

Developing Tools for Highway Safety – the NCHRP 500 Series Guidance Documents

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CH2M HILL**

Presentation Overview

- **Background on national research programs in surface transportation**
- **The National Strategic Highway Safety Plan**
- **The NCHRP Report 500 Series**
- **Status of Highway Safety in the U.S.**

What is 'NCHRP'?

- **National Cooperative Highway Research Program**
 - Owned by State DOTs through AASHTO
 - 'Pooled funds' support projects of widespread national interest
 - Administered by the National Academies under contract to AASHTO
- For more background see:
gulliver.trb.org/CRP/About/DivD.asp

NCHRP Research

- Heavily oriented to practical applications (solving current problems) of interest to state DOTs
- Results often shape or directly influence industry guidance documents, policies and standards

NCHRP Projects

- Program developed annually through AASHTO Standing Committee on Research
- Competitively awarded (universities, research organizations, consulting firms)
- Panels of peers write RFPs, select contractor, oversee technical progress

Some History on Highway Safety

- Despite best efforts, rate of highway fatalities remains high throughout 1980s and early 1990s (over 43,000 annually)
- Many in the industry consider this level unacceptable and resolve to address it
- Up until 2007, travel increased annually

National organizations partnered with AASHTO



- USDOT
 - AASHTO
 - GHSA
 - NTSB
 - MADDATA
- | | |
|-------|-------|
| AAA | ARTBA |
| AAMVA | RSF |
| AARP | ATSSA |
| NSC | GMC |
| TRB | IIHS |



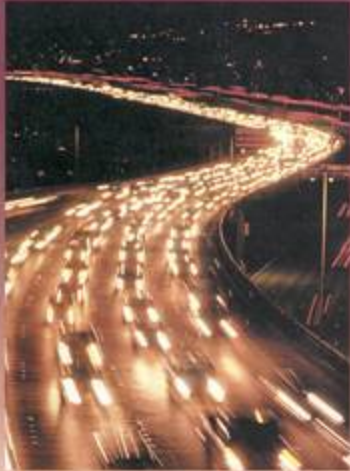
AASHTO: Transportation Center of Excellence



CH2MHILL

AASHTO's leadership provided national direction

AASHTO Strategic Highway Safety Plan



A Comprehensive Plan to
Substantially Reduce
Vehicle-Related Fatalities and
Injuries on the Nation's Highways

- A strategic plan for highway safety that will positively impact the nation's present and predicted statistics on vehicular related death and injury.
- Published in 1998; implementation has been the focus since 2002

The SHSP addresses safety on the highways in 22 areas of emphasis involving many stakeholders



AASHTO Strategic Highway Safety Plan



A Comprehensive Plan to
Substantially Reduce
Vehicle-Related Fatalities and
Injuries on the Nation's Highways

Strategic Highway Safety Plan

- 22 Emphasis Areas (“Goals”)
- A “comprehensive approach” to reducing highway fatalities
- To be implemented across all jurisdictions (state, county, municipal)

Highway safety became one-third of FHWA's 'Vital Few'



Reduce congestion



Enhance safety



Streamline the environmental process

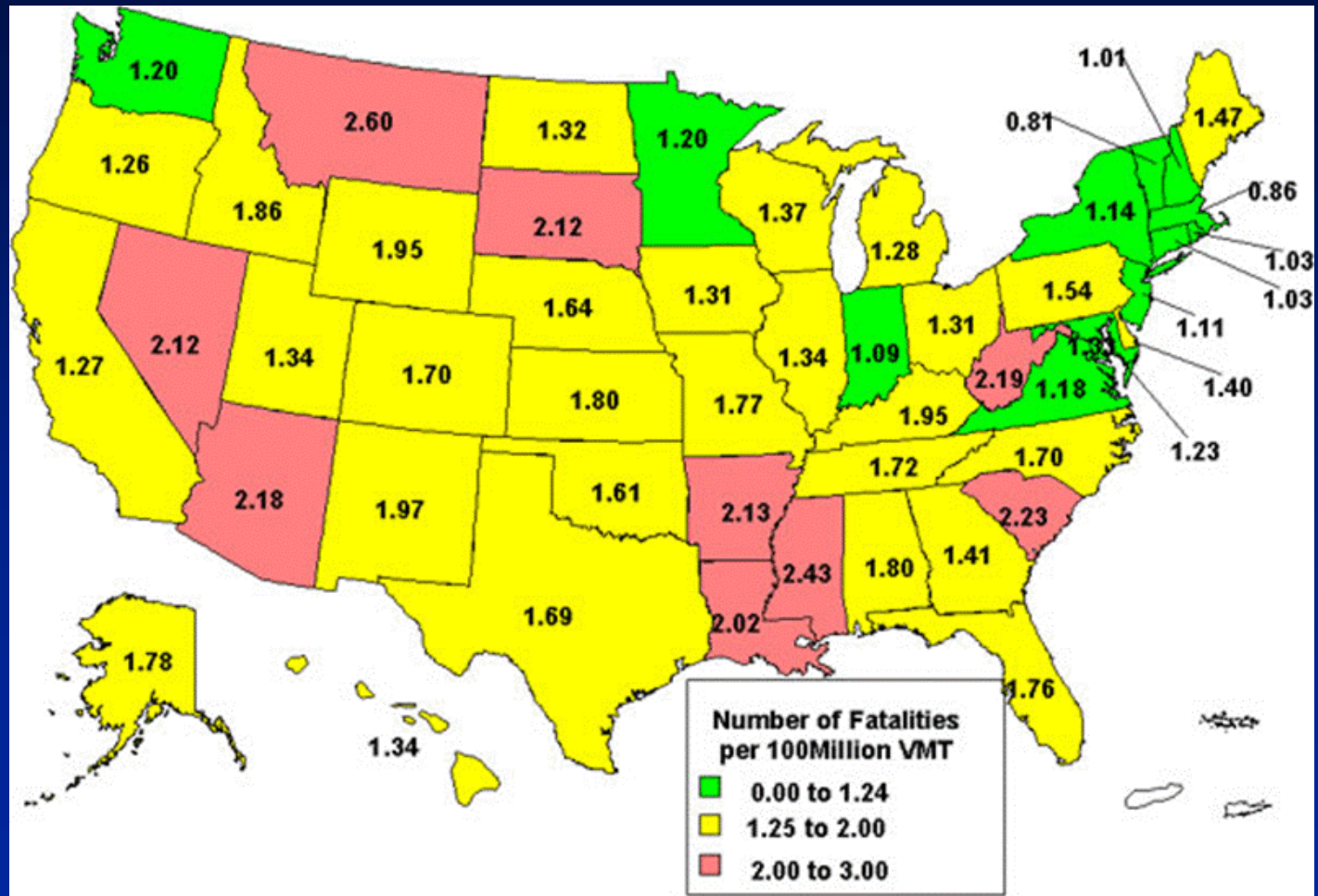
'Our goal is to reduce roadway related fatalities and injuries by designing a forgiving infrastructure. We advocate highway safety programs related to the roadway and road user.'

