Bumps in the Road to Zero Traffic Fatalities

DRIVE SMART Virginia
5th Annual Distracted Driving Summit
Norfolk, VA
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Motor vehicle crash deaths have declined significantly in the U.S. during the past 50+ years.

U.S. motor vehicle crash deaths and deaths per billion vehicle miles traveled (1950-2015)

- Motor vehicle crash deaths
- Crash deaths per billion vehicle miles traveled

- 2015: 35,092 deaths (11.2 per billion

Graph showing a significant decline in motor vehicle crash deaths from 1950 to 2015.
Motor Vehicle Deaths in 2016 Estimated to be Highest in Nine Years

NSC offers insight into what drivers are doing and calls for immediate implementation of proven, life-saving measures.

Itasca, IL – For the first time in nearly a decade, preliminary 2016 data from the National Safety Council estimates that as many as 40,000 people died in motor vehicle crashes last year. That marks a 6% increase over 2015, and a 14% increase over 2014 – the most dramatic two-year escalation since 1964 – 53 years. The preliminary estimate means 2016 may have been the deadliest year on the nation's roads since 2007. An estimated 4.6 million roadway users were injured seriously enough to require medical attention in 2016, and estimated cost to society was $432 billion.
ETSC says EU member states also need to take action to help improve road safety. Declines in levels of police enforcement, a failure to invest in safer infrastructure and a lack of action on tackling speed and drink driving have also played a role in recent poor progress in some member states. ETSC’s in-depth analysis of the latest national road safety data will be launched on 20 June at the ETSC Road Safety Performance Index conference in Brussels.

The European Commission has, for the first time, published a figure for the number of people seriously injured on Europe’s roads: 135,000 in 2014. This move required the adoption, by all EU member states, of a standardised definition of what constitutes a serious road injury, as well as a standardised way of collecting the data. ETSC welcomes this long overdue and positive step in the right direction. But a long term target and measures to reduce the numbers seriously injured are now needed. They were promised last year but not delivered. ETSC says that now the data are available, there is no reason to delay further.

Notes to editors:

1. In a report published last week, ETSC called for an overhaul of Europe’s vehicle safety framework: http://etsc.eu/europes-car-safety-framework-needs-overhaul/

For further information

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Downward trend in Japan’s traffic deaths suffered minor reverse in 2015

The number of deaths caused by traffic accidents in 2015 rose by four from the previous year to 4,117, up for the first time in 15 years, the National Police Agency said Monday.

The number of fatalities among people aged 65 or older increased by 54 to 2,247, according to the NPA’s preliminary data. They accounted for 54.6 percent of all such deaths, the highest level since officials began compiling comparable statistics in 1967.

An NPA official attributed the rise to the growing population of elderly people, who have a higher mortality rate in the event of an accident.

The data mean that the government failed to achieve its target of reducing the annual traffic death toll to 3,000 or less by 2015, which was set under the basic plan for traffic safety covering fiscal 2011 to 2015.

“We need to make a drastic review of our measures, as the annual total (of traffic deaths) surpassed the target by more than 1,000 people,” Taro Kono, chairman of the National Public Safety Commission, told a news conference.

Despite the increase, the traffic deaths in 2015 were the fourth fewest since the survey was launched in its current format in 1948.
Crash deaths and their rate are highly correlated with economic conditions.
U.S. motor vehicle crash deaths and unemployment rate
1950-2015

Motor vehicle crash deaths
Unemployment rate

2015
5% rate
35,092 deaths
U.S. motor vehicle crash deaths per billion vehicle miles traveled and unemployment rate
1950-2015

Crash deaths per billion vehicle miles traveled
Unemployment rate

11.2 per billion
5 percent
Change in U.S. motor vehicle crash deaths per billion miles traveled and unemployment rate
1950-2015
Effects of economy on miles traveled and crash deaths

- **Miles traveled**
  - Increase by 1.5% each year, on average
  - Increase by another 1.8% for each 1 percentage point decline in unemployment

- **Crash deaths**
  - Decrease by 2% each year, on average
  - Increase by 1% for each 1% rise in miles
  - Increase by another 2% for each 1 percentage point decline in unemployment

- Combined with the effect on miles traveled, each 1 percentage point decline in unemployment is associated with about a 4% increase in crash deaths
Examples of economic effect on risky driving
Youth are returning to cars
2006-14, indexed to 2006

The graph shows the difference between teen and prime unemployment rates, as well as the exposure ratio, from 2006 to 2014. The teen to prime ratio is represented by a green line, while the unemployment spread is represented by a red line. The data is indexed to 2006.
Economic conditions affect speeds
Observed speeds on I-15 with 75 mph limit in Nevada
Motor vehicle crash deaths –Forecast
Motor vehicle crash deaths, 1990-2015
With projections for 2016-24

