

# Driver interactions with mobile phones

## Driving performance and safety implications

**NRSP**  
NATIONAL ROAD SAFETY

**PARTNERSHIP**  
PROGRAM

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# Housekeeping



Webinar is = 40 mins

Question time = 15 mins



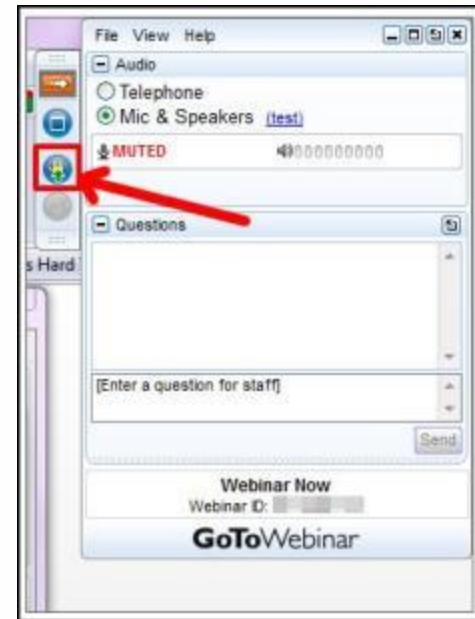
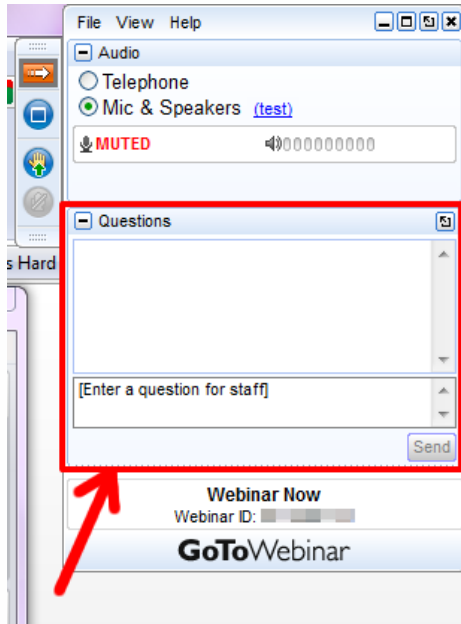
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# GoToWebinar functions



Please type your questions here

# Today's presenters

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# Today's' presenters

## Mitchell (Mitch) Cunningham

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# Overview of today's presentation

- Overview of driver distraction (Mike)
- Mobile phone use and driver behaviour (Mitch)
- Managing mobile phone distraction (Mike)



# Driver distraction is a significant road safety issue

- US
  - ~18% of injury crashes
  - ~10% of fatal crashes
  - 14% of all fatal crashes involved cell phone use
- Australia
  - Driver inattention contributing factor in ~58% of crashes
  - Driver distraction accounted for ~16% of these crashes
  - 70% of distractions considered voluntary

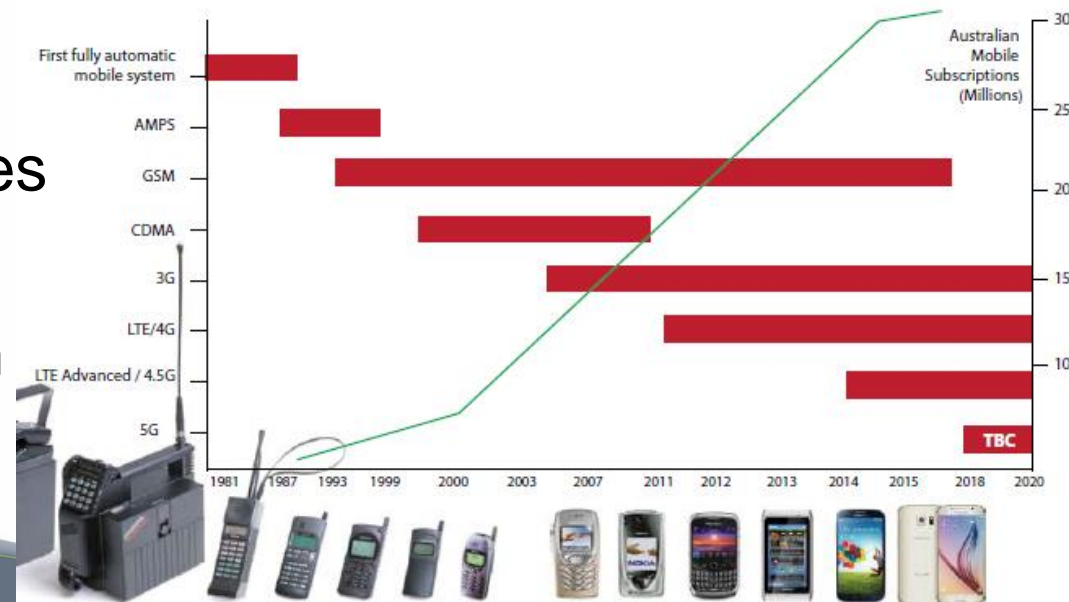
# Prevalence of mobile phone use while driving

