



UNIVERSITY OF LEEDS

Does street lighting improve cyclist safety?

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UBDC Shaping Cities through Urban Analytics Showcase Event

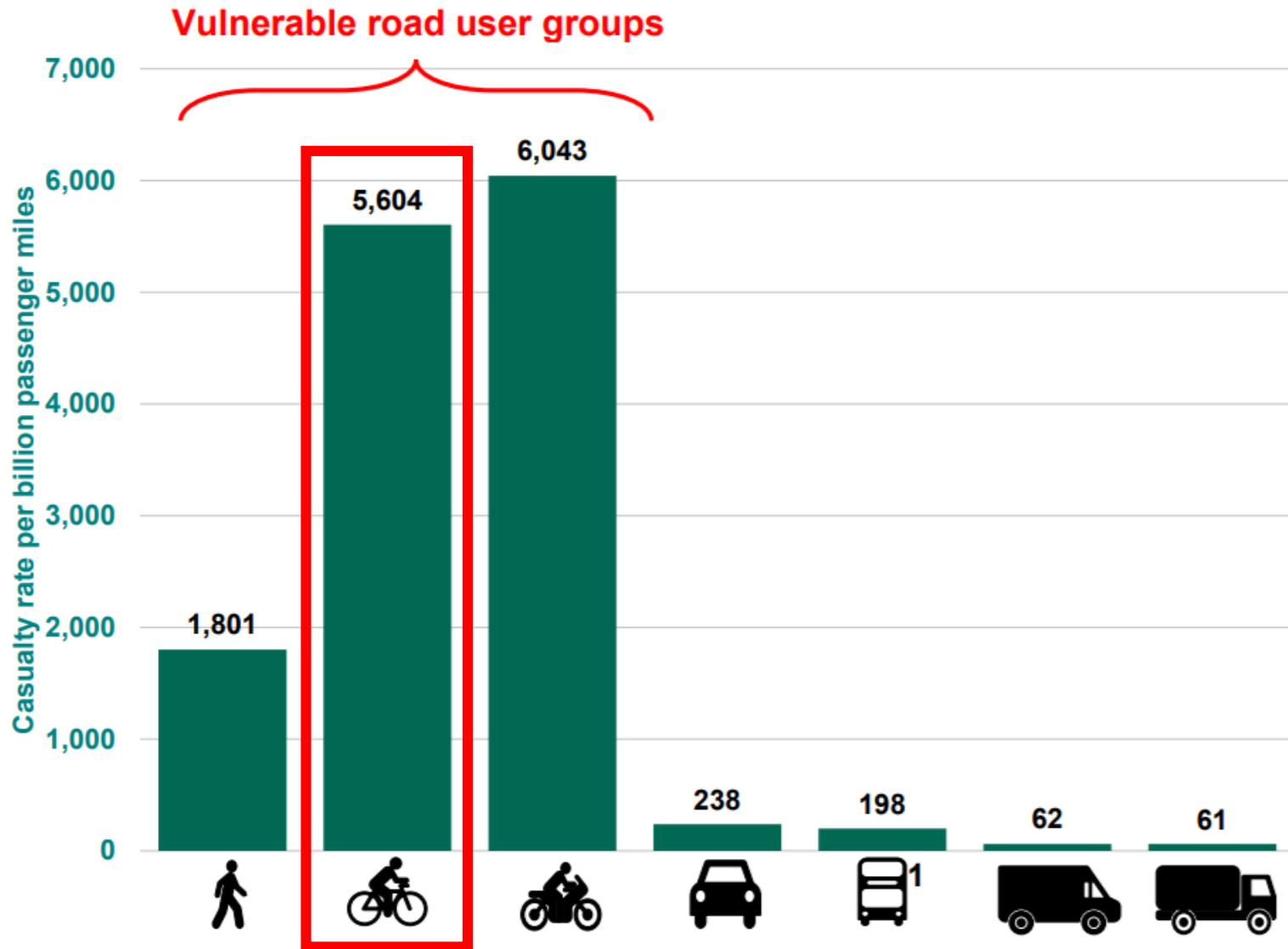
28th November 2018

Cycling is great!





Is cycling risky?



Source: DfT (2018). Reported road casualties in Great Britain: 2017 annual report. Department for Transport.

