

# **Advanced Technologies:** **An Opportunity to Improve Vehicle Safety**

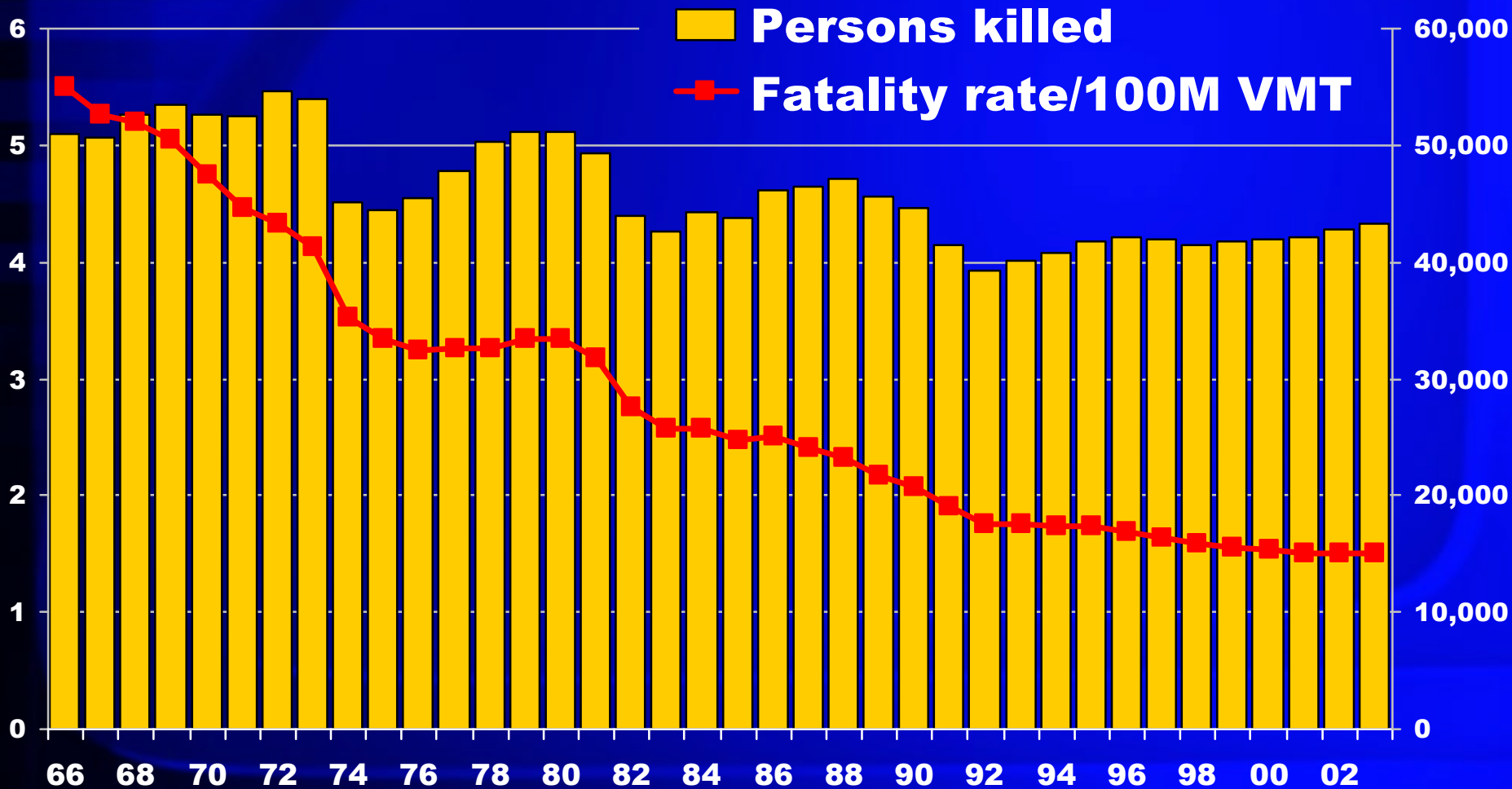
**Meeting with Automotive Suppliers**  
**Washington, DC**

