

# NIOSH Center for Motor Vehicle Safety

## Results from 2016 Midcourse Review

The NIOSH Center for Motor Vehicle Safety conducted a midcourse review of its *NIOSH Center for Motor Vehicle Safety Strategic Plan for Research and Prevention, 2014-2018*. This document outlines midcourse review purpose, methodology, results of internal review and external input, and research topics to consider for the remaining two years of the strategic plan.

## Executive summary

Motor vehicle crashes are the number one cause of injury deaths at work in the United States. Crash risk affects workers in all industries and occupations, whether employees drive tractor-trailers, cars, pickup trucks, or emergency vehicles, and whether driving is a primary or occasional part of the job.

**The National Institute for Occupational Safety and Health (NIOSH) and its Center for Motor Vehicle Safety (CMVS) are committed to preventing work-related motor vehicle crashes and injuries.**

Since 2014, NIOSH's CMVS has followed a 5-year strategic plan for research and prevention, pursuing goals that address distinct facets of work-related motor vehicle safety. To review midcourse progress and guide next steps, NIOSH conducted an internal review of the plan, showing meaningful progress in three of five strategic areas and nearly two-thirds of performance measures at least partially met. The CMVS then sought external input via public comments and invited stakeholder reviews, and drew conclusions which merge key takeaways with next steps for developing research that addresses unmet goals within the strategic plan.

Based on the findings of this review, the NIOSH CMVS encourages research evaluating policy, program, and training interventions to reduce work-related motor vehicle crashes and injuries, taking into account known and hypothesized crash risk factors for workplace driving, e.g., fatigue, commuting, distraction, medications, and chronic health conditions. Also, the CMVS encourages research assessing the work-related effects of the rapidly-expanding fields of vehicle-to-vehicle and vehicle-to-infrastructure technology, highly-automated vehicles, active safety systems, and in-vehicle monitoring systems.

The CMVS greatly appreciates the time and effort of the individuals and organizations who responded to our request for review and comment. Their input is critical to helping us shape priorities for the next 2 years and proceeding toward a new 10-year strategic plan. Moving forward, the CMVS will continue to promote research findings and encourage researchers to describe the impact and cost of interventions to help businesses prioritize prevention strategies.

For information about the NIOSH Center for Motor Vehicle Safety, visit [www.cdc.gov/niosh/motorvehicle](http://www.cdc.gov/niosh/motorvehicle).

## What we do

The NIOSH Center for Motor Vehicle Safety (CMVS), with our partners, conducts research and develops strategies to prevent work-related motor vehicle crashes and injuries.

Through 5 strategic goals, we're working to: **1)** identify risk factors for work-related crashes **2)** apply engineering and technology-based safety interventions **3)** promote evidence-based policies, standards, and regulations **4)** collaborate with global partners and **5)** communicate safety and policy recommendations.

## Why we do it

Millions of workers drive or ride in a motor vehicle as part of their jobs. Motor vehicle crashes are the leading cause of work-related injury deaths in the United States, accounting for 23,865 deaths from 2003-2015.<sup>1</sup>

These deaths have an impact on workers, their families, businesses, and communities. In 2013 alone, motor vehicle crashes at work cost U.S. employers \$25 billion — \$65,000 per nonfatal injury and \$671,000 per death.<sup>2</sup> All workers are at risk of crashes, whether they drive light or heavy vehicles, or whether driving is a main or incidental job duty.

The goal of the Center for Motor Vehicle Safety is to make sure that those who work in or near vehicles come home safely at the end of their work day.

## Who we work with

CMVS researchers collaborate with partners in industry, labor, professional and trade associations, government agencies, and academia.

## What sets us apart

NIOSH is the only part of the U.S. federal government whose mission encompasses prevention of work-related motor vehicle crashes and resulting injuries **for all worker populations**. Other federal agencies have responsibilities and interest in motor vehicle safety for specific worker groups (e.g., truckers, fire fighters, law enforcement officers).

