

# Recommendations of the Safe System Consortium



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## Recommendations of the Safe System Consortium

In early 2021, the Johns Hopkins Center for Injury Research and Policy (JHCIRP) and the Institute of Transportation Engineers (ITE) convened a group to discuss the potential for reimagining road safety and equity in the United States. Frustrated that conventional safety approaches have not shifted the rank of traffic deaths as the leading cause of death for young people and with the associated endemic inequities rooted in our road transportation system, this group of engineers, scientists, public health professionals, and safety experts considered the potential of an emerging concept—the Safe System approach—for changing the way roads affect our lives and communities.

With support from the FIA Foundation, this group—the Safe System Consortium—gathered for a series of meetings and deliberations and produced a set of recommendations designed to change the course of road safety and work toward a more equitable transportation system. These conversations and the resulting recommendations were guided by a commitment to both safety and equity in visioning the country’s approach to creating a next-generation transportation system. The timing of these recommendations is purposeful, responding to the opportunities presented by a new federal surface transportation bill and the identification of priorities by a new team of senior officials at the U.S. Department of Transportation.



## The Safe System Approach: Addressing Safety and Equity

The Safe System approach offers a unique opportunity to improve the value of our roads, enhancing their benefits to mobility and reducing their negative consequences. Road travel is much safer now than 50 years ago, but the rate of improvement started slowing in the 1990s and the problem has remained essentially unchanged over the past 10 years—persisting as the leading cause of death for teens and young adults.<sup>i,ii</sup> The Safe System approach not only promises to break this stalemate, but holds the potential to drive deaths toward zero.

Compounding our safety problem is the fact that the burden of death, injury, and social costs from crashes is unequally distributed.<sup>iii</sup> Our current roadway system reflects a history of flawed decisions about land use, opportunity, investment, and racial and ethnic equity.<sup>iv</sup> A Safe System can be implemented in ways that help address structural and institutional racism by correcting for prior under-investments in historically marginalized communities and closing gaps in safety between areas that have been well-served and those that have been underserved.

Improvements to road safety can contribute to equity by reducing the burden of unsafe roads on historically underserved communities.<sup>v</sup> Equity differs from equality. A system can achieve equality if each individual or group are given the same resources or opportunities. But a system that is equitable goes further. Equity requires recognizing that communities have been differentially impacted by a variety of circumstances, structures, and historical contexts that have unjustly advantaged some, while unjustly disadvantaging others. Hence, communities that have been disadvantaged require a differential allocation of resources and opportunities to eventually reach an equal outcome.<sup>vi</sup> In the U.S., the recognition that certain groups—because of their race, ethnicity, or ability, for example—have not enjoyed the same access to resources and opportunities must be accounted for through equitable decision-making. A definition provided by Camara P. Jones, MD, MPH, PhD, applies the concept of equity to health:

*Health equity is assurance of the conditions for optimal health for all people. Achieving health equity requires valuing all individuals and populations equally, recognizing and rectifying historical injustices, and providing resources according to need. Health disparities will be eliminated when health equity is achieved.<sup>vii</sup>*



The definition by the PolicyLink Transportation Equity Caucus shows how the concept relates to transportation, revealing the range of determinants of an equitable transportation system, including safety.

*Transportation equity refers to the consideration of racial, economic, and social equity in transportation. A commitment to transportation equity involves creating affordable and accessible transportation options for all people; ensuring fair access to quality jobs, workforce development, and contracting opportunities in the transportation industry; promoting healthy, safe, and inclusive communities; and making equitable investments in transportation infrastructure and planning, especially in low-income areas and communities of color.*

— PolicyLink Transportation Equity Caucus



Substantial improvements in safety will require equitable solutions. Individual and community sociodemographic characteristics have shown independent and additive effects on risks of crash death, resulting in concentrations of risk in lower-income neighborhoods where exposure to traffic tends to be higher and investment in safety programs and infrastructure tends to be lower.<sup>viii,ix</sup> Prioritizing these communities for implementation of the Safe System approach, and closing the gap between the highest and lowest risk neighborhoods, will yield large gains in both safety and equity.



Over the past 20 years, a number of nations and cities around the world have adopted the Safe System approach. This approach begins with a commitment to eliminate fatalities and serious injuries among all road users, and uses thoughtful road and vehicle design to minimize crashes that occur when people make mistakes and to reduce crash forces so that people are less likely to be injured when crashes occur. By designing safety into the road system, deaths and serious injuries are engineered out. While the U.S. differs in cultural and historical context from nations with the longest experience with the Safe System approach, their experience bodes well for similar benefits in this country, if we implement the approach in ways that prioritize safety upgrades in areas most in need.

### The Safe System approach differs from conventional road safety methods in ...

#### Not accepting loss of life

The performance target in a Safe System is zero—the elimination of traffic deaths and serious injuries—rather than incrementally reducing their number. This is much more than rhetoric. It is a different way of pursuing safety.

#### Selecting the right interventions

Interventions are focused on preventing predictable behaviors such as distraction and fatigue from resulting in high energy crashes. The objective is to make the system tolerant of routine human errors.

#### Thinking systemically and working proactively

When remedies are found for problem road situations in a Safe System, the solution is applied in similar locations throughout the system. Safety is implemented proactively and systemically rather than solely by reacting to problem spots.

#### Focusing on survivability, not crashes

The focus of a Safe System is on preventing death and serious injury rather than preventing crashes. Cars can be repaired, human bodies often cannot. Reducing crash forces and protecting road users is the key.

#### Sharing responsibility

When crashes occur, the focus of a Safe System is on changing the design of the roads or vehicles so they do not happen again, rather than on blaming the victim for their failure to negotiate the system safely. People behave in repeated and predictable ways. The road system should assist them in doing the right thing and reduce opportunities for errors or mistakes. This does not absolve road users from their obligation to behave safely, but acknowledges that safety progress requires collective responsibility.

