

# Implementing an In-Vehicle Monitoring Program: A Guide for the Oil and Gas Extraction Industry

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# Who is NIOSH?

- The National Institute for Occupational Safety and Health (NIOSH) is the US federal agency responsible for conducting research and making recommendations for the prevention of work-related injury and illness
- NIOSH is part of the Centers for Disease Control and Prevention (CDC) in the Department of Health and Human Services

## **Oil & Gas Extraction Program**

Provide effective interventions to reduce rate of illness and injury:

- High quality research
- Practical solutions
- Partnerships
- Research to Practice – r2p

# Background

- Oil and gas extraction industry employed 499,437 workers in 2011, US<sup>1</sup>
- Oil well operators, drilling contractors, service companies
- Fatality rate is 7 times that of all US industries; varies by company type and establishment size
- Leading cause of fatality is motor vehicle crashes



<sup>1</sup>Data Source: Bureau of Labor Statistics, QCEW



# Most Frequent Fatal Events 2003-2009

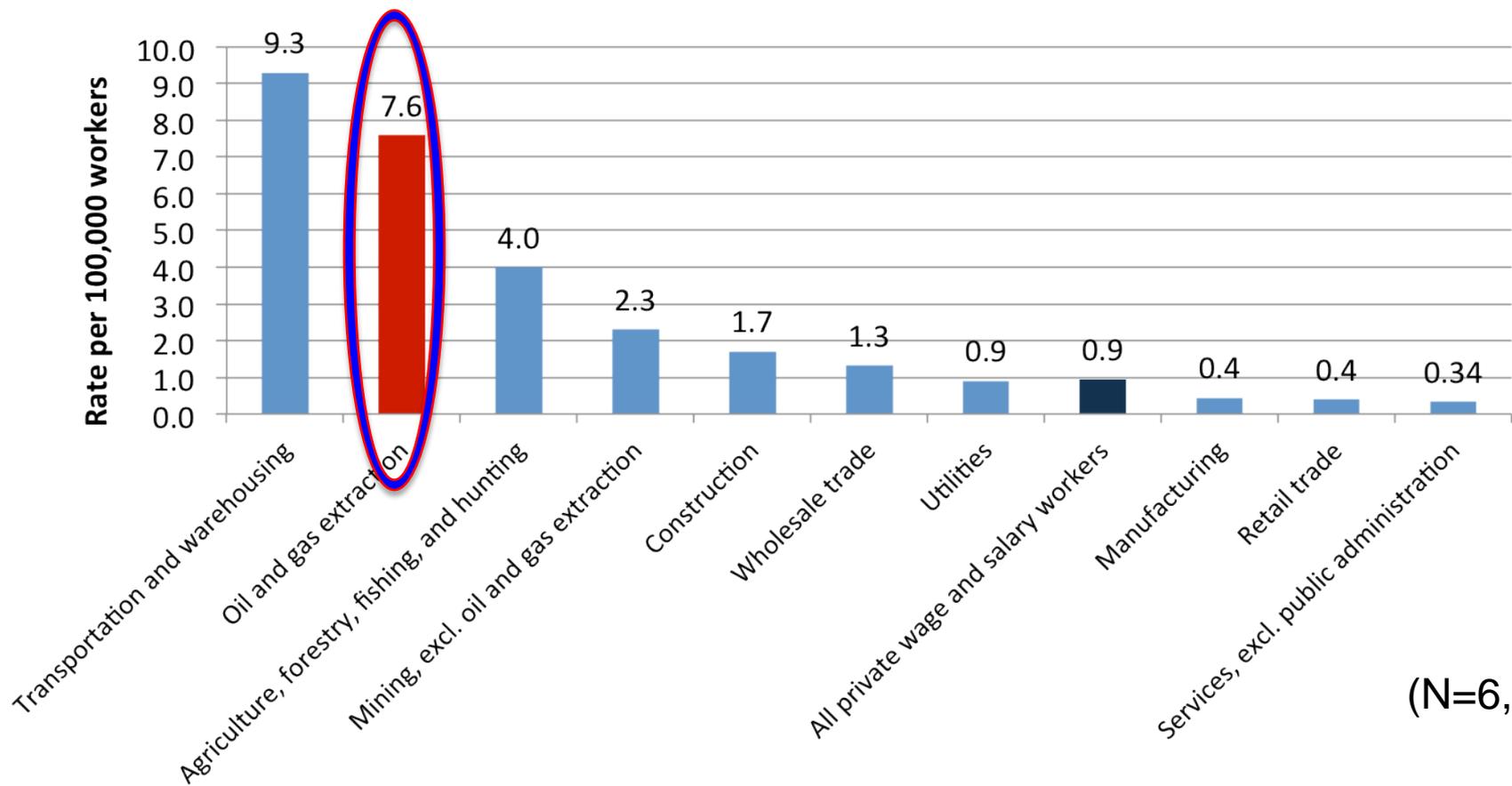
## Oil and Gas Extraction Workers, US

| Injury Event                            | Fatalities | % Total      |
|---|------------|--------------|
| Highway crash                           | 202        | 28.5         |
| Struck by object                        | 144        | 20.3         |
| Explosion                               | 57         | 8.0          |
| Caught/compressed in machinery or tools | 50         | 7.1          |
| Fall to lower level                     | 46         | 6.5          |
| Fire                                    | 40         | 5.6          |
| Electric current                        | 36         | 5.0          |
| Aircraft crash                          | 25         | 3.5          |
| Other                                   | 108        | 15.1         |
| <b>Total</b>                            | <b>708</b> | <b>100.0</b> |

Source: CDC-NIOSH APO; with restricted access to BLS, Census of Fatal Occupational Injury data.

