.



**VISION 4 ERONETWORK**

# A New Direction

The Safe System approach aims to eliminate fatal and serious injuries for all road users by:

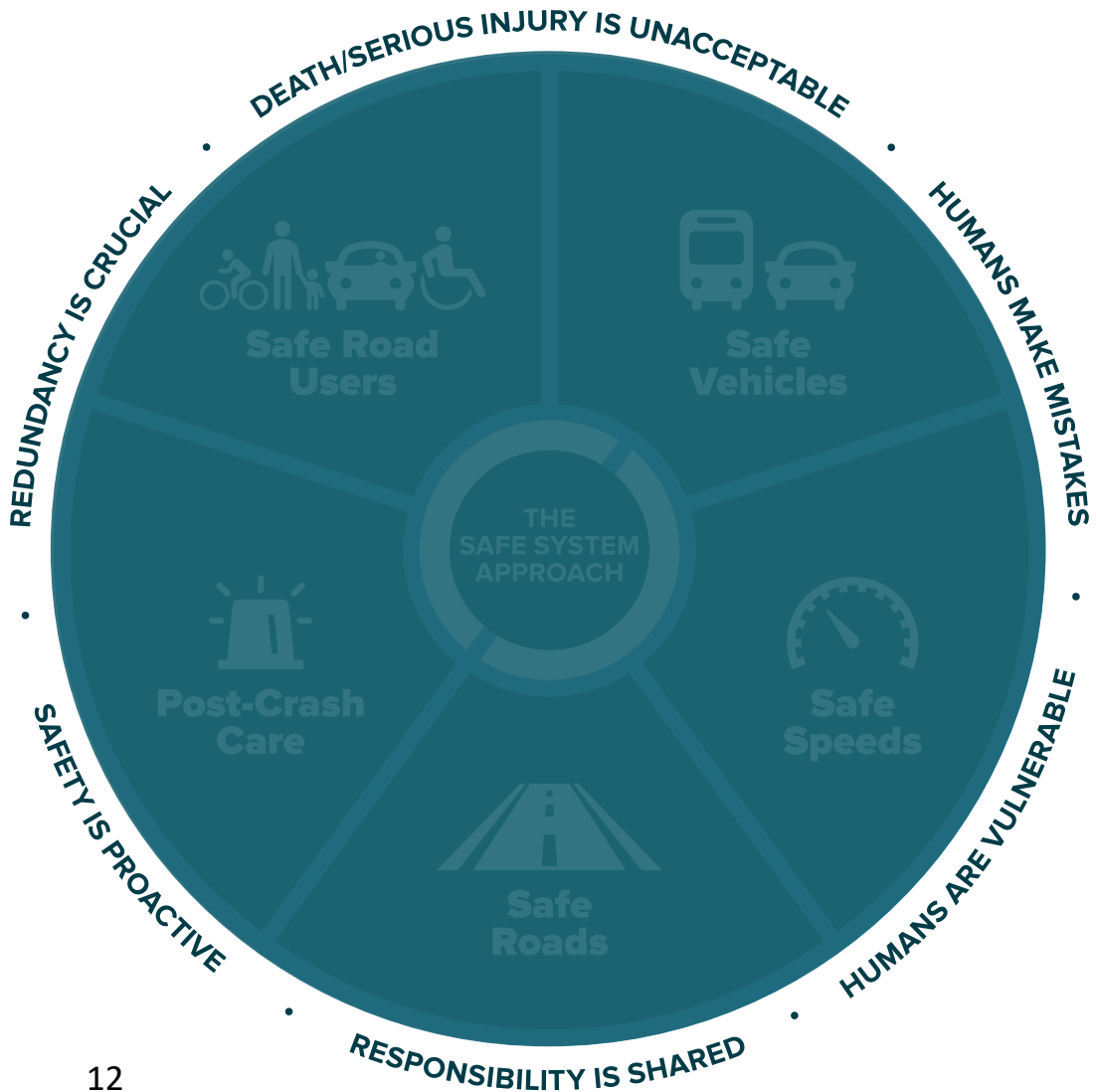


**Accommodating human mistakes**



**Keeping impacts on the human body at tolerable levels**

# THE 6 SAFE SYSTEM PRINCIPLES



Death/serious injury is unacceptable



Safety is proactive



Humans make mistakes



Responsibility is shared