Risk to cyclists at night



1. Is there an increase in risk to cyclists at night?
2. Does street lighting influence risk to cyclists at night?

Cycling at night



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Confounding factors:



Changes in driver characteristics and behaviour



Changes in cyclist characteristics and behaviour

Cycling at night

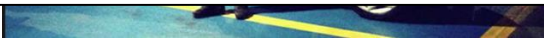


1. Is there an increase in risk to cyclists at night?
2. Does street lighting influence risk to cyclists at night?

Confounding factors:



SOLUTION: Compare collisions in day and dark at same time of day



Changes in driver characteristics and behaviour

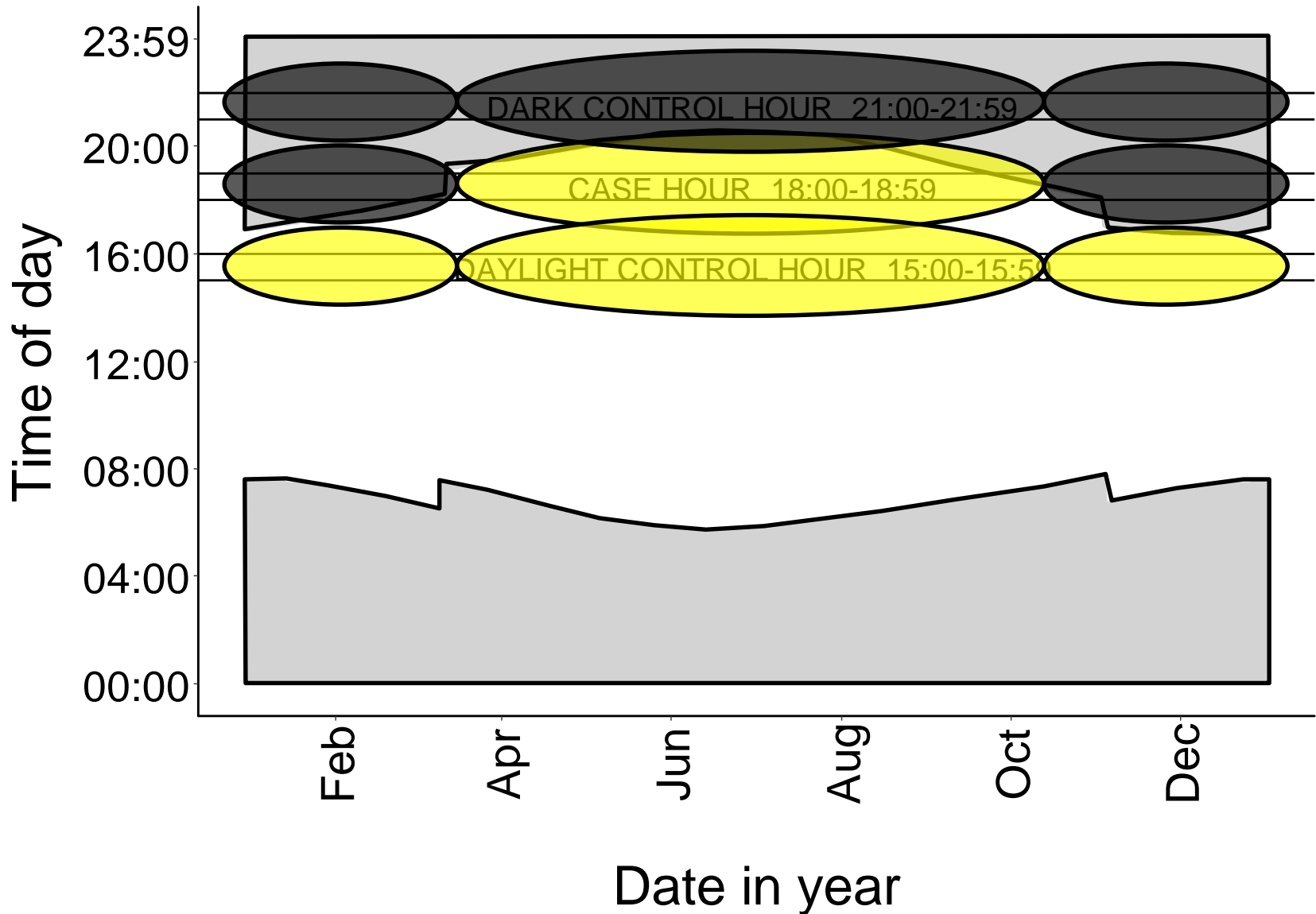


Changes in cyclist characteristics and behaviour



More dangerous road conditions

Quantifying effect of darkness



Quantifying effect of darkness – odds ratio

Case hour in darkness ÷ Case hour in daylight

Control hour when
case hour in darkness ÷ Control hour when
case hour in daylight