## Priority populations

We research and provide guidance to promote motor vehicle safety for **truck drivers, other high-risk workers** (e.g., emergency medical service (EMS), law enforcement, oil and gas extraction workers), and **all who drive for work** (e.g., home healthcare workers, sales representatives).

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<sup>1</sup> Bureau of Labor Statistics [2003-2015]. Table A-2. Fatal occupational injuries resulting from transportation incidents and homicides, all United States.

<sup>2</sup> Network of Employers for Traffic Safety [2015]. Cost of motor vehicle crashes to employers – 2015.

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## Purpose of midcourse review

### Demonstrate results, facilitate growth

Featuring 5 strategic goals and 46 key performance measures, the *NIOSH Center for Motor Vehicle Safety: Strategic Plan for Research and Prevention, 2014-2018* was launched to coordinate NIOSH's existing motor vehicle safety research and set a course for the next 5 years.

The Center for Motor Vehicle Safety conducted a midcourse review of its strategic plan to:

- Demonstrate progress made since the plan's start.
- Facilitate growth in research areas of strength and potential strength.

### Status

The CMVS is now preparing for a full review of the current plan at the end of 2018 and for the 10-year strategic plan that will follow. Results gathered from this midcourse review will play an important role in shaping the approach toward these activities.

Across all of our strategic areas, the CMVS will continue to explore opportunities to secure resources and partnerships that will lead to measurable impact and completed performance measures.

# Methodology

## Our approach

Taking a multifaceted approach, the CMVS conducted **internal review** with an objective self-assessment and sought **external input** with a clear request for action-oriented feedback.

## Steps / Internal review

How well are we meeting our goals?

**Method:** Compare metrics outlined in the [2014-2018 strategic plan](#) with Center accomplishments and develop [NIOSH Center for Motor Vehicle Safety: Performance Measures](#) to visually reflect Met, Partially Met, and Not Met measures for each of the 5 strategic goals.

How do progress and situational factors influence future work?

**Method:** Discuss progress in the context of CMVS internal strengths and weaknesses, identify external opportunities and threats, outline expected priorities for future work, and develop [NIOSH Center for Motor Vehicle Safety: Progress Report 2016](#) to share progress inside NIOSH, with partners, and with the public.

## Steps / External input

Where do external commenters believe we should focus our resources?

**Method:** Seek input on CMVS work and goals – specifically related to research priorities, communications and outreach, and use of NIOSH products – through:

- Review by stakeholders representing an employer organization, federal agency, labor group, non-governmental organization, and academia.
- Public written comment solicited via a Federal Register notice.
- Input from presenters and participants at a public web meeting announced in the Federal Register.

## Results / Internal review

### CMVS perspective

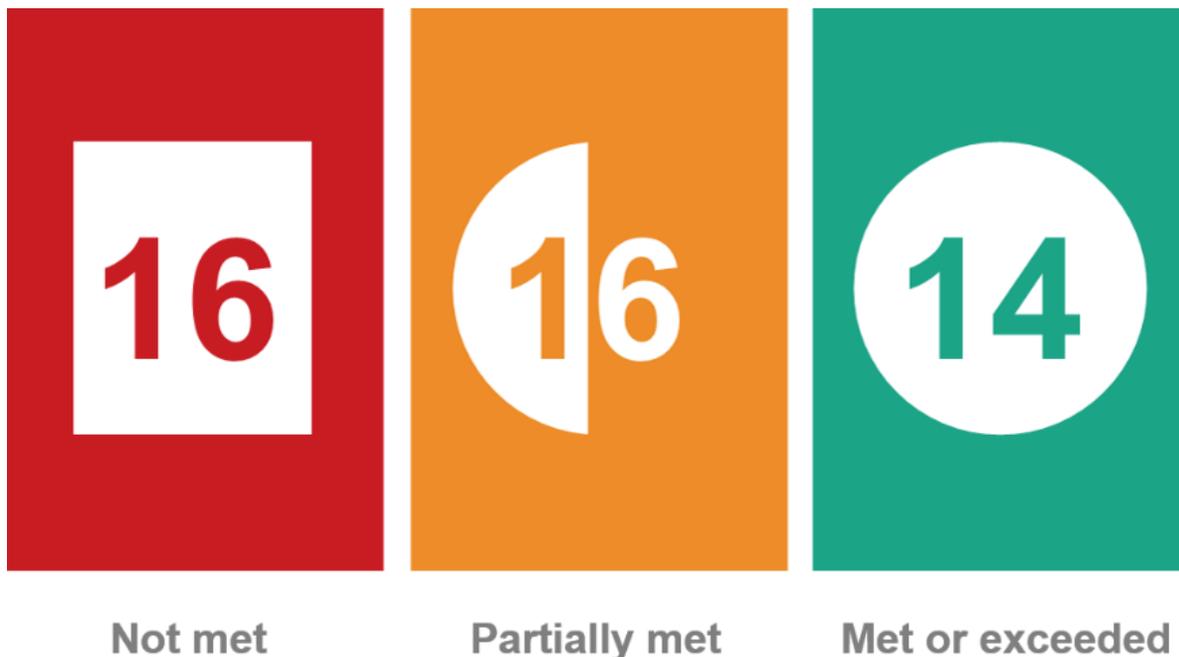
The internal review gave the CMVS a cohesive understanding of its current state before requesting external input. The CMVS is also using the review to guide future plans, as it highlighted areas of strength and gaps in goal-related progress.