*A. George Ostensen,
Jan/Feb 2003 Public Roads*

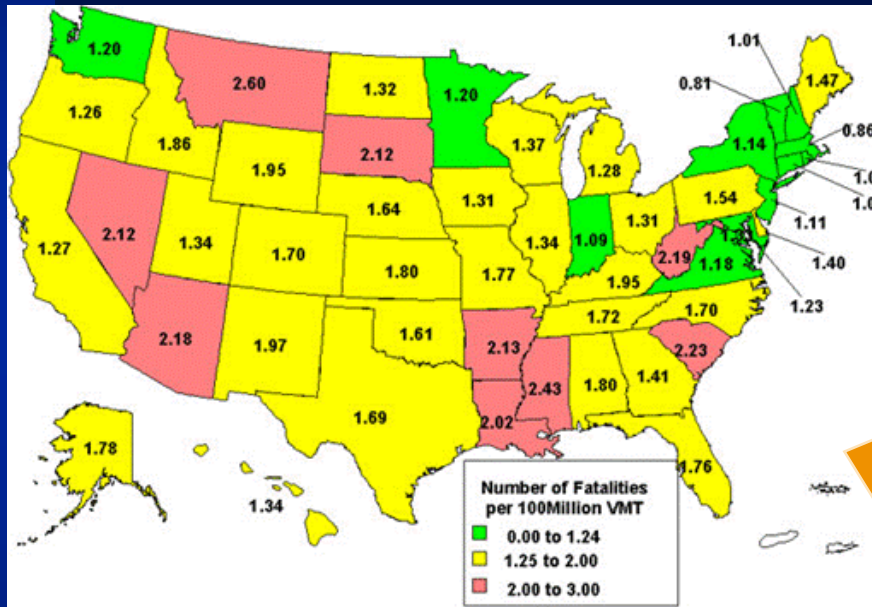
The Original National Highway Safety Goal

- Reduce the Highway Fatality Rate from 1.5 to **1.0 per 100 million vehicle miles**
- Reduce in absolute numbers highway fatalities by **5000 to 7000 per year** (from 43,000)

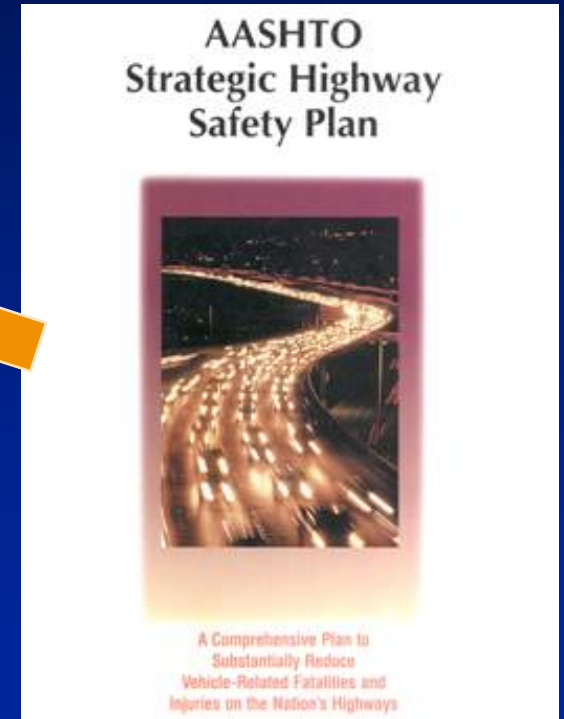
Where we started (2002)

