

Distracted Driving and Crash Risk Across Drivers of Different Age Groups

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Background and Research Needs

- Naturalistic driving studies have shown
 - Secondary tasks engagement → CNC* ↑
- Risk increases ~4 times due cell phone use compared to alert driver.
- Only investigated adult/experienced drivers

- Need: Prevalence and Risk for:
 - Novice drivers
 - Young adults
 - Senior drivers

* CNC- Crash/near crashes



What Is a Naturalistic Driving Study?

- No experimenter present
- Participants drive as they normally would
- Collected (preferably) in privately owned vehicles
- Unobtrusive instrumentation
- Provide:
 - Detailed pre-crash information
 - Real-life behaviors
 - Rich databases for subsequent mining



Data Acquisition Systems (DASs)

- NextGen
 - Highly configurable
 - Quickly installed within any vehicle
 - Large capacity data collection
 - Provides a wide array of I/O options
 - Distributed sensors network, including NTSC cameras for flexibility



*NextGen
DAS*

SHRP 2...at a Glance

- The Second Strategic Highway Research Program Naturalistic Driving Study (SHRP 2 NDS)
- Largest naturalistic driving study ever undertaken
 - 3,542 drivers, diverse age/gender groups
 - 4,368 data years; 5,512,900 trip files
 - Up to 2 years of data collection per participant
 - Light vehicles & SUVs
- Six data collection sites
- Data useful for next generation of researchers
 - > 1,600 crashes
 - > 2,900 near-crashes (“it would have been a crash, but...”)
 - 32,475,671 miles of driving
 - **~2 petabytes of data (1 PB = 1,024 TB = 1,048,576 GB)**
- Huge logistical challenge...



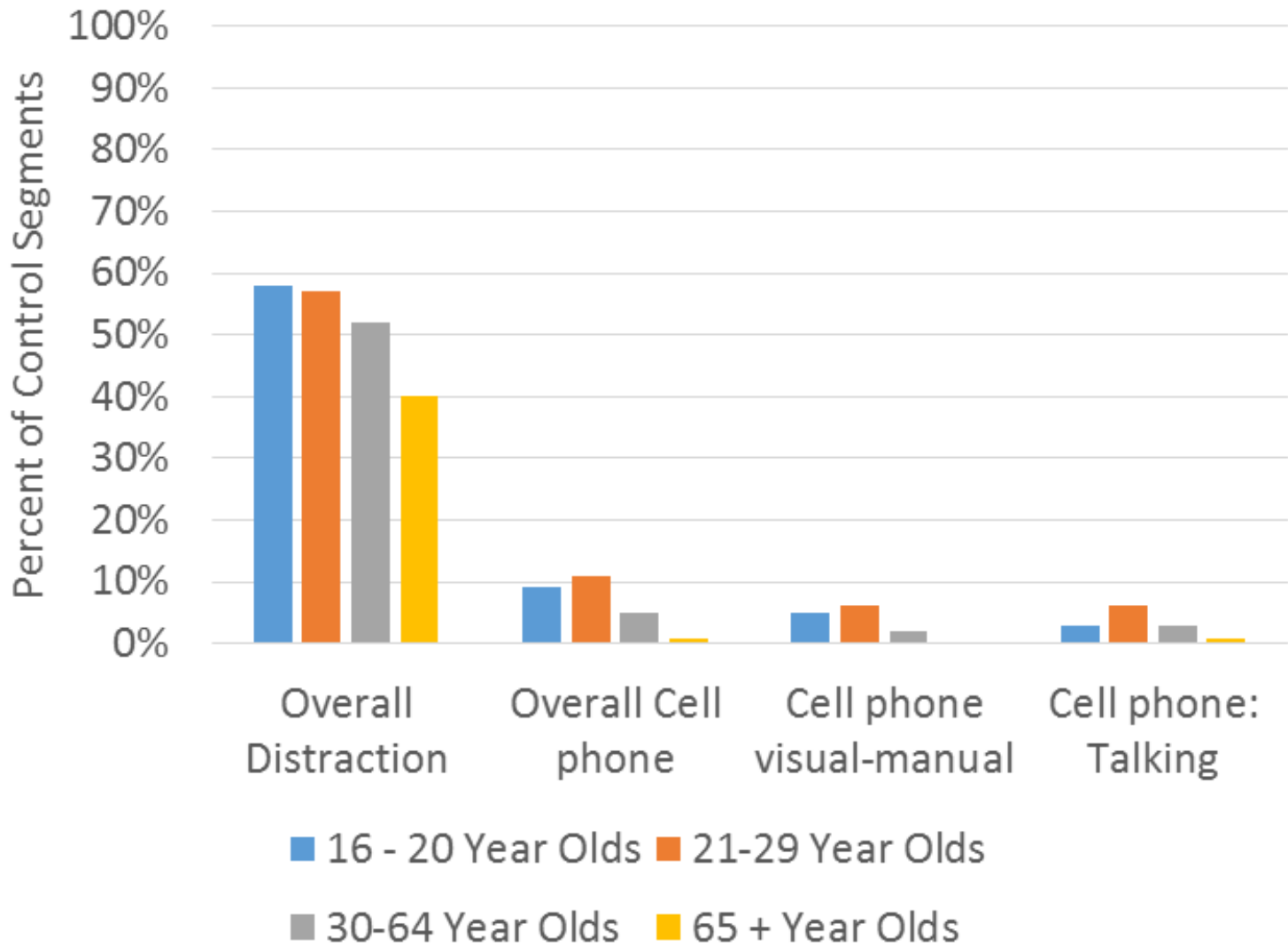
Please no Recording/Picture taking of the following slides.