The Safe System approach starts with a different mindset.<sup>x</sup> Our current road system is designed to move cars quickly, with other considerations of secondary importance. The cost of this singular focus over 100 years of road building is a predictable loss of about 100 people per day in the U.S. Change is possible. Other nations have shown that roads can serve mobility needs—for work, business, or pleasure—without creating an extreme risk. They have demonstrated that designing and maintaining the road environment—including sidewalks and bike paths—to fit the needs of people works far better than focusing solely on designing roads for moving vehicles quickly.

The conventional approach to road safety is built on an expectation that people—of all ages and abilities—can safely use the road system if they constantly and consistently maintain a very high level of diligence, care, and skill while on or near the roads. Because people will inevitably make mistakes, the conventional approach addresses safety with a complex set of rules and an elaborate enforcement

and adjudication system. The result is predictable. Laws, enforcement, and adjudication have improved safety, but are only marginally effective in reducing risk when roads are designed to encourage high speeds and require error-free use. Walkers, bicyclists, drivers, passengers, children, young people, disabled people, and the elderly have been killed in the same ways during each of the past 100 years. To expect that it will be different next year, or in the next 100 years, is unreasonable.

The Safe System approach begins by prioritizing the lives of people on and near the roads. Roads in a Safe System are designed to accommodate predictable human limitations and behavior. People are held accountable for reasonable behavior, but normal human lapses in judgment or diligence are expected and roads are configured so that such errors do not lead to death or serious injury. Even with a forgiving design, crashes will occur in a Safe System, so roads are designed to limit crash forces to survivable levels.<sup>xi</sup>

## Safe System Fundamentals

### 1. Anticipate and accommodate predictable human limitations and behavior such as lapses in diligence, perception, and attention, for example...



**Road Diets** reduce four-lane undivided roads to two thru lanes plus a center turning lane, calming traffic, reducing the consequences of distraction and inattention and cutting crashes by 19-47%.<sup>xii</sup>



**Pedestrian Hybrid Beacons** increase driver awareness of pedestrians crossing mid-block or at unsignalized intersections, overcoming driver inattentiveness or distraction and reducing pedestrian crashes by 55%.<sup>xiii</sup>

### 2. Reduce crash forces to levels that are survivable by reducing impact speeds or changing angle of collision, for example...



**Roundabouts** slow traffic through dangerous intersections and prevent deadly side impacts, reducing severe crashes by 78-82%.<sup>xiv</sup>



**Median Barriers** on rural divided highways reduce high-energy head-on crashes by 97%.<sup>xv</sup>

There are many specific design elements that can be used to improve roads and create a Safe System, such as roundabouts and road diets, but a Safe System is much more than a checklist of road features. In a Safe System, infrastructure owners and operators focus on their responsibility for the safety of all users of the system, using these tools and others thoughtfully and deliberately to design and operate roads that are self-enforcing, leading people intuitively to safe behavior.

The Safe System approach is an essential step toward sustainable mobility. The consequences of our current road system—nearly 40,000 deaths and 3 million serious injuries,<sup>xvi</sup> and close to \$1 trillion in comprehensive economic impact<sup>xvii</sup> each year—are simply too high. We need to change our course.

## A Case for the Safe System Approach

Evidence of the effectiveness of the Safe System approach can be seen both in the outcomes of nations and cities that have pursued this strategy and in the tools and methods used to achieve this success. A Safe System is not a one-time fix, but rather a distinctly different approach to identifying safety needs and planning and implementing solutions. No nation claims to yet have a fully comprehensive Safe System. However, Australia, New Zealand, Spain, Sweden, and The Netherlands each have more than 20 years of experience with the approach. While it is difficult to evaluate the effects of the Safe System approach in isolation from other factors, a number of nations that have implemented a Safe System have shown sharp reductions in traffic deaths.<sup>xviii</sup> During this same period, 1990–2017, traffic deaths in the U.S. dropped by 16%.<sup>xix</sup> Looking more closely at methods, there is ample evidence that the types of interventions used to achieve Safe System objectives are effective in reducing death and injury. Examples include:

