

# NIOSH Center for Motor Vehicle Safety



Stephanie Pratt, PhD

Presentation to the NIOSH Board of Scientific Counselors  
June 20, 2014

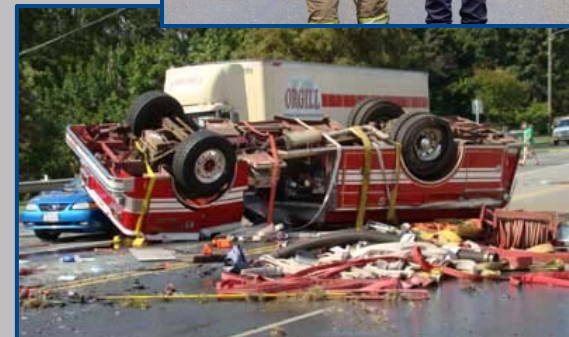
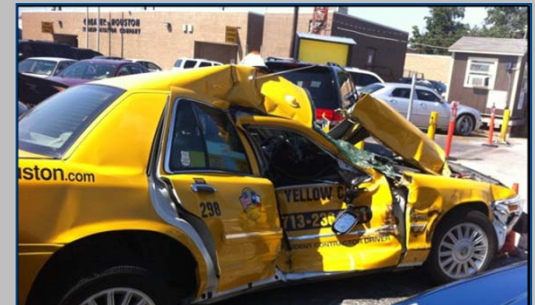
# Goals for this presentation

- Overview of Center and its strategic plan
- Partnerships and communication strategies
- Products and research
- Special topic: Connected vehicles



# Work-related motor vehicle crashes

- Leading cause of work-related fatality
- Over 18,000 deaths 2003-2012
- #1 or #2 cause in every major industry sector
- 35% of all workplace fatalities



Source: Bureau of Labor Statistics, Census of Fatal Occupational Injuries

## VISION

All workers who are exposed to hazards of motor vehicle traffic while working have the highest possible levels of protection from the risk of motor vehicle crashes and resulting injuries.



*NIOSH Center for*  
**Motor Vehicle Safety**  
*/// Keeping Workers Safe on the Road*

**NIOSH Center for Motor Vehicle  
Safety**  
Strategic Plan for Research and  
Prevention, 2014-2018

DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Centers for Disease Control and Prevention  
National Institute for Occupational Safety and Health



## New strategic plan

Review by stakeholders and  
subject-matter experts:

- University of Michigan  
Transportation Research Institute  
(UMTRI)
- Centre for Accident Research and  
Road Safety (Australia)
- National Safety Council
- CDC/National Center for Injury  
Prevention and Control

Electronic docket and Federal  
Register notice

<http://www.cdc.gov/niosh/docs/2014-122.pdf>



## NIOSH Center for Motor Vehicle Safety: Strategic Goal Areas

1. Advancing understanding of risk factors for work-related crashes
2. Implementing engineering and technology-based safety interventions
3. Implementing comprehensive, evidence-based road safety management policies
4. Engaging in global collaborations to prevent work-related crashes
5. Making clear and concise guidance and information products available to workers, employers, and other stakeholders



## A data-driven approach

- 40% of fatalities are truckers
  - Supported by strong regulatory and research communities
- 60% are other workers
  - Emphasis on high-risk groups: emergency responders, oil & gas industry workers
  - Regulation and research are more limited and fragmented





**Partners  
Communications  
Impact Strategies**





## Key governmental partners

- Other CDC agencies:
  - National Center for Injury Prevention and Control
  - “Winnable Battle” for motor vehicle injury prevention
- DOT agencies:
  - National Highway Traffic Safety Administration
  - Federal Motor Carrier Safety Administration
- Department of Homeland Security
- National Institute of Justice
- State departments of health and labor

## Key NGO/private sector partners

- Network of Employers for Traffic Safety
- National Safety Council
- American Society of Safety Engineers
- Research institutes: University of Michigan, Virginia Tech
- Truck and ambulance manufacturers