### How well are we meeting our goals?

The CMVS set performance measures for each of its 5 strategic goals. A [performance measures document](#) displays progress toward meeting these measures.

The CMVS team assessed current status towards meeting performance measures for each strategic goal. Each measure is rated as *Not Met*, *Partially Met*, or *Met or Exceeded*. A *Partially Met* rating required funding of a project, initiating work under an existing project, or completing work addressing a part of the performance measure.

Across all 5 goals, the current strategic plan sets 46 specific performance measures. Of these, 16 are Not Met, 16 are Partially Met, and 14 were Met or Exceeded as of September 2016.



## How do progress and situational factors influence future work?

Using results from performance measures, the CMVS reported progress highlights for each strategic goal in a [progress report](#). Reporting results at goal level allowed for a higher-level and thematic assessment of progress.

The green progress ratings show that we've accomplished the most toward meeting Goals 2 and 5.

Goal 1: Identify risk factors for work-related crashes



Goal 2: Apply engineering and technology-based safety interventions



Goal 3: Promote evidence-based policies, standards, and regulations



Goal 4: Collaborate with global partners

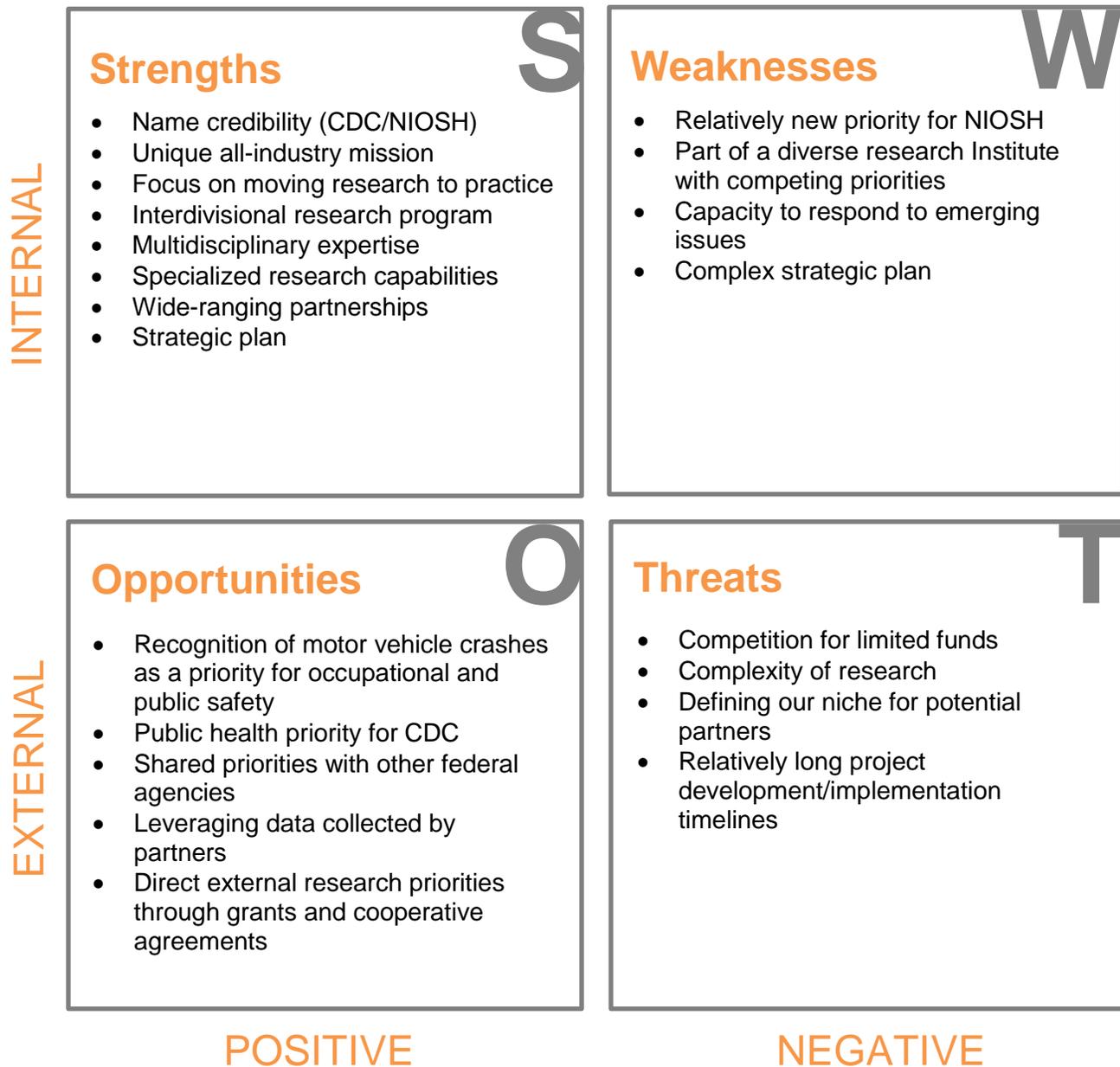


Goal 5: Communicate safety and policy recommendations



## SWOT analysis

The next step involved placing performance measure results in context of CMVS **s**trengths, **w**eaknesses, **o**pportunities, and **t**hreats. Understanding these issues is critical when we think about progress made to date and achievements anticipated by the end period covered by the strategic plan.



## Internal / Strengths and weaknesses

The strength of the CMVS is rooted in credibility as an interdivisional, multidisciplinary research program that harnesses the scientific expertise of NIOSH to prevent work-related motor vehicle crashes. This unique perspective is reflected in:

- A multidisciplinary approach
- Advanced and unique research facilities
- Diverse and thriving partnerships

We are committed to moving our research findings into practice in the workplace.

Motor vehicle safety is a relatively new priority for NIOSH, which poses challenges in terms of channeling research expertise spread across different NIOSH locations and promoting research that is consistent with the CMVS strategic plan. Our long project-planning cycle – designed to ensure the quality and relevance of our research – may also limit our ability to quickly respond to emerging issues.

## External / Opportunities and threats

We face possible external threats from potential partners' lack of understanding about our mission and capabilities: not fully recognizing the CMVS role in work-related motor vehicle safety, or having unrealistic expectations of what the CMVS is capable of doing. Work with industry partners may be complicated by the relatively long planning and implementation cycles under which the CMVS and other federal programs operate. In this time of limited resources, we must continue refining our niche and clearly communicating it to attract the most beneficial partnership opportunities.