- Blue line: motor vehicle crash deaths
- Orange line: if unemployment declines by 1.7% each year
- Red line: if unemployment remains steady at 4.9
The downward trend continues because vehicles with improved crashworthiness are still working their way into the vehicle fleet.
Crash protection ratings by model year

Improvements beginning in 1995

- Moderate overlap front
- Side impact
- Head restraints and seats
- Roof strength
- Small overlap front

Legend:
- Poor
- Marginal
- Acceptable
- Good
Death and injury reductions
Good versus poor in IIHS tests

- Front offset with moderate overlap test
  - Fatality risk in head-on crashes is 46 percent lower
- Side impact crash test
  - Fatality risk in side impact crashes 70 percent lower
  - In addition to the benefit of adding side airbag protection for the head
- Rear impact test (seat only)
  - Neck injury risk in rear crashes is 15 percent lower
  - Risk of neck injury requiring 3+ months treatment is 35 percent lower
IIHS crash test ratings for registered vehicles by calendar year

All registered vehicles

- **moderate overlap frontal offset test**
- **side impact test**
- **roof strength test**
- **small overlap frontal offset test**

Categories:
- Good
- Acceptable
- Marginal
- Poor
- Unrated
Persistent problems
Belt-use rate and unrestrained proportion of occupant deaths
Daytime, 2000-16
Percent of vehicle crash deaths where speeding was a contributing factor, 1993-2015
On U.S. roads in 2015, about 181,000 red light running crashes caused about 137,000 injuries and 771 deaths.
Percent of U.S. crash deaths involving at least one driver with BAC ≥ 0.08 percent, 1982-2015
Is legalization of marijuana use a new problem?
Laws legalizing some uses of marijuana
September 2017

Please remove outlines from CA, NV, ND, AR, FL, RI, ME

source: National Conference of State Legislatures
### Changes in damage claims and crash deaths after legalization of recreational marijuana use

<table>
<thead>
<tr>
<th></th>
<th>Aydelotte et al. 2017, AJPH</th>
<th>Highway Loss Data Institute 2017</th>
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<tr>
<td><strong>study states</strong></td>
<td>Colorado and Washington</td>
<td>Colorado, Washington, Oregon</td>
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<td><strong>control states</strong></td>
<td>Alabama, Indiana, Kentucky, Missouri, South Carolina, Tennessee, Texas, Wisconsin</td>
<td>Idaho, Montana, Nevada, Utah, Wyoming</td>
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<td><strong>calendar years</strong></td>
<td>January 2009-December 2015</td>
<td>January 2012-October 2016</td>
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<td><strong>outcome measure</strong></td>
<td>change in annual motor vehicle crash fatality rate per billion miles traveled</td>
<td>change in collision claim rate per 100 insured vehicle years</td>
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<tr>
<td><strong>result</strong></td>
<td>2.7% increase in fatalities (not statistically significant)</td>
<td>2.7% (significant increase)</td>
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Rising speed limits aren’t helping
Maximum speed limits
January 1993

[Map showing speed limit signs across the United States, with various states highlighted in different colors indicating speed limits: 55 mph (DC only), 60 mph, 65 mph, 70 mph, 75 mph, 80 mph, 85 mph.]

Legend:
- 55 mph (DC only)
- 60 mph
- 65 mph
- 70 mph
- 75 mph
- 80 mph
- 85 mph
Maximum speed limits
January 2013

- 55 mph (DC only)
- 60 mph
- 65 mph
- 70 mph
- 75 mph
- 80 mph
- 85 mph
Deaths and expected deaths if maximum speed limits had not increased
1993-2013

- 28,000 deaths
- 32,000 deaths
- 36,000 deaths
- 40,000 deaths
- 44,000 deaths

- 1,900 expected deaths
- 33,000 deaths
Summary

- Speed limits continue to go up
- 8 percent increase in traffic fatality rate on interstates and freeways for every 5 mph increase in maximum speed limits
  - 500 additional deaths in 2013
- 4 percent increase on other types of roads
  - 1,400 additional deaths in 2013
- Approximately 33,000 lives lost due to post-NMSL speed limit increases
  - Three quarters of the 43,000 lives saved by frontal airbags
Maximum speed limits
June 2017

- 55 mph (DC only)
- 60 mph
- 65 mph
- 70 mph
- 75 mph
- 80 mph
- 85 mph
Despite effectiveness, the use of automated enforcement programs is losing ground.
Percent difference in actual fatal crash rates during 1992-2014 in cities with red light cameras vs. expected rates without cameras

- red light running fatal crashes: -30
- fatal crashes at intersections with signal lights: -20
Push to ban red light cameras not at top of legislative agenda.