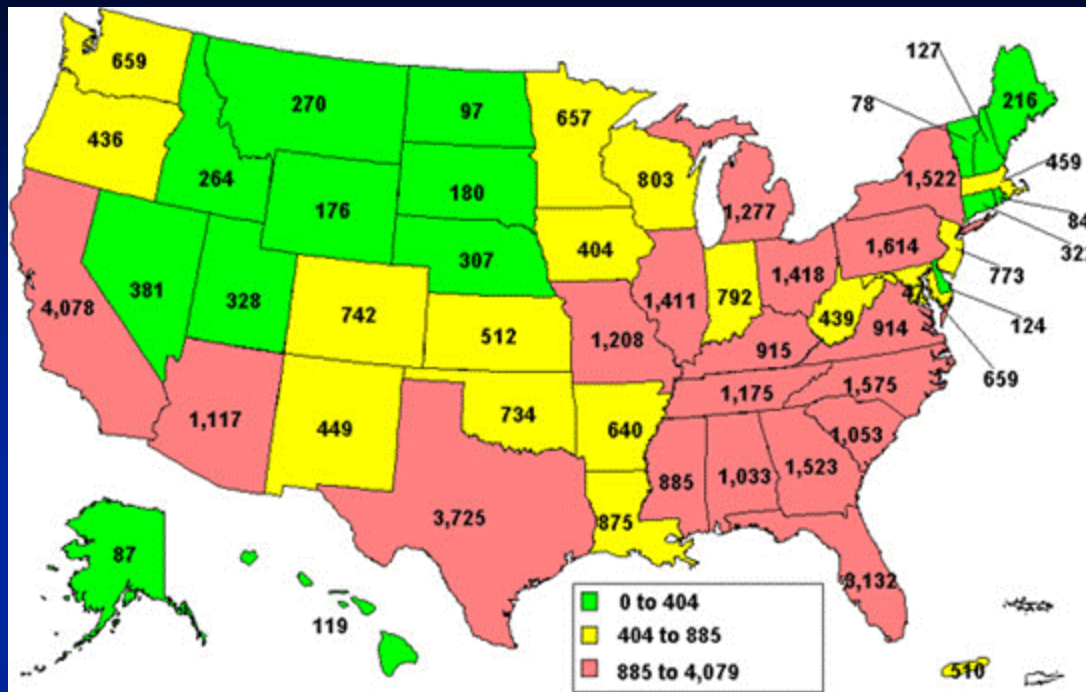


Implementing the national plan



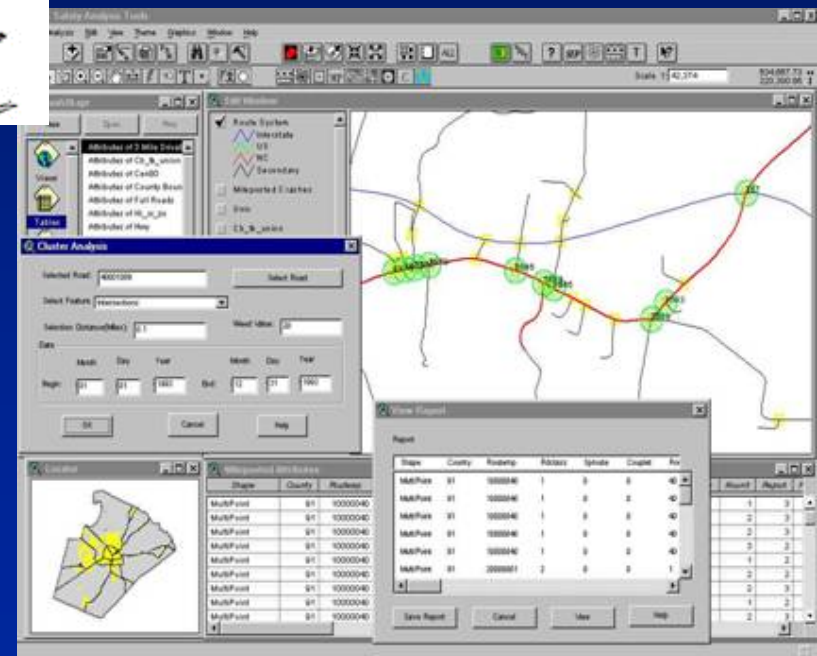
States would develop their own 'tailored', data-driven state strategic highway safety plan





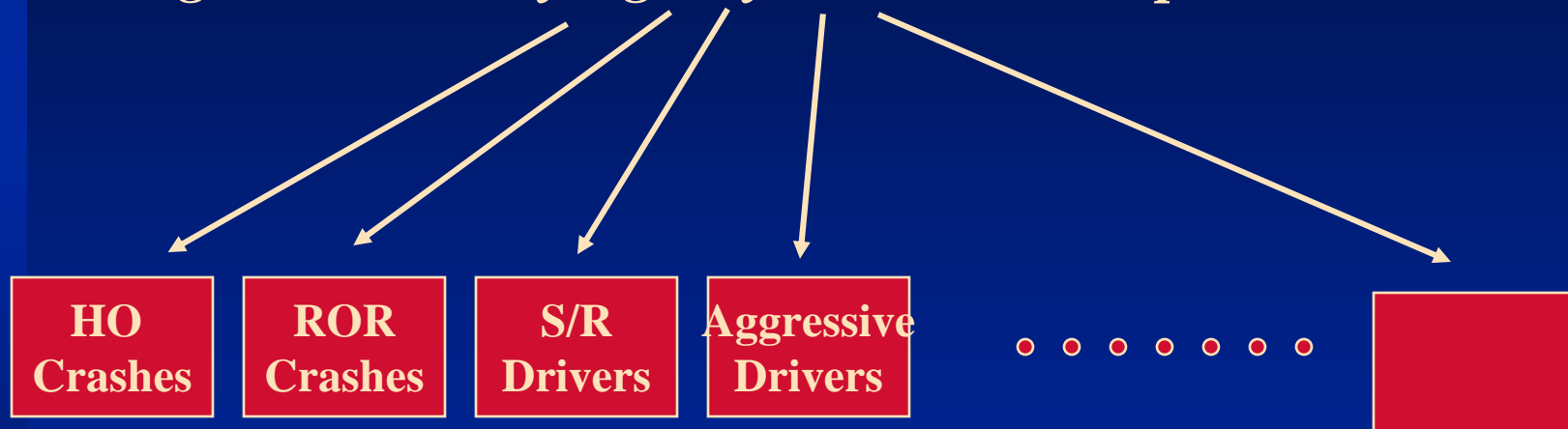
Implementation
at the state
level should be
data driven

Where are the fatalities?
What are their circumstances?
What measures or approaches
will be most effective?