= Odds ratio – effect of
darkness on cyclist
collisions

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Control hour when
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= Odds ratio – effect of
darkness on cyclist
numbers

Odds ratio > 1 = darkness
associated with increase in collisions



High number of lights



VS



Low / no lighting

PROBLEM - Cyclist exposure



More cyclists =
more collisions

Fewer people cycle in dark than in daylight

PROBLEM - Cyclist exposure



More cyclists =
more collisions

Fewer people cycle in dark than in daylight

Hour	Mean daily count of cyclists		
	Apr - Sep	Jan – Mar, Oct – Dec	Percentage reduction
Case hour	442	248	-44%
Control hours	348	247	-29%

Data for Birmingham, 2012-2015. See Fotios, Uttley & Fox (2017) & Uttley, Fotios & Lovelace (submitted)

PROBLEM - Cyclist exposure



More cyclists =
more collisions

Fewer people cycle in dark than in daylight , reduction bigger on unlit vs lit roads

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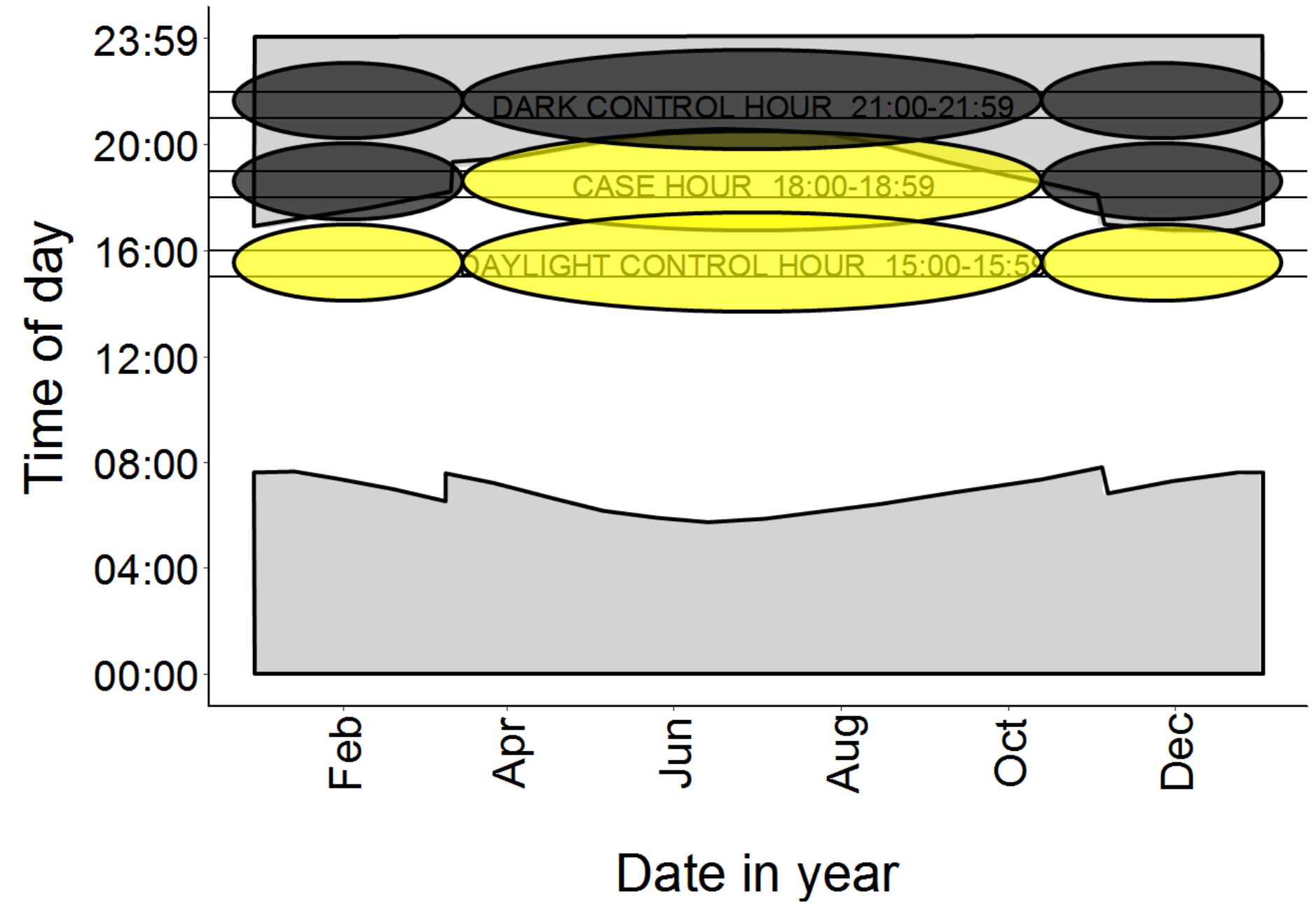
ADJUSTED Odds Ratio