**Jeffrey Runge, M.D.**  
**Administrator**  
**National Highway Traffic Safety Administration**  
**August 3, 2004**

# Top 10 Leading Causes of Death in the United States for 2001, by Age Group

RANK	Cause and Number of Deaths											Years of Life Lost
	Infants Under 1	Toddlers 1-3	Young Children 4-7	Children 8-15	Youth 16-20	Young Adults 21-24	Other Adults			Elderly 65+	All Ages	
							25-34	35-44	45-64			
1	Perinatal Period 13,734	Congenital Anomalies 496	<b>MV Traffic Crashes 533</b>	<b>MV Traffic Crashes 1,546</b>	<b>MV Traffic Crashes 5,979</b>	<b>MV Traffic Crashes 4,136</b>	<b>MV Traffic Crashes 6,759</b>	Malignant Neoplasms 16,569	Malignant Neoplasms 139,785	Heart Disease 582,730	Heart Disease 700,142	Malignant Neoplasms 23% (8,614,131)
2	Congenital Anomalies 5,513	<b>MV Traffic Crashes 421</b>	Malignant Neoplasms 400	Malignant Neoplasms 829	Homicide 2,414	Homicide 2,738	Homicide 5,204	Heart Disease 13,326	Heart Disease 98,885	Malignant Neoplasms 390,214	Malignant Neoplasms 553,768	Heart Disease 22% (8,110,571)
3	Heart Disease 479	Accidental Drowning 393	Exposure to Smoke/Fire 178	Suicide 447	Suicide 1,879	Suicide 1,924	Suicide 5,070	<b>MV Traffic Crashes 6,891</b>	Stroke 15,518	Stroke 144,486	Stroke 163,538	<b>MV Traffic Crashes 5% (1,700,952)</b>
4	Homicide 332	Homicide 362	Congenital Anomalies 168	Homicide 391	Malignant Neoplasms 814	Accidental Poisoning 771	Malignant Neoplasms 3,994	Suicide 6,635	Diabetes 14,913	Chronic Lwr. Resp. Dis. 106,904	Chronic Lwr. Resp. Dis. 123,013	Stroke 5% (1,687,683)
5	Septicemia 312	Malignant Neoplasms 321	Accidental Drowning 164	Congenital Anomalies 324	Accidental Poisoning 566	Malignant Neoplasms 768	Heart Disease 3,160	HIV 5,867	Chronic Lwr. Resp. Dis. 14,490	Influenza/Pneumonia 55,518	Diabetes 71,372	Chronic Lwr. Resp. Dis. 4% (1,444,745)
6	Influenza/Pneumonia 299	Heart Disease 200	Homicide 133	Accidental Drowning 293	Heart Disease 398	Heart Disease 543	Accidental Poisoning 2,507	Accidental Poisoning 5,036	Chronic Liver Disease 13,009	Diabetes 53,707	Influenza/Pneumonia 62,034	Suicide 3% (1,079,822)
7	<b>MV Traffic Crashes 139</b>	Exposure to Smoke/Fire 170	Heart Disease 82	Heart Disease 273	Accidental Drowning 326	Accidental Drowning 211	HIV 2,101	Homicide 4,268	Suicide 9,259	Alzheimer's 53,245	Alzheimer's 53,852	Perinatal Period 3% (1,070,154)
8	Nephritis/Nephrosis 133	Septicemia 96	MV NonTraffic Crashes 51	Exposure to Smoke/Fire 140	Congenital Anomalies 244	Congenital Anomalies 206	Stroke 601	Chronic Liver Disease 3,336	<b>MV Traffic Crashes 8,750</b>	Nephritis/Nephrosis 33,121	<b>MV Traffic Crashes 42,443</b>	Diabetes 3% (1,014,201)
9	Stroke 108	Influenza/Pneumonia 92	Benign Neoplasms 46	MV NonTraffic Crashes 125	Accidental Falls 114	HIV 167	Diabetes 595	Stroke 2,491	HIV 5,437	Septicemia 25,418	Nephritis/Nephrosis 39,480	Homicide 3% (924,263)
10	Meningitis 78	Perinatal Period 63	Septicemia 33	Chr. Lwr. Resp. Dis. 102	Acc. Dischg. of Firearms 114	Accidental Falls 134	Congenital Anomalies 458	Diabetes 1,958	Nephritis/Nephrosis 5,106	Hypertension Renal Dis. 16,397	Septicemia 32,238	Chronic Liver Disease 2% (623,998)
ALL	27,568	4,288	2,703	6,672	15,851	14,940	41,683	91,674	412,204	1,798,420	2,416,425	All Causes 100% (36,866,317)

