5-26-25

Failures of NHTSA's Leadership

I received many comments on the Editorial "Budget Cuts at NHTSA: Programs to Cease and Areas to Cut" (Viano 2025a). I have encouraged everyone to submit a Letter to the Editor if they want to share their perspective. Several asked that I expand on my concerns with NHTSA and provide additional information on the issues.

My concerns are failures of NHTSA's leadership to prioritize activities that focus on the core mission to reduce traffic deaths. NHTSA's leadership has failed to manage the work of staff and the contractor network to achieve meaningful progress in reducing annual fatalities and improving highway safety. Figure 1 in the Editorial (Viano 2025a) shows the US had a "flat line" in the number of fatalities the past 25 plus years. This means NHTSA's activities and research have not been effective in reducing deaths on US roads. NHTSA has failed its mission.

This is a failure of NHTSA's leadership to invest in projects that lead to interventions reducing annual fatalities. Much of NHTSA's work drags on 10, 15, 20 years with no field benefit. NHTSA's research does not identify interventions that will reduce traffic deaths now. As a result, there is no effect of most of what NHTSA does with a large budget from Congress.

My concerns are not with the staff or the contractor network. These individuals are well-educated, highly skilled and motivated to complete the needed work for NHTSA and safety in America. The problem is NHTSA's leadership has not defined the needed work that leads to reductions in traffic fatalities. NHTSA research does not define the scope or proportion of fatalities being addressed, the possible effectiveness in reducing fatalities and the costs and barriers to implementing interventions that are effective with measurable reductions in fatalities on US roads.

The core mission of NHTSA is to lower highway fatalities. The "flat line" the past 25 years in annual fatalities points to failures of NHTSA's leadership to focus work on areas that drive down deaths. One respondent said "NHTSA research should be prioritized by a peer panel consisting of outside parties and not left alone to make decisions to rediscover the wheel." My analysis is similar but more subtle that NHTSA's research focuses on "refining the wheel" with no meaningful effect on the core mission of the agency to make highways safer by driving down fatalities.

There are at least 12 failures of NHTSA's leadership. They are described in the following list and are discussed in more detail. NHTSA's leadership has failed to:

1. Set targets focusing activities on reducing annual fatalities.
2. Focus research on projects with measurable reductions in fatalities.
3. Verify assumptions and methods for field data collection are reliable, valid and accurate.
4. Verify sampling frequencies in NASS-CDS and CISS are correct and represent serious injury in the US.
5. Terminate testing that no longer provides meaningful benefits.

6. Follow up on useful research findings.
7. Follow up on new crash tests and technologies.
8. Engage industry, IIHS and others in setting priorities and a research agenda.
9. Address the inherent problem of an Agency that conducts research, regulates, investigates and enforces.
10. Require timely engineering reports on internal and external studies.
11. Require useable archives of reports and studies on NHTSA research and activities.
12. Conduct critical analysis of projects, programs and technologies.

1. NHTSA's leadership failed to set targets focusing activities on reducing annual fatalities: NHTSA's leadership does not set targets to reduce annual fatalities. Without targets, goals cannot be laid out for activities. Figure 1 in Viano (2025a) shows fatalities normalized to the level in 1979 for 15 countries with data from 1979, 2002-2021. For most Americans, the number of deaths each year due to traffic crashes, firearms, heart disease, cancer and other causes is a benchmark on how the country is managing the health of its population. While it is useful to consider rates of death per miles driven, registered vehicles, licensed drivers or registered vehicles, the fatality count shows an important national trend.

The US reduced fatalities 16.0% from the level in 1979. The level in 2021 is the same as in 2002 (0.840 v 0.842, normalized to 1979). In contrast, 14 other countries have reduced traffic deaths 77.4% (0.226 ± 0.059) since 1979, a staggering difference. The US fatalities dropped 15.8% from 1979 to 2002 to a ratio of 0.842. The ratio was 0.840 in 2021, essentially no change over 19 years.