Use collision rates instead of collision counts

Case hour in darkness ÷ Case hour in daylight

Control hour when
case hour in darkness ÷ Control hour when
case hour in daylight

ADJUSTED Odds Ratio



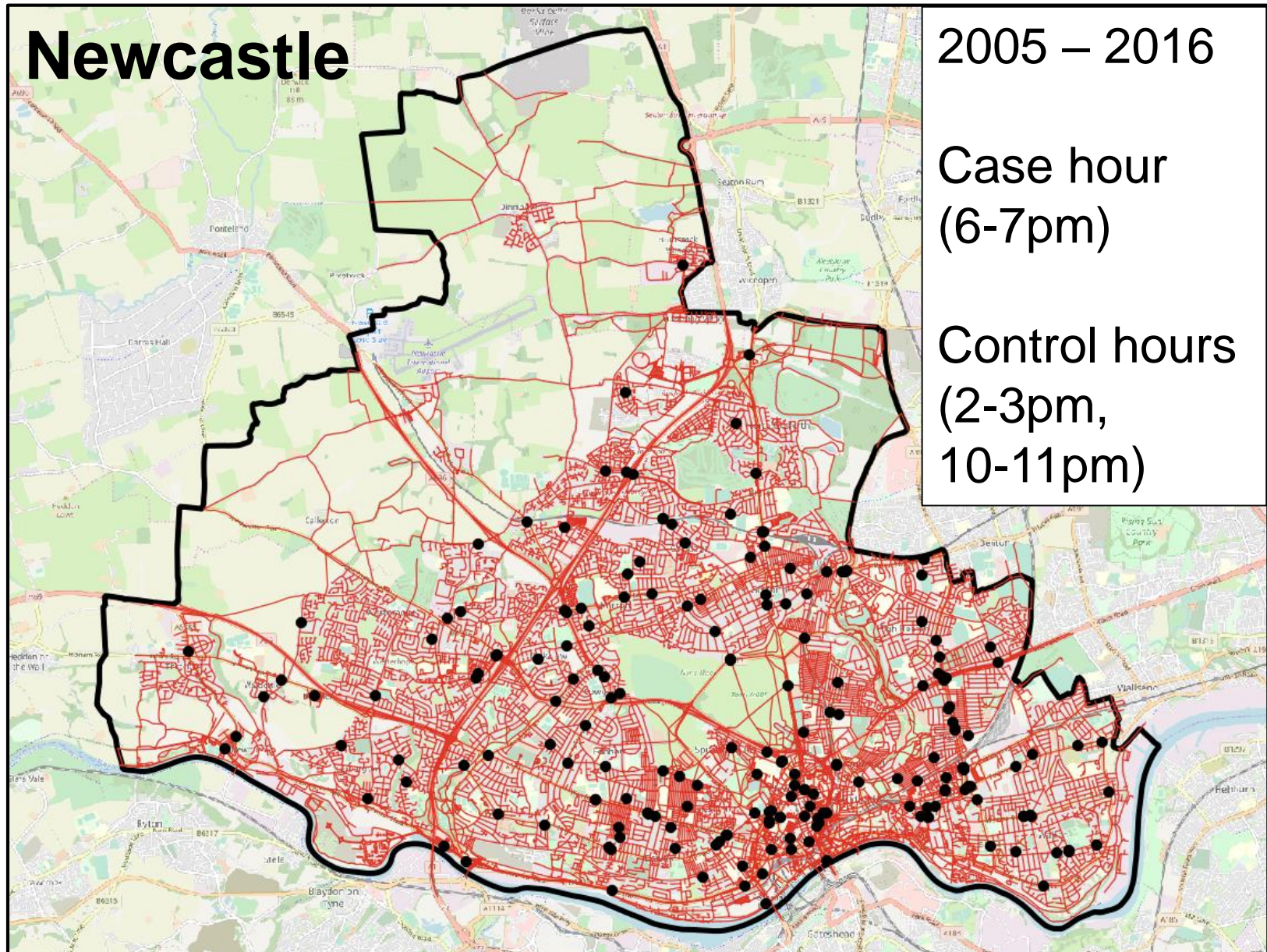
ADJUSTED Odds Ratio