The 'vision' -- Guidance documents would aid the implementation of strategic decisions

Strategic Decision by Agency to Address Emphasis Area



{SHSP Emphasis Areas}

NCHRP Project 17-18

- **Funded in 2000 through SCOR for \$1.1 million initially**
- **Produce guidance for 6 out of 22 ‘high priority’ SHSP emphasis areas**
- **Intention to extend contract to address other areas**

NCHRP 17-18(3) — Guidance for Reducing Fatal Crashes

- **Produce “guidebooks” intended to facilitate agency implementation of SHSP objectives**
- **Focus is on low-cost, readily implementable strategies**
 - **Proven effective**
 - **Experimental/innovative**
 - **Comprehensive**
- **Audience is state DOTs and other agencies (county, municipal)**

Elements of a Successful Team – How CH2M HILL won and executed the work

- **Winning acquisition strategy**
- **Champions and Leadership**
- **Corporate humility (expertise resides outside your organization)**
- **Strong project management**
- **Flexibility (listen, adjust)**

NCHRP Project 17-18(3) Project Organization

- **CH2M HILL Project Executive Team**
 - Tim Neuman, Project Director
 - **Ron Pfefer** (Maron Engineering, Israel) and **Kevin Slack**, co-PIs
- **Emphasis Area Managers (Phase I)**
 - Charlie Zegeer (UNCHSRC) -- Trees in Hazardous Locations
 - Hugh McGee (BMI) -- Head-on Crashes
 - Forrest Council (BMI)-- Run-off-road Crashes
 - Doug Harwood (MRI) -- Unsignalized Intersections
 - Roy Lucke and Richard Raub (NUCPS) -- Aggressive Drivers
 - Dr. Pat Waller -- Drivers with Suspended/revoked Licenses

Working Materials Developed by Project Team Under 17-18 (3)

- **Printed Guides** for developing programs to address fatal crashes
- **Website** for collecting and disseminating information on program development and effectiveness, and in-depth technical background; maintain currency of knowledge base

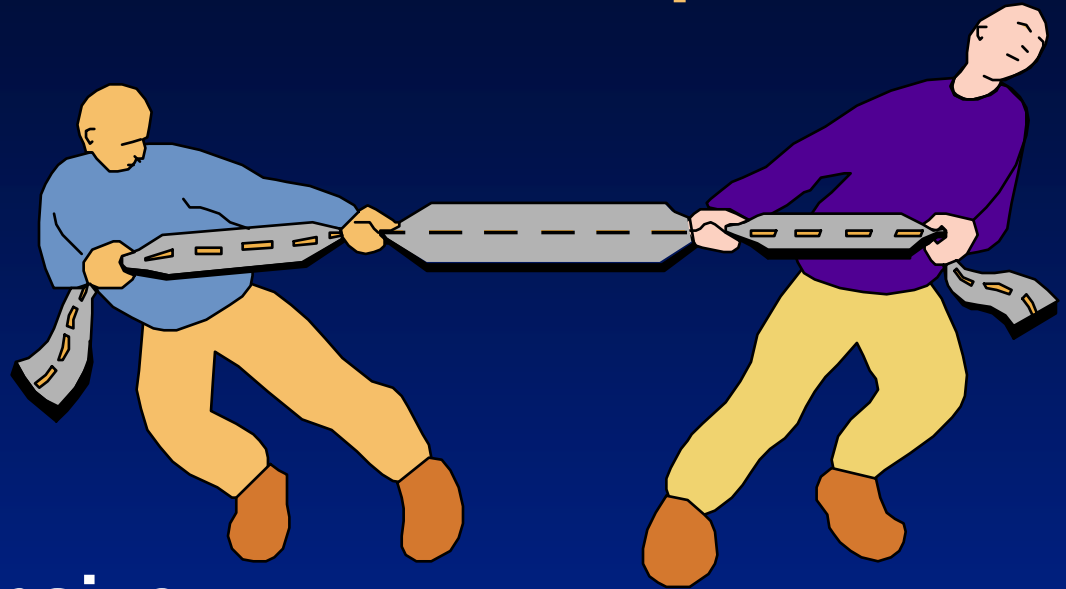
Guidebook Development Process

- Strategy and “best practices” identification (literature review, surveys, phone interviews)
- Workshops and Tree Symposium involving agency leaders
- Selection of Demonstration Agencies*
- Demonstration of Guides*
- Final Revisions and Publication

Emphasis area workshop participants

- Outside experts, researchers, etc.
- Academics
- Practitioners (potential users)
- Agency managers (implementers)

Challenges in Guide Development



- Be comprehensive
- Represent current research
- Be scientifically rigorous
- Reflect input from key stakeholders
- Be user friendly

Guidebook and Website Content

- Introduction
- Types of Problems Addressed
- Strategies for Addressing Problems
- Model Implementation Process
- Profiles of Recent Implementation Efforts*
- Resources and Materials*