The 2021 fatalities in the US were 11,528 lower than died in 1979 (51,093 deaths). If the US fatalities dropped to the average of 14 other countries or 0.226, the US would have had an additional 31,387 fewer fatalities. This is an incredible number of preventable deaths in the US. It also shows there is an enormous gap between the meager changes in annual fatalities in the US compared to the significant drops in other countries. NHTSA sets no targets shielding itself from accountability for the lack of fatality reductions. The number of fatalities that occur annually on US roads is an important statistic of traffic safety.

The US trend in Figure 1 (Viano 2025a) is largely driven by a socio-demographic strata of race, ethnicity, gender and low SES (socioeconomic status) that has been neglected by NHTSA's initiatives the past 46 years. Fatal crashes involve vehicles 10 or more years old, more than half the time. Most of the drivers are not wearing the seatbelt. Low SES coupled with age, race and ethnicity is an important strata for seatbelt non-use, risk taking, impaired driving and improper child restraint. NHTSA stopped in-depth investigation of vehicles 10 or more years old in the late 2000s, thereby avoiding information on a significant proportion of fatal crashes in the US (Viano 2023). They restarted in 2017 but at too low a rate to get a correct picture of older vehicle crashes. No solutions can be proposed without studying the problem.

NHTSA published the seminal study on HARM in 1982, but recently failed to use the metric or even annual fatalities to set targets and guide its activities (Malliaris et al. 1982). They abandoned a clear means of tracking progress year to year. Malliaris et al. (1982) introduced the concept of HARM that became consequential in setting priorities for traffic safety activities at

NHTSA and the industry. HARM from crashes was determined by the product of the number of fatalities times the societal cost of a death. The same approach was used for different severities of injury based on maximum MAIS (Abbreviated Injury Scale). Societal costs increased with the severity of MAIS. The sum of MAIS 2-5 injuries times their cost was added to the fatality cost to get a national cost of death and injury from motor vehicle crashes. Malliaris et al. (1985) clustered HARM by crash type (front, side, rear, rollover) and crash severity in terms of delta V for belted and unbelted occupants by seating position and age.

NHTSA set priorities for HARM reduction in the 1980s-1990s associated with crash direction, delta V, seating position and restraint use. NHTSA and the industry followed a strategy of HARM reduction for more than a decade. For example, each new vehicle platform at GM had to present a HARM reduction plan for the vehicle. At the end of the development, they had to present the reductions in HARM achieved with the new vehicle structures, restraints and friendly interiors. It was an excellent way to focus attention during vehicle development. HARM focused the attention of NHTSA, vehicle manufacturers and automotive safety researchers.

NHTSA should restore HARM as the metric of traffic safety in the US (Viano 2023). They should update the calculation to include fatalities, serious injuries (MAIS 3+) and disabling injuries. The calculation should be made from 1979 to today, so everyone can see what has happened the past 46 years. NHTSA needs to correct NCSS, NASS-CDS and CISS data on serious injury using an AIS code translator, corrected sampling frequencies and corrected case weights. The meaning of fatalities has a broader context in this paper to include HARM from deaths, serious injuries and disabling injuries. NHTSA should also set targets for crashes avoided and crash severity reductions, recognizing the role of crash avoidance technologies in the US safety strategy.

NHTSA is largely unaccountable for driving down deaths on US roads. The appropriation process does not measure how the agency has done in the past or why they have not achieved meaningful reductions in fatalities. Without targets, there is no accountability on NHTSA to conduct meaningful programs (Leonhardt 2023). When NHTSA changes test procedures and protocols, the historic tests are typically not compared. This makes it difficult to see changes over time, making it impossible to chart progress. When changes are made in field data, it is difficult to see year-to-year or decade-to-decade changes. Old-to-new field data needs to be compatible. Changes in injury coding with different MAIS versions and crash selection criteria have made comparing field data difficult. Often, NHTSA says only the most recent field data is relevant. Nothing could be further from the truth.

The US Congress (2012) passed a highway safety improvement program (MAP-21) to achieve a significant reduction in traffic fatalities and serious injuries on public roads. It discussed targets for safety performance and developing State highway safety plans, including older drivers and high risk roads. It is unclear how NHTSA's activities and research align with MAP-21. I am unaware of targets set by NHTSA to reduce fatalities then, today and over the next 5 years.