# Work with partners to raise awareness of issue and Center



The screenshot shows the homepage of the Safety+Health website. At the top left is the National Safety Council logo. The main title is "Safety+Health" with the subtitle "The Official Magazine of the NSC Congress & Expo". Below this is a navigation bar with links for NEWS, CURRENT ISSUE, SAFETY TIPS, WORKPLACE SOLUTIONS, and PRODUCTS. A secondary navigation bar includes E-NEWSLETTERS. A prominent advertisement features a pair of hands and the text "Ultimate protection. Ultimate safety. Get a free\* PRO-SAFE® glove sample today." Below the ad, there is a breadcrumb trail: "Home » NIOSH announces focus on motor vehicle incidents". The main article title is "NIOSH announces focus on motor vehicle incidents" dated "October 2, 2013". Tags include "2013 NSC Congress & Expo", "Center for Motor Vehicle Safety", "Government shutdown", "Motor vehicle fatalities", "NIOSH", "silica", and "Truck driver safety". Social media sharing options for Email, Print, Facebook, Twitter, Google+, LinkedIn, and a general Share button are present. A "Related Articles" sidebar lists: "NIOSH creates driving safety center", "NIOSH releases fact sheets for home health care workers", and "NIOSH provides resources for tornado response". The main article text begins: "Chicago – Motor vehicle incidents are the leading cause of worker fatalities, and NIOSH Director John Howard said it is time to 'unravel' the excuses and contributing factors that allow the trend to continue. Speaking during the Occupational Keynote at the 2013 NSC Congress & Expo, Howard said NIOSH has launched the Center for Motor Vehicle Safety to help reduce motor vehicle fatalities – 17,000 of which occurred from 2003 to 2011."



The image shows the cover of the Professional Safety magazine. The title "Professional Safety" is displayed in a large, bold font, with "Professional" in black and "Safety" in orange. Below the title is the subtitle "Journal of the American Society of Safety Engineers". A small text box at the bottom of the cover reads "Supplement to 'PS Asks,' Professional Safety, August 2013".

Supplement to "PS Asks," Professional Safety, August 2013

## Stephanie Pratt

### PS: What prompted NIOSH to create a Center for Motor Vehicle Safety?

Stephanie: Motor vehicle crashes have been the leading cause of work-related fatalities since data were first collected in the 1980s. Motor vehicle safety is a concern that cuts across all industry sectors, so it made sense for NIOSH to mount a coordinated effort to address this urgent worker safety problem. The NIOSH Center for Motor Vehicle Safety (NCMVS) is hosted by the Division of Safety Research in Morgantown, WV, but many other individuals and programs in other NIOSH units across the U.S. make important contributions to the center.



## New CDC report on older drivers in the workforce complements Drive Safely Work Week 2013 theme

Download the free employer toolkit at  
<http://www.trafficsafety.org/drivesafelyworkweek>

Older workers who drive as part of their job have significantly higher traffic death rates than younger workers, according to a new report from the Centers for Disease Control (CDC).

"Driving safety is really a shared responsibility between employers and workers," said lead researcher Stephanie Pratt in an [interview with HealthDay](#). Dr. Pratt is the coordinator of the Center for Motor Vehicle Safety at the CDC's National Institute for Occupational Safety and Health and a federal liaison to the NETS Board of Directors.

**NTA National Truckers Association®**

# Communications and social media

- New Twitter account

**@NIOSH\_MVSAfety**



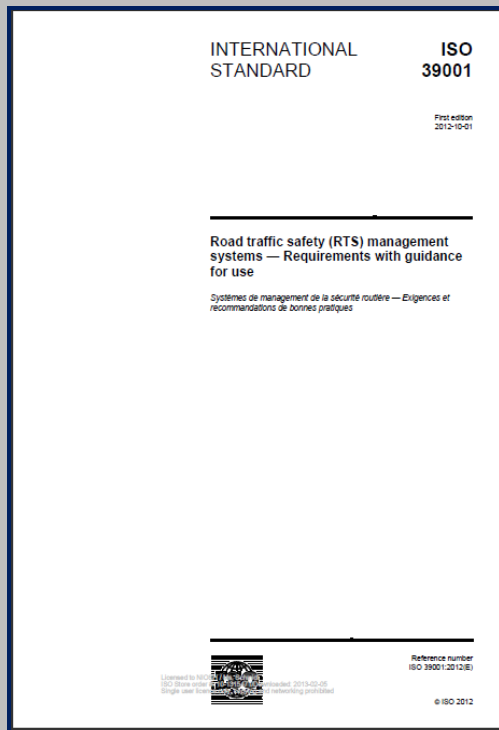
- NIOSH Science Blog entries
- New suite of identity/branding products

