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VERRA MOBILITY WHITE PAPER

THE NEXT ERA OF ROAD SAFETY:
How Modern Technology, Policy and
Public Trust Will Define the Future
Beyond Vision Zero

EXECUTIVE SUMMARY

U.S. roadway safety suffered a serious setback during and after the pandemic. Traffic deaths rose sharply, risky driving became more visible and many communities saw longstanding safety problems intensify around schools, work zones, intersections and high-injury corridors.

Now, recent data is showing signs of progress. **NHTSA estimates** that traffic fatalities declined to 36,640 in 2025, down 6.7% from 39,254 in 2024. The agency also reported that traffic deaths declined in 39 states, the District of Columbia and Puerto Rico, while vehicle miles traveled increased by about 0.9%. The good news is that as road miles have increased, fatalities are declining.

Progress is a win, but not a victory. We're still a long way from the goal of Vision Zero to eliminate traffic deaths. Tens of thousands of people are still killed on U.S. roads each year, and compared to nations with similar demographics and conditions, the U.S. is still trailing peer nations on roadway safety. Speeding, distraction, impairment and red-light running behaviors have proved difficult to change with only street design and public education.

To help change driver behaviors, and make our streets safer, the next phase of Vision Zero needs to focus on road safety modernization. That means expanding our multi-layered Safe System approach with legislation, data, technology, privacy protections, human oversight and transparent public reporting. It also means learning from states and cities that are seeing progress by moving away from traditional moving violations for certain traffic offenses toward more civil, fine-based models that have been designed to change behavior without creating unnecessary collateral consequences such as losing the ability to get to work.

Many city and state transportation officials have seen significant progress in the past few years. States such as California have created new authority for speed safety cameras in selected cities, with civil penalties, warning periods, human review, privacy rules and ability-to-pay provisions. Hawaii is expanding a statewide automated enforcement program. Washington, D.C., Atlanta, San Francisco, Philadelphia and Pittsburgh are all using data-driven programs to address specific safety problems.

Now we have an opportunity to take what is working, measure it clearly and build public trust around programs that are fair, focused, and life saving.



THE STATE OF U.S. ROAD SAFETY



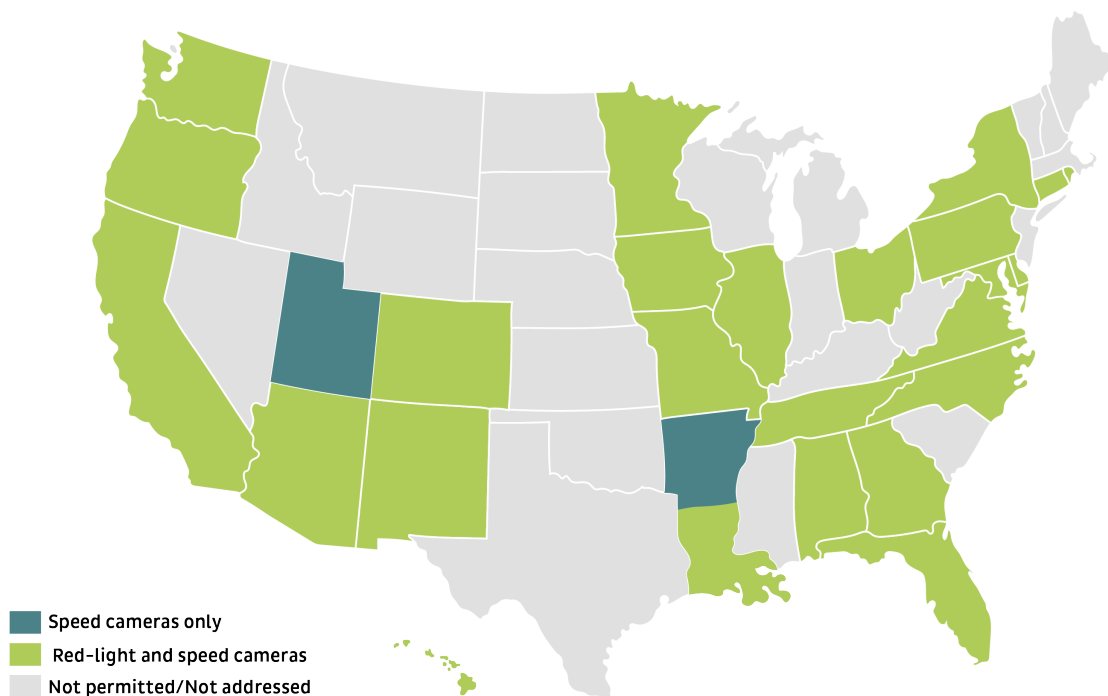
From 2020 to 2022, the pandemic changed driving behavior in ways that are still visible on U.S. roads. Empty streets encouraged higher speeds. Enforcement patterns changed. Distracted driving became more common as mobile devices became even more central to daily life. Many transportation agencies entered the post-pandemic period with higher fatality counts, limited staffing and growing pressure to respond.