# Persons Killed and Rate Per 100M VMT

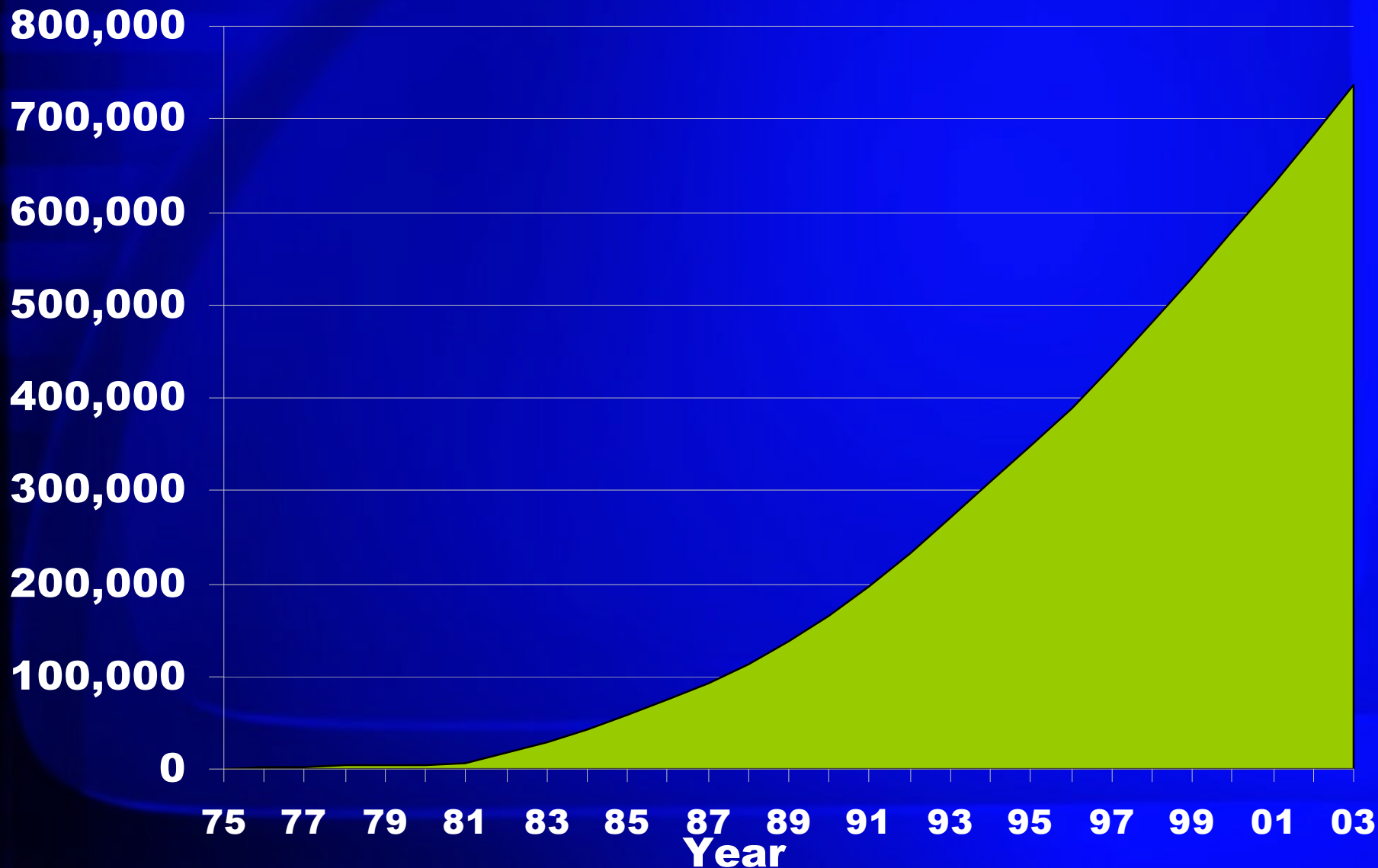


Source: 2002 FARS

# 2008 Goal is Challenging



# Cumulative Lives Saved Since 1975: 736,306



# Haddon Matrix

Human

Vehicle

Environment

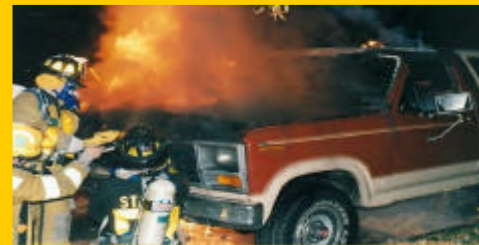