*NIOSH Center for*

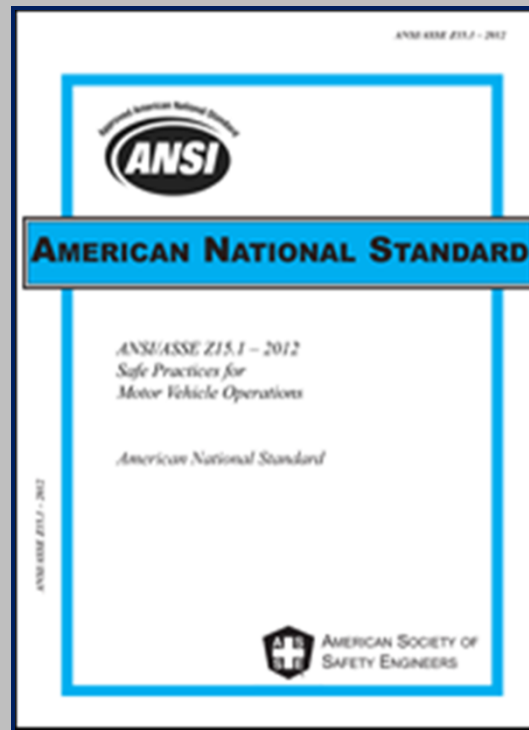
**Motor Vehicle Safety**

*/// Keeping Workers Safe on the Road*

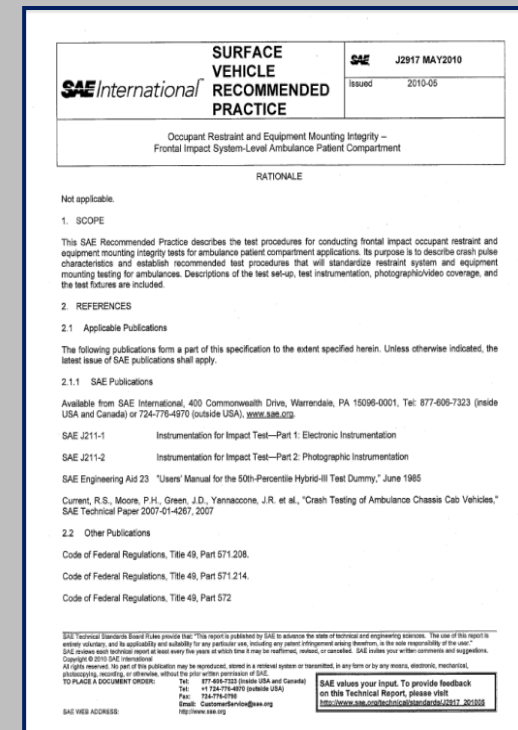
# Consensus and industry-based standards