## An Australian Government survey:

- 93% of Australian drivers own a mobile phone
- 59% report mobile phone use while driving
- 28% of drivers report using a hands-free kit

## Consider exposure:

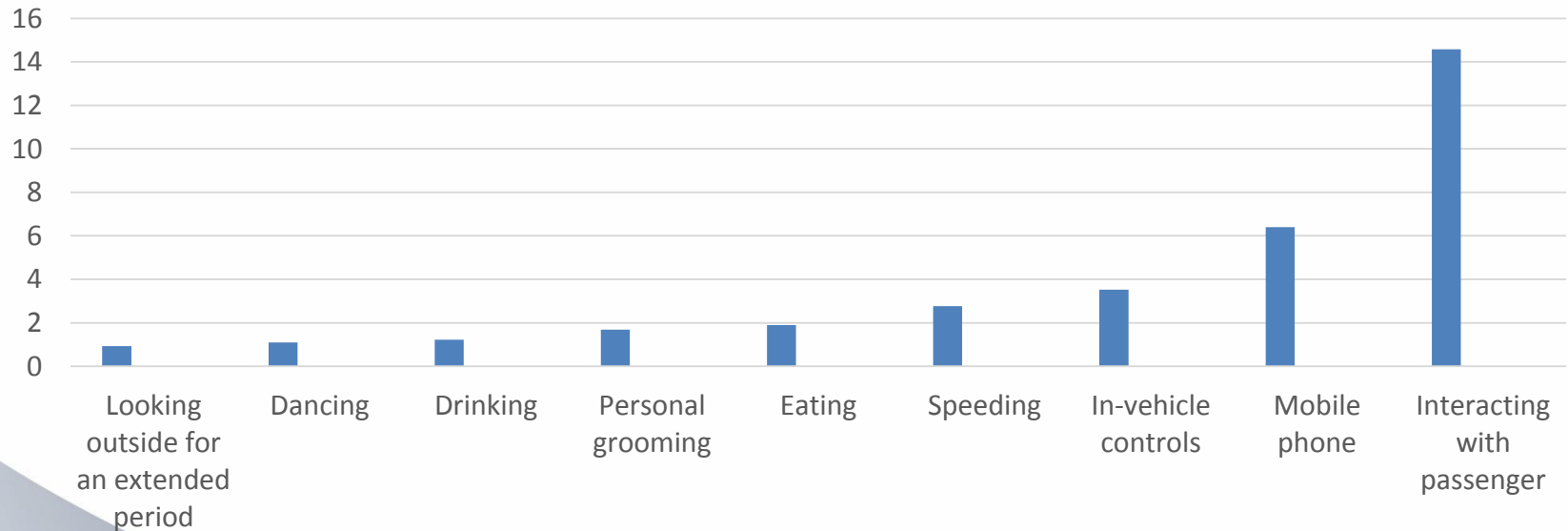
- 32.6million mobiles
- 24million Aussies
- 135% penetration



# Mobile phone use in cars is prevalent

- at any given moment during daylight in the US, [660,000 people](#) are using handheld cell phones while they drive. (NHTSA 2013)

Relative prevalence of distraction events (Dingus et al., 2016)



# What is driver distraction?

*“...the diversion of attention away from activities critical for safe driving toward a competing activity, which may result in inattention.”*