While the latest NHTSA data is showing progress, the U.S. is still facing a road safety crisis by any practical standard. More than 36,000 deaths in one year would be unacceptable in other transportation systems. A single commercial aviation fatality draws national attention, while road deaths occur every day, across thousands of streets, intersections, highways and school routes.

Pedestrians, cyclists, motorcyclists, children, road workers and people in historically underserved neighborhoods often face higher exposure to unsafe conditions. Local roads and arterials carry daily conflict among drivers, walkers, cyclists, freight, buses, school transportation and emergency vehicles.

The question is whether current tools are sufficient to keep the trend moving and close the gap between U.S. outcomes and the safety performance seen in other high-income countries.

PERMITTED USE OF AUTOMATED ENFORCEMENT BY STATE LAW LEGISLATIVE PERMITTED TO IMPLEMENT NEW PROGRAMS AS OF 2026



WHY PROGRESS VARIES BY STATE



Road safety in the U.S. is shaped by federal strategy, state law and local implementation. That structure gives states flexibility, but it also creates a fragmented safety environment.

Some states authorize automated speed enforcement in school zones, work zones, residential corridors or high-injury networks. Others allow red-light cameras but restrict speed cameras. Some states permit school bus stop-arm enforcement. Others place strict limits on photo enforcement or prohibit it. Even where technology is authorized, local agencies may face different rules for fine levels, signage, warning periods, privacy, data retention, adjudication and revenue use.

This variation in regulations often affects what a city can do when it identifies a dangerous corridor. A city in one state may be able to combine engineering improvements with speed safety cameras, public dashboards, school zone enforcement and civil penalties. A city in another state may have to rely on police deployment, education campaigns and infrastructure changes alone.

What may seem like small administrative issues can end up impacting whether agencies can scale effective countermeasures.



Sidebar: Examples From The State Policy Landscape

SAFETY TOOL	WHAT VARIES BY STATE	WHY IT MATTERS
SPEED SAFETY CAMERAS	Cameras must be authorized within state legislation; many states restrict programs to school zones or in vulnerable locations; local communities may need additional approvals	Speed is a leading factor in fatal and serious crashes, especially on non-interstate roads. With automated enforcement, speeding has been reduced by up to 94%
RED-LIGHT CAMERAS	Each state must allow for the programs within legislation; local jurisdictions can opt into red-light safety programs; most states are vehicle owner liability with limited states using driver liability	Intersections remain high-risk locations for angle crashes, pedestrian conflicts and serious injuries. Red-light cameras have created a 24% reduction in fatal red-light-running crashes.
SCHOOL BUS STOP-ARM CAMERAS	Whether districts can use cameras to enforce illegal passing; districts may collaborate with local law enforcement or use district police to enforce the program; specific road laws regarding illegal school bus passing vary by state	Passing a stopped school bus creates a direct risk to children entering or leaving the bus. After a program has launched, up to 98% of violators do not repeat the same dangerous driving behavior
WORK-ZONE SPEED ENFORCEMENT	Whether camera enforcement is permitted in temporary or active work zones; which organization/entity is authorized to enforce	Road workers and drivers face elevated risk in changing traffic patterns. Work zone speed safety programs have shown a 50% drop in work zone crashes
CIVIL PENALTY STRUCTURES	Violations may be treated as civil fines, moving violations or criminal-style penalties	Civil models can reduce collateral consequences while still influencing behavior
PRIVACY AND REVIEW RULES	Whether laws require human review, image limits, retention limits or restrictions on facial recognition	These rules affect public trust and program legitimacy