ISO 39001:2012  
Road Traffic Safety  
Management Systems



ANSI/ASSE Z15.1 – 2012:  
Safe Practices for Motor  
Vehicle Operations



SAE J2917: Occupant  
Restraint and  
Equipment Mounting  
Integrity



# Current Research





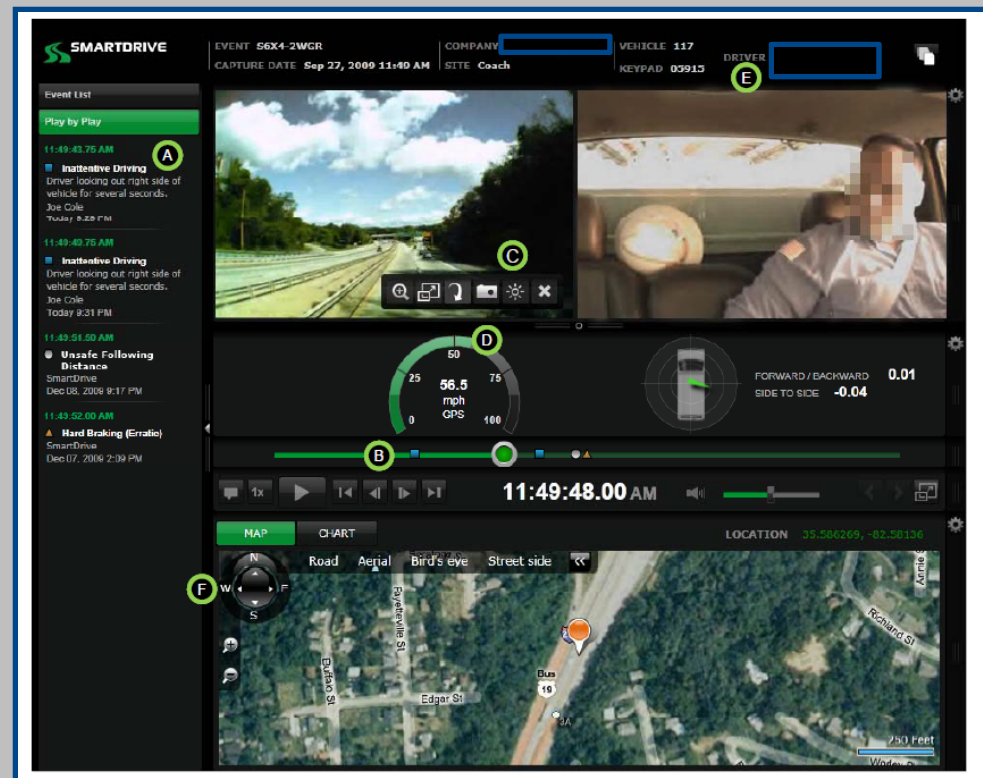
## Matching of CFOI and FARS data

- Partners:
  - Bureau of Labor Statistics (Census of Fatal Occupational Injuries)
  - National Highway Traffic Safety Administration (Fatality Analysis Reporting System)
- Takes advantage of strengths of both systems
- Products: Methods paper, epidemiologic analysis
- Results already used by NHTSA to help state FARS analysts better identify work relationship

# Evaluation of in-vehicle monitoring systems

Partners: Package delivery company, oil and gas services company, IVMS system vendor

- Video and other onboard recording
- Interventions:
  - In-cab warning lights
  - Supervisory coaching
  - Group feedback



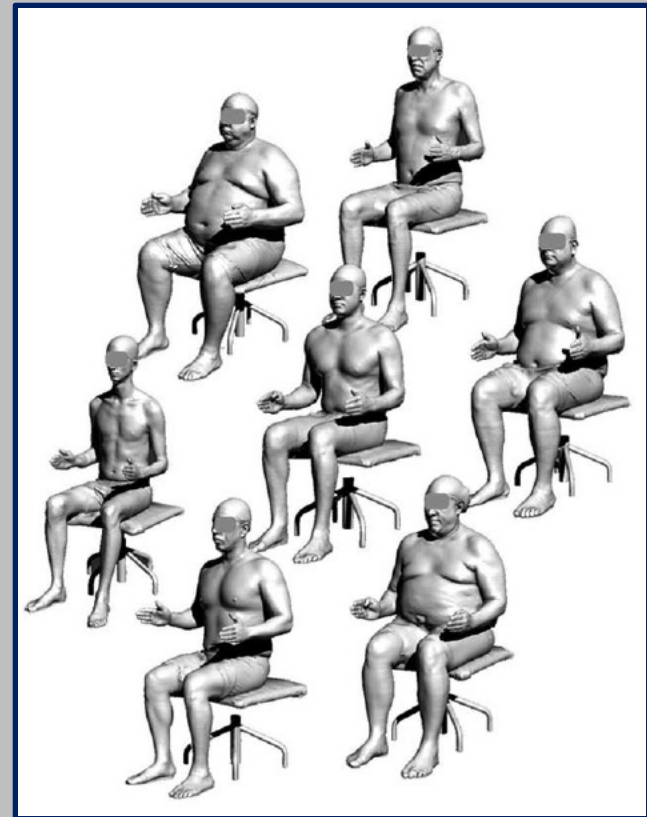
# New interagency agreement with National Institute of Justice

- Evaluation of Las Vegas Police Department motor vehicle safety program
- Pilot investigations of motor vehicle crash fatalities of law enforcement officers using FACE model



# U.S. truck driver anthropometry

- New data on body dimensions based on a national sample of 1,950 truck drivers
- Performed 3D whole-body scans and cab workspace measurements for 180 truck drivers
- Found that drivers were about 30 pounds heavier than average
- Developed representative body-type models



# U.S. truck driver anthropometry: Impact

Manufacturers are using NIOSH data to design safer truck cabs

- Better visibility from the cab
- Better fit in the cab
- Improved seat belt design



