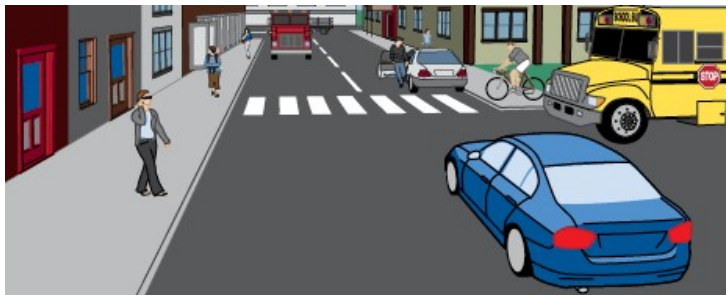


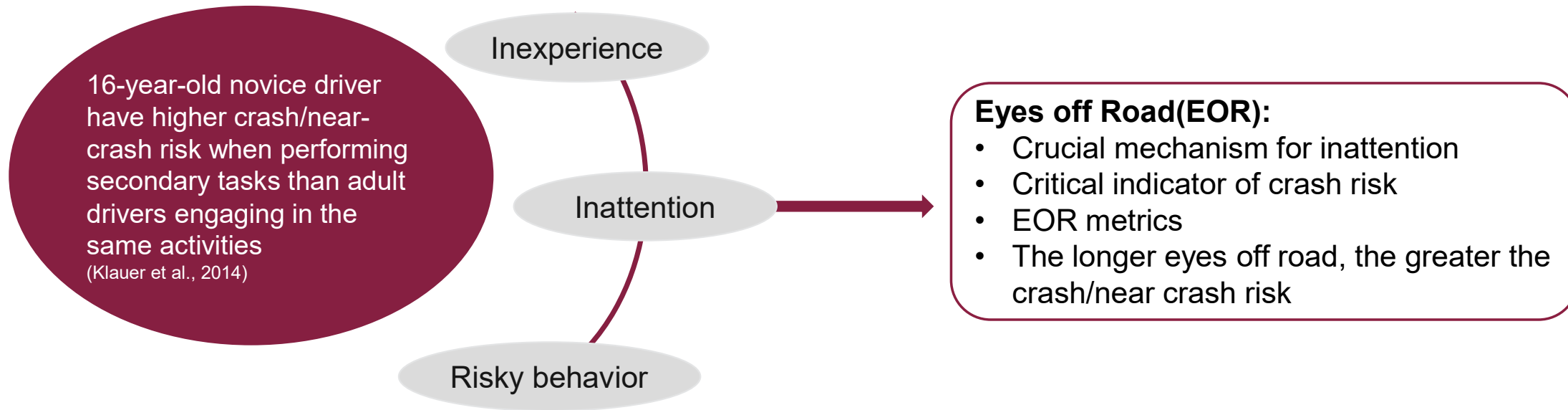
Teen Driving Performance Associated with Distraction

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Research Opportunity



Research Gaps

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Few studies directly examine eyes-off-road (EOR) crash risk among teen drivers.

Established evidence

Longer eyes-off-road duration is associated with greater crash and near-crash risk.

Remaining gap

Evidence on differences by teen driver age and driving experience remains limited.

Research Objectives

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1. Assess the association between duration of EOR, crash risk, and driving experience
2. Determine how the relationship between the duration of inattention and crash risk changes with age

Method

- Two naturalistic data sets used to evaluate the association between visual inattention and crash risk for teen drivers.
 - ▣ Second Strategic Highway Research Program (SHRP 2)
 - ▣ Supervised Practice Driving Study (SPDS)

	SHRP 2	SPDS
Age	16-19 years	16-17 years
Licensure Stage	Independent driving phase (not required to start at date of licensure)	Independent driving phase (starting at licensure)
Miles	1,800,000	380,000
Crashes	149	60
Number of Participants	488	82
Geographic Coverage	6 sites in US	1 site in US
Geographic Coverage	6 sites in US	1 site in US