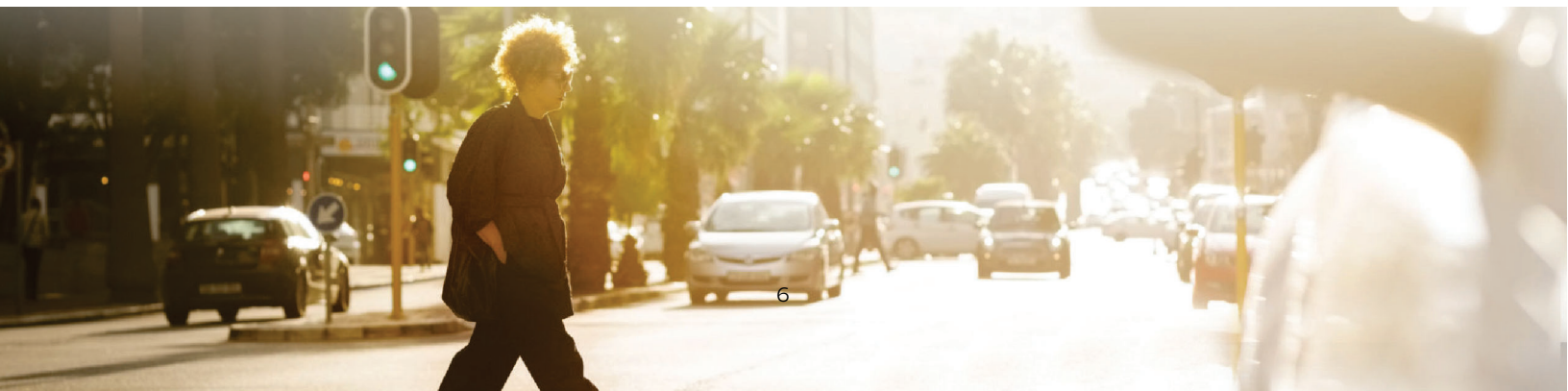
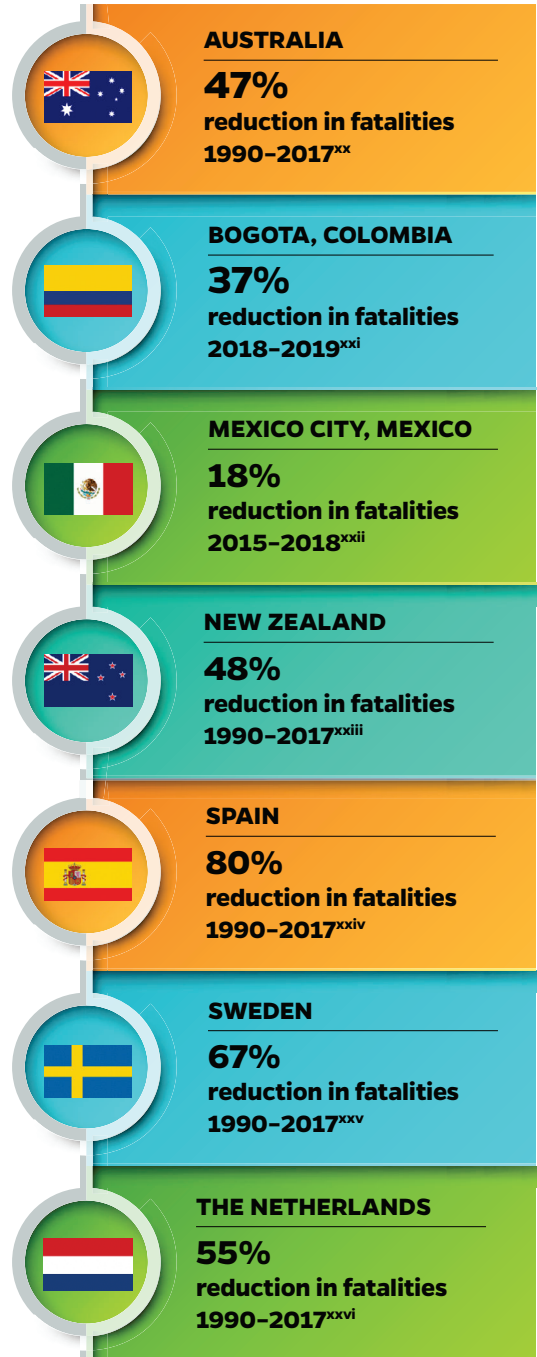
### Accommodating human behavior prevents serious crashes

**Rumble Strips** on road centerlines or shoulders alert inattentive drivers who have strayed from their lane, reducing head-on crashes by 44–64% and run-off-road crashes by 13–51%.<sup>xxvii</sup>



**Separated Bike Lanes** prevent bicycle-car collisions due to distraction, inattention, or failure to see by either drivers or cyclists. Protected/separated bike lanes are associated with significantly better safety for all road users.<sup>xxviii</sup>

## Examples of Nations and Cities That Have Adopted the Safe System Approach



## Lowering crash forces reduces injury

The speed at impact directly affects crash forces and the probability of serious injury or death.<sup>xxxix</sup> While the relationship varies according to the roadway environment, studies show that relatively small changes in speed can result in substantial increases in both crash and injury risk.<sup>xxx xxxi xxxii</sup>



San Francisco MTA Vision Zero Action Plan

## Working Toward Equity Using the Safe System Approach

The central vision of the Safe System approach is zero traffic deaths and serious injuries—there is no other acceptable number—and getting to zero requires a focus on equity. That is, the goal is to eliminate death and serious injury for everyone using the roads, which includes people of all ages, abilities, races, ethnicities, and income levels. This not only implies, but demands, investment according to need. In a Safe System, we do what it takes to achieve the same outcome for all: zero road deaths and serious injuries.

Transitioning to a Safe System provides opportunities to address a range of safety consequences in communities that have long been underserved and marginalized. Road system owners—including state and local governments and metropolitan planning organizations—will need to select locations for Safe System investments as they work toward widespread implementation. If locations are prioritized thoughtfully, using data that are sensitive to local needs and capture not only the immediate impacts of crashes but also their second- and third-order effects, such as limiting opportunities for physical activity and access to jobs and education, then we can implement the Safe System approach in an equitable way. We can invest first in areas most in need, closing gaps between the well-served and underserved and improving equity as we move forward.

A further way that the Safe System approach can improve equity, especially racial equity, is in its potential to reduce the need for police traffic enforcement. Our current road system relies on traffic enforcement to achieve safety by reducing noncompliant user behaviors resulting from errors—such as failing to see a stop sign—and judgment—such as speeding. While law enforcement programs have contributed significantly to safety in the past,<sup>xxxiii xxxiv xxxv</sup> the effectiveness of this approach has diminished<sup>xxxvi</sup> and the negative effects of frequent police traffic stops have become unsustainable. The U.S. Department of Justice Bureau of Justice Statistics reports that about 19 million traffic stops occur each year in the U.S.<sup>xxxvii</sup> Traffic stops are the most common reason for contact between community members and law enforcement and are a persistent source of racial and economic injustice.<sup>xxxviii</sup> In a Safe System, roads are designed such that the intuitive behavior is the safe behavior. Designers adjust lane width, sight distance, and other roadway cues so that drivers find the speed at which they feel comfortable driving is within the safe speed limit. Pedestrian crossings and bike paths are designed so that walkers and cyclists find that the easiest way to get across traffic is the safe way. These designs save lives and reduce the need for traffic law enforcement to achieve safety. Achieving a Safe System will take time and the need for police traffic law enforcement will not be displaced in the near future, but moving toward a Safe System puts us on a path toward increased safety with less dependence on enforcement.