# Ambulance safety research

**Goal:** Reduce vehicle-related injuries to workers in the ambulance patient compartment

## Strategy for policy impact:

- Develop SAE testing standards
- Revise GSA purchase specification
- Influence manufacturing standards and NFPA standard





# National recognition for NIOSH ambulance safety research

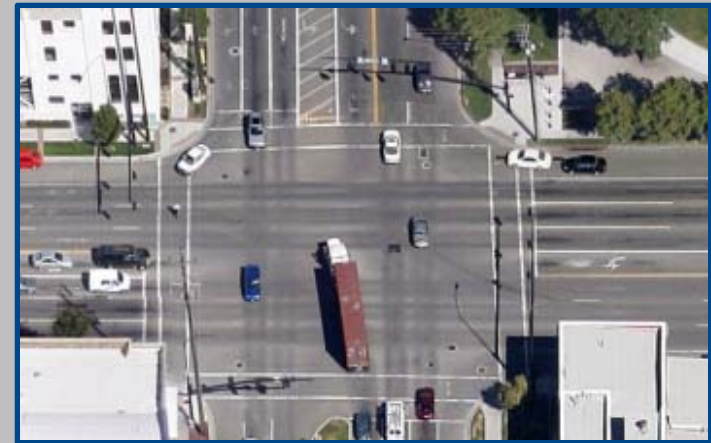
NIOSH project officer Jim Green a finalist for a 2014 Service to America medal (SAMMIE)

- Nominated for Citizen Services Medal
- Cited for collaborations with industry and other federal agencies to create ambulance crash standards



# Building capacity for vehicle-related engineering research: DSR driving simulator

- Advanced Driver Assistance Systems for fire apparatus
- Occupational driving safety at intersections



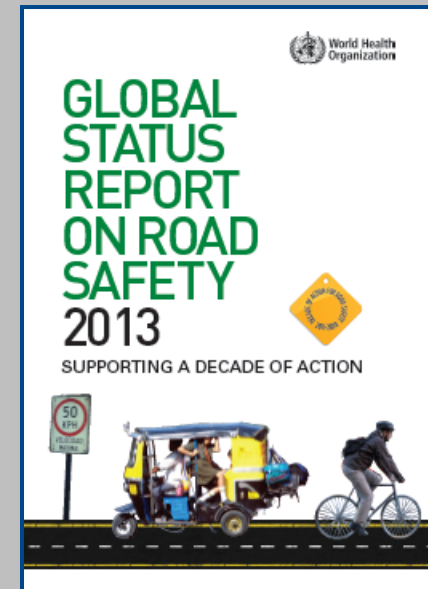
# Global road safety

Contributes to NIOSH goal to enhance global occupational safety and health through international collaborations



# Global road safety activities

- UN Road Safety Collaboration
  - Work-related Road Safety Group
  - Inclusion of work-related road safety in UN resolutions and Decade of Action
- Project to evaluate truck driver training and build fleet management capacity in India
- Journal article on global sources of data on work-related crashes
- Technical assistance to governments and NGOs





# Recent and Upcoming Journal Articles and Other Products





## Selected recent journal articles

- Sieber WK et al. [2014]. Obesity and other risk factors: the National Survey of U.S. Long-Haul Truck Driver Health and Injury. *Amer J Indust Med* [e-pub ahead of print]
- Retzer KD, Hill RD, Pratt SG [2013]. Motor vehicle fatalities among oil and gas extraction workers. *Accident Analysis & Prevention* 51:168-174.
- CDC [2013]. Occupational highway transportation deaths among workers aged 55 years and older — United States, 2003–2010. By Pratt SG, Rodríguez-Acosta RL. *MMWR* 62(33):653-657.
- Guan J, Hsiao H, Bradtmiller B, Kau T-Y, Reed MR, Jahns SK, Loczi J, Hardee HLH, Piamonte DPT [2012]. U.S. truck driver anthropometric study and multivariate anthropometric models for cab designs. *Human Factors* 54:849-871.