Strategy Outline

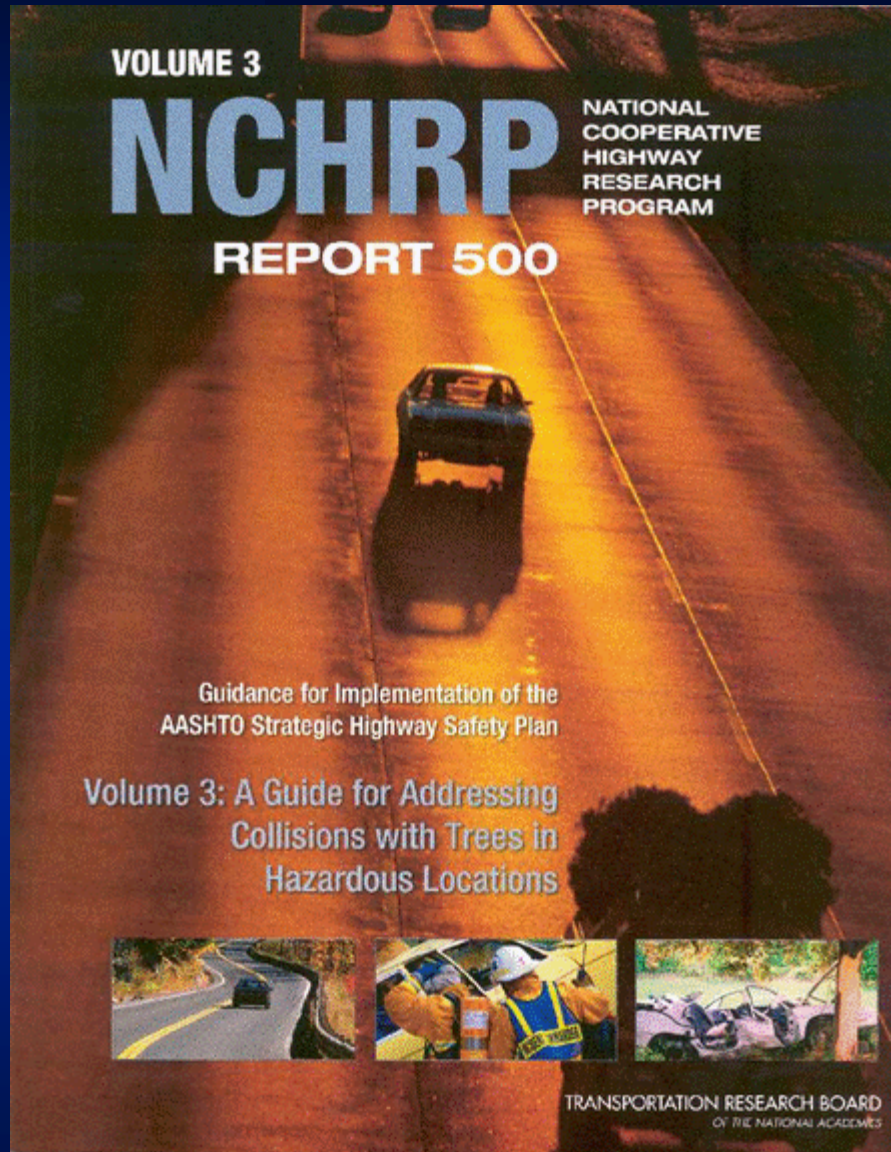
- *Target Crashes*
- *Expected Effectiveness*
- *Keys to Success*
- *Potential Difficulties*
- *Appropriate Measures and Data*
- *Associated Needs for, or relation to, Support Services (e.g., Public Information and Education, Traffic Law Enforcement, and Emergency Medical Services)*
- *Organizational, Institutional and Policy Issues*
- *Interagency Participation*
- *Issues Affecting Implementation Time*
- *Costs Involved*
- *Training and Other Personnel Needs*
- *Legislative Needs*

Identification of Strategies

- ***Proven*** -- Research and experience demonstrates high confidence that measurable impact will be observed
- ***Tried*** -- Not 'proven' or results not well documented
- ***Experimental***

Model Implementation Process



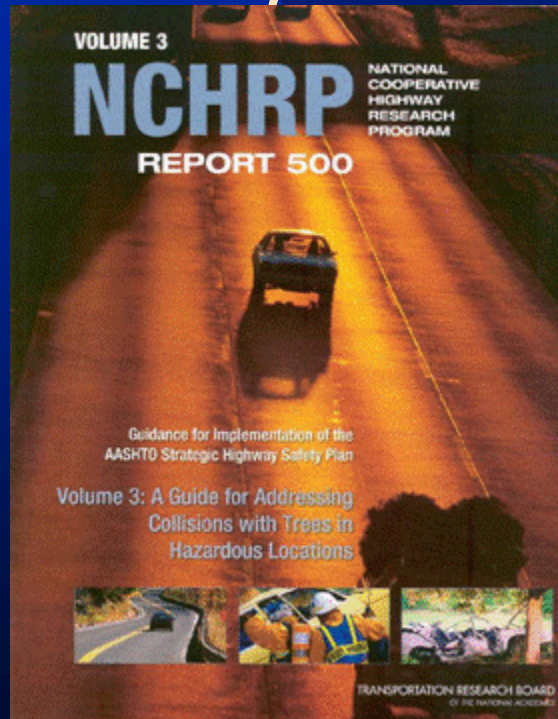


SHSP Guidance -- NCHRP Report 500 Series

- *Vol. 1-- Aggressive Driving*
- *Vol. 2 -- Suspended and Revoked Licenses*
- *Vol. 3 -- Trees in Hazardous Locations*
- *Vol. 4 -- Head-on Crashes*
- *Vol. 5 -- Unsignalized intersections*
- *Vol. 6 -- Run-off-Road Crashes*

see <http://safety.transportation.org/plan.aspx>

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AASHTO/NCHRP Strategic Highway Safety Plan - Microsoft Internet Explorer provided by CH2M HILL

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Address <http://safety.transportation.org/plan.aspx> Go Links

Strategic Highway Safety Plan

American Association of State Highway and Transportation Officials
and the National Cooperative Highway Research Program

AASHTO - NCHRP

Search - Feedback - Safety Plan Home

THE STRATEGIC HIGHWAY SAFETY PLAN

A Comprehensive Plan to Substantially Reduce Vehicle-Related Fatalities and Injuries on the Nation's Highways

September 1997

To order a hard copy of the Safety Plan, visit the [AASHTO Publications Bookstore](#) or contact the Publications Ordering Department at 800.231.3475.