Targets should be visible for each NHTSA project and program that includes what proportion of fatalities (HARM) is being addressed, how the work leads to measurable effects on US roads and a description of the timing and impediments to the intervention. For example, a target of 10% reduction in fatalities each year would take 15 years to reach the level of fatality reduction achieved by 14 other countries in 2021. This would mean 4,292 fewer traffic deaths in the first year based on the 2021 level. A 20% reduction each year would take 7-8 years and involve 8,584 fewer deaths the first year. These are incredibly challenging goals that would focus NHTSA on meaningful activities.

2. NHTSA's leadership failed to focus research on projects with measurable reductions in fatalities: NHTSA leadership does not prioritize research with measurable benefits in fatality reductions. For example, test dummies are merely tools. Endless refinements in the tools are unnecessary unless there is a critical safety issue. The simplest tool for the problem is the most useful. Packing the dummy with instrumentation to measure everything, leads to what all too often happens, NHTSA does not even look at the data. The work on THOR, equity in dummies, modeling has no measurable effect on lowering fatalities (HARM). It should be stopped.

The type of crash tests conducted by NHTSA are inconsistent with the crashes causing fatalities (Bean et al. 2009). There is little value in more sophisticated dummies and criteria in tests that are not representative of fatal crashes in the US. New injury criteria are needed only when there is a clear safety issue. The work on BrIC was poorly conceptualized and shows a lack of understanding. The money wasted on dummies and injury criteria is enormous, but more importantly, it has distracted researchers from meaningful topics that have measurable effects on fatality reductions in the near term. The portfolio of biomechanics is a good example where most of the projects are meaningless to a measurable reduction in fatalities. Most of the work does not focus on fatalities.

Three-quarters of NHTSA's research projects for 2025 have no reasonable chance of producing measurable reductions in death on US roads. The research is meaningless to the mission of NHTSA to make traffic safer. Much of the portfolio looks like National Science Foundation (NSF) grants promoting knowledge on topics related to vehicle crashes. NHTSA's leadership did not require staff and contractors to determine the proportion of deaths addressed by the project, the expected reductions in fatalities, the cost and timing to implement the initiative, impediments and other normal questions that a business would require answers before funding a project. Regrettably, NHTSA is a funding agency that has minimal oversight on the return value for funding. NHTSA's research must focus on solutions that drive down traffic fatalities now, not 10, 15, 20 years later if ever. Most of the current portfolio will have no measurable effect on highway fatalities. That is why the US lags other countries.

In the context of this and the previous Editorial, meaningless research involves studies that yield no measurable reduction of fatalities in US crashes, except possibly beyond 10, 15, 20 plus years. It means the study will not reduce traffic fatalities with a measurable effect in the near term. Research that is successful but merely increases our knowledge on a subject or requires an intervention that may not be introduced in the near term are meaningless to NHTSA's core mission. This is not to say these studies are not interesting and academically acceptable, but they are not relevant to NHTSA's core mission. NHTSA's mission is to reduce traffic fatalities and its research should primarily focus on that goal.

NHTSA's leadership should be careful with topics in human factors, aggressive driving, substance abuse that are subjects that cross many other Federal agencies activities. The risk for duplication is great and the investigator's need to clearly point out other agencies funding in the areas. How to manage meaningful research is a difficult task; one that NHTSA is historically not suited to carry out.

The "flat line" in fatalities in the US since 2002 attests that NHTSA's research the past 23 years has not lowered fatalities. It has been ineffective, meaningless. Moreover, NHTSA's research the past 46 years has resulted in a meager reduction in fatalities from 1979 to 2002. This underscores the concern that NHTSA's research plan for 2025 has not been prioritized for projects that lead to effective fatality prevention on US roads. It does not.

NHTSA's leadership should require each project to estimate field benefits in reducing fatalities. Europe and some areas in the US use Vision Zero to set targets and track fatality changes (Tingvall et al. 2000, Bjornberg et al. 2023). Vision Zero and HARM share the same conceptual framework to lower annual fatalities by prioritizing research and interventions based on reductions in fatalities (HARM).