## Selected recent NIOSH/other documents

- Fact sheets on safety of younger drivers at work: for employers, and for parents/young workers\*
- Proceedings paper for ASSE conference:
  - Pratt S, Retzer K, Tate D [2014]. Reducing road risk using journey management.
- Network of Employers for Traffic Safety [2014]. Guidelines for an employer road safety program.
- Final report and employer tools: Hilton Foundation project on truck driver safety in India

\* [www.cdc.gov/niosh/docs/2013-152](http://www.cdc.gov/niosh/docs/2013-152), [www.cdc.gov/niosh/docs/2013-153](http://www.cdc.gov/niosh/docs/2013-153)



## Planned NIOSH/other documents

- Technical report: Results and recommendations from motor vehicle survey of Iowa LEOs
- Data sourcebook for industry use of NIOSH anthropometric data on truck drivers
- Journey management guidance for oil & gas sector
- Generic journey management guidance
- Updated NIOSH fact sheet on older drivers



# Autonomous vehicles and connected-vehicle technologies



# Current levels of vehicle automation

- **Level 0:** *No Automation*
- **Level 1:** *Function-Specific Automation*
  - E.g., cruise control, automatic braking, or lane-keeping
- **Level 2:** *Combined Function Automation*
  - At least two primary control functions work together
  - Driver cedes active primary control in certain limited driving situations, but is still expected to be available at all times to assume control

National Highway Traffic Safety Administration (NHTSA) [2013]. Preliminary Statement of Policy Concerning Automated Vehicles. Washington, DC: NHTSA.



## Future levels of vehicle automation

- **Level 3:** *Limited Self-Driving Automation*
  - Driver can cede full control of all safety-critical functions under certain traffic or environmental conditions
- **Level 4:** *Full Self-Driving Automation*
  - Vehicle can perform all safety-critical driving tasks and monitor road conditions for entire trip

National Highway Traffic Safety Administration (NHTSA) [2013]. Preliminary Statement of Policy Concerning Automated Vehicles. Washington, DC: NHTSA.

# NIOSH Science Blog on semi-autonomous vehicles

CDC Home  
**CDC** Centers for Disease Control and Prevention  
CDC 24/7: Saving Lives. Protecting People.™

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## NIOSH Science Blog

Safer Healthier Workers

[NIOSH > NIOSH Science Blog](#)

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### Semi-Autonomous Motor Vehicles: What Are the Implications for Work-related Road Safety?

**Categories:** [Motor Vehicle Safety](#)

April 22nd, 2014 7:17 am ET - **Stephanie Pratt, PhD and Kwame Bofofo, MPH**



Vehicles communicating with each other and with the road infrastructure. Graphic courtesy of University of Michigan Mobility Transformation Center.

Motor vehicles that are semi-autonomous – in other words, those that can operate for extended periods with little human input – are no longer just a product of science fiction. Semi-autonomous vehicles (Level 3 automation as defined below) are expected to reach the market within five years, and employers that buy or lease vehicles will need to consider the effects of this major technological change on their transportation policies and operations.

**Defining the issue:** The National Highway Traffic Safety Administration (NHTSA) has defined five different levels of vehicle automation ranging from Level 0 (no automation) to Level 4 (fully automated). These are defined as follows:

- Level 0 is *No Automation*.
- Level 1 automation is *Function-Specific Automation* such as cruise control and automatic braking or lane-keeping. These features are widely available in vehicles on the market today.
- Level 2 automation is *Combined Function Automation*, which means that at least two primary control functions are designed to work together, for example, adaptive cruise control in combination with lane centering. The driver cedes active primary control in certain limited driving situations, but is still responsible for monitoring the roadway and safe operation and is expected to be available for control at all times and on short notice.
- Level 3 automation is *Limited Self-Driving Automation*. Vehicles at this level of automation enable the driver to cede full control of all safety-critical functions under certain traffic or environmental conditions. In these situations, the driver relies heavily on the vehicle to

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## Potential benefits for employers

- Crash reduction:
  - Reductions in injuries, asset damage, and liability
- Improved efficiency and productivity:
  - Reduced congestion, increased highway capacity
  - Goods and services delivered more quickly/efficiently
- Reduced fuel consumption:
  - Lower fuel costs and reduced travel and idling time
  - Contribution to environmental or sustainability goals