## The Safe System Consortium Process

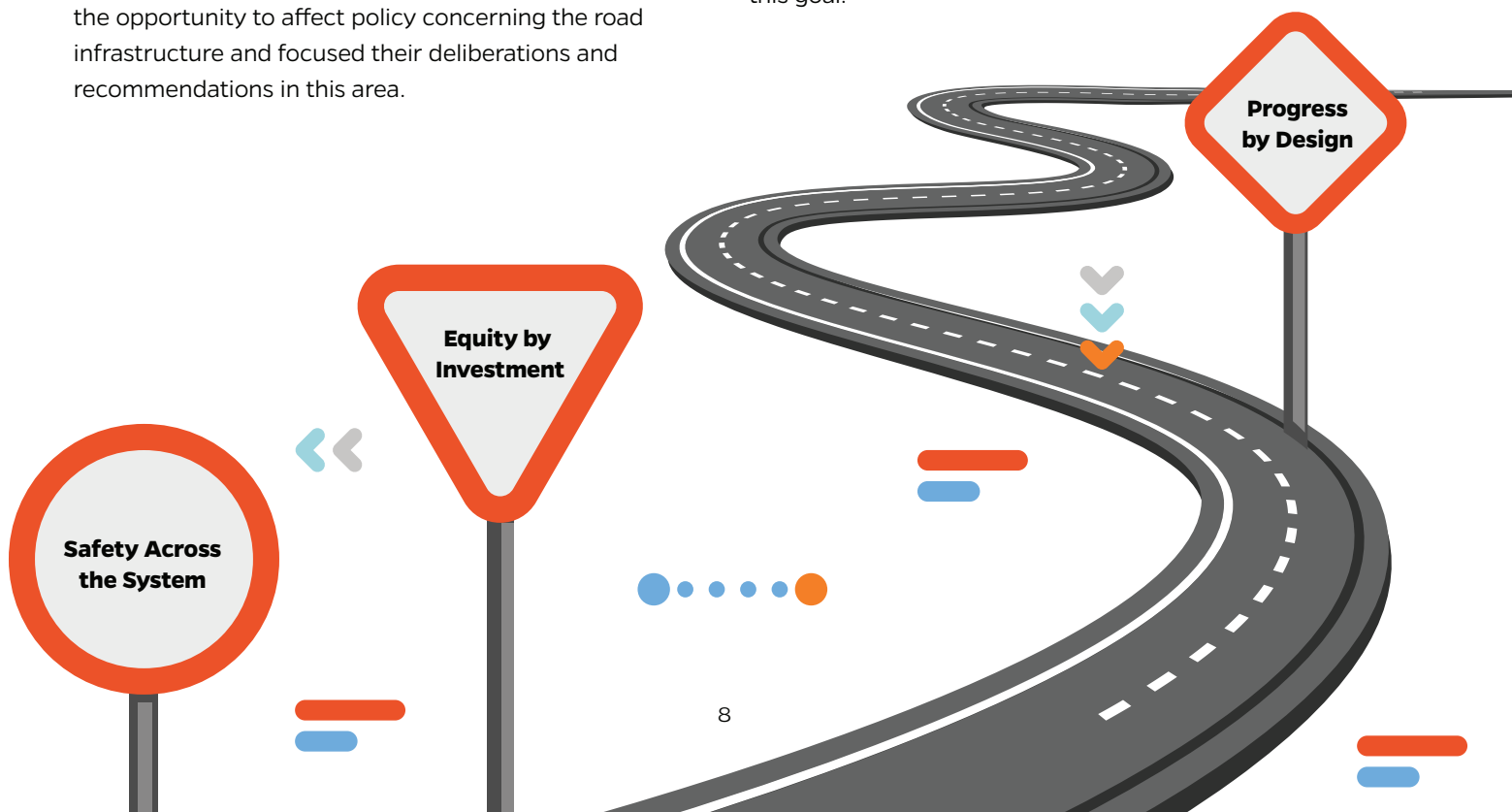
The objective of the Safe System Consortium was to develop an evidence-informed set of priority recommendations for widespread implementation of the Safe System approach based on the best available knowledge and experience. While the recommendations will be useful in a variety of contexts, the Consortium report responds to current opportunities by targeting federal policy and programs.

During 2021, a new federal surface transportation bill will be formulated, a process that entails policy discussions throughout the nation's transportation system, covering a wide range of topics and engaging experts from many fields. Simultaneously, a new political team is in place within the Executive Branch, including the U.S. Department of Transportation, which means a new group of senior leaders with a fresh set of interests and ideas is now in charge. Although interest in the Safe System concept is rapidly spreading, the idea is relatively new in the U.S. and getting the best recommendations in the hands of Congressional and Administration decision makers is an excellent way to inform policy and programs.

While the Safe System concept covers the full scope of the road transportation system—vehicle design, user behavior, and emergency response as well as the roads—the Consortium recognized the immediacy of the opportunity to affect policy concerning the road infrastructure and focused their deliberations and recommendations in this area.

The Consortium was convened by the JHCIRP and the ITE with support from the FIA Foundation. Participants included experts from a diversity of fields with knowledge and experience in the Safe System approach, including road engineers, public health professionals, safety advocates, academics, researchers, and international road safety experts. The group deliberated in a series of meetings and agreed on a set of recommendations that will provide essential resources to enable Safe System adoption and adaptation to the U.S. context, maximize the social benefit of improvements to the roadway system by considering equity, offer guidance for local implementation, and remove impediments to progress.

Building a Safe System will transform our communities, reducing loss of life and serious injury, reducing parents' fear for the lives of their small children and teens, and improving equitable mobility and access for everyone. Because safer roads will invite more walking and biking, the benefits can extend to climate change. But these changes will require thoughtful analysis, persistence, and concomitant decisions and policy action at many levels. The Consortium identified three essential areas for change that will set a course for achieving a Safe System—**Safety Across the System, Equity by Investment, and Progress by Design**—and urge unanimous dedication to reaching this goal.