Three big datasets

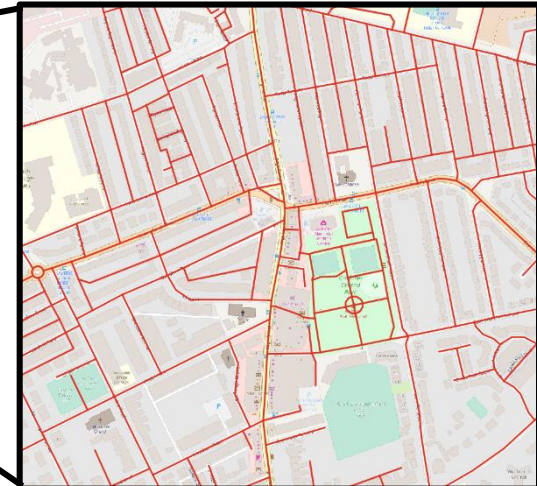
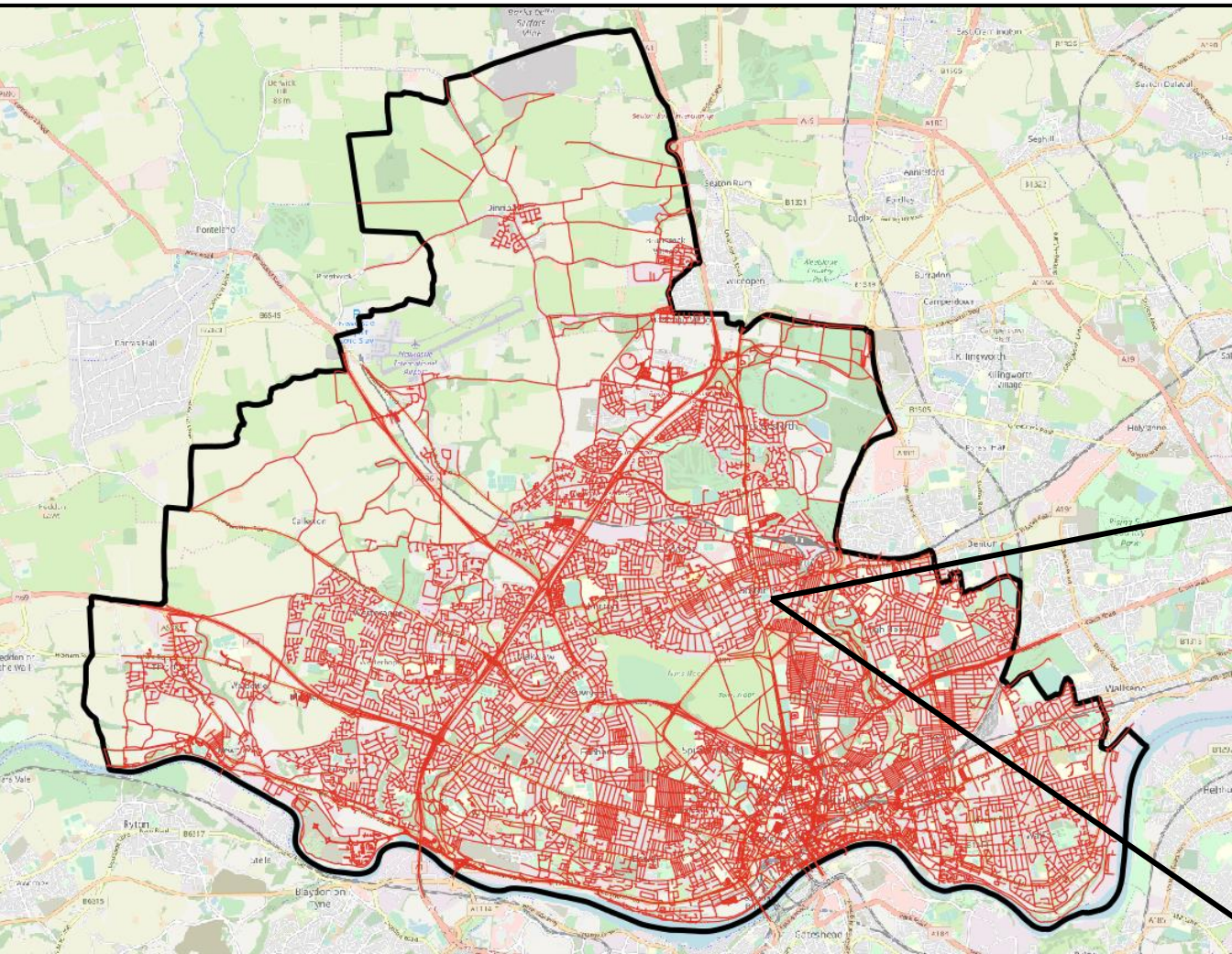
1. STATS19 – road traffic collisions (involving cyclists)
2. Strava – crowdsourced data about cycling trips
3. Street lighting – locations of every light in an area