Humans are vulnerable



Redundancy is crucial

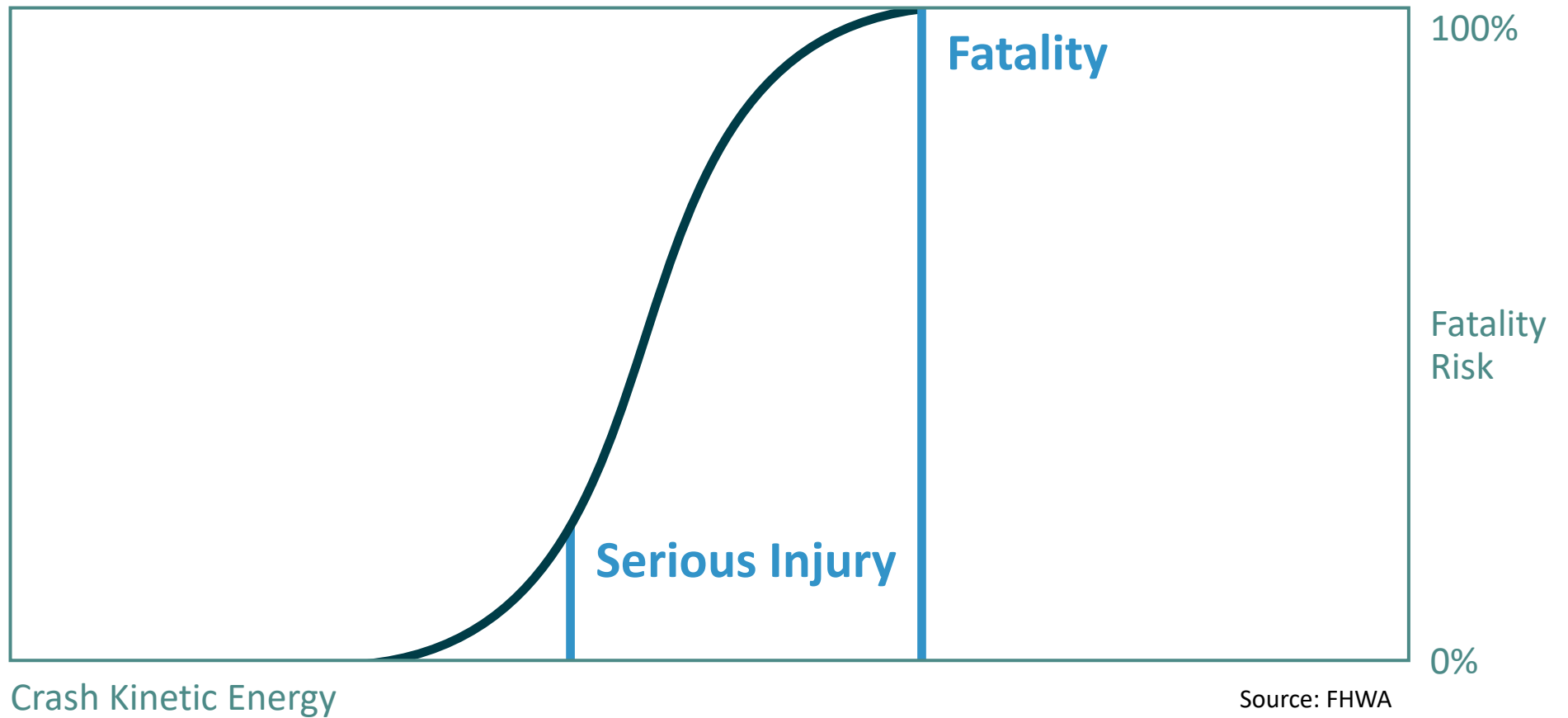
# Death/Serious Injury is Unacceptable



# Humans Make Mistakes



# Humans are Vulnerable



# Responsibility is Shared



## System managers

Planners, designers, builders, operators,  
maintenance workers



## Vehicle manufacturers

## Law enforcement personnel

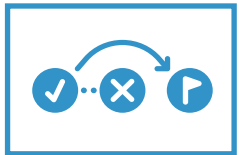
## Post-crash personnel

## System users





# Safety is Proactive



---