– *Regan & Strayer (2014)*



# Mechanisms of distraction

- Triggering factors
- Diversion of attention
- Types of distraction
- Interference
- Moderating factors

# Triggering factors

- Driver state (e.g. bored)
- Driver needs (e.g. for information)
- Properties of distraction source (e.g. ringing phone)



# Diversion of attention

- Interferes or interrupts activities critical for safe driving
- This interference will be greater:
  - The longer the diversion of attention
  - The more frequent the diversion of attention
  - If the diversion coincides in time with an activity critical for safe driving that is unexpected (e.g. braking car ahead)

# Types of distraction - visual

- “Eyes off road”



# Cognitive/internal distraction

- “Mind off road”
- Drivers mind can also be off the road when eyes are off the road and hand off wheel



# Bimanual interference

- “Hands off wheel”



# Interference 1

Eyes off road, mind off road, and hand off wheel can interfere with activities critical for safe driving:

- Route finding
- Route following
- Steering and velocity control
- Collision avoidance
- Traffic rule compliance
- Vehicle monitoring

# Interference 2

The degree of interference will be a function of:

- Joint demand of driving and phone use
- Degree to which driving and phone use compete for the same mental resources
- How driver distributes attention between driving and phone



# Moderating factors

- Driver characteristics
- Driving task demand
- Secondary task demand
- Self-regulation