Cyclist collisions – STATS19

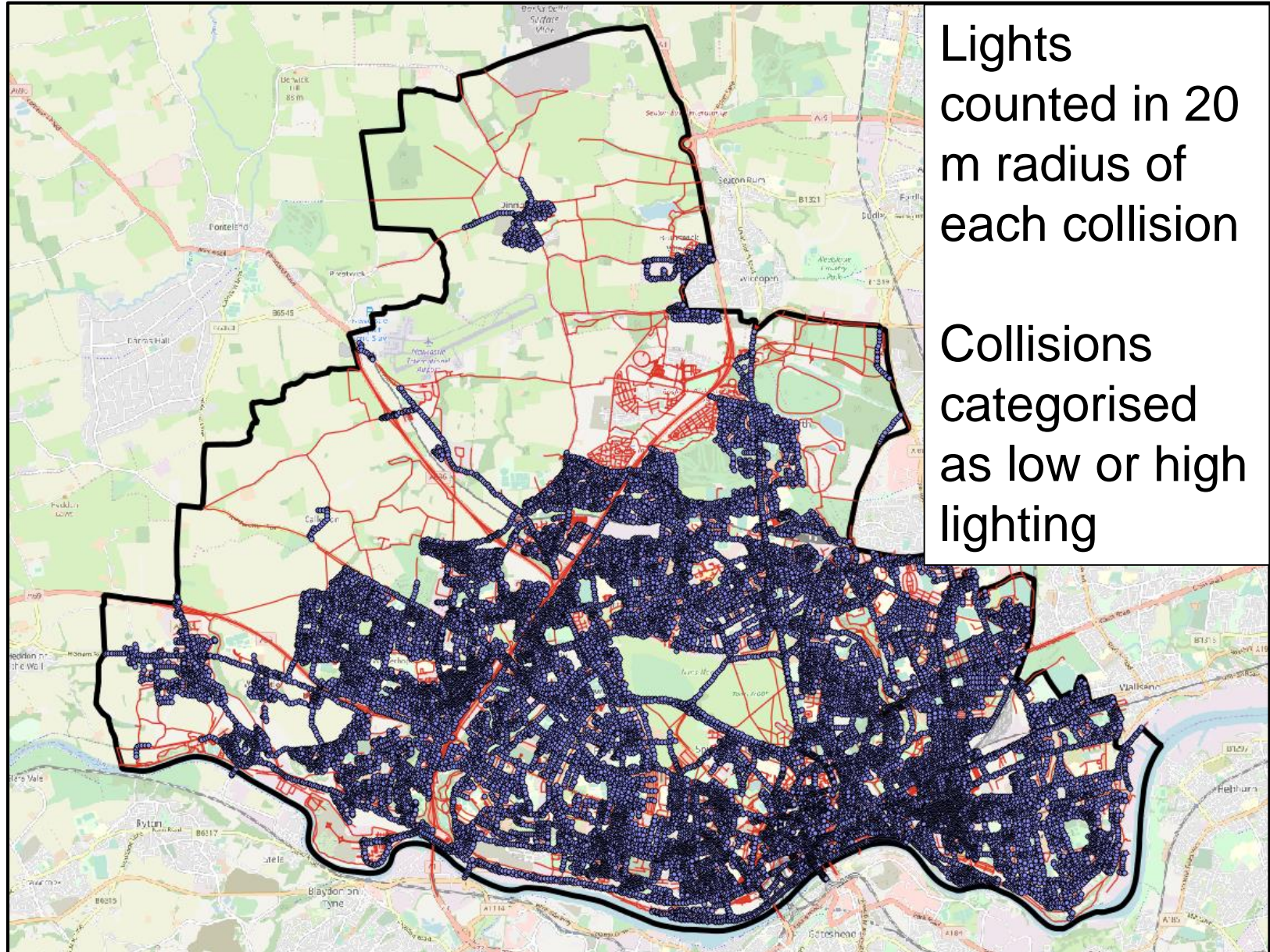




Newcastle

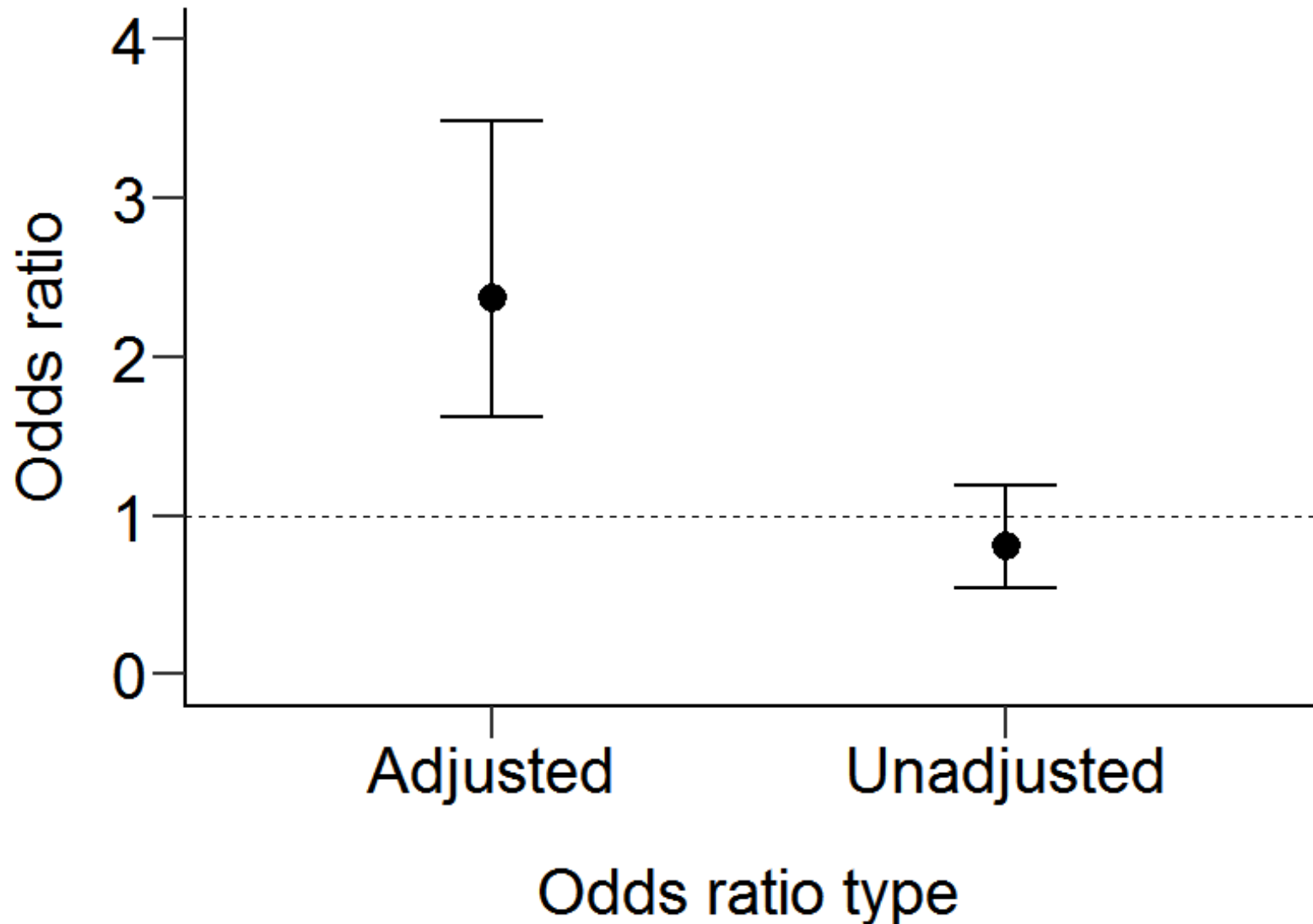


Street lighting – Newcastle City Council



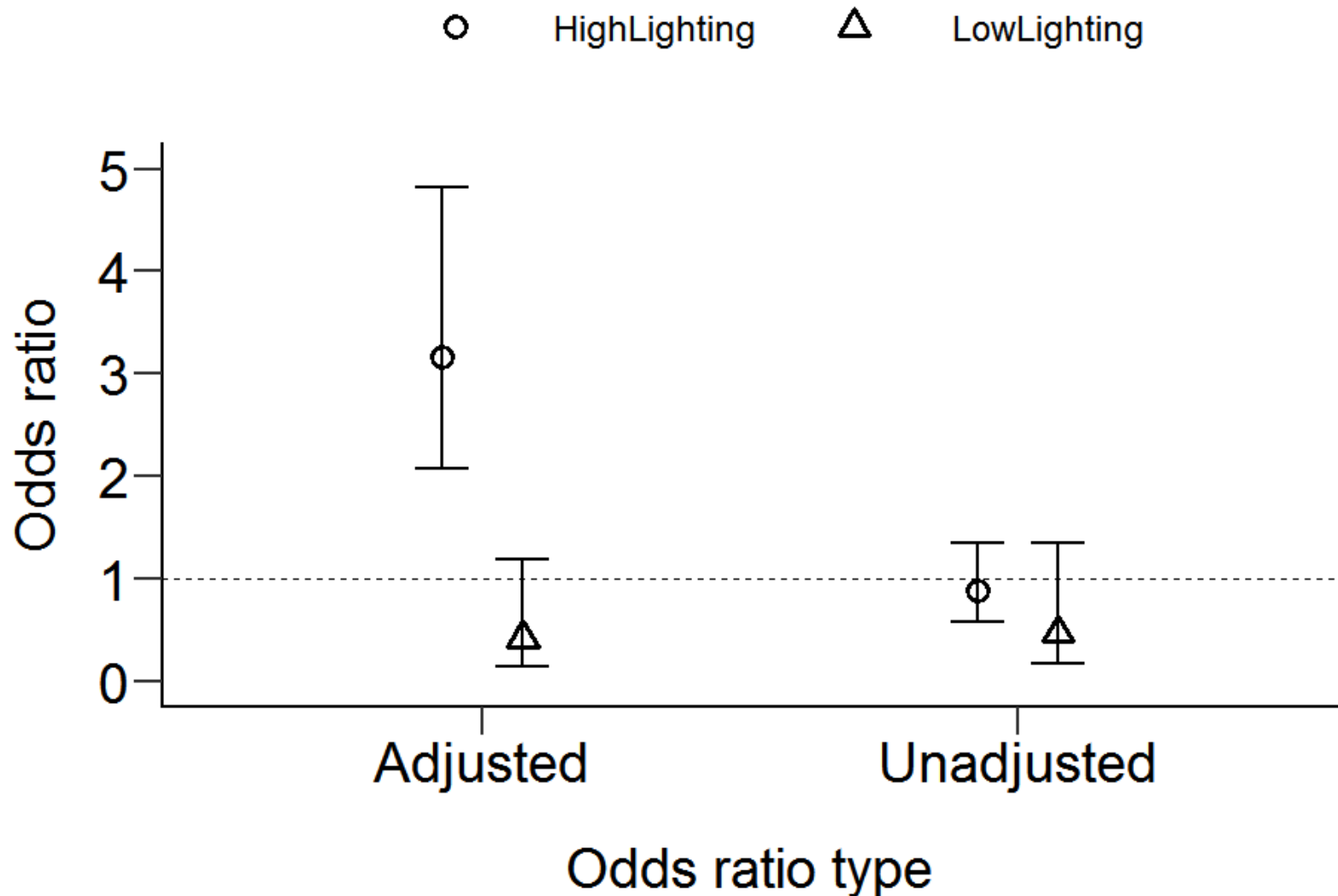
Results – overall effect of darkness

(REMINDER: OR > 1 = increased risk after-dark)



Results – influence of lighting on risk

(REMINDER: OR > 1 = increased risk after-dark)



Conclusions and further work

- Importance of accounting for exposure – potential of crowdsourced data like Strava
- Cycling at night is significantly more dangerous than in daylight
- Even after adjusting for exposure, increased lighting did not improve safety, may have decreased it (many caveats though)
- Further work needed to confirm whether lighting has influence on cyclist risk
- Role of cycle lights?

Thanks for listening

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Any questions, if you've not fallen asleep?



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