California's AB 645 is an example of the policy direction many transportation officials are looking to. The law allows selected cities to pilot speed safety systems with civil penalties rather than moving violations. It requires notices, administrative review, appeals and diversion options for indigent recipients. In practice, that gives local agencies a tool for speed management while creating a framework that addresses fairness, due process and public acceptance.



San Francisco's early implementation is already showing how that policy shift can change the public conversation. In a [GovTech article](#), Viktoriya Wise, director of streets at the San Francisco Municipal Transportation Agency, explained the goal plainly: "I'm not interested in giving people tickets. I just need them to change their behavior and to understand why speeding is so dangerous."

Wise's perspective is important to highlight for both civic leaders and citizens. A citation is one mechanism to use, but the outcome that's important to focus on are fewer dangerous driving events, crashes and serious injuries.



VISION ZERO AND THE SAFE SYSTEM APPROACH



Vision Zero set a clear public goal: eliminate traffic deaths and serious injuries. The Safe System approach gives agencies a framework for reaching that goal.

USDOT's National Roadway **Safe System** approach organizes safety around five objectives: safer people, safer roads, safer vehicles, safer speeds and post-crash care. The model recognizes that people make mistakes, the human body has physical limits and the transportation system should be designed to reduce the likelihood that a mistake becomes fatal.

That framing is important because it recognizes that the most effective road safety programs use layers to support and reinforce behavior change. Street design can slow vehicles and reduce conflict points. Speed limits can reduce the actual risk to vulnerable road users, because the slower a car's speed at impact, the less likely someone is to be seriously injured.

Automated enforcement can discourage dangerous behavior when officers are not present. Public education can reinforce expectations while vehicle technology can prevent or reduce crashes. Post-crash response can improve a victims' likelihood of survival when a crash occurs.

No single layer is enough in every location. A school zone may need better signage, crossing improvements, speed management, automated enforcement, community education and data reporting. A high-injury corridor may need better lighting, signal timing, protected turns, lane narrowing, speed cameras and enforcement against red-light running. A work zone may need temporary design changes, lower speeds, worker protection and camera enforcement during active construction.

This is where road safety modernization becomes practical. Data helps agencies find the most dangerous places. Legislation determines which tools are available and then technology helps apply those tools consistently. Governance and the ability to create widespread public education determine whether the public trusts the program, and drivers start changing their behavior.



DRIVER BEHAVIOR REMAINS THE HARDEST VARIABLE



Even with speed-calming infrastructure, better automated braking systems in vehicles, and regulatory changes, driver behavior is still the most difficult variable to change.

Speeding is central to that challenge. FHWA and NHTSA data shows speeding contributed to **28% of all traffic fatalities in 2022**, and **87% of speeding-related fatalities** occurred on non-interstate roads. The problem isn't confined to high-speed highways. Injuries happen on the roads where people live, walk to school, ride bikes, wait for buses and cross intersections.

Distraction from mobile phones adds another layer. The **AAA Foundation's 2024 Traffic Safety Culture Index** found that most drivers recognize the danger of phone-related distractions, yet many still report risky behavior behind the wheel. Many transportation officials know the core truth that public awareness doesn't always translate into safer behavior.

Verra Mobility's own survey data reflects the same concern. In a **2025 distracted-driving survey** of 2,000 U.S. drivers aged 18 and older who drive multiple times a week, 85% said distracted driving is as dangerous as, or more dangerous than, drinking and driving. At the same time, 63% said the average driver has gotten worse in recent years. This is one of the biggest challenges for safety campaigns: it's much easier for people to see the fault from other drivers, while rationalizing their own choices. It's just human nature, but that's a big part of the need for automated solutions that can provide fair, unbiased enforcement for actual behavior.