# Motor Vehicle Fatality Rate 2003-2009

## Oil & Gas Extraction vs. Other Industries, US

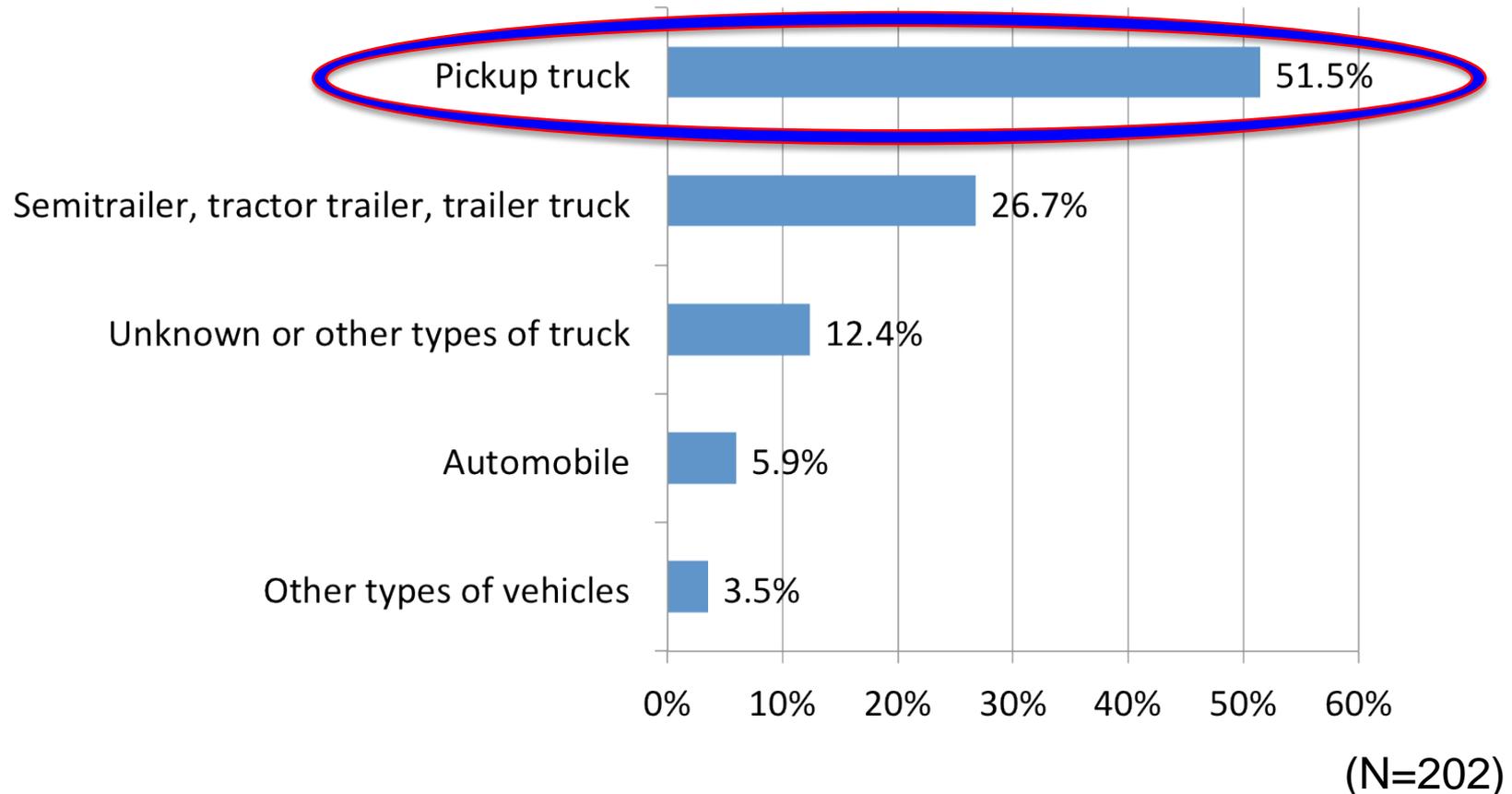


(N=6,953)

Sources: CDC-NIOSH with restricted access to BLS CFOI and Quarterly Census of Employment and Wages. \*NOTE: Excludes 6 fatalities of private wage and salary workers 2003-2009 who were not classified by industry.

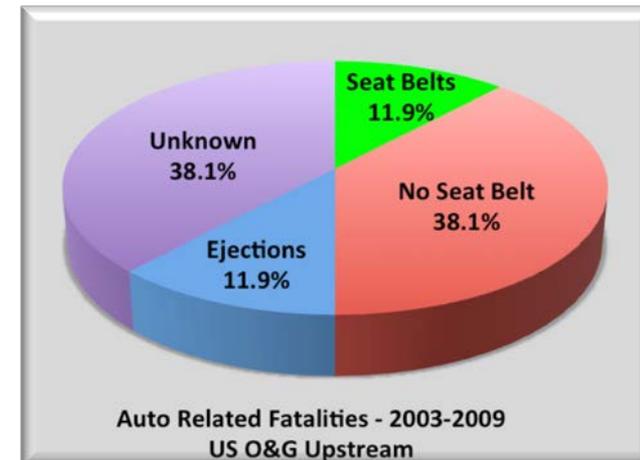
# MV Fatalities by Vehicle Type 2003-2009

## Oil & Gas Extraction Type, US



## Some key findings:

- Seatbelts
- Speed
- Small companies, contractors
  - Lack of resources and experience
  - Sense of urgency ; 24/7 business
  - 'Get 'er done'*
- Short service employees *'Green hats'*
  - High turnover
  - Limited labor pool



## Research to Practice (r2p) Process

- Analysis of motor vehicle fatalities
- Literature review of ‘best practice’
- Interviews of industry experts on road safety
- Formation of a NIOSH Oil & Gas Motor Vehicle Workgroup



# Opportunities for improved safety

- Training & Education
  - Driver competence
  - On-board orientation
  - Journey management
- IVMS
  - In-Vehicle Monitoring System
    - On-board coach
    - Provides alerts