**Identify risks**



---

**Mitigate risks**

# Redundancy is Crucial



Safe road  
users



Safe vehicles



Safe speeds



Safe roads



Post-crash  
care

# THE 5 SAFE SYSTEM ELEMENTS



Safe vehicles



Safe speeds



Safe roads



Safe road users



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

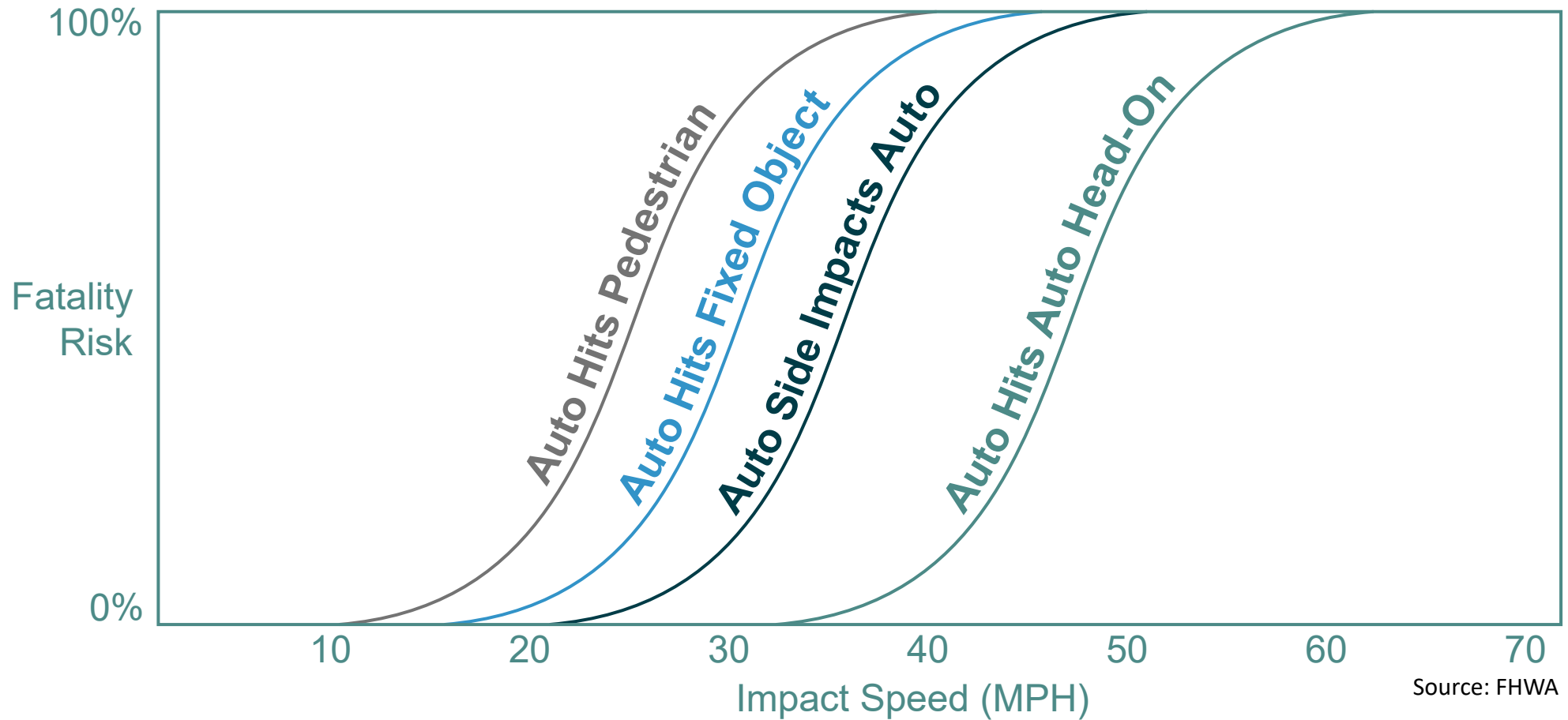
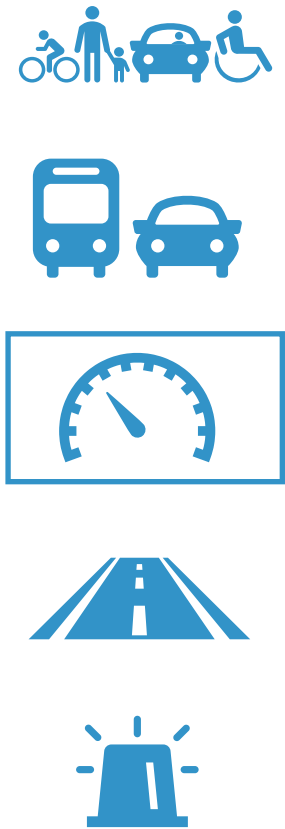
## Passive safety