- [Introduction](#)
- [The AASHTO Initiative](#)
- [Funding Requirements and Benefits](#)
- [Summary](#)
- [The Six Elements of the Safety Plan](#)
- [Safety Plan Implementation Guides](#)

Introduction

The good news is that a child born today can expect to live an average of approximately 75 years. The bad news is that if the average crash rates recorded from 1991-1995 remain unchanged, over that 75-year lifetime one child out of every 84 born today will die violently in a motor vehicle crash. Furthermore, 6 out of every 10 children born today will be injured in a highway crash over a lifetime many of them more than once. This is a disturbing look ahead at the life of a child born today a life for which estimates of death, injury, and damage are unacceptably high. These statistics need not become reality. Heightened intervention by the diverse traffic safety community, both in its continuing daily efforts to improve highway safety and in the effective implementation of dramatic new initiatives it forges can reduce these ominous predictions.

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The AASHTO Initiative

http://safety.transportation.org/plan.aspx#_Implementation_Guides

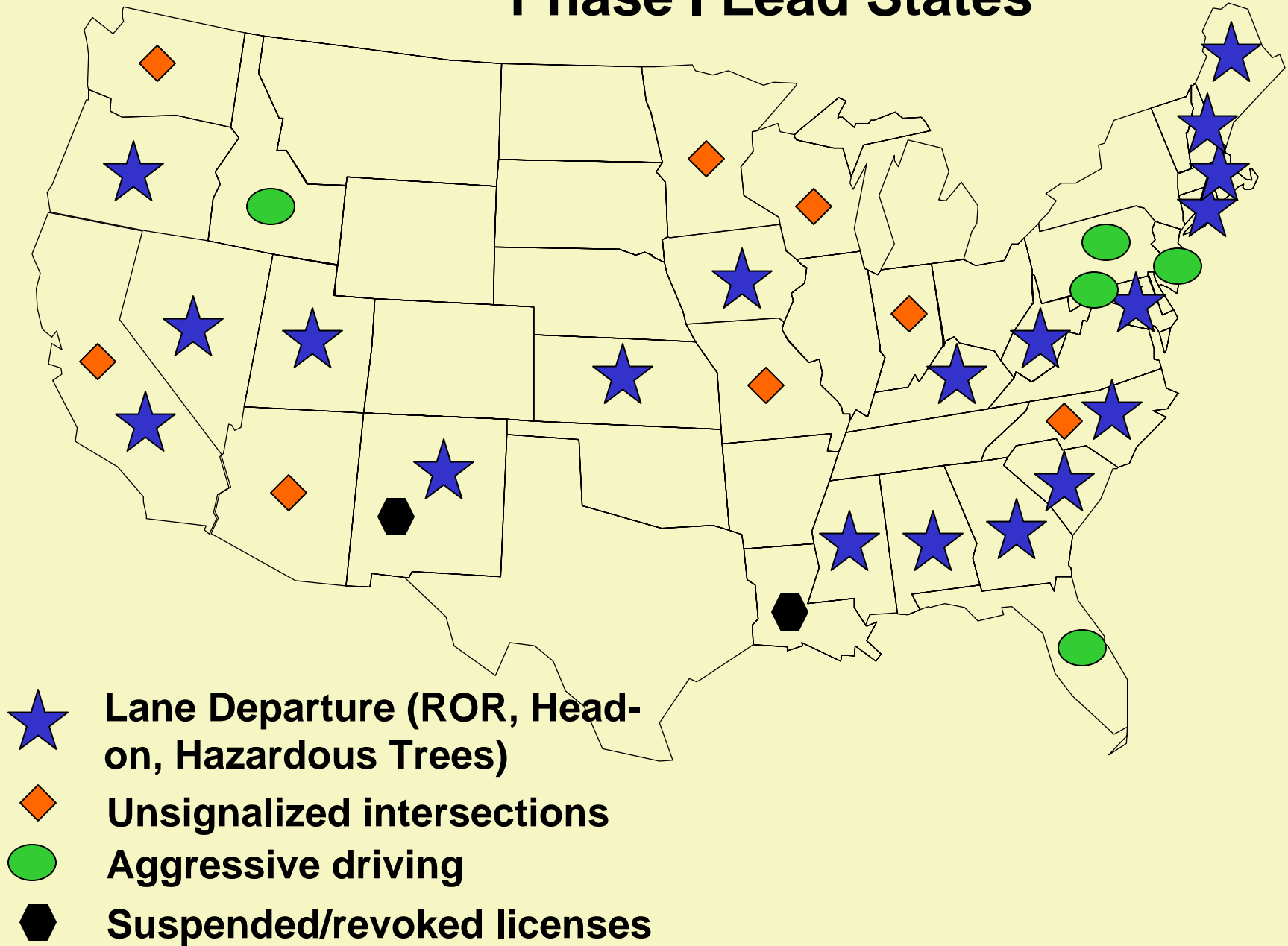
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Go to <http://safety.transportation.org/>

Lead State Groups Promote Active Usage of Guides

- **‘Lane Departure’ (combines run-off-road, head-on, trees in hazardous locations)**
- **Unsignalized Intersections**
- **Aggressive Driving**
- **Suspended/Revoked Drivers**

Phase I Lead States



Lead State Program- Use the Guides to:

- **Establish a statewide goal for reducing fatalities in a given emphasis area**
- **Develop a detailed action/implementation plan**
- **Provide feedback on the guide for future enhancement**