Methods: Eyes off Road Risk Analysis

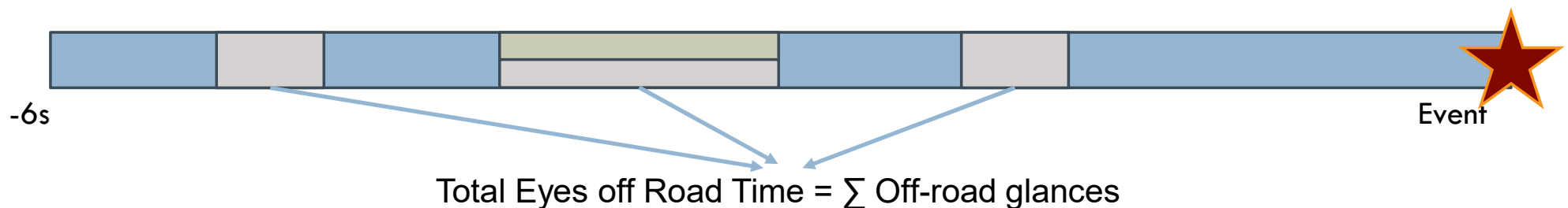
- ❑ Baseline events and Safety Critical Events (SCE) Crash/near Crash events
- ❑ **Eyes off road (EOR):**
 - ❑ Total EOR:
 - ❑ Single longest glance (SLG)
- ❑ **Age:** 16-17 vs. 18-19
- ❑ **Driving phases:** first 6 months vs. second 6 months

	SHRP 2	SPDS
Age	16-19 years	16-17 years
Driving phases	n/a	First 6 months Second 6 months

Methods: EOR Coding

Units of Analysis:

-  Single longest off-road glance: the duration of the single longest off-road glance during the 6-second window prior to a **Crash/Near-Crash (CNC)** or **Baseline** event.
-  Off-road glances: Glances away from the forward roadway during the the 6-second window.



Odds Ratio comparisons for safety outcomes by glance measures

Off-road glance duration grouping

	0s	1s	2s	3s	4s	5s	6s
1s cutoff	<1s (ref.)	≥1s					
2s cutoff	<2s (ref.)		≥2s				
3s cutoff	<3s (ref.)			≥3s			
4s cutoff	<4s (ref.)				≥4s		
5s cutoff	<5s (ref.)					≥5s	

All events were reclassified at each cutoff; each row represents a separate comparison and model.

$$\text{Odds Ratio (OR)} = \frac{\text{Odds of SCE when glance duration} \geq X}{\text{Odds of SCE when glance duration} < X} \rightarrow \frac{\frac{\text{SCE with glance} \geq X}{\text{Baseline with glance} \geq X}}{\frac{\text{SCE with glance} < X}{\text{Baseline with glance} < X}}$$

OR > 1: Higher odds of outcome in exposed group

OR < 1: Lower odds of outcome in exposed group

CI Including 1: Not statistically significant

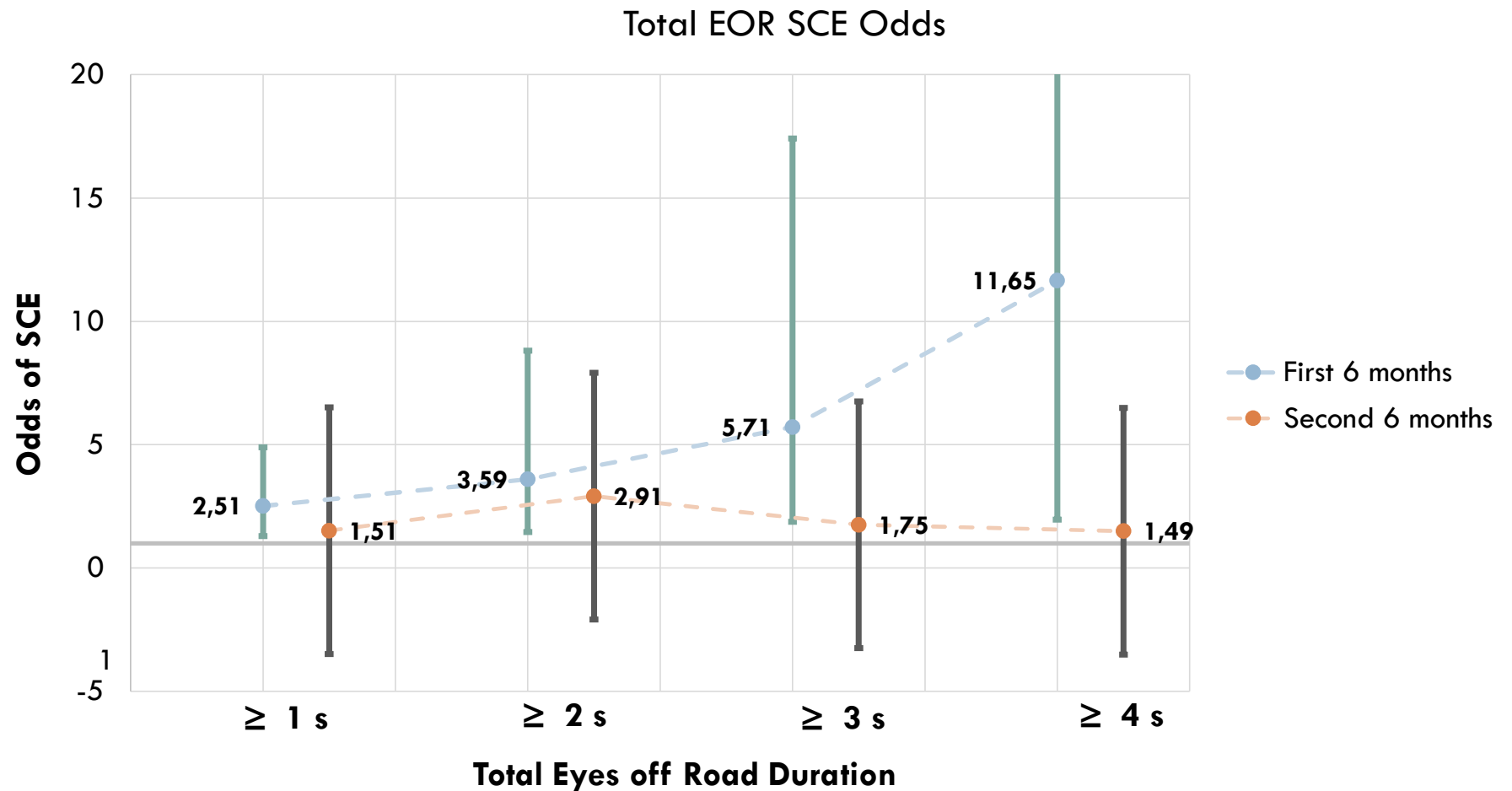
Results: EOR Risk was Highest during First 6 Months