As we focus on improving external understanding of our identity, we can also leverage existing partnerships to reduce the toll of work-related motor vehicle crashes. The growing recognition of the importance of work-related crashes as an issue for both occupational and public safety offers new opportunities for research and partnerships. Specifically, we can increase our effectiveness by taking advantage of data and workplace access provided by partners, and working with partners to develop innovative ways to share research results and recommendations with a range of audiences.

# Results / External input

## Public perspective

Seeking external input enabled the CMVS to capture the perspective of different groups concerning: research priorities, communications and outreach, and use of NIOSH products.

The public comment period took place from August 15 to October 14, 2016. Through a Federal Register notice, the CMVS requested comments via a web meeting and formal submission to the NIOSH docket. In addition, we obtained written reviews by representatives of key stakeholder groups: an employer organization, federal agency, labor organization, non-governmental organization, and university research institute.

## Web meeting

### About

The Adobe Connect web meeting on September 14, 2016 included four presenters – two internal, two external – and an audience of 29 attendees, more than half of whom were external to NIOSH. This format enabled presenters to explain their feedback and recommendations and allowed for discussion between presenters, CMVS leaders, and attendees. Web meeting attendees also had the opportunity to learn about new NIOSH research projects that are directly related to their recommendations.

### Feedback

Presenters supported the CMVS strategic plan, commending the commitment of the CMVS to collaborative research. One presenter was struck by the fact that NIOSH's CMVS is the only part of the federal government whose mission extends to preventing work-related motor vehicle crashes in all worker populations, recognizing it is "a major responsibility." Another recognized that the CMVS has completed much work in a short time and built a strong foundation of content on digital platforms.

### Recommendations

In addition to commenting on what NIOSH has done, presenters offered suggestions for future priorities. Key topics mentioned include in-vehicle technologies, fatigued driving, commuting, non-traditional employment arrangements, and educational materials.

Specific selected recommendations from the public web meeting include:

- Continue contributing to knowledge about: 1) how engineering- and technology-based tools installed in work vehicles affect the safety of all road users, 2) how drivers interact with in-vehicle technologies, and 3) tools to teach drivers how to interact with new technologies in their work vehicles.
- Consider research to: 1) better identify contributing risk factors for fatigued driving on the job, 2) assess the effectiveness of fatigue-reduction interventions including awareness campaigns and employer policies, and 3) explore how fatigue-related crashes are recorded by investigators, law enforcement, and employers.

- Clarify whether research on commuting-related crashes and/or long commutes as a risk factor for at-work crashes is within the scope of NIOSH work. If so, initiate research related to commuting behaviors: crash risk, risk factors, and intervention effectiveness.
- Consider the safety of drivers working in non-traditional employment arrangements, particularly contracted drivers for rideshare services and transportation network companies, and how these types of vehicle operations affect motor vehicle safety for everyone.
- Remember that traditional communication channels are still important. Develop products that are easily accessible for organizations that may not have a large communication department or health and safety department.

## Docket

### About

NIOSH requested public comments via a Federal Register announcement on August 15, 2016. The [NIOSH Center for Motor Vehicle Safety: Midcourse Review of Strategic Plan](#) docket remained open for comment until October 14, 2016. This format enabled public commenters to provide feedback in a less-restricted timeframe. The docket garnered a total of 5 comments.

### Feedback

Commenters focused on CMVS publications. One noted that NIOSH's CMVS has produced excellent publications addressing fatigue and distraction as risk factors for work-related crashes and injury. Another highlighted the lack of publications related to illegal substances, prescription and over-the-counter medications, and chronic medical conditions as crash risk factors.

### Recommendations

In suggesting future priorities, commenters mentioned topics such as illegal substances, prescription and over-the-counter medications, and general health issues for those who drive for work.

Specific selected recommendations from the public docket include:

- Develop strategies to inform workers of side effects of commonly-used medications and medication mixtures that may impair their ability to safely operate motor vehicles.
- Develop a risk categorization system for prescription and over-the-counter medications similar to the one produced by the Driving under the Influence of Drugs, Alcohol and Medicines (DRUID) project conducted in the European Union.
- Address chronic medical conditions as crash risk factors in the remaining two years of the CMVS strategic plan.
- Evaluate truck drivers' stress due to financial concerns and factors such as time constraints beyond their control, particularly for small trucking companies and independent owner-operators.