School transportation is another example. A survey of 2,000 parents and caregivers found that **82% support safety cameras to monitor** to monitor and penalize drivers who illegally pass stopped school buses, while 70% favor automated enforcement in school zones. The same survey found that 43% had

observed a near miss in a school zone and 33% had seen a near miss around a stopped school bus.

Those numbers help explain why local leaders are looking for consistent, targeted interventions. Public education can explain the law. Traditional enforcement can address behavior when officers are present. Automated programs can extend visibility to locations and times where dangerous driving occurs repeatedly.

Melba Rivera-Irizarry, vice president at Verra Mobility, described the role of technology in D.C. as,

"Automated enforcement technology acts as a force multiplier, changing driver behavior to keep constituents safe."

The most useful performance measure is behavior change. Program data shows some school bus stop-arm programs have seen violations decline as much as 50% within two months of launch, while 98% of drivers who receive one stop-arm violation do not receive a second. In Atlanta, the school bus stop-arm safety program recorded 150,000 citations in its first year and declined to 98,000 in 2025. **Atlanta Public Schools** also saw a 64% reduction in citations from the first month to the last month of the 2023-24 school year.

Not every program will produce the same outcome; regional conditions and traditional behaviors can impact these results. But they show why measurement matters. If violations fall, repeat offenses decline and serious crashes decrease, a program can be evaluated on safety performance rather than volume of citations.

WHAT IS WORKING IN MUNICIPALITIES



Several public agencies are showing how layered safety programs can work in practice.

WASHINGTON, D.C.: A 360-DEGREE SAFETY MODEL

Washington, D.C., offers one of the clearest examples of automated enforcement as part of a broader safety program. The city's Automated Safety Camera program includes speed safety cameras, red-light cameras and school bus stop-arm cameras as part of a broader safety strategy.

A recent [article](#) reported that D.C.'s automated enforcement network included 208 speed safety cameras, 56 red-light cameras and 25 school bus stop-arm cameras. The district also uses public-facing data to show locations and violation history, a transparency practice that other communities can study.

Charles Turner, associate director of automated safety cameras for DDOT, described the program's role directly: "The program has become a key tool in the Vision Zero initiative."

D.C.'s data also points to behavior change. In 2023, 70% of vehicles that received a speed camera ticket didn't receive a second citation. A 2019 district study found that speed cameras reduced crashes by 30% within one year of installation.



SAN FRANCISCO: CIVIL PENALTIES AND PUBLIC TRUST

San Francisco offers a different model. After years of legislative advocacy, the city became the first in California to launch a speed safety program under AB 645. The program selected 33 locations based on safety data, including high-injury network information. It includes a warning period, civil fines, human review and privacy protections.

The city's approach is useful because it links state authorization, local data, public engagement and program rules in one framework. Only the rear license plate is photographed. Each potential violation is reviewed by a human. The program includes ability-to-pay provisions and requires that revenue be reinvested in traffic-calming measures rather than general funds.

After one year, [San Francisco reported](#) an 80% decline in speeding at the 33 locations where cameras were installed. That result gives other California cities a practical early benchmark as they consider how to use the authority created by AB 645.

HAWAII: STATEWIDE SCALE

Hawaii is an example of statewide scale. In 2026, the Hawaii Department of Transportation and Verra Mobility announced a 10-year contract to expand red-light and speed enforcement from 17 sites to 187 dual-enforcement cameras across the state's major islands.

Early Oahu red-light camera data showed a 62% decline in daily red-light running violations at camera locations, a 76% reduction in the major crash rate and 90% of violators not receiving a second citation. During the first six months after speed enforcement launched, the program captured more than 510,000 violations, with some vehicle speeds exceeding 100 mph.

Edward Tiedje, vice president, Verra Mobility, framed Hawaii's program as a state-level leadership example: "Hawaii has shown immense leadership in elevating the safety needs of the entire state."