### Safety across the System

**C**hanging the U.S. road system is an enormous task requiring strong leadership and adequate resources. There are more than 4 million miles of U.S. roads, and responsibilities for design, operation, maintenance, and improvement are spread among thousands of owners. Local towns, cities, and county governments own nearly 80% of road-miles. States own most of the remainder and only about 3% is owned by the federal government and tribal governments.<sup>xxxix</sup>

The Consortium recognizes the need to leverage the federal surface transportation bill and the influence that the hundreds of billions of dollars authorized by this legislation can have—directly and indirectly—on road owners across the nation. The Consortium also recognizes the influence that transportation has on other social needs such as housing, employment, education, health, and the environment, and urges a broader consideration of sources for funding, collaborations, and other resources that could facilitate realization of a holistic vision for a Safe System.

Leadership is needed to address a significant barrier to Safe System implementation, the entrenched assumption that crash injuries are exclusively the fault of the victim or other road user and that road or vehicle designers can do little to compensate. While road users should be expected to take reasonable care, blaming the victim for crash injuries lessens the motivation for improvements to the system—both to roadway and vehicle design—and only prolongs the safety problem.



### Recommendations

#### **Set expectations for allocation of federal funding to advance the Safe System approach.**

- Require that Safe System principles be followed when federal funds are used for road design and operation.
- Incentivize and support adoption of the Safe System approach as the basis for Vision Zero strategies at federal, tribal, state, and local levels, including dedicated funding for evidence-based strategies such as road diets, protected bike lanes, and roundabouts, when used as part of a Safe System.
- Create a new Safe System program within the Federal Highway Administration (FHWA) Surface Transportation Block Grant Program supporting implementation of projects meeting the Safe System definition.

#### **Demonstrate the benefits of the Safe System approach.**

- Conduct a multiyear incentive-funded program for states to establish Safe System demonstration sites nationwide.

#### **Stimulate system improvement by leading government-wide change in the attribution of crash causation.**

- Create an Executive Order directing federal agencies to review programs and policies for opportunities to reduce road safety victim-blaming and to develop plans for implementing change.
- Require that the Secretary of Transportation update the 2008 National Motor Vehicle Crash Causation Study, focusing on the role that road and vehicle design improvements could have in preventing crashes and injuries.

#### **Increase public awareness of the potential of safe roads and greatly reduced crash deaths.**

- Develop and conduct a national Vision Zero/Safe System awareness and education campaign that is culturally sensitive and based on evidence, and monitor effects on traffic safety culture.



## Consortium Recommendations for Safer Vehicles

**A**lthough its charge focused on road infrastructure, the Consortium recognizes the importance of other parts of the system, including vehicle safety. Vehicle safety technology is a key ingredient of a Safe System and could make a major contribution to reductions to crash deaths over coming decades. Advanced driver assistance systems (ADAS) such as automatic emergency braking (AEB) and lane-keeping assist are entirely consistent with Safe System principles, improving safety by compensating for limitations in driver performance. Passive driver impairment detection systems, with the potential of their being built into every new vehicle, have been in development for more than a decade and offer a means for accommodating and controlling alcohol use behaviors that have proven highly resistant to other countermeasures.

### **Prevent and mitigate crashes by accelerating adoption of ADAS.**

Establish expectations for minimum performance levels and implementation rates of ADAS technologies including AEB, blind zone detection systems, lane departure warning, and lane-keeping assist.

### **Prevent impaired drivers from endangering themselves and others.**

Develop a national strategy and timeline for introducing impairment detection technology in new vehicles with the goal of implementing the devices in all new vehicles.

## Consortium Recommendations to Achieve:

### **Equity through Investment**

**W**hen applied equitably, Safe System investments are made proactively and systemically to prevent serious crashes and reduce crash forces where crashes persist, saving lives, improving mobility, and enhancing access to health determinants across the community. However, achieving equity in Safe System investment will require overcoming structural racism in long-standing processes that have been barriers to improving roads in historically underserved communities and communities of color. Other barriers include a lack of engagement of marginalized communities in investment-related decision-making by local authorities<sup>xi</sup> and lack of measurement methods that are sensitive to the range of health-related consequences of transportation infrastructure conditions.<sup>xii</sup>

The following recommendations are intended to reduce the risks faced by road users in underserved communities and optimize the potential for a Safe System to contribute to transportation equity and health equity. These actions will bolster leadership for equitable investment of resources for Safe System implementation and upgrade decision-making criteria that overlook the needs of some communities and fail to recognize the range of health-related implications of underinvestment in road infrastructure in historically underserved communities. The Consortium recognizes that while Safe System implementation can lead to substantial improvements in transportation equity, sustainable solutions will require the involvement of other sectors and partners and a commitment to long-term policy and system changes that address the root causes that limit racial, ethnic, economic, and social equity.

## Recommendations:

### **Incorporate a principles statement (Sense of Congress) addressing the Safe System approach and transportation equity in the federal surface transportation bill.**

#### **Set expectations for allocation of federal funding to improve equity in road transportation.**

- Require that road safety equity that addresses place-based disadvantage and disinvestment be included as a factor in project selection decisions when using federal funding, and encourage states to use a similar factor in allocating state funding.
- Change the FHWA Highway Safety Improvement Program (HSIP) project selection criteria to prioritize reducing gaps in safety—for people walking and bicycling as well as vehicle occupants—between well-served and underserved communities.
- Convene a federal interagency task force charged with identifying sources of funding across the Executive Branch to support implementation of a Safe System in historically underserved communities.
- Incentivize use of federal funds to advance safety equity through Safe System investments.