    - Calculates a driver score



# IVMS

- Records data such as date, time, speed, acceleration, deceleration, safety belt use of a driver/vehicle
- Measures driver performance against a predetermined set of parameters
- Has shown to be effective in realizing immediate and positive effect on driver behavior



# Reported Benefits of IVMS in Literature

Oil & Gas literature – SPE papers:

- Reduces motor vehicle crash rates (50%-93%) <sup>1</sup>
- Reduces speeding (60%) <sup>2</sup>
- Reduces miles driven (8%-20%) <sup>3</sup>

Other literature:

- Federal Motor Carriers Safety Admin. (FMCSA) study found significant reduction in “safety-related” events in 2 commercial motor vehicle operations in a 17-week evaluation<sup>4</sup>
- A study of 250 emergency vehicle drivers found that it encourages safety belt use (13,500 to 4 violations)<sup>5</sup>

<sup>1</sup> Gale et. al, 2012, Mora et. al, 2010, Velasquez, et. al, 2010, Matusalen, et. al, 2006, Ballard et. al, 2004, Jutten et. al, 2002, Cocianni & Taviansky, 1998) <sup>2</sup> Twilhaar, 2000 <sup>3</sup> Lopez, 2006, Twiilar, 2000, <sup>4</sup> Hickman, 2010, <sup>5</sup> Levick, 2005