3. NHTSA's leadership failed to verify sampling frequencies in NASS-CDS and CISS are correct and represent serious injury in the US: NHTSA's leadership did not require verification that sampling frequencies assumed for field data collection were accurate and reliable. I can find no critical analysis of data collection procedures that would have found incorrect sampling frequencies, incorrect domain (strata) placement of vehicles, inaccurate and unreliable case weighting factors and other errors. All fatal crashes are investigated in NASS-CDS and CISS that occur in a PSU (primary sampling units). It is a census within the PSU area. Older vehicles make up more than 50% of vehicles with a fatality, and most of the occupants are unbelted. Crashes involving serious injury are prospectively sampled based on assumed sampling frequencies.

The sampling paradigm for injured occupants in CISS depends on the vehicle age with priority selection of new vehicles with serious (A) injury, moderate-minor injury (B, C, U) and no injury (O) before selecting mid-age vehicles with serious, moderate-minor and no injury, and then older vehicles. The sampling frequencies used by CISS are incorrect. The sampling frequencies in NASS-CDS are incorrect after 2009, when NHTSA stopped investigating older vehicles (Zhang et al. 2013). CISS chose 10%-10%-6% sampling frequencies for new-mid-old vehicles (Zhang et al. 2019, 2024, Viano 2025b). The selection is incorrect and leads to a biased sample. The sampling frequencies should be based on occupant injury. The correct proportion is unknown, but is closer to 6%-6%-14% to make a representative sample of serious injury crashes in the US.

CISS weighting factors are sometimes incorrect by orders of magnitude for a seriously injured occupant in an older vehicle hit by a new vehicle (Viano 2025b). A flaw in CISS is to assign the same weighting factor to each vehicle in two-vehicle crashes, irrespective of the injury outcomes in each vehicle. The CISS sampling paradigm emphasizes new vehicles irrespective of injury severity. It leads to cases with an unusually high weighting factor (correctly) assigned for the new vehicle with no injury to the driver (weighting factor is the inverse of the injury risk). The unusually large weighting factor is also (incorrectly) given

to the older vehicle with a seriously injured child in the rear seat. This distorts the sample of serious injury in comparison to other cases with lower weights for serious injury.

There are many cases of unusually high weighting factors in the CISS and NASS-CDS databases. The domains (strata in NASS-CDS) should be corrected. The errors in sampling frequency should corrected (adjusted) and new case weights calculated to revise CISS and NASS-CDS data. While corrections are made, MAIS coding differences over the years need to be adjusted as much as possible (translated) so data from earlier years is compatible with current data. Compatible data back to the 1980s is needed to track trends.

The sampling frequencies are used at the beginning of data collection. If they are wrong, the type of crashes selected is wrong. This can be seen with too few older vehicles sampled with serious injury compared to the census of fatal crashes (Viano 2025b). The errors make CISS and NASS-CDS unreliable and not representative of serious injury in the US. The data is not field representative, despite attestations by NHTSA's leadership to Congress that the data is nationally representative (Federal Register 2022). The calculation of HARM requires accurate field data on serious injuries in road crashes. CISS is not a representative sample of serious injury crashes in the US with the current weighting factors (Viano 2025b).

4. NHTSA's leadership failed to verify assumptions and methods for field data collection are reliable, valid and accurate: NHTSA's leadership does not conduct self-critical analysis of assumptions and methods used to collect field data. A good example is the errors in case weights in NASS-CDS and CISS on serious injury (Viano 2025b). NHTSA was put on notice in 2012 that NASS-CDS had cases with unusually large weights for serious injury (Brumbelow, Farmer 2013). NHTSA's leadership was informed. NHTSA did nothing to investigate the issue. Prasad et al. (2024) noted unusually large case weights that skewed injury risks in oblique frontal crashes. NHTSA did nothing.