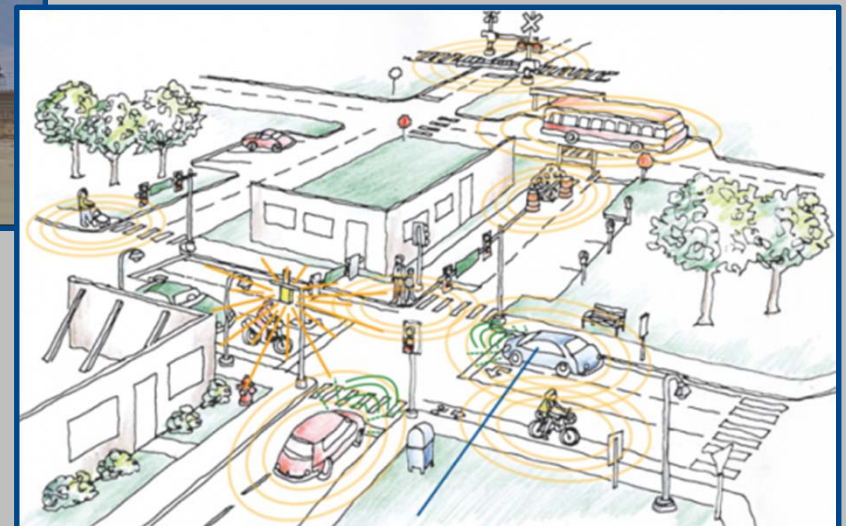


## Policy implications for employers

- Driver training and licensing:
  - Will states require special testing or certifications?
  - Will employers need to provide additional training?
- Distracted driving:
  - Will the vehicle become a legitimate workplace during the times the driver has ceded control?
  - What does this mean for policies on distracted driving?
- Liability:
  - Who is responsible -- the driver, the driver's employer, or the manufacturer?
  - How will the courts determine who is liable, and how will insurers conceptualize fault?

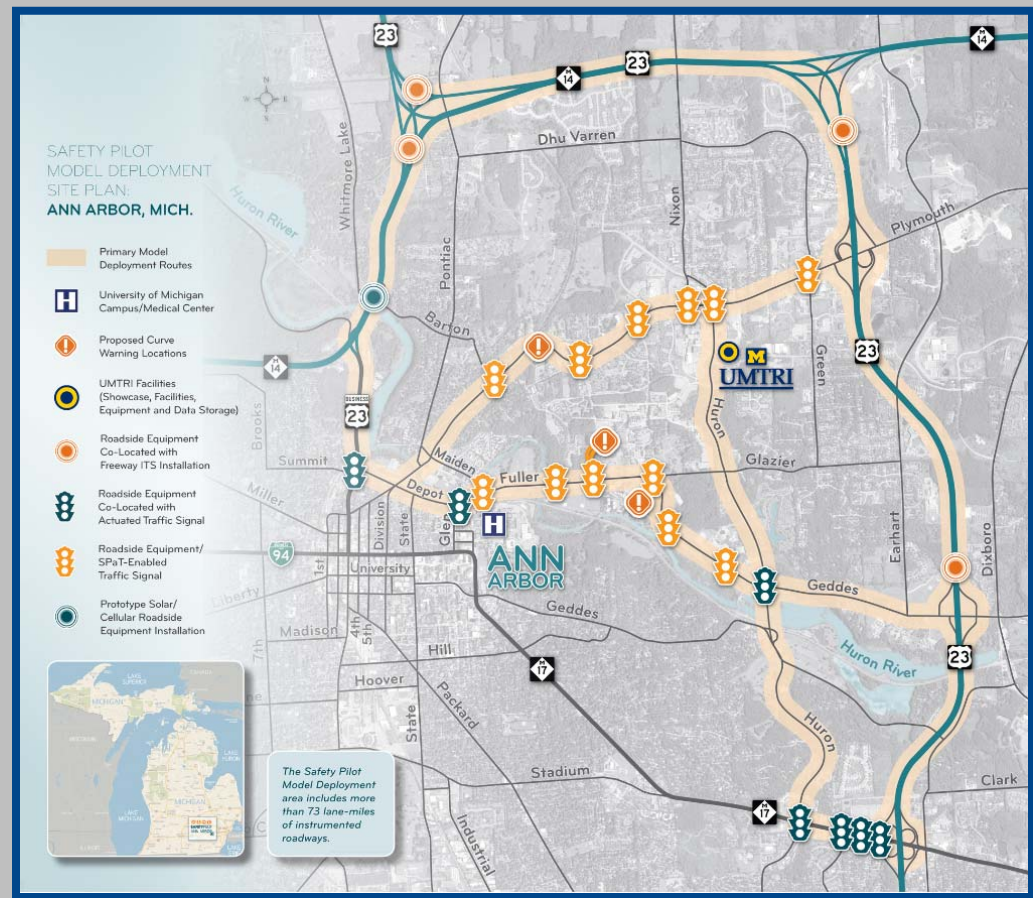
# Connected-vehicle technologies

- Vehicle-to-vehicle (V2V)
- Vehicle-to-infrastructure (V2I)