# Any question at this point?



# #Driving

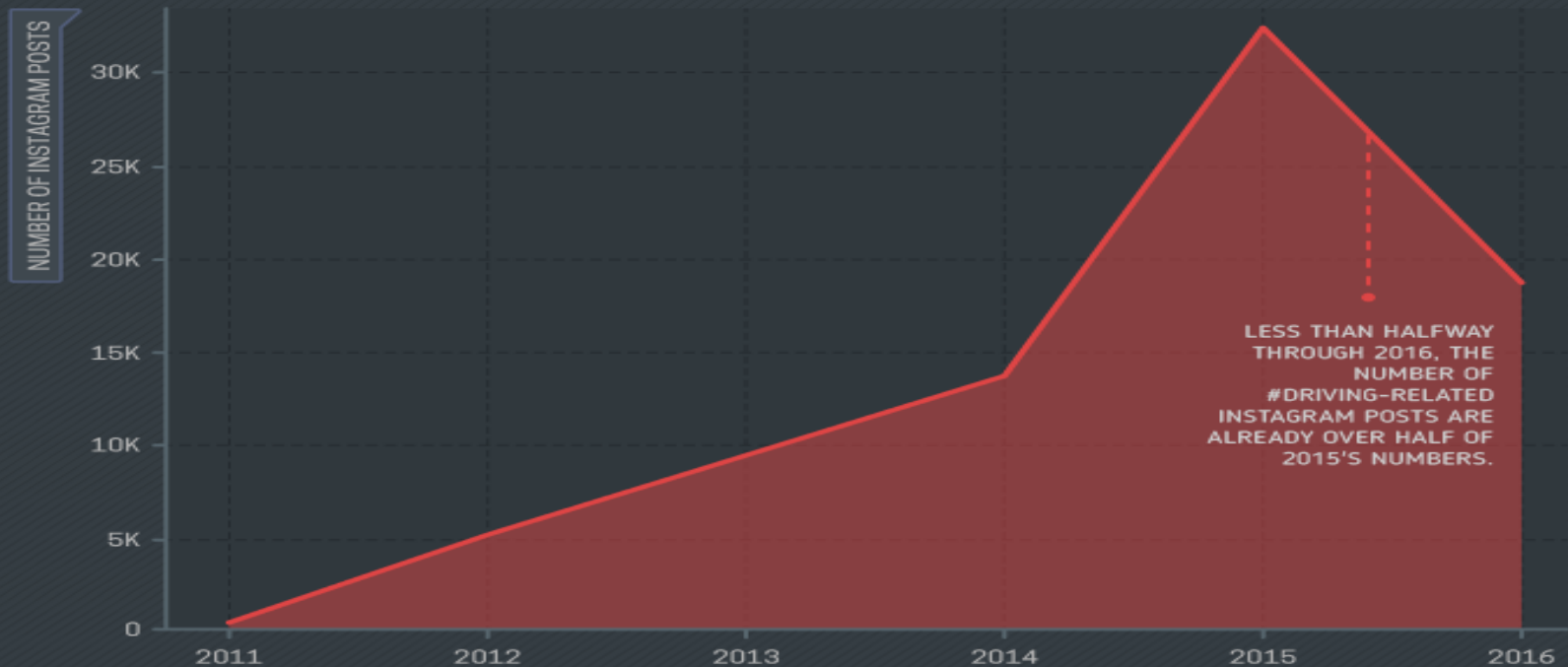


## WHEN DO PEOPLE UPLOAD INSTAGRAM POSTS WITH **DRIVING-RELATED** HASHTAGS

**# DRIVING-RELATED HASHTAGS** | #selfiewhiledriving, #drivingselfie, #driving, #ihopeidontcrash, #hopeidontcrash, #drivinghome, #drivingtowork, #drivingtoschool



## INSTAGRAM POSTS WITH DRIVING-RELATED HASHTAGS, BY YEAR



# Handheld texting – performance degradation

- Texting is associated with:
  - more prolonged and frequent glances from the road
  - poorer detection of road events
  - slow responses to hazards