Pre-Event



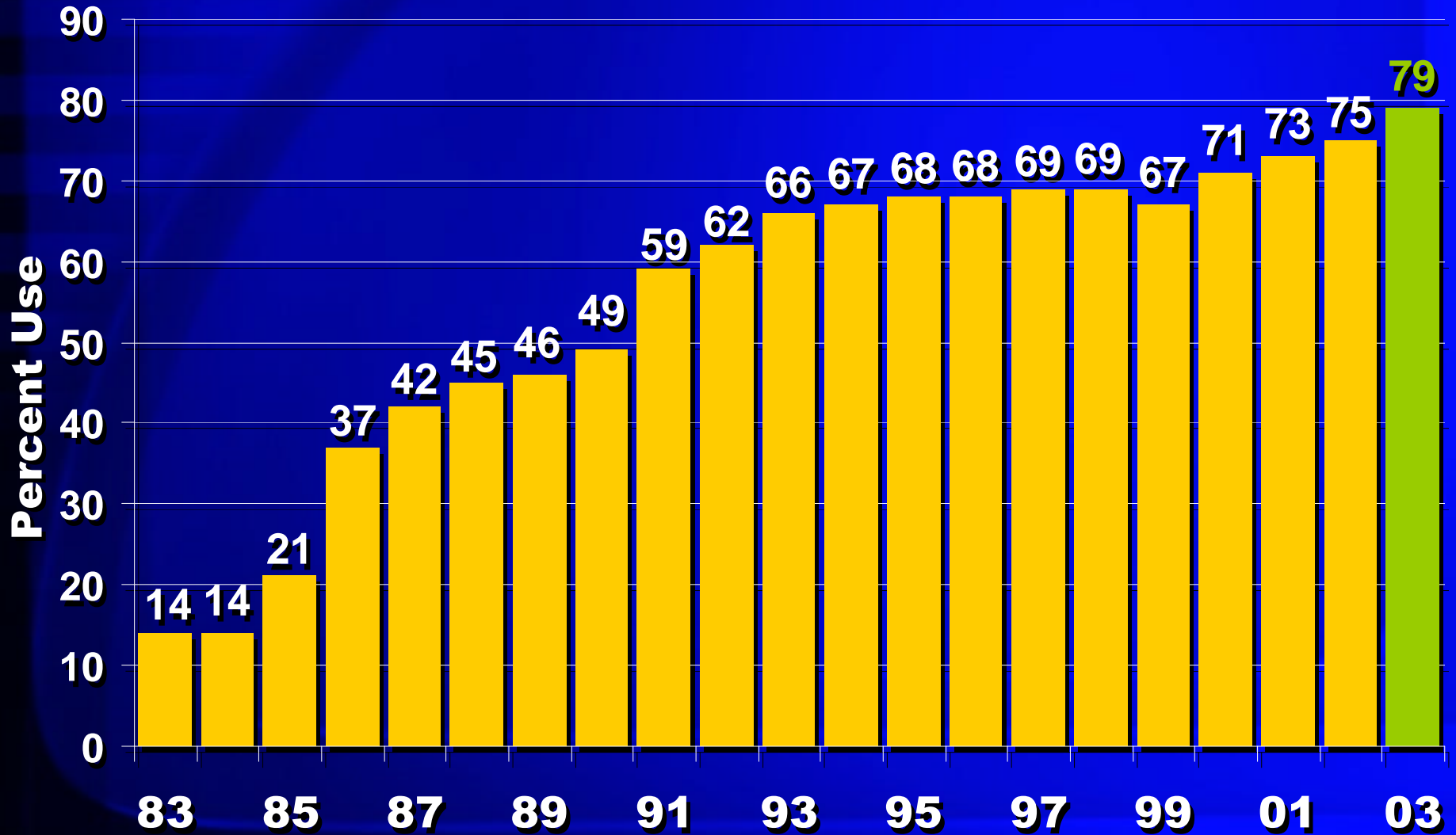
Event



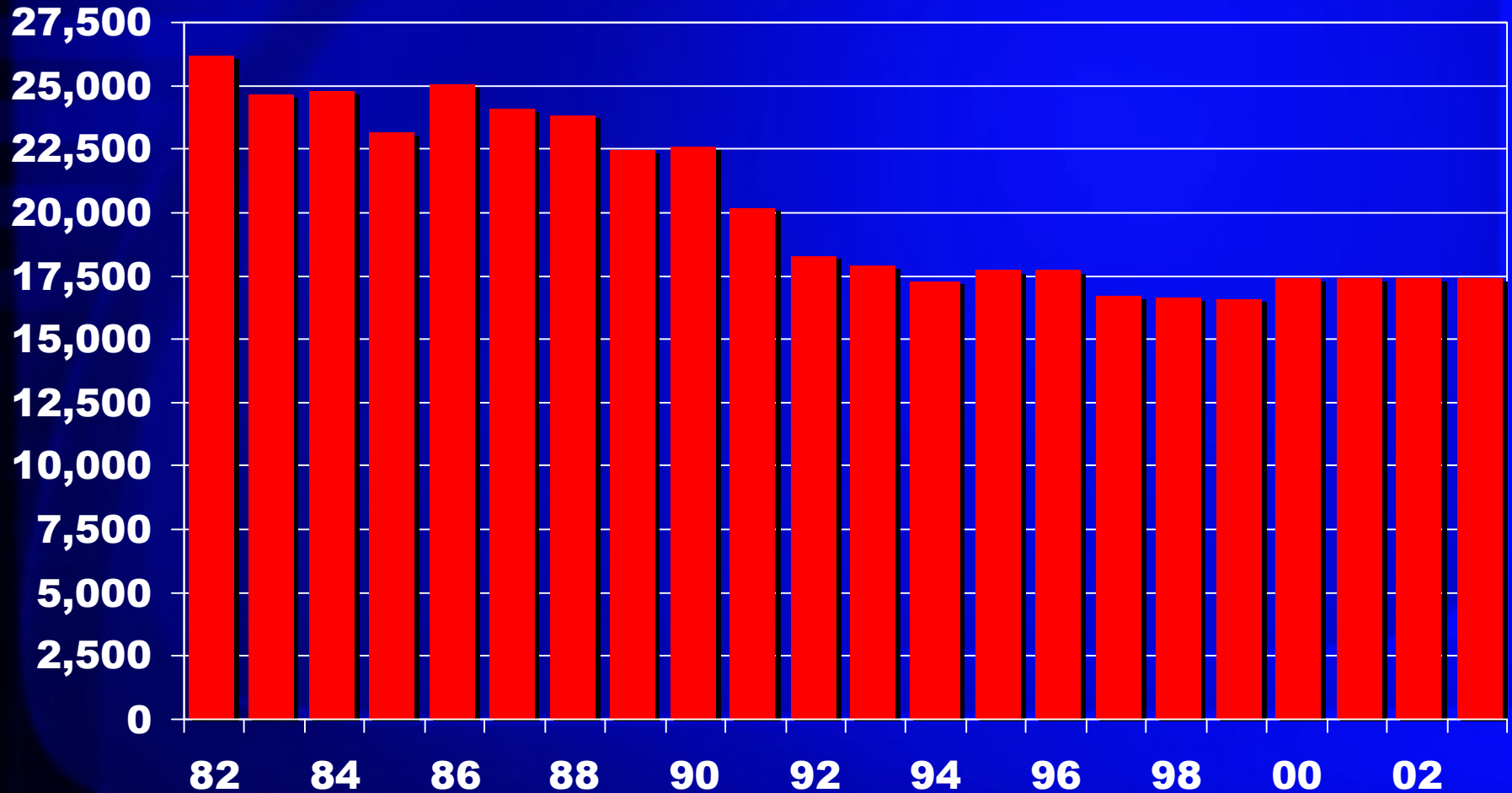
Post-Event



# Safety Belt Use Rates



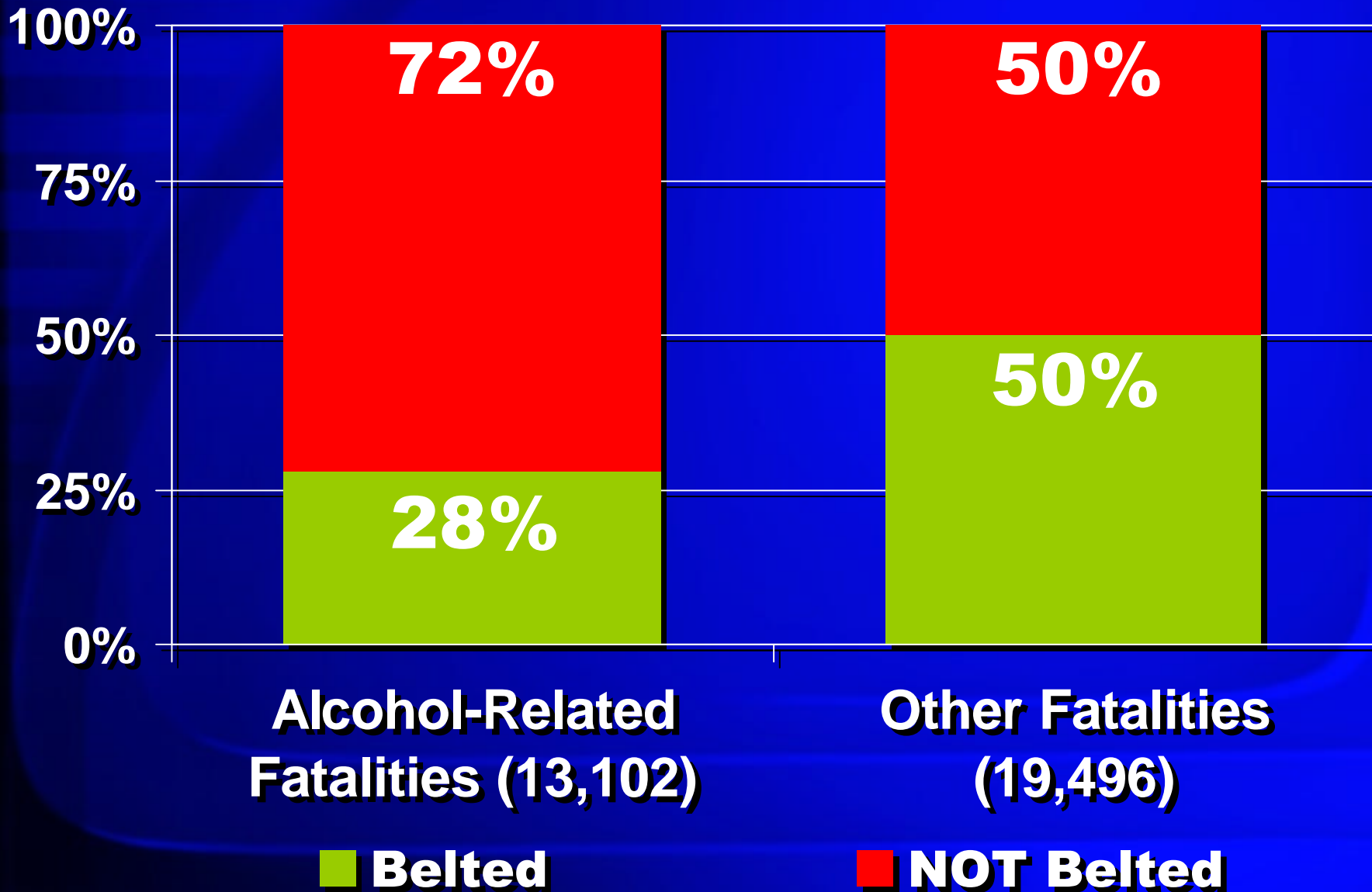
# Alcohol-Related Fatalities 1982 – 2003