## Reported benefits of IVMS in interviews:

- Targets high risk driver behavior
- Contributes to social responsibility
- Reduces maintenance costs
- Can be used as tool for verifiable Hours of Service
- Reduces insurance premiums, claims, citations



## IVMS Challenges

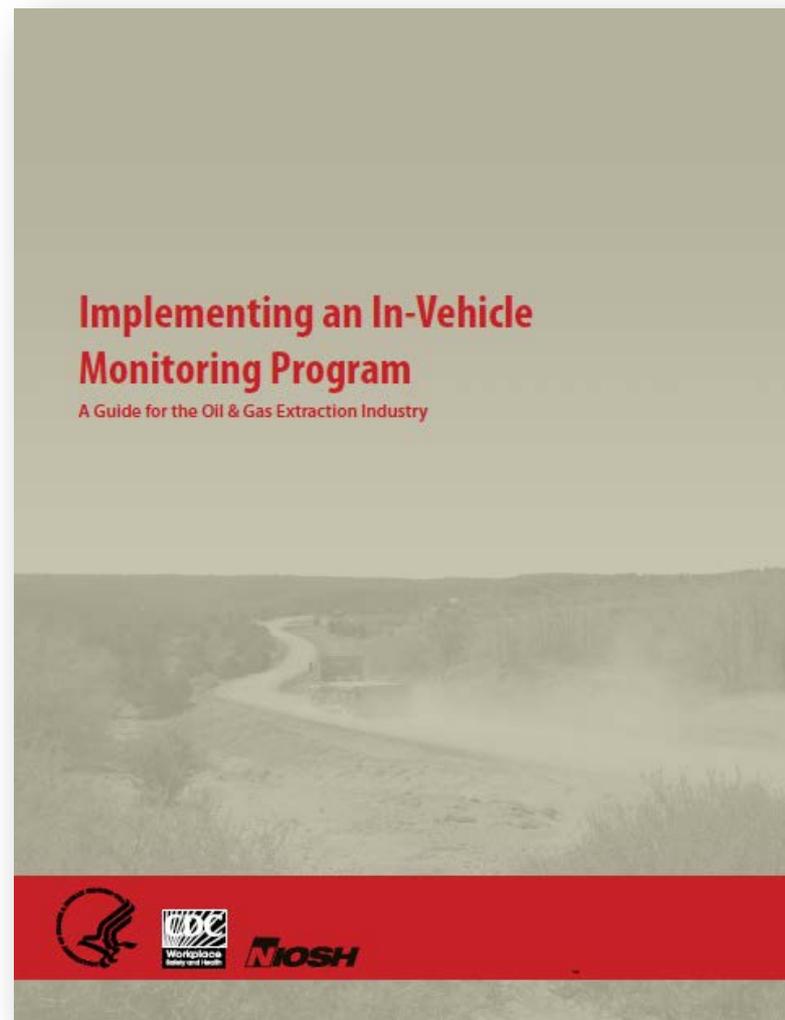
- Lack of awareness of actual needs
- Lack of knowledge of capabilities / limitations
- Lack of experience in implementation
- Lack of knowledge in deriving greatest value from the the data



# The Results

A **guide** which is intended to provide companies with a structured approach and help them to:

- Decide whether to install monitors
- Select a system that meets needs
- Successfully implement an IVMS
- Employ the data provided by monitors to improve motor vehicle safety
- Effectively track its effects on crash rates