NCHRP Project 17-18(3) Project Organization

- **CH2M HILL Project Executive Team**
 - Tim Neuman, Project Director
 - **Ron Pfefer** (Maron Engineering) and **Kevin Slack**, co-PIs
- **Emphasis Area Managers (Phase II)**
 - Doug Harwood (MRI) – Highway Curves
 - Jane Stutts (UNCHSRC) and Ingrid Potts (MRI) – Older Drivers
 - Charlie Zegeer (UNCHSRC) -- Pedestrians
 - Nick Antonucci (CH2M HILL)-- Signalized Intersections
 - Dr. Pat Waller (Univ of Michigan) and Ron Knipling (VaTech) – Large Trucks
 - Dick Raub (Northwestern Univ CPS) – Unbelted Drivers

NCHRP Project 17-18(3) Project Organization

- **CH2M HILL Project Executive Team**
 - Tim Neuman, Project Director
 - Ron Pfefer (Maron Engineering) and Kevin Slack, co-PIs
- **Emphasis Area Managers (Phase III)**
 - Jane Stutts (UNCHSRC) and Ron Knipling (Va Tech) – Drowsy and Distracted Drivers
 - Robert Foss (UNCHSRC) and Jim Hedlund (Highway Safety North) – Alcohol
 - Darren Torbic (MRI) and John Chew (The EMSSTAR Group) -- Rural EMS
 - Ingrid Potts (MRI), Steve Garets (OSU) and Jim Nichols - - Motorcycles
 - Jim Bryden and Nick Antonucci (CH2M HILL) -- Work Zones

NCHRP Project 17-18(3) Project Organization

- **CH2M HILL Project Executive Team**
 - Tim Neuman, Project Director
 - Kevin Slack and Kelly Hardy, co-PIs
- **Emphasis Area Managers and Primary Authors (Phase IV)**
 - Darren Torbic (MRI) and Craig Raborn (UNCHSRC) -- Bicycles
 - Will Stein and John Nitzel (CH2M HILL) -- Freeway Head-on Crashes
 - John Nitzel (CH2M HILL), Ingrid Potts (MRI) and Neil Lerner (WESTAT) -- Speed Management
 - Doug Harwood (MRI) and Dr. Forrest Council (UNCHSRC) -- Highway Safety Data
 - Rob Foss (UNCHSRC) – Younger Drivers

NCHRP
Project 17-18



Implementing the AASHTO Strategic Highway Safety Plan

Saving 9,000 More Lives a Year

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About Project 17-18

Strategic Highway Safety Plan

Six Elements of the Plan

Implementation Guides
(NCHRP Report 500)

Appendixes & Guides Map

Lifelines Newsletter

Assessment Tool

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Safety Portal

Implementation Guides

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Volume 06: A Guide for Addressing Run-Off-Road Collisions



39

Percent of Fatal Crashes Involve Leaving the Roadway

Run-Off-Road (ROR) crashes involve vehicles that leave the travel lane and encroach onto the shoulder and beyond and hit one or more objects. Nearly 4 of every 10 fatal motor vehicle crashes—well over 14,000 a year—involve a single vehicle leaving the roadway. There are more than twice as many ROR fatal crashes on rural roads than on urban roads. Some 42 percent of ROR fatal

NCHRP 500-6 Run-Off-Road Collisions

This guide addresses reducing the likelihood that a vehicle will leave the roadway through roadway design, or if the vehicle does leave the road, then minimizing crashing or overturning; and if not, then by minimizing the severity of a crash.

[Download the guide in PDF](#)

[View the Guide and Appendixes in HTML](#)

Order a printed copy

Related publications

[Run-Off-Road One Pager](#)

[Self Assessment Tool](#)



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[About Project 17-18](#)[Strategic Highway Safety Plan](#)[Six Elements of the Plan](#)[Implementation Guides
\(NCHRP Report 500\)](#)[Appendixes & Guides Map](#)[Lifelines Newsletter](#)[Assessment Tool](#)**Strategies and Countermeasures
7 New Implementation Guides Released**

Seven new guides for implementing the Strategic Highway Safety Plan are now available. Report 500: Volumes 8-14 provide detailed information on strategies for reducing collisions and injuries in these emphasis areas:

- Horizontal Curves
- Utility Poles
- Older Drivers
- Pedestrians
- Signalized Intersections
- Heavy Trucks
- Increased Safety Belt Use

Scheduled for release later this year: a guidance document addressing alcohol-related crashes. Guides that were previously released addressed these emphasis areas:

- Aggressive Driving
- Head-on Collisions
- Run off the Road
- Trees
- Unlicensed/Suspended/Revoked Drivers
- Unsignalized Intersections

Also available as a NCHRP Report 501:

- [Integrated Safety Management Process \(Report 501\)](#) (PDF)



Click on image to
download latest issue

SAD FACT
42,643 died in
highway crashes
in 2003.



Enter the
Safety Portal



Aggressive Driving

Description of Strategies

Objectives

Two objectives have been identified for addressing aggressive driving:

1. Deter aggressive driving in specific populations and at specific locations (this includes those with a history of such behavior).
2. Improve the driving environment to eliminate or minimize the external "triggers" of aggressive driving.

Both populations and specific individuals among whom aggressive driving appears to be over-represented are to be identified. In addition, geographical areas where such events most frequently occur are to be identified. The approach uses three components:

- Crash records and observations to identify populations and geographical areas,
- Driver records to identify individuals displaying a propensity toward aggressive driving, and
- Observations to examine the driving environment to identify "triggers" that could set off aggressive driving.

Where populations or geographical areas are over-represented, two approaches are appropriate for taking corrective action:

- Identify means of reaching the populations through targeted education, public information, and sanctions.
- Reinforce education and public information through enforcement.