- Consider work-related threats to truck drivers' health such as difficulty in obtaining adequate sleep and accessing healthy food options and healthcare options.

## Stakeholders

### About

The stakeholder review timeframe paralleled that of the public docket: August 15 to October 14, 2016. Stakeholders provided focused comments that reflected their varying experiences, perspectives, and roles in workplace motor vehicle safety.

### Feedback

Stakeholders showed support for NIOSH CMVS goals – and that NIOSH has a plan to guide its research agenda. Stakeholders also recognized NIOSH's research relationships with multinational companies and industry groups, noted using NIOSH road safety research as a resource in producing toolkits, and offered to provide support to NIOSH work.

### Recommendations

In their comments, stakeholders covered a range of recommendations – some of which NIOSH is already doing. Recommendations also revealed areas of interest to those invested in the motor vehicle safety field. Key topics include:

- Prescription and over-the counter medications, illicit substances, and chronic medical conditions as crash risk factors
- Unsafe driving behaviors such as speeding, distracted driving, fatigued and drowsy driving (including workers not covered by federal hours-of-service regulations), and non-use of seat belts
- Safety implications of vehicle technologies, e.g., connected-vehicle technology, advanced driver assistance systems, crash avoidance technology, and highly-automated vehicles
- The aging workforce, and the increase in non-traditional employment such as ridesharing services
- Employer-based motor vehicle safety programs: helping employers make the business case for programs, and evaluating crash-prevention policies, interventions, and tools
- The impact of off-the-job or off-duty behaviors on motor vehicle safety on the job
- Identifying commuting-related crashes, and the contribution of long commutes to motor vehicle safety on the job
- Leveraging research and communication capacity of partners in the public, private, and NGO sectors to expand research and reach wider audiences with prevention information

Specific selected recommendations from stakeholders include:

- Address the contribution of prescription and over-the-counter medications to work-related crashes.

- Expand the depth of knowledge and understanding about drowsy driving through improved data collection efforts that will, in turn, lead to practical and evidence-based solutions.
- Conduct research among temporary and contingent workers, particularly contracted drivers and drivers for rideshare companies.
- Continue or initiate research on the effectiveness of crash avoidance systems and advanced driver assistance systems (ADAS) in emergency response, and the effectiveness of connected-vehicle technologies in reducing work-related crash risk.
- Engage companies using “driverless” cars as research partners to learn how autonomous vehicles impact the safety of all road users.
- Investigate whether on-the-job motor vehicle safety policies carry over to commuting and driving outside work.
- Provide fleet managers with data needed to evaluate the impact of safety programs and technological interventions.
- Promote the identification of contracted and rideshare drivers in crash data.
- Collect and analyze data on compliance with employer policies (e.g., electronic device use, seat belt use, speed limit compliance) on the job or in company-owned vehicles.
- Expand research partnerships with multinational companies, industry groups, and nonprofit organizations.
- Build on previous NIOSH research (e.g., the U.S. National Survey of Long-Haul Truck Driver Health and Injury) as well as recommendations from groups such as the National Academy of Sciences, to develop longitudinal studies and other follow-on research.
- Because transportation is likely to change significantly in the next 5 to 10 years, build enough flexibility into future strategic plans to allow timely response to emerging issues.
- Place more emphasis on tracking the adoption of NIOSH findings and recommendations in the workplace.
- Produce “camera-ready” educational materials that employers, workers, and safety practitioners can reproduce as needed.
- Reach out to human resources (HR) departments and/or partner with HR organizations to provide motor vehicle safety guidance and recommendations to risk managers within human resource departments who have safety responsibilities.
- Identify avenues for bringing work-related crash costs and road safety management benefits to employers’ attention, including working with partners to develop and distribute research-based information.

# Conclusions

## Have we made progress?

The NIOSH Center for Motor Vehicle Safety is making substantial progress towards meeting the 5 goals laid out in the strategic plan covering 2014 to 2018.