Hawaii's model is notable because many U.S. programs remain local, limited or pilot-based. A statewide approach can create consistency across jurisdictions, especially when programs use common standards for deployment, review, data and public reporting.

PITTSBURGH: A FOCUSED START AT HIGH-RISK INTERSECTIONS

Pittsburgh shows how a city can target a specific safety problem. The city is launching its first automated red-light camera program at six high-risk intersections. Pittsburgh's Department of Mobility and Infrastructure reported 750 crashes, including seven fatal crashes, due to red-light running from 2019 to 2023.

The program gives the city a tool to address a documented pattern of dangerous behavior. Pittsburgh plans to add six intersections each year, up to 30 locations by the end of 2029.

Pittsburgh Mayor Corey O'Connor explained the public safety rationale in the city's announcement: "Running red lights is serious and puts our residents at higher risk for accidents that could have been prevented."

Red-light running is not an abstract violation. It is tied to preventable crashes at intersections where drivers, pedestrians and cyclists cross paths. Reducing red-light violations reduces crashes.

PHILADELPHIA: REINVESTING IN ROAD SAFETY

The city of Philadelphia is also showing how cities can use revenue from enforcement to make streets safer for everyone. Automated speed enforcement funds have supported safety projects, including traffic calming around schools. By reinvesting revenue in safety, this helps build public trust and reduces historic concerns that traffic safety is more focused on revenue generation. When residents can see that safety program revenue is reinvested in safer streets, the program is easier to explain and defend.

All of these municipal examples have common traits for success. They identify specific risks. They rely on enabling authority. They focus on measured behavior. They include public education or warning periods. And they create a record that can be reviewed, audited and improved.



DATA, PRIVACY AND PUBLIC TRUST



Road safety modernization depends on data, but the public will not support safety programs if agencies cannot explain how data is collected, used, protected and deleted. National push-back and concerns over sharing data like automated license plate reader (ALPR) databases have shown the importance of municipalities using local values to prioritize the retention and safekeeping of driver data.

enabled tools may eventually help identify risk patterns that are difficult for humans to see across large networks.

Better data also creates higher expectations. Residents want to know why a camera was placed at one location and not another. Many low-income areas often have less investment in safety infrastructure and a higher risk of accidents. But safety programs need to be deployed equitably and fairly so that citizens are reassured that a program is designed for safety rather than revenue. People want to know whether images are reviewed by a person, whether faces are captured, whether data is retained or shared, and how they can contest a citation.

Those questions should be answered before deployment.

San Francisco's program is instructive because it includes rear-plate-only image capture, civil penalties, warning periods, human review and income-based reductions. The details are operational, but they serve a larger purpose: They show residents that the program has rules.

Public trust is also strengthened when agencies publish results. A dashboard, annual report or public presentation can show whether speeding declined, whether repeat offenses decreased, whether crashes changed and whether cameras were moved when behavior improved. Transparency turns enforcement into a safety management tool.