Source: FARS



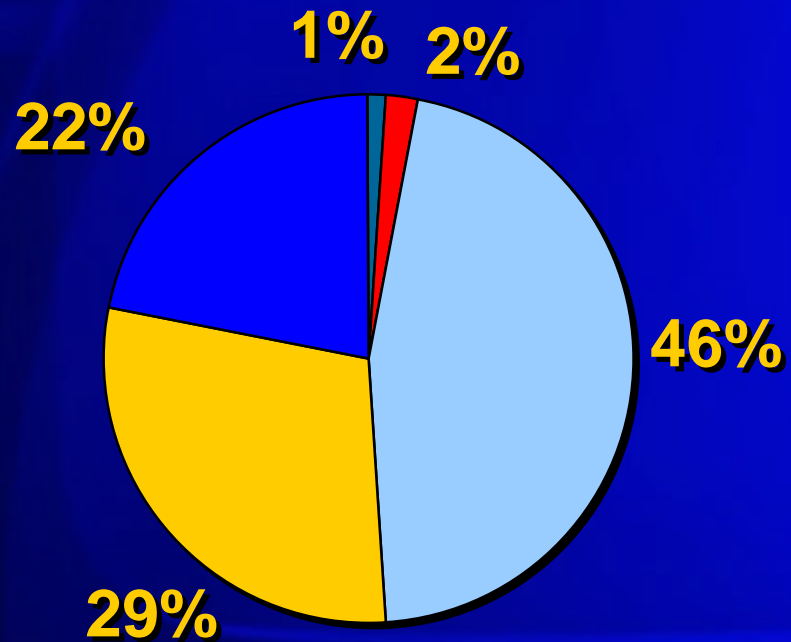
# 2002 Occupant Fatalities: 32,598



# Vehicles and Fatalities by Collision Type 2002

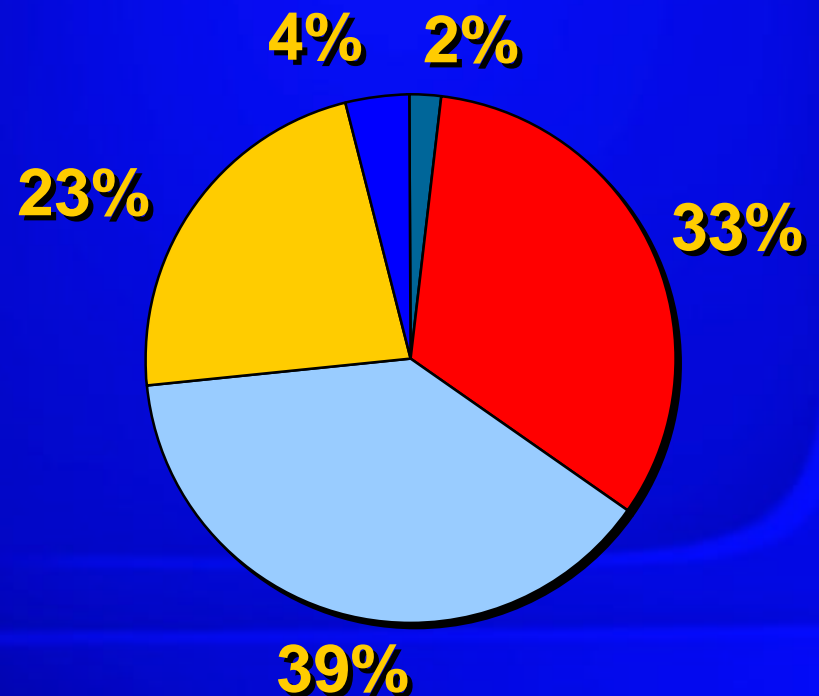
## Passenger Vehicles in Crashes

Approx. 10.6 million vehicles involved



## Passenger Vehicle Occupant Fatalities

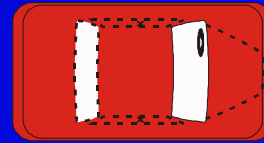
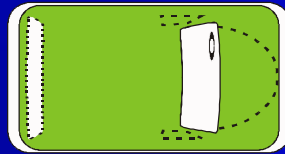
32,598 total occupants killed