- In second six months, drivers showed a lower prevalence of Total EOR but a higher prevalence SLG
- Odds of SCE increases as Total EOR duration increases
- Overall, EOR crash risk decreased in second six months

EOR Groups	Total EOR - SCE Odds		SLG - SCE Odds	
	First 6 months	Second 6 months	First 6 months	Second 6 months
<1 s vs. ≥ 1 s	2.51 (1.29, 4.89)	1.51 (0.72, 3.19)	2.84 (1.29, 6.2)	1.99 (0.86, 4.57)
<2 s vs. ≥ 2 s	3.59 (1.46, 8.81)	2.91 (1.08, 7.83)		4.96 (1.01, 24.24)
<3 s vs. ≥ 3 s	5.71 (1.87, 17.41)	1.75 (0.43, 7.09)		
<4 s vs. ≥ 4 s	11.65 (1.96, 69.13)	1.49 (0.14, 16.21)		

Total EOR - SCE Odds for first and second 6 months

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Results: EOR Risk Decreases with Increasing Age

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- Generally, EOR crash risk decreased with increasing age
- Single Longest EOR Glances are more risky than multiple glances of the same duration , especially for 16-17 year olds

	Total EOR - SCE Odds		SLG - SCE Odds	
	16-17 years	18-19 years	16-17 years	18-19 years
<1 s vs. ≥ 1 s	1.89 (1.89, 1.9)	1.66 (1.29, 2.12)	2.2 (2.2, 2.2)	1.74 (1.33, 2.29)
<2 s vs. ≥ 2 s	3.05 (3.05, 3.05)	2.13 (1.56, 2.91)	11.03 (11.02, 11.04)	2.47 (1.41, 4.33)
<3 s vs. ≥ 3 s	4.36 (2.54, 7.5)	2.09 (1.39, 3.14)	29.89 (5.57, 160.53)	25.36 (5.02, 127.96)
<4 s vs. ≥ 4 s	5.89 (2.78, 12.49)	1.95 (1.11, 3.42)	45.38 (45.32, 45.43)	--
<5 s vs. ≥ 5 s	11 (10.99, 11.02)	2.96 (0.94, 9.38)	17.51 (1.6, 191.24)	--

Key Findings and Limitations

- ❑ Crash risk **increases** with **longer glance durations**
- ❑ Crash **risk decreases** with **increasing age and experience**, even measurable within the first year of independent driving
- ❑ Novice drivers are clearly learning how to manage glance behaviors, but crash rates remain higher for this age group through 25 years

Limitations

- ❑ SPDS sample was used to assess the effect of driving experience; this study had a relatively small sample size compared to SHRP2
- ❑ SPDS data was collected from one geographic location compared SHRP2's multiple data collection sites.

Implications for Policy and Practice

- Ensure that teen and parent are aware of how risky it is for teen drivers to take eyes off road for even one or two seconds
 - ▣ Using cell phone apps (e.g., Do Not Disturb While Driving) to minimize distraction while driving
 - ▣ Introduction of driver attention support features (e.g., driver monitoring) in new vehicles may potentially help teen drivers
- Requiring parent sessions for novice drivers in potential risk of eye off road



Do Not Disturb
While Driving

Thank You!

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