#### **Reduce barriers to implementing Safe System projects in historically marginalized communities.**

- Reduce or eliminate local match requirements for Safe System projects in lower-income communities and communities of color.
- Require that local transportation decision makers such as Metropolitan Planning Organizations (MPOs) include meaningful engagement of representatives of underserved communities in transportation investment allocation decision processes and policies.
- Require that recipients of federal funds collect race and ethnicity data for people involved in crashes and traffic stops using methods based on new federal guidance, as a means for improving knowledge of racial inequities.

### **Improve confidence among state, local, and American Indian/Alaska Natives tribal agencies in making decisions on Safe System projects that could improve equity.**

- Identify or develop and demonstrate a process for assessing gaps in road safety across communities, including the availability of safe walking and cycling facilities.
- Develop guidance on project prioritization schemes that address equity and the Safe System approach.
- Provide training to support investments in the Safe System approach in historically marginalized communities and/or those with high rates of motor vehicle deaths, including American Indian/Alaska Native tribal lands.
- Develop guidance for measuring the full range of benefits from Safe System projects, including benefits to transportation safety, health equity, safety equity, and access to health determinants such as education, employment, and health care services.



## Consortium Recommendations to Achieve:

### Progress by Design

**T**he Safe System concept is new to most authorities that are responsible for road systems in the U.S., and detailed guidance will be needed to stimulate and steer progress in implementation.

The Consortium recommends that federal transportation officials develop training and implementation tools and educate state and tribal departments of transportation to assist them in becoming proficient in Safe System principles and practice. State and tribal departments should then prioritize training for local road owners to enable them to analyze their problems and effectively implement Safe System solutions.

Safe System principles need to be incorporated in foundational policy and guidance documents that steer the design and operation of roads, such as the American Association of State Highway and Transportation Officials (AASHTO) Policy on Geometric Design, the Highway Safety Manual, and the Manual on Uniform Traffic Control Devices. Of particular importance is guidance on setting safe speed limits based on evidence of human injury tolerance.



Adoption of Safe System principles will change the practices of most professionals who work with the road infrastructure, and in the longer term will significantly change roles of some stakeholders such as law enforcement officers. The Consortium recognizes that guidance will be needed to make smooth professional transitions. For example, with more intuitive, self-enforcing roads, law enforcement officers will have more time to participate in problem identification, using their familiarity with traffic behaviors to diagnose problems and suggest Safe System solutions.



## Recommendations:

### **Develop a Safe System toolbox to support proactive, systemic implementation of the Safe System approach in urban, suburban, and rural environments.**

- Develop materials and outreach to assist state DOTs in adopting Safe System principles, including new information addressing the implications of shared responsibility for tort law and guidance on behavioral expectations for road users.
- Develop and disseminate new materials to define the relationship of traffic safety culture to a Safe System.
- Develop a road safety gap analysis tool covering walkers, bicyclists, and vehicle occupants, including the capability to assess injury risk in crashes based on kinetic energy levels in predicted crash types.
- Evaluate the use of conflict measurement tools, including observation methods and advanced technologies, for predicting crashes in low-incidence locations.
- Demonstrate the use of Vision Zero for Youth as a technique for introducing Safe System concepts at the local level.

### **Identify new roles for safety stakeholders—aligned with the Safe System concept.**

- Demonstrate roles of additional stakeholders, including law enforcement and community members, in performing safety audits and diagnosing problems with road user interaction with infrastructure.
- Increase engagement of public health professionals in long-range transportation planning.
- Model new professional relationships at the federal level by establishing a joint research office serving both FHWA and the National Highway Traffic Safety Administration (NHTSA) and focused on understanding and improving the interaction of road users with infrastructure to achieve self-enforcing roads.

### **Actively engage with the international community of leaders working toward implementation of the Safe System approach.**

- Increase engagement of the U.S. DOT in global road safety leadership through the United Nations and otherwise as a means for exchanging experience and insights with international safety experts on Safe System implementation.



### **Develop new techniques to facilitate Safe System adoption by underserved communities.**

- Demonstrate a pathway to a Safe System for rural and underserved communities, including American Indian/Alaska Native tribal lands, addressing project prioritization, resource identification, and implementation.
- Develop an incentive-funded program to encourage state DOTs to conduct technical assistance on Safe System principles and solutions for community infrastructure owners—with particular attention to underserved communities.
- Require that states receiving federal funds provide technical assistance for Safe System implementation to jurisdictions with limited resources.

### **Change road design operation practice norms to accommodate the Safe System approach.**

- Integrate the Safe System approach, including setting safe speed limits based on evidence of injury tolerance, in key foundational tools such as the AASHTO Policy on Geometric Design, the Highway Safety Manual, and the Manual on Uniform Traffic Control Devices as well as state and local design and operation manuals.
- Develop and disseminate new training tools to assist state, tribal, and local road designers and operators in setting speed limits according to evidence on human injury tolerance.

### **Incorporate Safe System concepts and values in core professional training.**

- Include Safe System and transportation equity objectives in ABET civil engineering accreditation standards.

## Priority Recommendations for Implementing the Safe System Approach from the Safe System Consortium

The following priority recommendations were developed by the Safe System Consortium convened in the spring of 2021 by the Center for Injury Research and Policy at Johns Hopkins Bloomberg School of Public Health and the Institute of Transportation Engineers with support from the FIA Foundation. The Consortium gathered recognized experts from a range of fields with knowledge and experience in the Safe System approach, including road engineers, public health professionals, safety advocates, academics, researchers, and international road safety experts.

### Recommendations for Congressional Action:

- Require that Safe System principles be followed when federal funds are used for road design and operation.
- Create a new Safe System program within the Federal Highway Administration (FHWA) Surface Transportation Block Grant Program supporting implementation of projects meeting the Safe System definition.
- Incentivize and support adoption of the Safe System approach as the basis for Vision Zero strategies at federal, state, and local levels, including dedicated funding for evidence-based strategies such as road diets, protected bike lanes, and roundabouts, when used as part of a Safe System.
- Incentivize use of federal funds to advance safety equity through Safe System investments.
- Incentivize Safe System adoption by creating a multiyear incentive-funded program for states to establish demonstration sites nationwide.