Modern Automated Safety Program



CHECKLIST

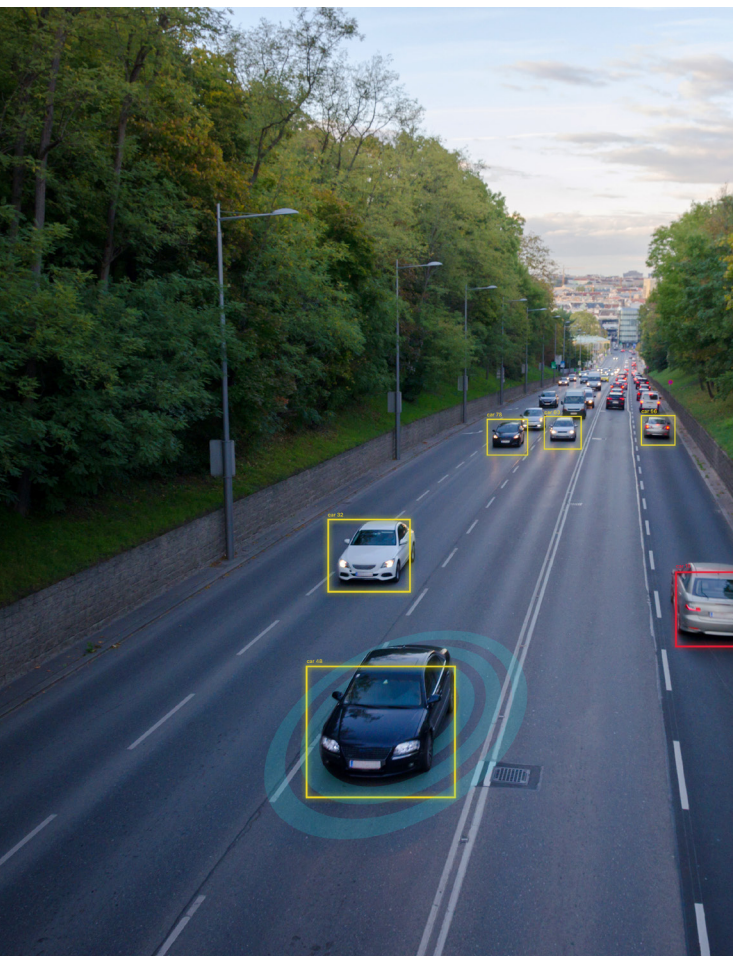
- | | | |
|---|--|---|
|  | 1. THE SAFETY CRITERIA USED TO SELECT LOCATIONS |  |
|  | 2. PUBLIC EDUCATION AND WARNING PERIODS |  |
|  | 3. HUMAN REVIEW BEFORE CITATIONS ARE ISSUED |  |
|  | 4. LIMITS ON IMAGE COLLECTION AND USE |  |
|  | 5. RESTRICTIONS ON FACIAL RECOGNITION |  |
|  | 6. DATA RETENTION AND DELETION TIMELINES |  |
|  | 7. ADMINISTRATIVE REVIEW AND APPEALS |  |
|  | 8. FINE REDUCTIONS OR ALTERNATIVES FOR PEOPLE WITH LIMITED ABILITY TO PAY |  |
|  | 9. PUBLIC REPORTING ON VIOLATIONS, REPEAT OFFENSES, CRASHES AND PROGRAM OUTCOMES |  |

AUTONOMOUS VEHICLES, CONNECTED VEHICLES AND AI

The next milestone in road safety is being shaped by technology already arriving on public roads. Autonomous vehicles, connected vehicles and AI-assisted infrastructure will create new governance questions.

Autonomous vehicles are improving, but they will operate for years in mixed traffic with human drivers, pedestrians, cyclists, emergency responders, delivery vehicles and school transportation. That makes civic coordination as important as vehicle capability. Cities need protocols for curb management, emergency response, work zones, traffic incidents, unusual weather and interactions with public safety personnel.

Connected vehicles create another opportunity. Vehicle-to-vehicle and vehicle-to-infrastructure communication could help prevent crashes, improve signal timing and support faster incident response. The challenge is that much of the useful data is fragmented across public agencies, automakers, technology providers, insurers and mobility companies. Safety value increases when the right data can be shared in the right format under the right governance rules.



AI has a practical role in this system. It can help transportation professionals analyze crash patterns, detect near misses, identify speeding hot spots, evaluate work-zone risk and prioritize limited resources. But AI must be incorporated thoughtfully and deliberately in a way that improves efficiency without creating new challenges.

Public agencies need to know that AI can help surface patterns, but people need to remain responsible for policy, review, enforcement decisions and accountability.

The aviation industry offers a useful comparison. Commercial aviation reduced risk over decades through transparency, shared data, near-miss reporting and a culture focused on learning rather than blame alone. Road safety is more complex because the U.S. has hundreds of millions of vehicles, thousands of agencies and far more daily decision-makers. Still, the principle applies: learning from risk before tragedy occurs is more effective than responding after lives are lost.