NHTSA's leadership should have asked for verification of assumptions, methods and procedures in field data collection of serious injury. Nothing was done. NHTSA ignored the issue. There are many analyses NHTSA could have conducted. For example, NHTSA could have validated the methods and assumptions in a PSU and local hospitals to verify the crash selection strategies and case weights for serious injury were accurate. NHTSA did nothing. NHTSA could have compared fatalities estimated from NASS-CDS and CISS with the census in FARS. They did not. A recent study found NASS-CDS underestimated by 46% the census count of fatalities in FARS (Viano 2025c).

5. NHTSA's leadership failed to terminate testing that no longer provides meaningful benefits: NHTSA leadership does not stop crash testing when safety performance reaches an asymptote in vehicle design changes. Testing after that point has no measurable effect on fatalities in the field. The frontal NCAP test is good example. Vehicle design improvements reached an asymptote in the 2000s-2010s. Continued testing had manufacturers merely chasing star ratings without measurable benefits in occupant protection on US roads the past 25 years (Viano 2024a).

NHTSA spends an enormous amount of money on crash tests. The 35 mph frontal NCAP started in 1979 and showed improvements were needed in vehicle structures and occupant restraints. The motor vehicle industry quickly made vehicle design improvements, so that tests in the 1990s-2000s mostly with the Hybrid III dummy resulted in occupant compartment integrity and reasonable occupant restraint.

Vehicles reached an asymptote in frontal NCAP protection by 2000s-2010s with pretensioned and load-limiting belts that provided restraint with front airbags (Viano 2024a). It is rare that a belted occupant is fatally injured in a 35 mph frontal barrier-type impact. Modern vehicles no longer have occupant compartment intrusion and the forces on the occupant are too low with pretensioned, load-limiting belts and airbags to cause a fatality, except in rare circumstances. The 35 mph NCAP test is no longer relevant to highway fatalities and continued testing will not lead to reductions in US fatalities (Viano 2024a). The crashes causing fatalities are very different (Bean et al. 2009).

NCAP tests showed reductions in HIC from the 1980s-2000s (Viano 2024a). From 2000s-2020s, HIC reached an asymptote in response and varied within the test-to-test variability. The testing initially involved the Hybrid II (Part 572) and then the Hybrid III dummy. Both dummies provided insights as vehicle structures and restraint systems were improved. Importantly, the benefits of the frontal airbag, belt pretensioning and load-limiting were obvious with either dummy. THOR would not result in field relevant changes, even with over 250 channels of instrumentation and new injury criteria. Most data channels are never analyzed or reported by NHTSA. THOR is merely "refining the wheel."

THOR will not bring about measurable changes on US roads. THOR is more than 30 years old and has undergone numerous upgrades over the years. For example, an evaluation of THOR in the right-front passenger seat in oblique, offset frontal crash tests did not show meaningful advances from what could be seen with the Hybrid III dummy (Viano 2024c). THOR is far too complex and unnecessary, unless a specific safety need arises where the extra instrumentation provides value.

NHTSA's frontal NCAP test has not resulted in meaningful changes in vehicles the past 20 years that can be measured in field crashes (Viano 2024a). Manufacturers have been chasing star ratings that have no field relevance, wasting money and time on designs that marginally improve protection or degrade safety in lower speed crashes that occur more often (Viano 2024a). The test is not relevant to how fatalities occur on US roads.

Fifty model years (50 MY) of vehicles in frontal crashes were analyzed in NASS-CDS and CISS (Viano 2024a). The data was analyzed by vehicle model year (MY) without consideration for the varying MAIS codes used in the data. The data showed essentially no difference in serious injury (MAIS 3+) in frontal crashes over 50 MYs of vehicles in crashes from 1989-2020. The data demonstrated that changes due to NCAP testing from 1979-to-today have not resulted in measurable reductions in serious injury in frontal crashes on US roads. The analysis should be redone with corrected NASS-CDS and CISS data, and FARS data.