The midcourse review assessed progress by determining whether performance measures outlined in the plan were Unmet, Met, or Partially Met as of September 2016. The result? Nearly two-thirds of the 46 measures are at least Partially Met.

While the amount of progress varies by goal, most progress exists in the areas of risk-factor characterization, vehicle fit and design, motor vehicle safety training and policy evaluation, and communication of motor vehicle safety information to employers and those who drive for work.

Less activity has been completed in the areas of promoting evidence-based safety management programs and collaborating with global partners. Recently-funded projects will expand our understanding of fatigue as a risk factor and the effectiveness of fatigued-driving prevention measures in at-risk populations other than truckers. To a large extent, the amount of progress made in a given area reflects CMVS strengths and weaknesses.

## What did the comments show?

Stakeholders provided numerous suggestions for research needs ranging from ways to extend the reach of our communication efforts to specific recommendations for future research targets.

Strong interest was expressed for expanding research to cover a range of topics related to motor vehicle safety, including: connected-vehicle technology, advanced safety systems in vehicles, fatigued and drowsy driving, nontraditional employment arrangements, commuting, medications, chronic medical conditions, driver health and stress, driving behaviors, program and tool evaluation, distracted driving, and the relationship of off-the-job factors to on-the-job crash risk.

Additional comments centered on expanding collaborations, providing safety information in a “ready-to-use” format, and ensuring communication strategies include outreach to safety and health managers who work in human resource and risk management departments.

## What's next?

With less than 2 years remaining in the current strategic plan, the CMVS does not plan to revise its goals and performance measures before the next planning cycle, which will cover 2019 and beyond. In response to midcourse review comments, the CMVS will, however, expand the scope of its activities to cover two important new areas. First, we will investigate the relationships between off-the-job factors (e.g., sleep quantity and quality, medical conditions, and commuting) and the risk of work-related crashes. Second, we will seek to understand how the interrelationship between off-the-job driving (e.g., “mega commutes”) and on-the-job factors (e.g., company driving and crew transportation policies) influence motor vehicle safety, both at work and while commuting.

To fill research gaps identified during this midcourse review, the Center for Motor Vehicle Safety encourages both NIOSH and external researchers to develop proposals focused on evaluating policy, program, and training interventions to reduce risk factors such as fatigue, distractions, medications, and chronic health conditions. Further, we encourage research to support the safe application of emerging vehicle technologies (e.g., ADAS, highly-automated vehicles) to special-use work vehicles such as police, fire, and other emergency response vehicles. Research highlighting the costs of work-related crashes and economic benefits of crash prevention programs is also needed. Finally, researchers are encouraged to translate their research into informational products that can be easily used by employers to reduce crashes among their employees and contractors, and evaluate the impact of those products.

The CMVS will continue to expand its work toward prevention of fatigued and drowsy driving, in line with priorities for NIOSH and for several of our key partners in the government and NGO sectors. Since publication of our strategic plan in 2014, we have funded two new projects on fatigued and drowsy driving. Consistent with midcourse review recommendations, these projects involve worker populations who are generally not covered by federal hours-of-service regulations: the law enforcement community and the oil and gas extraction industry.

The CMVS will also continue to build its capacity to conduct engineering research on the workplace safety implications of connected-vehicle technologies and the effectiveness of advanced safety systems. To ensure that its resources support research specific to worker safety, the CMVS will focus this work on special-use vehicles operated in work environments, such as emergency response vehicles. Recognizing the potential impact of highly-automated vehicles on worker safety, the CMVS is monitoring advances in technology, employer policies, and regulatory policies and is laying the groundwork for developing relevant research specific to the application of highly-automated vehicles in work environments.

Finally, the CMVS will continue to improve the reach and effectiveness of its safety recommendations and informational products by using a variety of communication channels, increasing its distribution networks, and assessing the impact of its communication. Working toward these ends, we are currently conducting an analysis of audience needs and preferences, with emphasis on small businesses that employ our priority target populations (truckers, other high-risk workers, and all who drive for work).