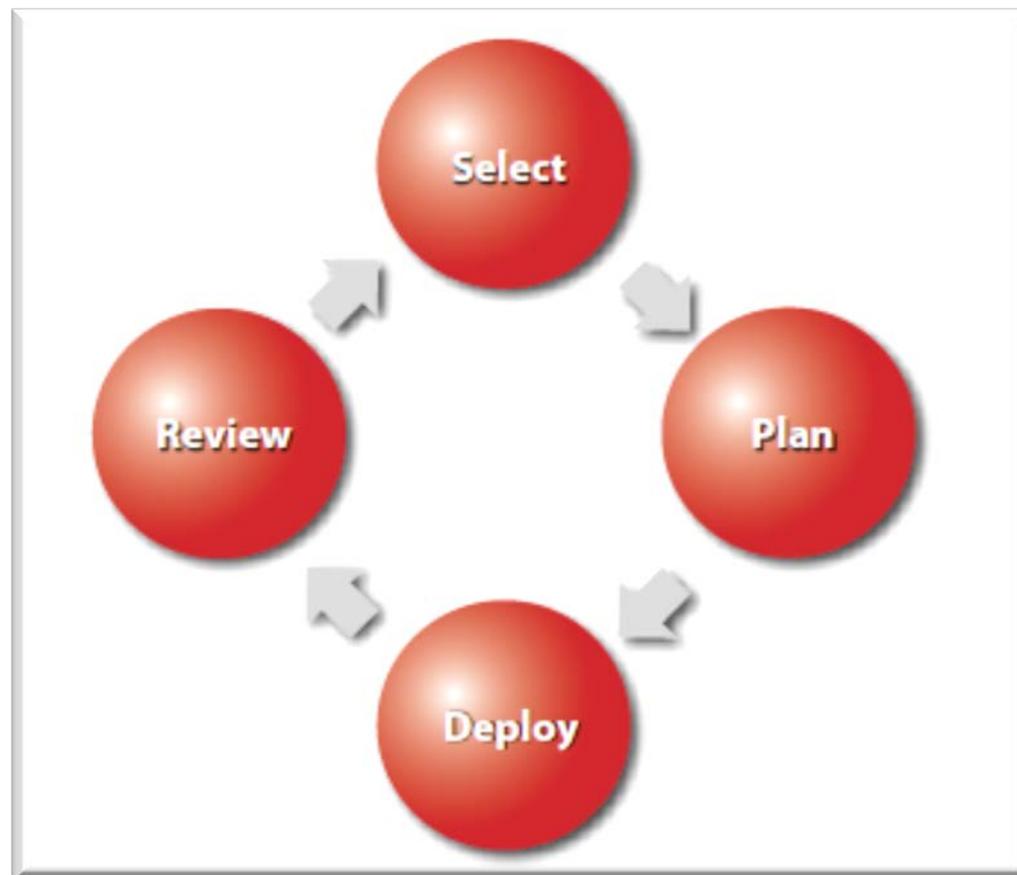


## Sections of the Guide

- An overview of motor vehicle fatality data for the industry
- Reported benefits of using IVMS
- 4 steps to implementing IVMS
- Appendices with additional tools (common IVMS features, driver coaching form, etc.)



## A structured approach in 4 Steps:



## Key considerations



- Make sure hardware matches operating environment (e.g. communications)
- Consider amount of maintenance required
- Conduct a pilot test of monitors
- Carefully set thresholds for tracking indicators (not too lax or too sensitive)

# Key considerations

## Plan

- Educate leadership about the system. Their engagement and visible support is essential.
- Solicit staff support and establish critical roles, responsibilities and accountabilities
- Tracking all vehicles and drivers is ideal. Otherwise: vehicles with high numbers of miles, passengers, hazardous materials, etc.
- Develop communications campaign and training to fully inform drivers of expectations



# Key considerations

## Deploy

- Handle any resistance to IVMS through clear expectations, training and positive reinforcement
- Implement a policy for recognition and accountability
- Conduct installation and training with the least amount of hassle to drivers
- Drivers with low scores should be coached. The coach should be able to determine whether operational pressures contribute to poor driving.





## Key considerations

- Fleet manager should monitor data daily for at-risk behaviour
- Track for trends and earlier warnings
- Overall unit or company data should be posted publicly at least monthly
- Track the performance of the IVMS program implementation (e.g. % of vehicles with working monitors)
- Track crash rates and correlate to IVMS data; use the data for improvement
- Monitor the data to measure ROI



# Considerations for Success

- Leadership and commitment
- Policy, for clarity and consistency
- Communication
- Training
- Accountability
- Attention to detail
- Support
- Follow through



# Dissemination and Evaluation Plan

- <http://www.cdc.gov/niosh/programs/oilgas/products.html>

- SPE / APPEA International Conference on Health, Safety and Environment, 2012
- OSHA Oil and Gas Safety Conference, Dallas, 2012
- SPE Americas E&P HSSE Conference, 2013
- Feedback from industry polling and work group
- O&G insurance companies, other industry organizations and opportunities



# Conclusion

- Motor vehicle fatality rate in the O&G industry is high
- IVMS, in conjunction with a motor vehicle safety program, is a promising tool
- IVMS is not a silver bullet, nor is it for everyone. Carefully consider the variety of devices and features available to select the product that best meets your needs.
- Goal of the guide is to be a reference for everyone



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Thank You

Questions?



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Consulting Services