Highway Safety: Past, Present and Future

2016 Lifesavers Conference
Long Beach, California
April 3, 2016

Adrian Lund
President, IIHS and HLDI
President LBJ signs Highway Safety Act
September 1966
LBJ congratulates Alan Boyd as the 1st Secretary of Transportation

November 1966

“The purpose of the Highway Safety Act is to promote the development of new countermeasures against accidents and their end results”
William Haddon Jr.

“It is time for society to decide to promote and demand nothing less than vehicle packages and roadside environments that protect people”
# Haddon matrix

## Recognizing opportunities to make a difference

<table>
<thead>
<tr>
<th>changes in…</th>
<th>before</th>
<th>during</th>
<th>after</th>
<th>losses</th>
</tr>
</thead>
</table>
| **people**  | • licensing (GDL, elderly)  
• impaired driving laws  
• camera enforcement | • restraints (use)  
• helmets  
• speed cameras | • alcohol  
• medical bracelet  
• general health | • injuries  
• deaths  
• income  
• hospital costs |
| **vehicles** | • driver assistance  
• daytime running lights  
• electronic stability control  
• advanced headlamps | • restraints (effect)  
• vehicle structure  
• bumpers | • automatic crash notification  
• fuel systems  
• repairability | • damage  
• insurance costs |
| **environment** | • intersection design  
• trouble-spot treatment  
• rumble strips | • roundabouts  
• breakaway poles  
• crash cushions | • emergency medicine | • economic  
• fuel usage (CAFE)  
• congestion |
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

- 1966: 54.9 per billion, 50,894 deaths
- 2014: 10.8 per billion, 32,675 deaths
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014


Motor vehicle crash deaths

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

1950-2014

1970: NHTSA issues first passive occupant restraint requirement

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

1974: 55 mph National Maximum Speed Limit

Motor vehicle crash deaths

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

1950-2014

1978: Tennessee enacts first child passenger safety law

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

1978: NHTSA begins New Car Assessment Program (NCAP)

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths

Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

1980: MADD founded

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

1982: First Lifesavers Conference in Detroit

Motor vehicle crash deaths per billion vehicle miles traveled

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths

Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

1984: New York enacts first seat belt law

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

1984: National Minimum Drinking Age Act

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths


1950-2014
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

1984: NHTSA issues final passive occupant restraint requirement for passenger cars unless 2/3 of U.S. population covered by belt use laws

Motor vehicle crash deaths

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

1950-2014

1986: CDC establishes injury control program

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

1986: California begins first alcohol ignition interlock program

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

1986: National Roadside Survey by IIHS shows dramatic decline in drinking drivers

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

1987: National Maximum Speed Limit relaxed on rural Interstate highways

Motor vehicle crash deaths

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

1950-2014

1987: National SAFE KIDS Campaign founded

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

1988: Advocates for Highway and Auto Safety founded

Motor vehicle crash deaths

Crash deaths per billion vehicle miles traveled


1988

Motor vehicle crash deaths

Crash deaths per billion vehicle miles traveled

30,000 35,000 40,000 45,000 50,000 55,000 60,000 65,000 70,000 75,000 80,000

Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

1989: IIHS and MADD announce research confirming efficacy of 3 major alcohol-impaired driving laws (ALR, Per Se, and 1st Offense Jail)

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

1990: Supreme Court holds sobriety checkpoints constitutional

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

1990: NHTSA revises FMVSS 214 to require dynamic side impact testing

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

1991: NHTSA extends automatic restraint requirement to light trucks with a GVWR of 8,500 pounds or less

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

1992: IIHS opens the Vehicle Research Center

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

1993: North Carolina begins Click It or Ticket campaign

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

1995: National Maximum Speed Limit repealed

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

**1996:** Florida enacts first graduated driver licensing law

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

1950-2014

1996: NHTSA begins NCAP side impact protection testing/rating

Motor vehicle crash deaths

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

1950-2014

2000: 0.08 BAC law required by FY 2004
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

2001: California becomes first State with seat belt use above 90%

Motor vehicle crash deaths

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

1950-2014

2004: Washington enacts first all-offender ignition interlock law

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

1950-2014

2007: NHTSA issues FMVSS 126 requiring electronic stability control

Crash deaths per billion vehicle miles traveled

Motor vehicle crash deaths

Motor vehicle crash deaths and deaths per billion vehicle miles traveled
2015 Marks Largest Increase in Traffic Deaths in 50 Years  

CBS News, 2/17/16

U.S. Traffic Deaths Increase Sharply in 2015  

Reuters, 2/5/16

Motor Vehicle Deaths in 2015 Increased by the Largest Percent in 50 Years  

Daily News, 2/18/16

Auto Fatalities at 7-year High in 2015  

ABC News, 2/5/16

Traffic Deaths Jump by Most Since 1966, Safety Group Says  

Houston Chronicle, 2/17/16

NSC: Motor Vehicle Deaths in 2015 Increased by Largest Percentage in 50 Years  

National Safety Council, 2/17/16

2015 Brought Biggest Percent Increase in U.S. Traffic Deaths in 50 Years  

Newsweek, 2/17/16
It’s the economy ...
US motor vehicle crash deaths and unemployment rate
1950-2014

Motor vehicle crash deaths

Unemployment rate

6 percent
32,675
Motor vehicle crash deaths per billion vehicle miles traveled and unemployment rate
1950-2014

Crash deaths per billion vehicle miles traveled

Unemployment rate

10.8 per billion

6 percent
Year-to-year percent changes in US motor vehicle crash deaths per billion vehicle miles traveled and unemployment rate

1951-2014

Crash deaths per billion vehicle miles traveled

Unemployment rate
Much of the improved highway safety picture in recent decades is due to vehicle designs
Vehicle and non-vehicle factors and highway safety