**Rollover** **Front** **Side** **Rear** **Other**

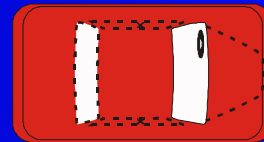
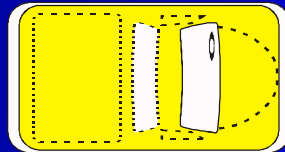
# Driver Fatality Ratios in Frontal Crashes

Large Van



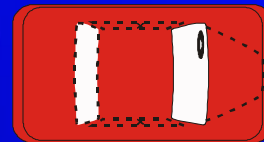
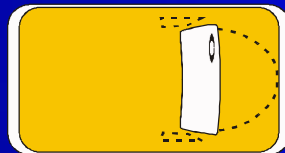
1:8.5

Large Pickup



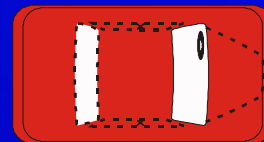
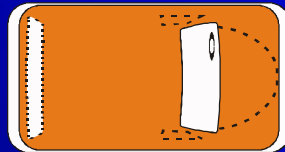
1:7.9

Sport Utility Vehicle (All)



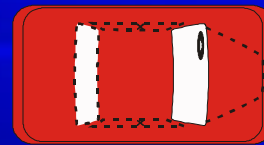
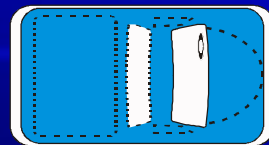
1:4.5

Minivan



1:3.6

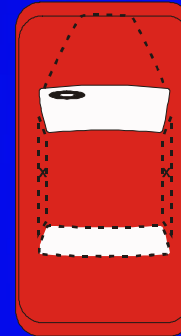
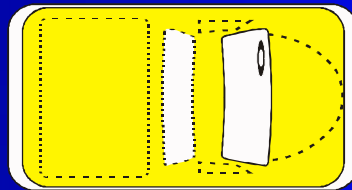
Compact Pickup



1:2.1

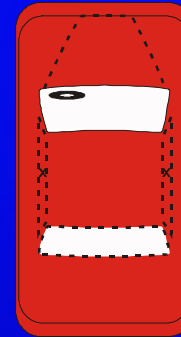
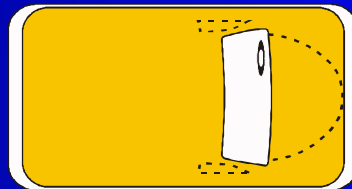
# Driver Fatality Ratios in Side Crashes

Large Pickup



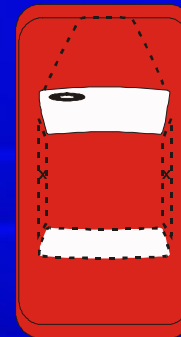
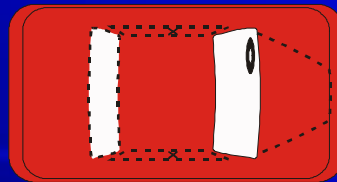
1:39.1

Sport Utility Vehicle (All)