Thank you!

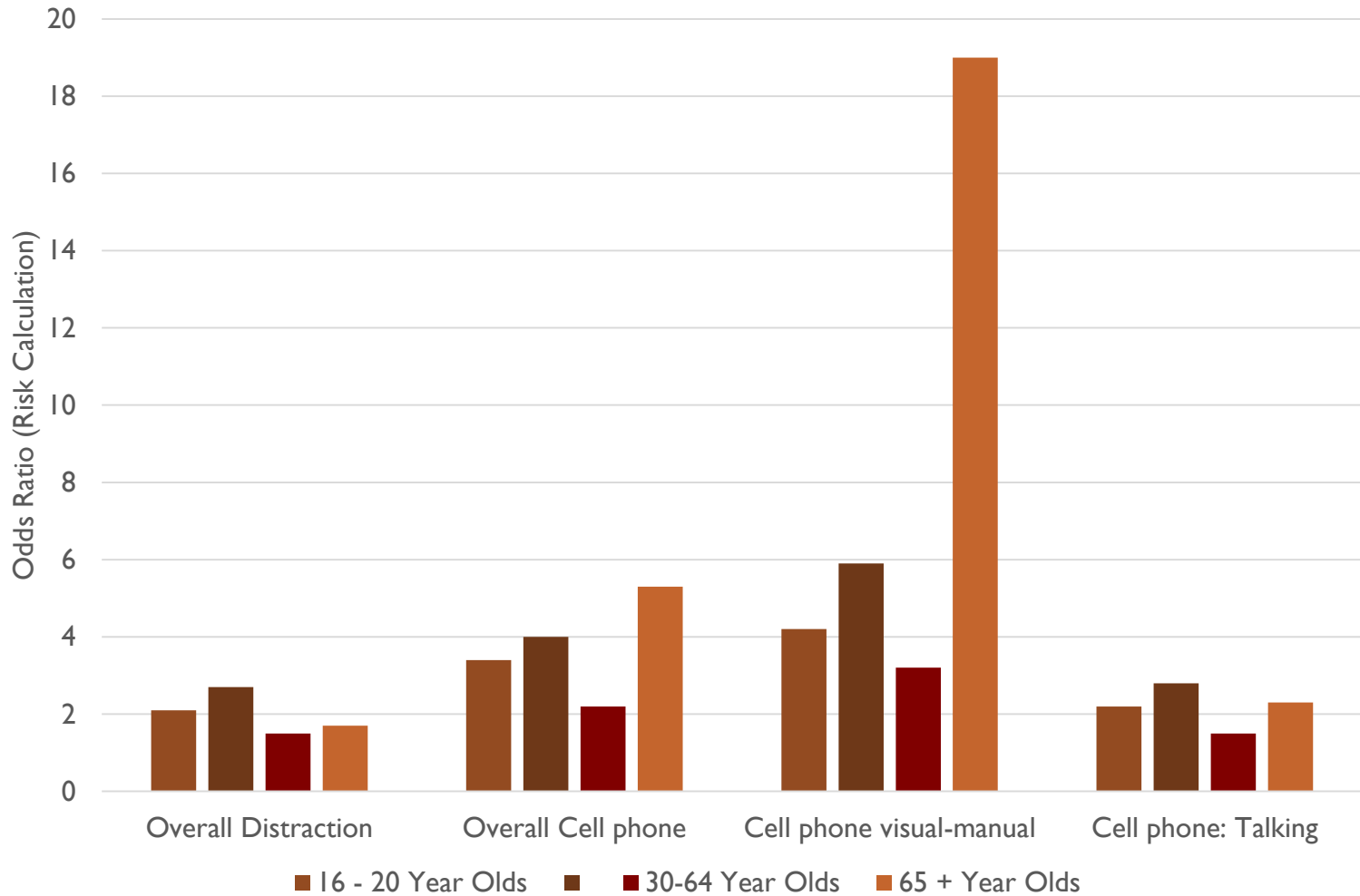
Video Coding and Analysis

- High g-force and/or short TTC events → crash
 - Coded 5 sec before/ 1 sec after each crash onset
- Random sample of non-crash road segments
 - Stratified sampling by Vehicle Miles Travelled
- Quality Control and Assurance
 - Training, protocols, spot-checking and inter-rater testing
- **Analysis-** Mixed effects logistic regression
 - Random intercept (account for within-driver correlations)

Prevalence of Secondary Task Engagement



Crash Risk by Secondary Task Type



Other High Risk Secondary Tasks

- Interacting with passenger increased risk for 16-20 year old drivers (OR: 1.4)
- For all ages:
 - External distractions (10 for 16-20 YO)
 - Reaching for objects (12 for 21-29 YO)
 - Operating in-vehicle devices (3.5 for 21-29 YO)
- 21 to 29 YO had highest risk on many of the secondary tasks

Conclusions

- Many types of secondary tasks increase crash risk for drivers of all ages—not just wireless devices.
- Risk of crash occurrence for novice drivers is highest for those tasks that require their eyes off the road.
 - Talking on cell phone increases risk for younger drivers.
- Supports hand-held device bans for novice drivers.
- Supports texting ban for drivers of all ages.



Sponsors

- Transportation Research Board –
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QUESTIONS??

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