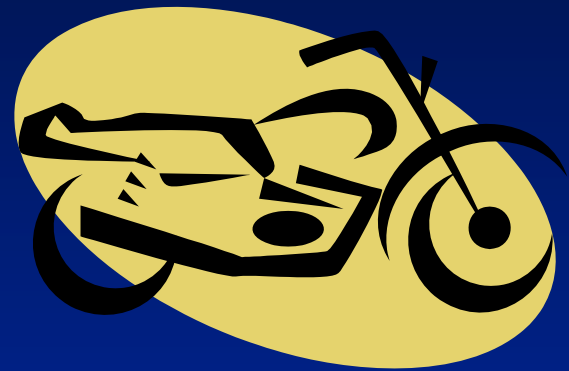
Where "triggers" in the roadway environment are identified, efforts are to be directed at eliminating or modifying the problems in the driving environment. Two key approaches are proposed:

- Make changes in roadways and traffic control devices to improve the flow of traffic.
- Reduce the frustrations arising from delays.

For all of these approaches, the law enforcement community plays a key role. They are in a position to stop acts of

The motorcycle guide – a story of power and intrigue

- Initiated in late 2003 (Phase III)
- Finally completed in mid 2008!
- Why should this take so long?



It was all about helmets

Lessons Learned

- **Wanting to save lives is not enough – you need**
 - tools and data and know-how
 - organizational leadership and champions
 - ability to work and cooperate across organizations
- **Not everyone shares your vision and priorities**

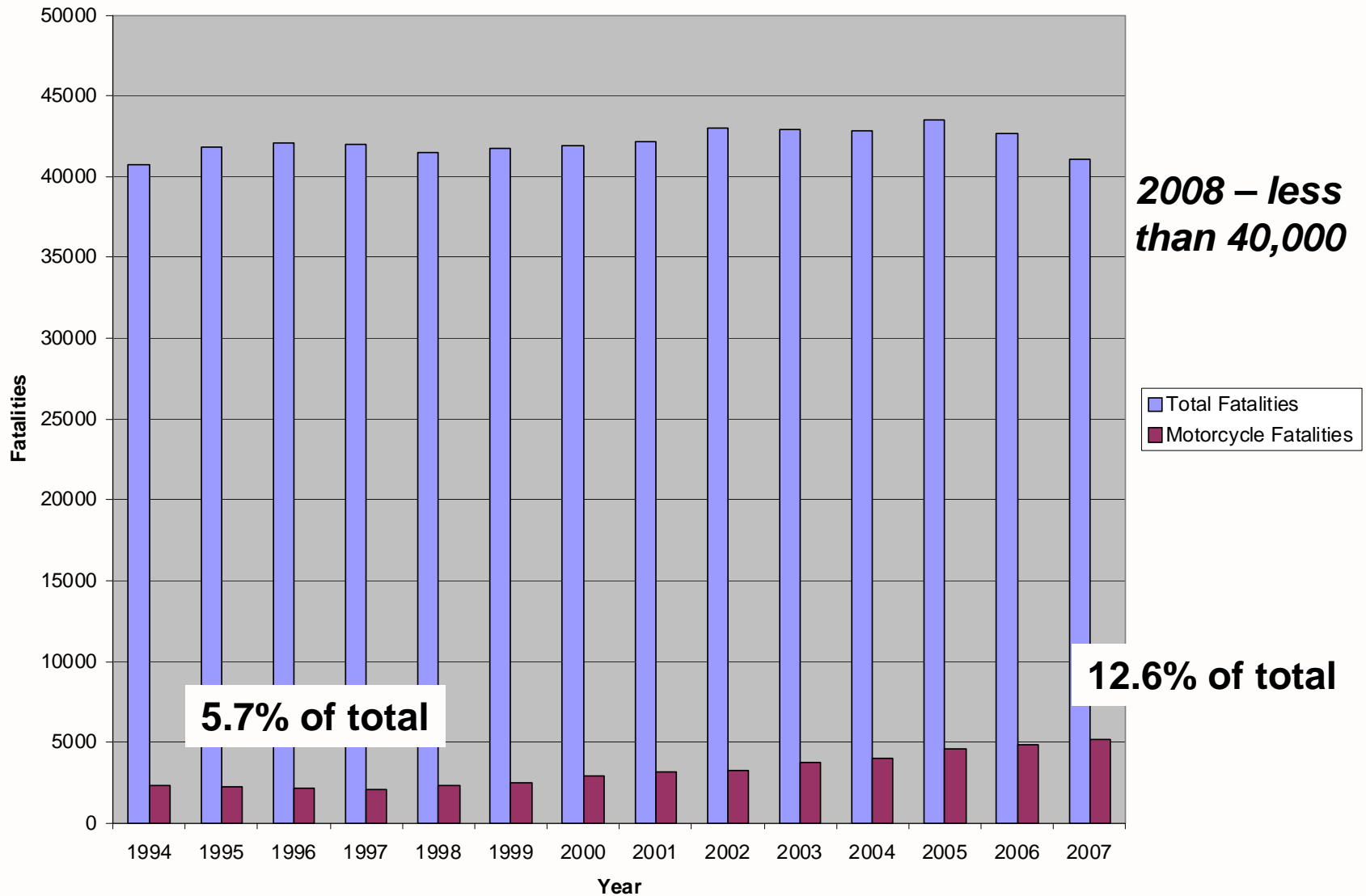
Where are we now

- **Most guides are available in pdf (some remain to be posted)**
- **Guides have been used by many states and are routinely referenced**
- **FHWA has funded research to address strategies labeled as ‘tried’**
- **Earliest guides are now 5 years old; some believe updating of information is needed**

Where are we now with highway safety nationally?

- SAFETEA-Lu legislation provided special funding
- It takes time for states to assemble knowledge base and leadership
- It takes time for programs and projects to be widely implemented
- 2006 'report card' assessed progress on implementation and results
- 2007 and 2008 statistics finally show strong downward trends emerging
- Today's challenge – highway safety at the local level

Highway Fatality Trends from FARS



Thank you -- questions

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