---

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.”

# Safe Roads



Safe roads are designed and operated to:

**1. Prevent crashes**

**2. Keep impacts on the human body at tolerable levels**

Preventing crashes involves:



Separating users in space



Separating users in time



Source for all images: Fehr & Peers  
Increasing attentiveness and awareness

# Safe Roads



Safe roads are designed and operated to:

1. Prevent crashes

2. Keep impacts on the human body at tolerable levels

Managing crash kinetic energy involves:



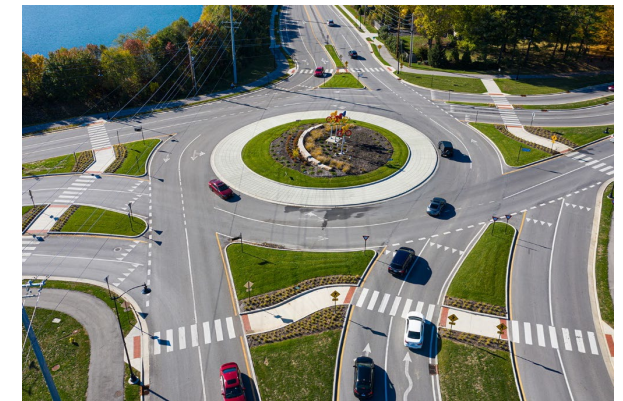
Source: Fehr & Peers

Managing speed



Source: Fehr & Peers

Manipulating mass



Source: City of Carmel, IN

Manipulating crash angles



# Post-Crash Care



Vital post-crash actions include:



First responders



Medical care



Crash investigation



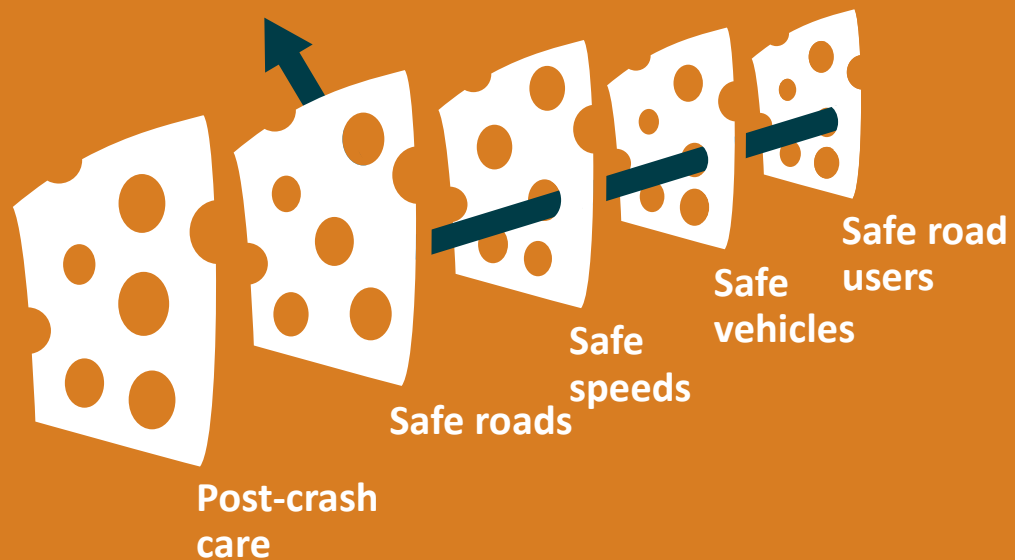
Traffic incident management



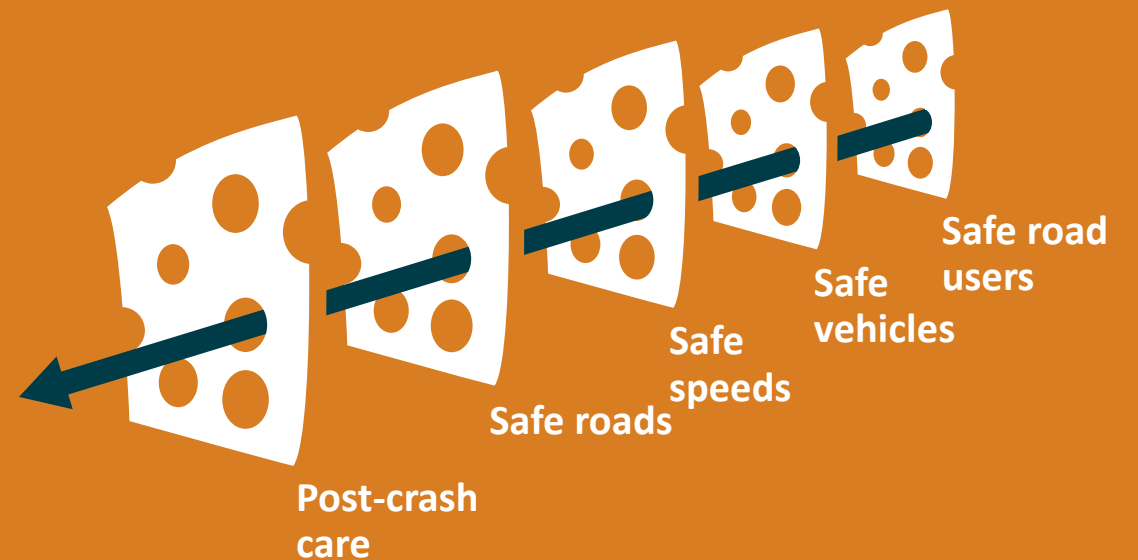
Justice

# Safe Systems have Redundancy

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



Death and serious injuries only happen when all layers fail



# Example Safe System: Carmel, IN

## Safe System Elements Covered



# The Safe System Journey

## Traditional approach

Prevent crashes →

Improve human behavior →

Control speeding →

Individuals are responsible →

React based on crash history →

## Safe System approach

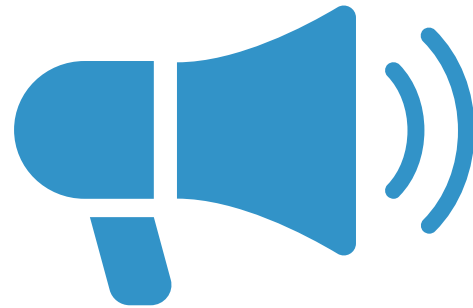
Prevent death and serious injuries

Design for human mistakes/limitations

Reduce system kinetic energy

Share responsibility

Proactively identify and address risks



---

## Safe System Materials

Find more resources at: [safety.fhwa.dot.gov/zerodeaths](https://safety.fhwa.dot.gov/zerodeaths)

Thank You!



Jeffrey Shaw – FHWA Office of Safety

[jeffrey.shaw@dot.gov](mailto:jeffrey.shaw@dot.gov)