  - involved in a higher number of crashes
  - poorer control of vehicles within lane
- Decrements typing > reading
- “*I’m on my way home*” took an average time of 37s to type, 26s of which were looking off the road



# Handsfree (i.e. voice-based) texting

## – performance degradation

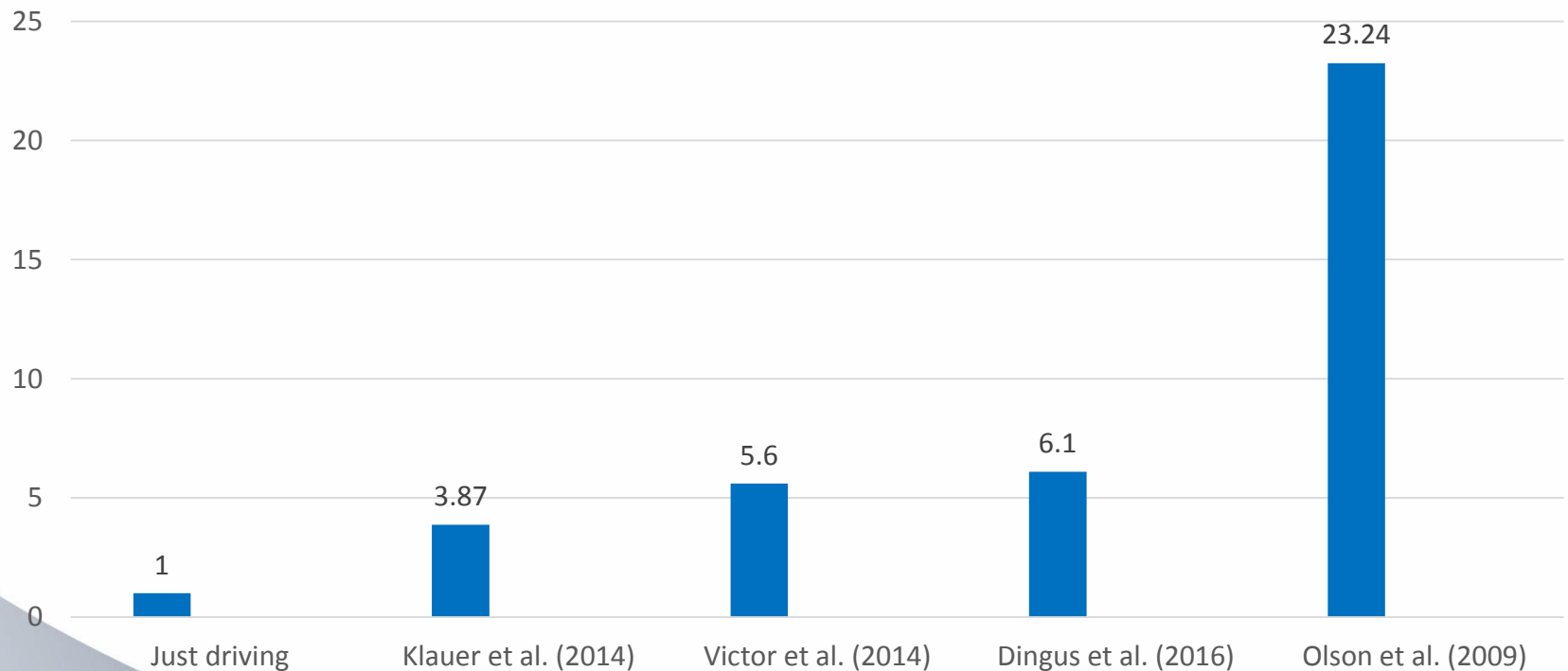
- Some benefits compared to manual texting
  - Less glances from roadway
  - Better steering control
  - Poor maintenance of lane position
- However, there's still impaired performance
- Voice-based still takes mind off the road, and eyes off the road (e.g. to verify message)