### Recommendations for the Biden Administration:

- Convene a federal interagency task force charged with identifying sources of funding across the Executive Branch to support implementation of a Safe System in historically underserved communities.
- Develop guidance for measuring the full range of benefits from Safe System projects, including direct benefits to transportation safety, health equity, safety equity, and access to health determinants such as education, employment, and health care services.
- Demonstrate a pathway to a Safe System for rural and underserved communities, including American Indian/Alaska Native tribal lands, addressing project prioritization, resource identification, and implementation.
- Create an Executive Order directing federal agencies to review programs and policies for opportunities to reduce road safety victim-blaming and to develop plans for implementing change.
- Work with road infrastructure constituents to integrate the Safe System approach, including setting safe speed limits based on evidence of injury tolerance, in key foundational tools such as the AASHTO Policy on Geometric Design, the Highway Safety Manual, and the Manual on Uniform Traffic Control Devices, as well as state and local design and operation manuals.



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## References

- <sup>i</sup> National Center for Statistics and Analysis. 2020. Traffic safety facts 2018 annual report: A compilation of motor vehicle crash data (Report No. DOT HS 812 981). National Highway Traffic Safety Administration.
- <sup>ii</sup> Webb, C. N. 2020, July. Motor vehicle traffic crashes as a leading cause of death in the United States, 2016 and 2017 (Traffic Safety Facts Research Note. Report No. DOT HS 812 927). National Highway Traffic Safety Administration.
- <sup>iii</sup> Guo, Y., Chen, Z., Stuart, A., Li, X., Zhang, Y. 2020. A systematic overview of transportation equity in terms of accessibility, traffic emissions, and safety outcomes: From conventional to emerging technologies, Transportation Research Interdisciplinary Perspectives, Volume 4, 100091, ISSN 2590-1982. Retrieved from <https://doi.org/10.1016/j.trip.2020.100091>.
- <sup>iv</sup> U.S. Department of Transportation. 2016. *Beyond Traffic 2045*. Retrieved from [https://www.transportation.gov/sites/dot.gov/files/docs/BeyondTraffic\\_tagged\\_508\\_final.pdf](https://www.transportation.gov/sites/dot.gov/files/docs/BeyondTraffic_tagged_508_final.pdf).
- <sup>v</sup> Guo, Y., Chen, Z., Stuart, A., Li, X., Zhang, Y. 2020. A systematic overview of transportation equity in terms of accessibility, traffic emissions, and safety outcomes: From conventional to emerging technologies, Transportation Research Interdisciplinary Perspectives, Volume 4, 100091, ISSN 2590-1982. Retrieved from <https://doi.org/10.1016/j.trip.2020.100091>.
- <sup>vi</sup> Milken Institute School of Public Health. The George Washington University. November 5, 2020. Equity vs. equality: What's the difference? Retrieved from <https://onlinepublichealth.gwu.edu/resources/equity-vs-equality/>.
- <sup>vii</sup> Camara Jones. 2014. "Systems of Power, Axes of Inequity: Parallels, Intersections, Braiding the Strands." *Medical Care*. Volume 52, Number 10, Suppl 3. Retrieved from: [http://media.morehousetcc.org/RESOURCES/PUBLICATIONS\\_and\\_DELIVERABLES/Jones%20Systems%20of%20Power.pdf](http://media.morehousetcc.org/RESOURCES/PUBLICATIONS_and_DELIVERABLES/Jones%20Systems%20of%20Power.pdf).
- <sup>viii</sup> Morency, P., Gauvin, L., Plante, C., Fournier, M., Morency, C. 2012. "Neighborhood Social Inequalities in Road Traffic Injuries: The Influence of Traffic Volume and Road Design", *American Journal of Public Health* 102, no. 6 (June 1, 2012): pp. 1112-1119.
- <sup>ix</sup> Cubbin, C., LeClere, F.B., Smith, G.S. 2000. status and injury mortality: individual and neighbourhood determinants. *J Epidemiol Community Health*. 54(7):517-524.
- <sup>x</sup> Belin, M-Å., Tillgren, P., Vedung, E. 2011. Vision Zero—a road safety policy innovation. *International Journal of Injury Control and Safety Promotion*.
- <sup>xi</sup> Abel, S., Paniati, J.F., Lindley, J.A. 2020. The road to zero: Taking a safe systems approach. *ITE Journal*. May 2020. Institute of Transportation Engineers.
- <sup>xii</sup> Federal Highway Administration. 2010. Evaluation of Lane Reduction "Road Diet" Measures on Crashes, FHWA-HRT-10-053.