Passenger vehicle driver deaths per million vehicles, actual vs. expected for 1985 fleet
Crashworthiness
Crashworthiness in 1959 and 2009
New car assessment programs (NCAPs)
By year of inception
What’s next for vehicle safety?
Cars that sense what’s around them are enabling new crash prevention systems.
Front crash prevention systems are preventing crashes reported to insurers

Systems intended to prevent front to rear crashes

- 10 percent reduction, on average, in property damage liability claims for vehicles with forward collision warning
- 14 percent reduction, on average, in PDL claims when FCW includes emergency autobrake
- 19 percent reduction in bodily injury claims for vehicles with FCW and autobrake

If every vehicle had had FCW with autobrake in 2014, we estimate there would have been more than 700 thousand fewer PDL claims and more than 200 thousand fewer injury claims.
Twenty automakers have committed to make AEB a standard feature by September 2022
Represent > 99 percent of U.S. market
The Google vision

Autonomous vehicles delivering occupants to pre-set destinations
Driver Alcohol Detection System for Safety
Preventing alcohol-impaired driving in a transparent manner

BREATH-BASED SYSTEM

TOUCH-BASED SYSTEM
How fast is this new technology coming?
“How Driverless Cars Will Radically Change Every Aspect of Our Lives”

“Nissan aims for fully autonomous cars by 2020”

“Google’s self-driving cars have autonomously driven over 1 million miles”

“Honda says autonomous cars won't be ready until 2030 at the earliest”
Fleet penetration of new technology is slow

Registered vehicles with available electronic stability control, actual and predicted
## Not all technology is working as expected

Insurance claim frequency reduction for 4 crash avoidance technologies, pooled across automakers

<table>
<thead>
<tr>
<th>Technology</th>
<th>Collision</th>
<th>PDL</th>
<th>BIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>front crash prevention</td>
<td>2&lt;sup&gt;A&lt;/sup&gt;</td>
<td>9&lt;sup&gt;A&lt;/sup&gt;</td>
<td>15&lt;sup&gt;A&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>2&lt;sup&gt;B&lt;/sup&gt;</td>
<td>14&lt;sup&gt;B&lt;/sup&gt;</td>
<td>19&lt;sup&gt;B&lt;/sup&gt;</td>
</tr>
<tr>
<td>adaptive headlights</td>
<td>1</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>lane departure prevention</td>
<td>1&lt;sup&gt;C&lt;/sup&gt;</td>
<td>(1)&lt;sup&gt;C&lt;/sup&gt;</td>
<td>3&lt;sup&gt;D&lt;/sup&gt;</td>
</tr>
<tr>
<td>side view assist (blind spot)</td>
<td>2</td>
<td>10</td>
<td>16</td>
</tr>
</tbody>
</table>

A = FCW without autobrake  
B = FCW with autobrake  
C = Mercedes & Mazda LDW only  
D = Mercedes only
Motor vehicle crash deaths and deaths per billion vehicle miles traveled

Still a long way to Vision Zero

Motor vehicle crash deaths

Crash deaths per billion vehicle miles traveled

2014
10.8 per billion
32,675 deaths
Many roads to Vision Zero

No need to wait for new technology
LOW-HANGING FRUIT

Dangers saving a life on the road is as basic as getting people to slow down, buckle up, or don a helmet. Tried and true countermeasures like these usually don't grab headlines, but if they were more widely propagated across the nation they would yield an immediate reduction in motor vehicle crash deaths.

The number of people who die in crashes in the United States is at a record low. Still, there were an estimated 32,738 motor vehicle crash deaths last year, according to a preliminary projection by the National Highway Traffic Safety Administration (NHTSA). Vehicles are safer than ever, and emerging technologies...
Thousands of people still die because they didn’t buckle up

- Safety belts saved an estimated 12,584 lives in 2013
- If everyone buckled up, an additional 2,800 deaths could have been prevented
- Belt laws increase belt use, especially with publicized enforcement
  - Belt use rates are higher in states with primary enforcement laws, which allow police to stop a driver solely for not using a safety belt
People continue to drive impaired...

- Nearly 7,000 deaths could have been prevented in 2013 if all drivers were below the legal limit.
- Despite earlier declines in alcohol-related highway deaths, about a third of all drivers who die in crashes in the U.S. have blood alcohol concentrations of 0.08 percent or higher.
Helmets make riding less dangerous

- Although motorcyclist deaths have fallen from their 2008 peak of more than 5,000, the 4,381 that occurred in 2013 were still more than double the number from 1997.

- Unhelmeted riders are 3 times more likely than helmeted ones to sustain traumatic brain injuries in the event of a crash.
Maximum speed limits
April 2016

- 70 mph
- 75 mph
- 80 mph
- 85 mph

State speed limits:
- 65 mph (D.C. only)
- 55 mph (D.C. only)
- 60 mph
- 70 mph
- 75 mph
- 80 mph
- 85 mph

States with 85 mph speed limit:
- Texas

States with 80 mph speed limit:
- Florida

States with 75 mph speed limit:
- South Dakota

States with 70 mph speed limit:
- North Dakota

States with 60 mph speed limit:
- Oregon

States with 55 mph speed limit:
- Nevada

States with 65 mph speed limit:
- California

States with 55 mph (D.C. only):
- District of Columbia
Almost one-quarter of crash deaths occur at intersections.

Conversion of stop sign and traffic signal intersections to roundabouts:

- 40 percent reduction in all crashes
- 80 percent reduction in injury crashes
- 90 percent reduction in fatal & incapacitating injury crashes
Many roads to Vision Zero
Lifesavers is a good place to learn how to get there sooner
More information and links to our YouTube channel and Twitter feed at iihs.org