# Safety Pilot project at UMTRI: Opportunity for collaboration

- V2V and V2I communications
- 73 miles of roads in Ann Arbor
- Over 2,800 vehicles





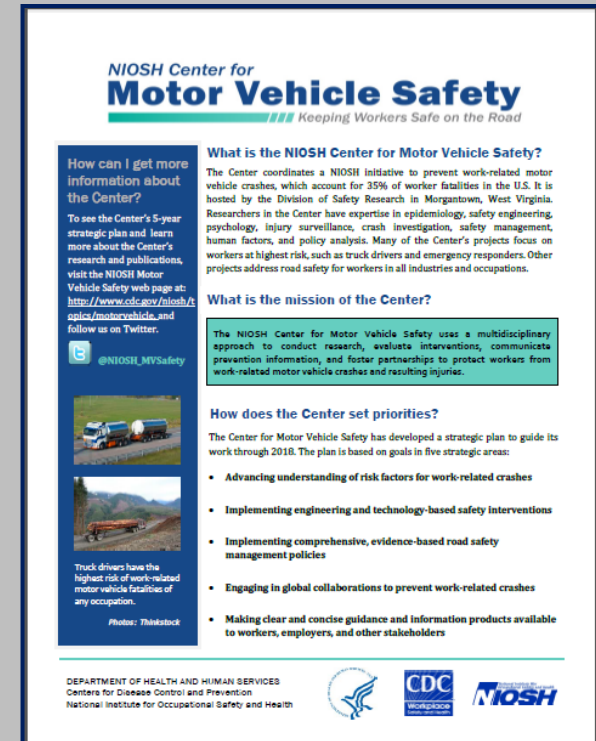
## Questions for the BSC

- What additional research questions should the Center be trying to answer?
- Are there other motor vehicle safety topics that the Center should consider examining?
- What further opportunities for partnerships might the Center pursue?

# Questions?

Stephanie Pratt, PhD  
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Motor Vehicle Safety  
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Web:  
<http://www.cdc.gov/niosh/topics/motorvehicle>



**NIOSH Center for Motor Vehicle Safety**  
Keeping Workers Safe on the Road

**How can I get more information about the Center?**  
To see the Center's 5-year strategic plan and learn more about the Center's research and publications, visit the NIOSH Motor Vehicle Safety web page at: [http://www.cdc.gov/niosh/topics/motorvehicle\\_and\\_follow\\_us\\_on\\_twitter](http://www.cdc.gov/niosh/topics/motorvehicle_and_follow_us_on_twitter).  
@NIOSH\_MVSAfety

**What is the NIOSH Center for Motor Vehicle Safety?**  
The Center coordinates a NIOSH initiative to prevent work-related motor vehicle crashes, which account for 35% of worker fatalities in the U.S. It is hosted by the Division of Safety Research in Morgantown, West Virginia. Researchers in the Center have expertise in epidemiology, safety engineering, psychology, injury surveillance, crash investigation, safety management, human factors, and policy analysis. Many of the Center's projects focus on workers at highest risk, such as truck drivers and emergency responders. Other projects address road safety for workers in all industries and occupations.



**What is the mission of the Center?**  
The NIOSH Center for Motor Vehicle Safety uses a multidisciplinary approach to conduct research, evaluate interventions, communicate prevention information, and foster partnerships to protect workers from work-related motor vehicle crashes and resulting injuries.

**How does the Center set priorities?**  
The Center for Motor Vehicle Safety has developed a strategic plan to guide its work through 2018. The plan is based on goals in five strategic areas:

- Advancing understanding of risk factors for work-related crashes
- Implementing engineering and technology-based safety interventions
- Implementing comprehensive, evidence-based road safety management policies
- Engaging in global collaborations to prevent work-related crashes
- Making clear and concise guidance and information products available to workers, employers, and other stakeholders

Truck drivers have the highest risk of work-related motor vehicle fatalities of any occupation.  
Photos: Thinkstock

DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Centers for Disease Control and Prevention  
National Institute for Occupational Safety and Health



*The findings and conclusions in this presentation are those of the author and do not necessarily represent the views of the National Institute for Occupational Safety and Health.*