Stop whining over red light cameras Wheeling police defend red light cameras.

Tempe man sues, claims photo enforcement is fraud.

Voters targeting red light cameras at polls.

Safety, not money, should be priority for red light cameras.

It’s Official: Red Light Cameras Don’t Work.

Houston voters decide on red light cameras.

More questions arise concerning red-light cameras.

Red light cameras still not approved.

More red-light camera questions.

Red-light issue screeches to halt.

Red Light Camera Blues? There’s an App for That.

Despite questions over red light cameras, St. Petersburg moves forward.

Haines City’s Red-Light Cameras: Increase Revenue, Decrease Staff.
U.S. communities with red light cameras
1992-2015
Percent difference in actual fatal crash rates in cities that turned off cameras during 2010-2014 vs. expected rates with cameras.
Intersection crash reenactment
Reductions in proportion of vehicles exceeding speed limit by more than 10 mph
6 to 8 months after camera enforcement

Scottsdale, AZ Loop 101 freeway
Montgomery County, MD residential streets
District of Columbia city streets
Spillover effects from automated enforcement

Reductions in proportion of vehicles exceeding speed limit by more than 10 mph

-100% -80% -60% -40% -20% 0%

Cameras operational
Scottsdale, AZ

Cameras not operational
Glendale, AZ

Loop 101 freeway
Long-term reductions in vehicle speeds and serious crashes associated with speed camera enforcement

Montgomery County, Maryland
Review of 28 international studies shows that speed camera enforcement reduces injury and fatal crashes
Wilson et al., 2010

- 8-50% reduction in injury crashes in the vicinity of camera sites
- 11-44% reduction in fatal or serious injury crashes in the vicinity of camera sites
- 17-58% reduction in fatal or serious injury crashes over wider areas
U.S. communities with speed cameras
1995-2016
Percent who favor camera enforcement
Telephone survey in Washington, D.C., 2012
Driver assistance technology may help, but it will take awhile
Front crash prevention systems are reducing police-reported rear-end strikes

Compared with vehicles without any front crash prevention…

…vehicles with **forward collision warning only** are **27% less likely** to rear-end another vehicle.

…vehicles with **forward collision warning AND autobrake** are **50% less likely** to rear-end another vehicle.

If every vehicle on the road had forward collision warning with autobrake in 2014, there would have been an estimated

- 1,000,000 fewer police-reported crashes
- 400,000 fewer police-reported injuries
20 automakers have committed to make AEB a standard feature by September 2022

99+% of U.S. market
Summary of technology effects on relevant police-reported crash types

-60%
-50%
-40%
-30%
-20%
-10%
0%
10%
forward collision warning
low-speed autobrake
fcw with autobrake
lane departure warning
side-view assist (blind spot)

-60%
New vehicle series with forward collision warning
By model year

Year | Standard | Optional | Not Available
--- | --- | --- | ---
2000 | 100% | 0% | 0%
2002 | 100% | 0% | 0%
2004 | 100% | 0% | 0%
2006 | 100% | 0% | 0%
2008 | 90% | 10% | 0%
2010 | 80% | 20% | 0%
2012 | 70% | 30% | 0%
2014 | 60% | 40% | 0%
2016 | 50% | 50% | 0%

Legend:
- Green: Standard
- Yellow: Optional
- Red: Not Available
Registered vehicles with forward collision warning

By calendar year
Estimated registered vehicles by feature
Calendar years 2016 and 2021

- Rear camera
- Rear parking sensors
- Blind spot
- Lane departure warning
- Forward collision warning
- Adaptive headlights
- Automatic emergency braking

2016
2021
Conclusions

- The road to zero has bumps
  - Increasing miles of travel as population increases
  - Growing economy contributes to both miles traveled and risk of those miles
  - Public policies are going in direction of increased risk
    - Higher speed limits
    - Political challenge of effective enforcement

- On the positive side
  - Vehicle design improvements will continue to roll into the vehicle fleet
  - New technology will be increasingly effective in preventing or mitigating crashes
  - Many adverse policy decisions are reversible given political will
  - There are additional roadway design changes that may be more acceptable
    - Roundabouts
    - Simple improvements in road signing
More information and links to our YouTube channel and Twitter feed at iihs.org

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Percent U.S. drivers using cellphones at any given daylight time and motor vehicle crash deaths
2000-15