6. NHTSA's leadership failed to follow up on useful research findings: NHTSA leadership failed to pursue useful findings and follow up with programs to reduce traffic deaths. A good example is the in-depth analysis of deaths in frontal crashes with belts and airbags. Bean et al. (2009) found clusters of crashes involving occupant deaths in 2000-2007 MY (model year) vehicles. The findings were useful and informative. They found six clusters: extreme crash severity (40%), corner and oblique impacts (24%), under-ride of a heavy vehicle (14%), occupant vulnerability (12%), tall, narrow object (3%) and other (7%). The study followed methods used in the past to prioritize vehicle design changes (Schwimmer, Wolf 1961, Huelke, Gikas 1965, 1966, Viano 1992). The case analyses in Bean et al. (2009) should be made publicly available so others can study the clusters of fatal crashes. NHTSA's leadership should have asked everyone to propose ideas to prevent the fatalities. NHTSA did nothing.

NHTSA's leadership did not follow up and prioritize activities to address the primary causes of death found by Bean et al. (2009). They did not direct staff to conduct similar studies on side impacts, rollovers or rear impacts. NHTSA wasted more than 15 years by not pursuing the findings on highway deaths. Opportunities were missed.

7. NHTSA's leadership failed to follow up on new crash tests and technologies: NHTSA's leadership failed to push forward new crash tests. A good example is the oblique-frontal car-to-car crash tests with a 5th female in the rear seat. Craig (2012) presented the finding in a slide show where on-board movies demonstrated lap-belt submarining in several vehicles. Nothing happened until NHTSA ran a series of frontal NCAP tests with a rear 5th female in 2015-2016 MY vehicles. I am unaware of any publication of the findings. I analyzed the data and saw submarining and very high occupant responses (Viano 2024b). Nothing more happened until the 2025 research project on the deformable moving barrier. Nothing practical has happened for nearly 15 years from the initial crash tests. There is no projected rollout of a test procedure or field benefit from expected vehicle and restraint design changes. In the meantime, IIHS has pursued rear occupant restraint usurping the initial testing by NHTSA. IIHS typically precedes NHTSA in pushing vehicle design changes with consumer tests. NHTSA does little to cause vehicle design changes.

NHTSA may not have adequately considered petitions for rulemaking where innovation is needed to lower fatalities on US roads. For example, NHTSA (2013) denied a petition from BMW of North America to amend FMVSS 208 to allow a seatbelt interlock for front occupants as an alternative to the unbelted crash test. The agency noted that 52% of crash fatalities were unbelted based on 2011 FARS. NHTSA more recently received a petition to revise the unbelted test in FMVSS 208 with a next generation seatbelt interlock system (Schmidt 2020). The issue remains open nearly 5 years later. These petitions are important because while seatbelt use is over 90% in observational studies, use is less than 50% in fatal crashes. It is imperative to increase seatbelt use by the socio-economic strata involved in many fatal crashes. This is a strata where race, ethnicity, age, gender and low SES are important. It is a strata that fails to properly restrain children in rear seats and engages in risk-taking behavior with children in the vehicle.

Another example, NHTSA has worked on alcohol interlock systems that have found some use with repeat DUI offenders. However, large scale interventions have not occurred. Again, there is a socio-economic strata that is involved in alcohol-drug

use, aggressive driving and speeding that leads to fatal crashes. Something must be done to drop fatalities involving alcohol-drugs on US roads. NHTSA needs to embrace innovative solutions and conduct trials to prevent highway deaths, otherwise the "flat line" in fatalities will continue.

8. NHTSA's leadership failed to engage industry, IIHS, others in setting priorities and a research agenda: The public meetings hosted by NHTSA are merely reports on what the Agency has decided to do. There is little opportunity to make major shifts in priorities, approaches and scope. Since the research agenda is flawed from the start, there is no hope of correcting it in a public meeting. At the end of the public meeting, the agency pats itself on the back for a "pretty slide show" and moves on. For example, the 2024 public meeting had very pretty slides on the 2025 research projects. Most of the research involved topics with no practical benefit in lowering fatalities now or in 5, 10, 15 years. Most if it would not result in measurable benefits in lowering fatalities on US roads. As such, most of NHTSA's research is meaningless to its core mission.