1:22.1

Passenger Car

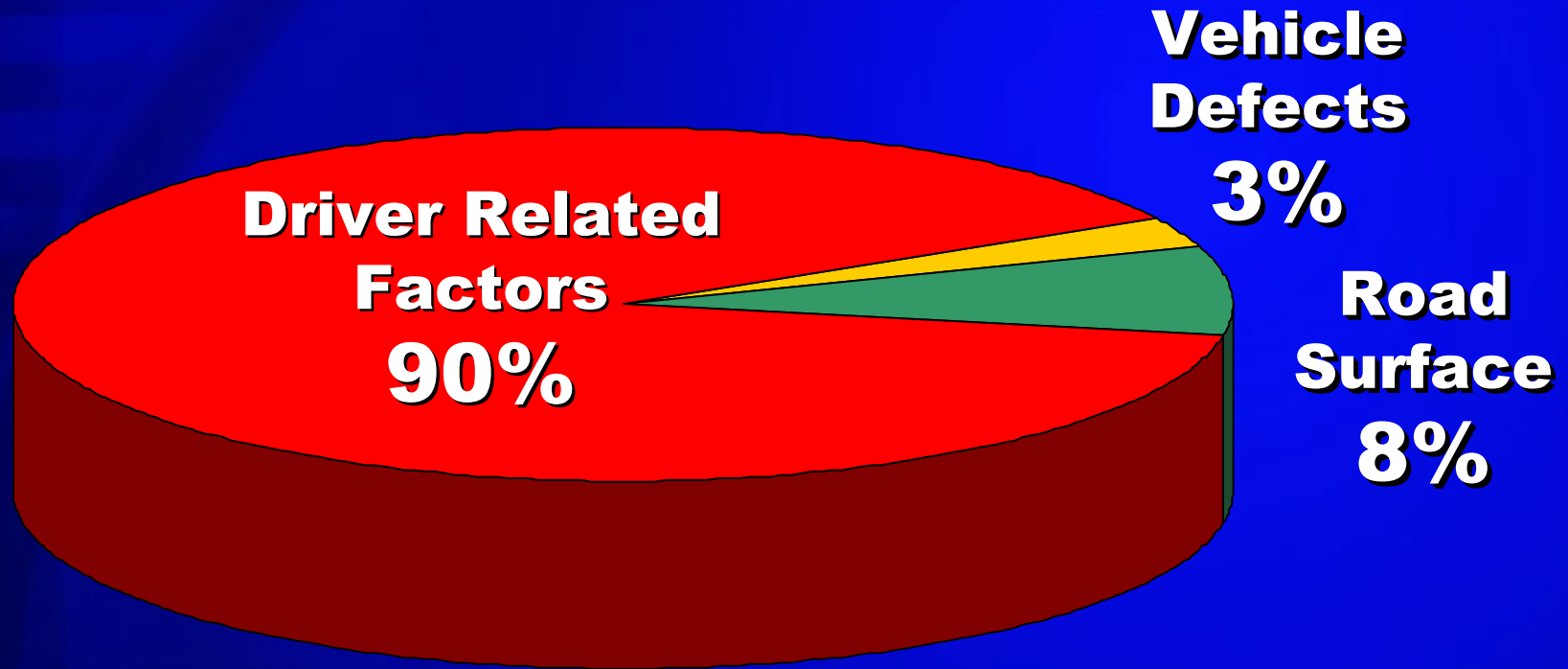


1:8.2

# Highway Safety Priorities

- Increase safety belt use
- Reduce impaired driving
- Improve vehicle compatibility
- Reduce rollovers

# Crash Causation Factors



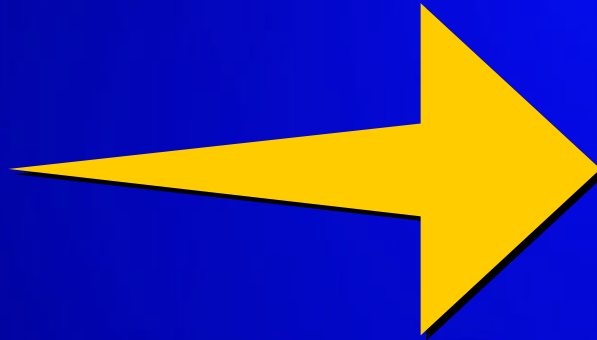
# Lives Saved by Rulemakings

● Child Restraints	36 – 50 lives
● Advanced Air Bags	117 – 215 lives
● TPMS	124 lives
● Tire Upgrade	1 – 4 lives
● Fuel Tank Integrity	8 – 21 lives
● Side Impact	700 – 1000 lives
● Total	986 – 1414 lives/year
<b><i>Primary belt laws</i></b>	<b><i>1400 lives</i></b>

# Evolution of Vehicle Safety

The Past

Crash  
Worthiness



The Future

Crash  
Avoidance



# Delivery of Auto Safety

## Traditional Approach

- Define problem
- Develop safety countermeasures
- Evaluate benefits
- Regulation

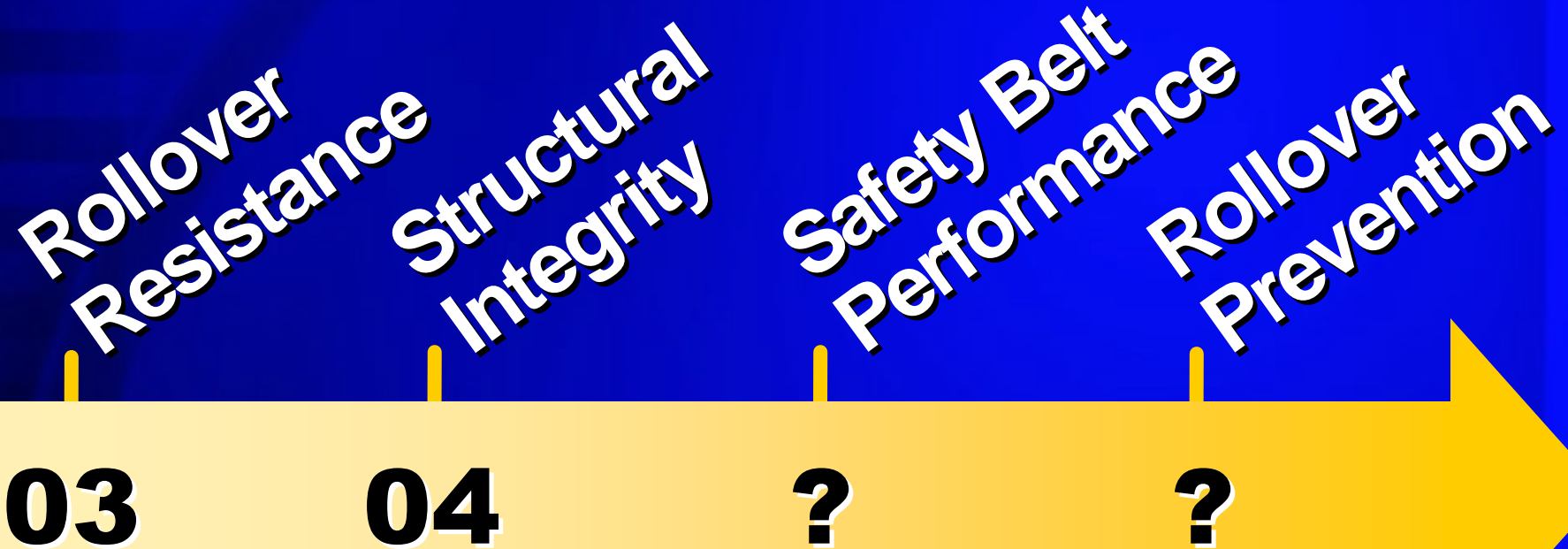
## New Approach

- Identify technologies
- Collaborative research
- Evaluate benefits
- Consumer information