INTERNATIONAL LESSONS



While many European countries take a much stricter stance on behaviors like speeding or using a cell phone on the road, the U.S. does not need to copy another country's system wholesale. It can learn from countries that have achieved stronger safety outcomes through consistent policy, speed management and layered interventions.

The **DEKRA Road Safety Report 2025** places U.S. roadway safety in a global context and points to the continued scale of traffic fatalities worldwide. European countries have generally taken a more systematic approach to speed management, automated enforcement, road design and post-crash care. Australia and the U.K. also offer examples of sustained public safety campaigns, speed enforcement and road design interventions.

SEVERAL LESSONS ARE RELEVANT FOR U.S. TRANSPORTATION OFFICIALS.

- First, speed management works best when it is treated as part of the safety system. Lower limits, road design, camera enforcement and public communication should reinforce one another.
- Second, penalties can be designed to influence behavior without creating disproportionate harm. Civil, vehicle-based and income-adjusted models can help align enforcement with safety goals.
- Third, public trust depends on clear rules. When programs include signage, warning periods, published data, human review and privacy protections, they are easier to defend.
- Fourth, safety progress is cumulative. Europe's reductions in deaths were not the result of one technology or one law. They came from years of consistent policy, better vehicles, safer infrastructure, speed management and cultural change.

The U.S. has its own legal structure, federal-state relationship and transportation culture. That makes state innovation especially important. When one state creates a workable model, others can adapt it.



A PRACTICAL ROADMAP FOR COMMUNITIES



City and state transportation officials do not need to wait for every piece of future technology to mature before they take steps to improve safety. Many of the most effective tools are available now. The challenge is aligning them with law, data, public trust and measurable outcomes.



SEVEN STEPS COMMUNITIES SHOULD TAKE TO OPTIMIZE AUTOMATED ENFORCEMENT PROGRAMS

1

IDENTIFY HIGH-RISK LOCATIONS.

Use crash data, speed studies, red-light running data, school transportation data, work-zone data and community reports to identify corridors and intersections where risk is concentrated.

2

REVIEW LEGAL AUTHORITY.

Determine whether state law allows speed safety cameras, red-light cameras, school bus stop-arm enforcement, work-zone enforcement or other automated tools. If the authority is limited or outdated, study models in states such as California that are moving toward civil, fine-based approaches.

3

DESIGN PROGRAMS AROUND SAFETY OUTCOMES.

Set goals such as reducing speeding, lowering repeat offenses, improving compliance near schools or reducing crashes at high-risk intersections. Avoid using citation volume as the main measure of success.

4

BUILD PRIVACY AND DUE PROCESS INTO THE PROGRAM.

Adopt clear rules for image capture, human review, data retention, appeals, income-based reductions and restrictions on secondary data use.

5

ENGAGE THE COMMUNITY BEFORE LAUNCH.

Explain the problem, show the data, describe the program rules and provide a warning period. Community members should understand where systems are placed and why.

6

MEASURE AND PUBLISH RESULTS.

Report changes in violations, repeat offenses, speeds, crashes and injuries. Share what is working and what needs adjustment.

7

REINVEST IN SAFER STREETS.

Where legally allowed, direct program revenue toward safety improvements such as traffic calming, crossings, lighting, school zone improvements and high-injury corridor projects.

CONCLUSION: LEGISLATIVE MODERNIZATION IS THE NEXT SAFETY TOOL



The U.S. has made real progress since the post-pandemic surge in roadway deaths. That progress should encourage transportation officials, legislators, safety advocates and technology partners to continue modernizing road safety systems.

The next step is legislative. States that still rely on older enforcement models should review how newer approaches are working in places such as California. Civil, fine-based programs with warning periods, privacy protections, human review, public reporting and ability-to-pay provisions can help shift the conversation from punishment to prevention.

This does not replace street design, education, vehicle safety technology or traditional enforcement. It gives communities another way to address the behaviors that continue to kill people on U.S. roads.

Vision Zero remains the right goal. Reaching it will require a more modern policy toolkit. States and municipalities that update their laws, protect privacy, measure outcomes and build trust will be better positioned to turn recent fatality reductions into sustained safety progress.





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