NHTSA showed a lack of leadership in setting up the research agenda, not requiring clear benefits and not requiring information on the timing of interventions. They have the best talent in the world at major Universities ready to conduct research on traffic safety, but they give them topics that have no direct effect on traffic deaths (HARM). NHTSA's leadership of research, statistics and other areas should be replaced. NHTSA's mission is to reduce traffic deaths, not prepare pretty slide shows and conduct "do good" research with no meaningful effect on annual fatalities.

9. NHTSA's leadership failed to address the inherent problem of an Agency that conducts research, regulates, investigates and enforces: There is an inherent problem when an agency is responsible for conducting research, implementing rules-regulations, investigating issues and enforcing violations. The multi-dimensional responsibilities of the administration are usually at cross purposes to setting a meaningful research agenda. It is a bad organizational model. Research is usually not innovative, it does not thrive with truly useful interventions to reduce fatalities on US roads. NHTSA needs to recognize the problem and setup means to avoid stifling innovation. The multi-purposes of NHTSA is a long-known threat to innovative research.

Most of NHTSAs research the past 46 years has had no measurable effect on US road fatalities. The research is typically general information without specific interventions to reduce fatalities in the field. Figure 1 in the Editorial showed the US experienced an upward trend in fatalities, despite a dramatic increase in NHTSA's budget and research (Viano 2025a). From 1979 to 2000, the fatalities dropped to 0.844. This was a 15.6% drop over 23 years. The fatalities "flat lined" the past 23 years. The obvious conclusion is that NHTSA has poorly selected topics and poorly chosen meaningful projects the past 46 years. There has been a meager drop in fatalities compared to other countries, even though enormous amounts of money are spent by NHTSA.

NHTSA has misguided research by not requiring specific effects in lowering fatalities on US roads. Most of the studies are merely nice work that adds to our understandings but has no measurable effect on highway safety. The researchers conduct the work, publish it and move on to the next topic. Their success seems to be completing the project, not driving down highway

deaths. Ten to fifteen years later there is no effect of the research on fatalities. NHTSA pats itself on the back for funding the research, the University researchers are happy being funded and both ignore whether there is any real world impact of the research. This is most of the NHTSA's research the past 46 years. This is why most of the 2025 research plan is meaningless to the core mission of NHTSA.

10. NHTSA's leadership failed to require timely engineering reports on internal and external studies: NHTSA's leadership does not ensure that technical reports are completed in a timely manner with clear background, methods, results and conclusions. For example, NHTSA conducted roof drop tests with an instrumented dummy in a $5 mil University research project. The results were presented in a slide show in 2015 (Kerrigan et al. 2015). No final report or data release has occurred by NHTSA or the contractor the past 10 years.

Another example, NHTSA conducted oblique-front crash tests with a moving deformable barrier in 2014-2017. I am unaware of any publication or analysis of the tests by NHTSA. NHTSA has not produced a final report on the testing, let alone what type of vehicle design changes may be expected or the estimated benefits in reducing US fatalities. Viano (2024c) analyzed the data and published the results. The crash test is not severe enough to cause intrusion that occurs in fatal crashes. NHTSA's crash test is not relevant to how occupants die in motor-vehicle crashes with belts and airbags (Bean et al. 2009). NHTSA has not reconciled that its crash testing is not how people die in highway crashes. US motorists will not realize benefits from a new test for more than 20 years after the initial testing, if at all. Most of the crash tests conducted by NHTSA are not analyzed or reported except for compliance tests. This is an enormous waste of money.

11. NHTSA's leadership failed to require useful archives of reports and studies on NHTSA research: Some of NHTSA's studies lead to DOT reports that are often difficult to find and link to earlier work in the NHTSA archives. This has been a long-standing issue, as searches are awkward often failing to bring up all studies on a topic. It is difficult to search the collection of NHTSA's experience on a topic and get all their studies. For example, NHTSA has a search option on www.nhtsa.gov. If one enters ESC (Electronic Stability Control), there are 5 pages of entries (about 55 items) including vehicle testing, specifications, letters, etc. If one enters pretensioner, there are 8 pages of entries of mostly unimportant background information. There is no way to cluster the files by DOT reports on the topics.