- <sup>xiii</sup> Zegeer, C., Srinivasan, R., Lan, B., Carter, D., Smith, S., Sundstrom, C., Thirsk, N.J., Zegeer, J., Lyon, C., Ferguson, E., and Van Houten, R. 2017. NCHRP Report 841: Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments. Transportation Research Board, Washington, D.C.
- <sup>xiv</sup> American Association of State Highway Transportation Officials. 2010. Highway Safety Manual. First Edition.
- <sup>xv</sup> National Cooperative Highway Research Program. 2014. Report 794, Median Cross-Section Design for Rural Divided Highways. National Academy of Sciences.
- <sup>xvi</sup> National Center for Statistics and Analysis. 2020. Traffic safety facts 2018 annual report: A compilation of motor vehicle crash data (Report No. DOT HS 812 981). National Highway Traffic Safety Administration.
- <sup>xvii</sup> Blincoe, L. J., Miller, T. R., Zaloshnja, E., & Lawrence, B. A. 2015. The economic and societal impact of motor vehicle crashes, 2010. (Revised) (Report No. DOT HS 812 013). Washington, D.C.: National Highway Traffic Safety Administration.
- <sup>xviii</sup> ITF. 2017, *Road Safety Annual Report 2017*, OECD Publishing, Paris. <https://doi.org/10.1787/irtad-2017-en>.
- <sup>xix</sup> National Center for Statistics and Analysis. (2020, November). Traffic safety facts 2018 annual report: A compilation of motor vehicle crash data (Report No. DOT HS 812 981). National Highway Traffic Safety Administration.
- <sup>xx</sup> ITF. 2017, *Road Safety Annual Report 2017*, OECD Publishing, Paris. <https://doi.org/10.1787/irtad-2017-en>.
- <sup>xxi</sup> Lieras, N., Linares, V., 2019, May 10. Q&A: how Bogota is harnessing leadership to redefine road safety and save lives. TheCityFix. World Resources Institute. Retrieved from <https://thecityfix.com/blog/qa-bogota-harnessing-leadership-redefine-road-safety-save-lives-natalia-lleras-veronica-linares/>.
- <sup>xxii</sup> Ballesteros, L. 2018, June 26. Changing culture to save lives: Mexico City's bold commitment to vision zero. [webinar] Vision Zero Network. Retrieved from <https://visionzeronetwork.org/mexico-citys-bold-commitment-to-vision-zero/>.
- <sup>xxiii</sup> ITF. 2017. *Road Safety Annual Report 2017*, OECD Publishing, Paris, <https://doi.org/10.1787/irtad-2017-en>.
- <sup>xxiv</sup> ITF. 2017. *Road Safety Annual Report 2017*, OECD Publishing, Paris, <https://doi.org/10.1787/irtad-2017-en>.
- <sup>xxv</sup> ITF. 2017. *Road Safety Annual Report 2017*, OECD Publishing, Paris, <https://doi.org/10.1787/irtad-2017-en>.
- <sup>xxvi</sup> ITF. 2017. *Road Safety Annual Report 2017*, OECD Publishing, Paris, <https://doi.org/10.1787/irtad-2017-en>.
- <sup>xxvii</sup> National Academies of Sciences, Engineering, and Medicine. 2009. Guidance for the Design and Application of Shoulder and Centerline Rumble Strips. Washington, D.C.: The National Academies Press. Retrieved from <https://doi.org/10.17226/14323>.
- <sup>xxviii</sup> Marshall, W.E., Ferenchak, N.N. 2019. Why cities with high bicycling rates are safer for all road users. *Journal of Transport & Health*, Volume 13, 00539 ISSN 2214-1405. Retrieved from <https://www.sciencedirect.com/science/article/pii/S2214140518301488>.
- <sup>xxix</sup> Elvik, R. 2009. The power model of the relationship between speed and road safety. Update and new analyses. Institute of Transportation Economics. TOI Report 1034/2009.
- <sup>xxx</sup> Elvik, R. 2013. A re-parameterisation of the Power Model of the relationship between the speed of traffic and the number of accidents and accident victims. *Accident Analysis and Prevention*. 50, 854–860.
- <sup>xxxi</sup> Federal Highway Administration. 2008. Desktop Reference for Crash Reduction Factors, FHWA-SA-08-011, September 2008, Table 11.
- <sup>xxxii</sup> City and County of San Francisco. 2015. Vision Zero Action Plan. Retrieved from <https://view.joomag.com/vision-zero-san-francisco/0685197001423594455?short>.
- <sup>xxxiii</sup> Tison, J., & Williams, A. F. 2010. *Analyzing the First Years of the Ticket or Click It Mobilizations* (Research Note. Report No. DOT HS 811 232). Retrieved from <https://www.nhtsa.gov/staticfiles/nti/pdf/811232.pdf>.
- <sup>xxxiv</sup> Bergen, G., Pitan, A., Qu, S., Shults, R.A., Chattopadhyay, S., Elder, R., Sleet, D.A., Coleman, H., Compton, R., Nichols, J.L., Clymer, J., Calvert, W.B., and the Community Preventive Services Task Force. 2014. Publicized sobriety checkpoint programs: A community guide systematic review. *American Journal of Preventive Medicine*. 46(5): pp 529–539.
- <sup>xxxv</sup> Task Force on Community Preventive Services. 2001. Recommendations to reduce injuries to motor vehicle occupants: increasing child safety seat use, increasing safety belt use, and reducing alcohol-impaired driving. *Am J Prev Med* 21(4S):16–22.
- <sup>xxxvi</sup> Nichols, J. L., & Solomon, M. G. (2013). *Click It or Ticket Evaluation*, 2011 (DOT HS 811 779). Retrieved from <https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/811779.pdf>.
- <sup>xxxvii</sup> Harrell, E., & Davis, E. 2020. *Contact between police and the public 2018—Statistical Tables*. Retrieved from <https://www.bjs.gov/index.cfm?ty=pbdetail&iid=7167>.
- <sup>xxxviii</sup> Woods, J. B. 2021. Traffic Without the Police. *Stanford Law Review*, 73. Retrieved from <https://ssrn.com/abstract=3702680>.
- <sup>xxxix</sup> Federal Highway Administration. 2020. Highway statistics 2019. Retrieved from <https://www.fhwa.dot.gov/policyinformation/statistics/2019/hm10.cfm>.
- <sup>xl</sup> Sanchez, T. 2006. An Inherent Bias? Geographic and Racial-Ethnic Patterns of Metropolitan Planning Organization Boards. Brookings Institution. Retrieved from <https://www.brookings.edu/research/an-inherent-bias-geographic-and-racial-ethnic-patterns-of-metropolitan-planning-organization-boards/>.
- <sup>xli</sup> Martens, K., Bastiaanssen, J., Lucas, K., 2019. Measuring transport equity: Key components, framings and metrics, Editor(s): Karen Lucas, Karel Martens, Florida Di Ciommo, Ariane Dupont-Kieffer. *Measuring Transport Equity*, Elsevier.





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