 **You:** Thanks Mike,  
your order arrived  
yesterday.

Car: Thanks Nike,  
Yoder arrived  
yesterday.

# Handheld texting – safety risk

## Crash risk





# Social media on HH phone – performance decrements



# Interactions with social media on phone – safety risk

We don't know yet – still early days need to explore the risk



# HH conversations - driving performance

- Mixed findings
- Horrey & Wickens (2006)
  - Increased RT to hazards
  - Reduced speed
  - Increased number of missed objects and driving errors
- Caird et al. (2008)
  - Increased RT to hazards, from 0.14-0.33 seconds
  - No effect on headway or lane keeping ability
- Cognitive distraction can impact driving through multiple mechanisms of interference
  - E.g. inattention blindness – *looked at but did not see*



# Handheld conversations – safety risk

- The jury is still not out on this issue
- Some NDSs suggest **no crash risk** involved (e.g., Klauer et al., 2006)
- Others suggest **reduced crash risk** (i.e. “a protective effect”) (e.g. Fitch, Hanowski, & Guo, 2015)
- Recent study suggests **2.2 times increase in crash risk** (Dingus et al. (2016))

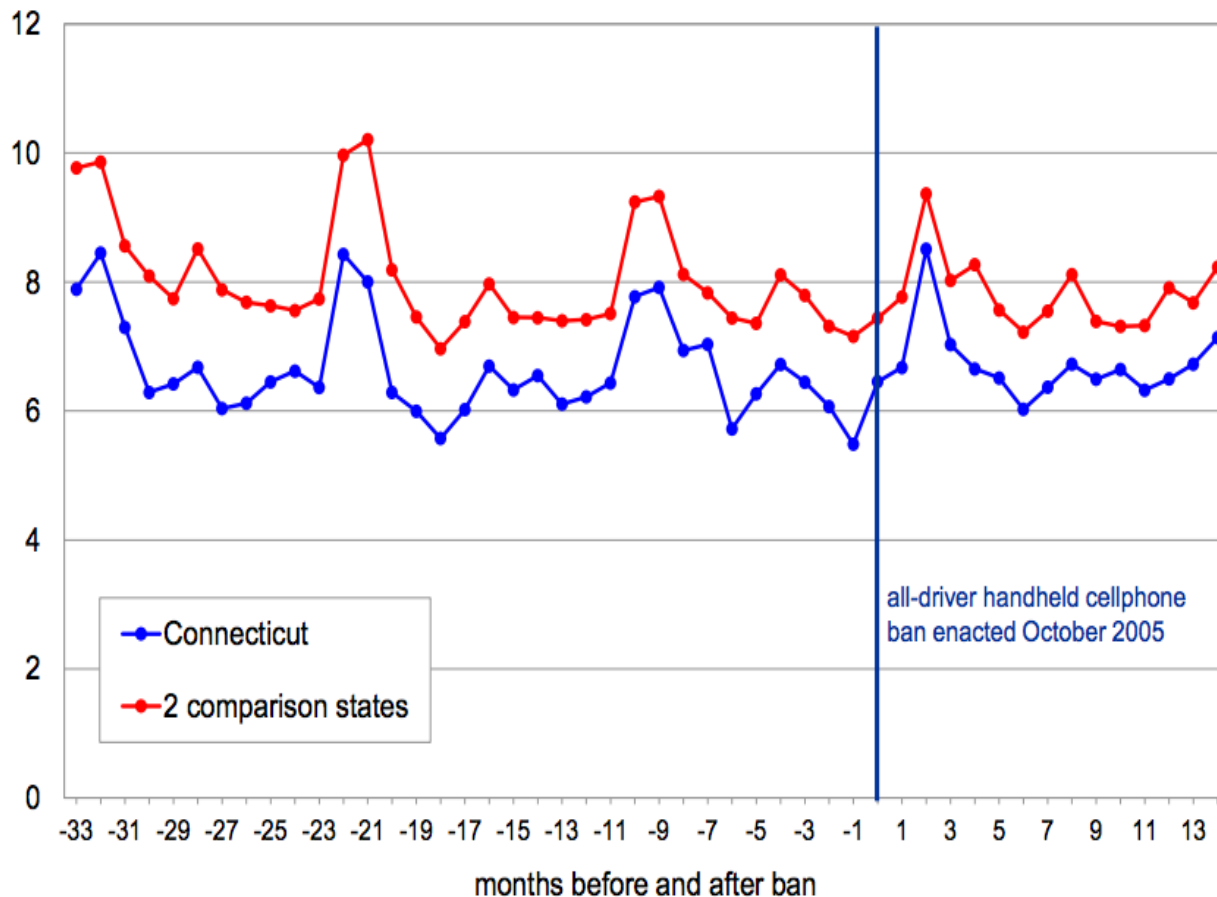
# Handsfree conversations

- No differences between handheld and handsfree conversations
  - Conversations, despite whether holding the phone or not, create cognitive distraction, and can impair driving performance
- The safety impact in the real-world is not yet clear



# Managing the problem - do we ban all phone use?

Collision claim frequencies for new vehicles by month  
Connecticut vs. Massachusetts and New York



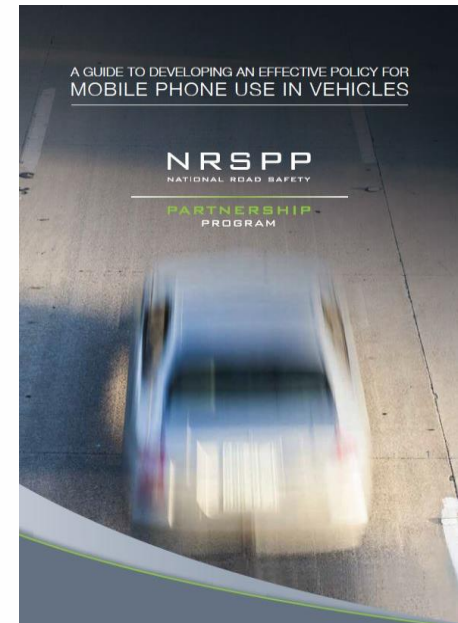


# Any questions at this point?



# Mobile Phone Use Policy

The aim of a Mobile Phone Use Policy is to help employees understand the risk of using a mobile phone while driving and the driving behaviour expected of them by their organisation.



# Managing the problem for the driver

- Always keep eyes on the road
- Never text, write or read while driving
- Buy, install and use a cradle for your phone
- Use your smart phone and the car's features
- Don't automatically answer the phone;
  - consider the road and traffic conditions
- Ensure the caller knows you're driving
- If you pull over ensure it is safe for you and other road users

# Managing the problem - employer



- Establishment of a baseline
  - AfMA is hosting the survey online for organisations to freely and securely use
  - Contact [sumv@afma.net.au](mailto:sumv@afma.net.au)
- Education
- How to communicate principles
- Training
- Collection, monitoring and analysis of critical incident data
- Enforcement

# Other considerations for employers

- Mobile phone selection and apps
- Vehicle purchase and design
  - Do you consider the connectivity?
  - Test it before the vehicle enters the road.
- ‘Whitelist’ of best HF performers
- More information please go to [www.sumv.com.au](http://www.sumv.com.au)

# Concluding remarks

- Handsfree capabilities bring some benefits, but not the answer for everything
  - See NRSPP Policy document and supporting material [www.nrspp.org.au](http://www.nrspp.org.au) or [www.sumv.com.au](http://www.sumv.com.au)

***Keep your eyes on the road!***



# Thank you for your time

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# Questions





# Thank you for your participation today

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