If one searches on DOT reports, a summary spreadsheet of report titles is provided as the first item. Its title says updated April 15, 2013. If one searches in the list for ESC, only 3 titles show up, but the seminal studies by Dang (2004, 2007) are not on the list. The website includes only 10 pages of files, most not involving research reports. NHTSA rarely turns DOT reports into publications in peer reviewed journals. This deprives all researchers of the review process on the work and archiving the study in large searchable databases. A peer-reviewed portion of the ESV Conference was started with Traffic Injury Prevention. This has been helpful, but it is not enough.

NHTSA has a crash test database with search parameters provided to list tests meeting criteria. However, there is no means to find all the frontal crash tests with an unbelted dummy. It is not possible to get the database in Excel or some other format, so

the public can locate relevant tests. The test data is available online with photos, movies and reports for many tests but the test description in the search is often vague. Many tests just say research. What research? The test types and dummies have options for sorting but it is unclear what each category includes. For example, under occupant type, there is THOR 5th female (TF), THOR dummy (TH), THOR-NT with mod kit (TK) and THOR metric (TM). The database with test details should be downloadable for user queries beyond the online search.

12. NHTSA's leadership failed to conduct critical analysis of projects, programs and technologies: NHTSA's leadership rarely conducts critical review of its activities, programs and technologies. If they did, it would be obvious that many activities have been ongoing for 10, 15 years or more without an established practice, intervention or field effect.

The US would have had 31,387 fewer fatalities in 2021 if the US fatalities dropped to the average of 14 other countries at 0.226. This is an incredible number of lives. However, fatalities "flat lined" because of failures of NHTSA's leadership. I am unaware of any NHTSA study discussing why there is a gap in fatality reductions between the US and 14 other countries.

Fatalities would have increased in the US if safety technologies were not voluntarily introduced by automotive manufacturers. For example, I drove prototype vehicles with ESC (electronic stability control) and AEB (automatic emergency braking) in 1995. ESC was developed by the GM Research Laboratories and fit on a vehicle for testing. AEB was developed by Hughes Research Laboratories (now HRL Laboratories), then a subsidiary of GM. AEB used forward radar to provide gap control and automatic emergency braking. It was fit on a vehicle for testing. Both technologies worked well in field tests on US roads. The technologies were put into production by GM without prompting or assistance from NHTSA. There were many other prototype vehicles fit with technologies like night vision, heads-up display, active suspension, 4-wheel steering, etc.

ESC and AEB have impressive records of fatality prevention. For example, Farmer (2004) found ESC reduced single-vehicle fatal crashed by 56% (95th CI = 39%-68%). This translated to an estimated 34% (95th CI = 21%-45%) reduction in overall fatality risk. The study caused US vehicle manufactures to install ESC as standard equipment on light vehicles (passenger cars, trucks, SUVs). Viano et al. (2024) found ESC lowered fatalities 65.2% (95th CI, 63.0-67.4%) in pole and 60.3% (95th CI, 59.0-61.5%) in tree impacts off-road.

Cicchino, Kidd (2024) found AEB reduced rearend crashes by 53% involving passenger vehicles. The effectiveness was 38% with medium-heavy trucks and 41% with motorcycles. Kullgren et al. (2023) found AEB reduced pedestrian impacts 18% (±19%, ns) and bicyclist impacts 23% (±19%) in daylight and twilight conditions. Overall, AEB reduced crash risks 8% (±15%; ns) with pedestrians and 21% (±17%) with bicyclists.

Ford voluntarily introduced Belt Minder in 2001 to increase seatbelt wearing. Williams et al. (2002) found seatbelt use increased from 71% to 76% ($p < 0.01$) with Belt Minder. The annual fatalities in the US would be higher without the voluntary introduction of crash protection and crash avoidance technologies by manufacturers.

NHTSA's leadership should encourage innovation by manufacturers, researchers and others if it is effective in reducing fatalities on US roads. NHTSA's leadership does not prioritize innovation. NHTSA's lackluster 2025 research program is evidence that innovation is not embraced. NHTSA's leadership should be replaced as part of a 44% reduction in headcount to 626 and 60% reduction in budget to $690 mil in 2026 (Viano 2025a).

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