# Reduce Rollovers



# Timeline for Reducing Rollover Fatalities



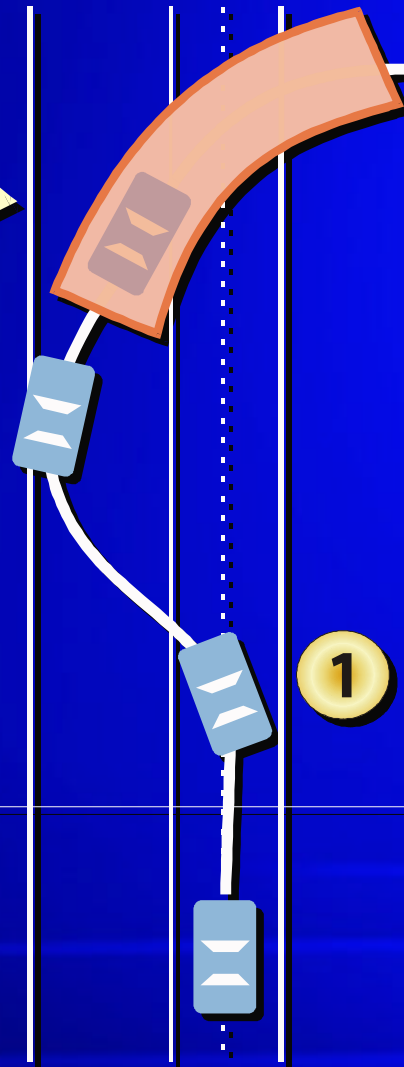
# Fishhook Maneuver

Zone where tip-up  
most likely to occur

Test Complete

Overcorrection 2

1 Initial rapid  
steering input



**Steering Machine Demo: AVI**

**2000 Toyota 4Runner 4x4**

**Maneuver: Fishhook**

**Entrance Speed: 40 mph**

**ESC: No**

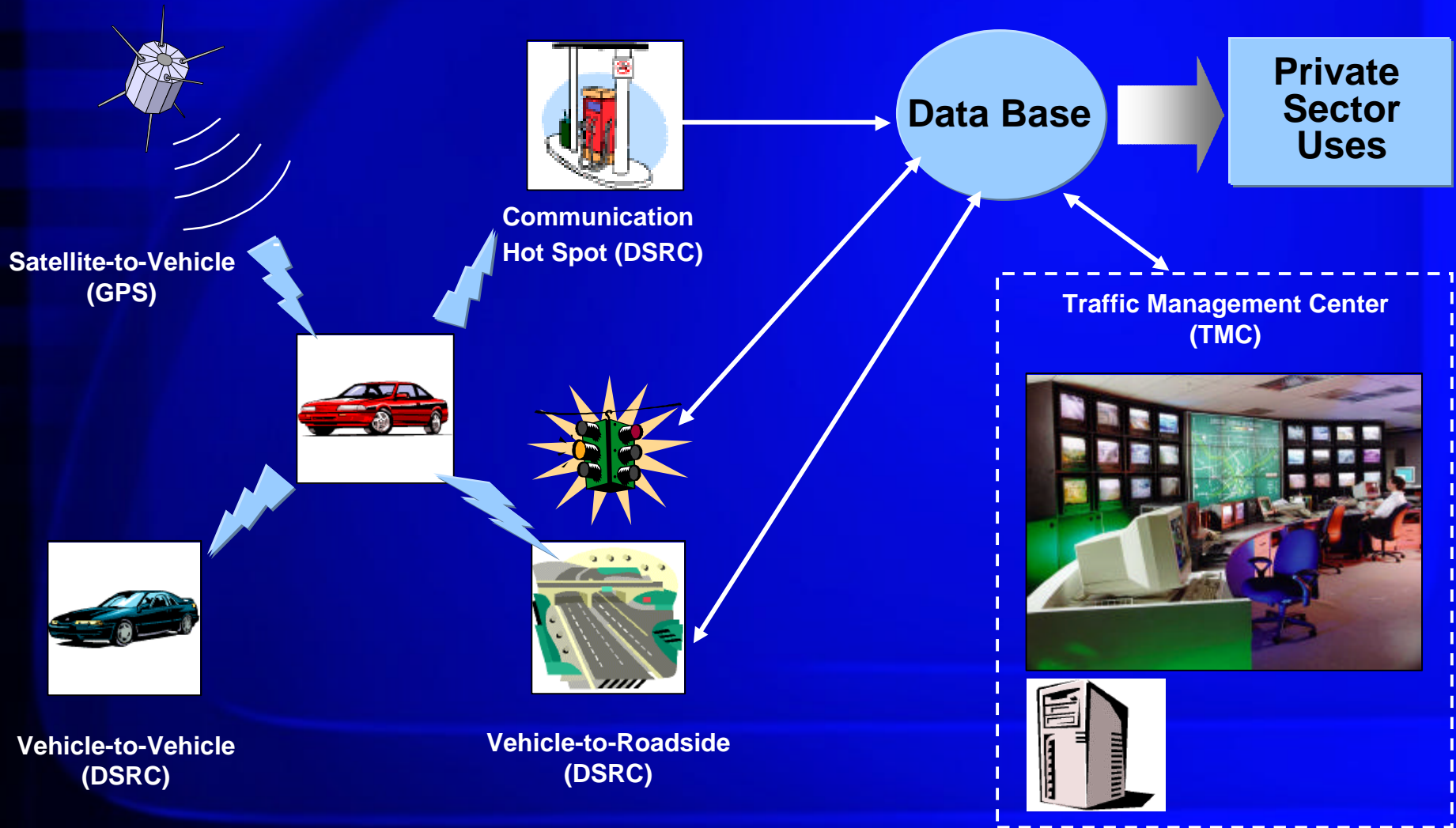
**2003 Toyota 4Runner 4x4**

**Maneuver: Fishhook**

**Entrance Speed: 45 mph**

**ESC: Yes**

# Dedicated Short Range Communication (DSRC)





# **What You Can Do**

- **Inform NHTSA of emerging technology**
- **Collaborative Research**
  - **Technology specifications**
  - **Test procedure development**
  - **Safety benefits**



**People Saving People**

**[www.nhtsa.gov](http://www.nhtsa.gov)**

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