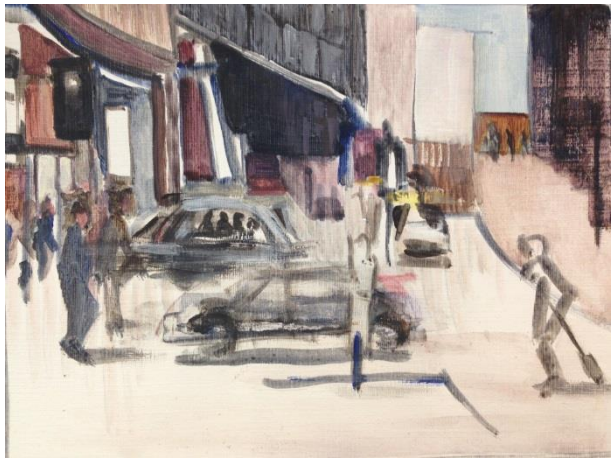
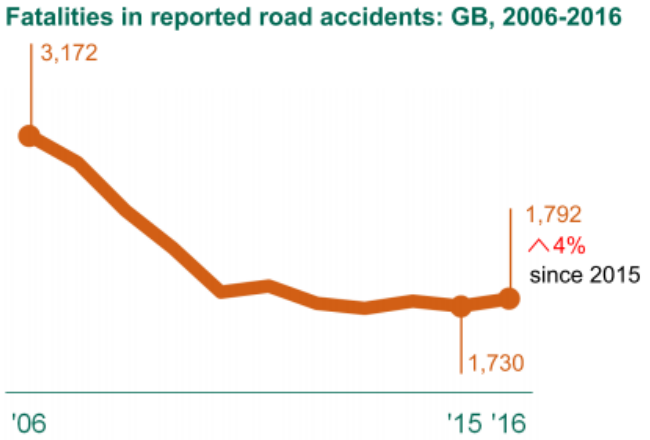
RISK BY TRAVEL MODE, GENDER AND AGE



Dr Shaun Scholes
on behalf of
Robel Feleke, Malcolm Wardlaw, &
Jennifer Mindell

Road Safety Workshop
20th November 2018

Introduction



- Cycling is perceived as an unsafe travel mode in many countries.
- However, road deaths in England have fallen sharply since 2007.
- We explored whether differences in road traffic fatality rates by age, gender and mode persist, and the associations of deprivation with these, making ‘like-for-like’ comparisons.

METHODS
RATES = NUMERATOR / EXPOSURE

Method: Numerator data

ONS mortality data

- England
- 2007-2012
  - 3yr aggregated data: age-group & sex,
  - 6yr aggregated data: by age-group & IMD quintile
  - IMD of residence (not location of road crash)
- ICD-10 external codes
  - V10.3, V10.4 ... V18.9 Cyclist injured in traffic collision/non-collision
  - V01.1, V01.9 … V09.9 Pedestrian injured in transport collision +
  - W00.4 … W19.4 Pedestrian injured in fall on-highway

Number of deaths to drivers

- (younger drivers) taken from STATS19

Method: Denominator data

National Travel Survey (NTS)

- Time spent travelling for each travel mode
- Travel diary
- Unit of analysis is *stage:* (trip>stage)
- Average **distance** travelled per person per week
- Average **time** spent travelling per person per week,
  - calculated using standard NTS methodology
  - i.e. amount of time spent driving is estimated amongst all NTS participants (it is **NOT** conditional on drivers)
- Annual mid-year population by age and sex each year
- NTS estimates aggregated to population

Statistical analysis

- **Outcomes:**

Fatalities per billion km travelled (**f/bn km**): exposure as distance

Fatalities per **M**illion **H**ours **U**se (**F/MHU**): exposure as time

- **Estimates (numbers; fatality rates)**
  - by age-group* and sex 2007-09 & 2010-2012; 2007-2012
  - by age-group* and IMD for 2007-2012
  - by travel mode: all modes; driving; cycling; walking

- **Statistical comparisons between IMD quintiles (most deprived vs least)**
  - Rate ratios (RR): no difference = 1

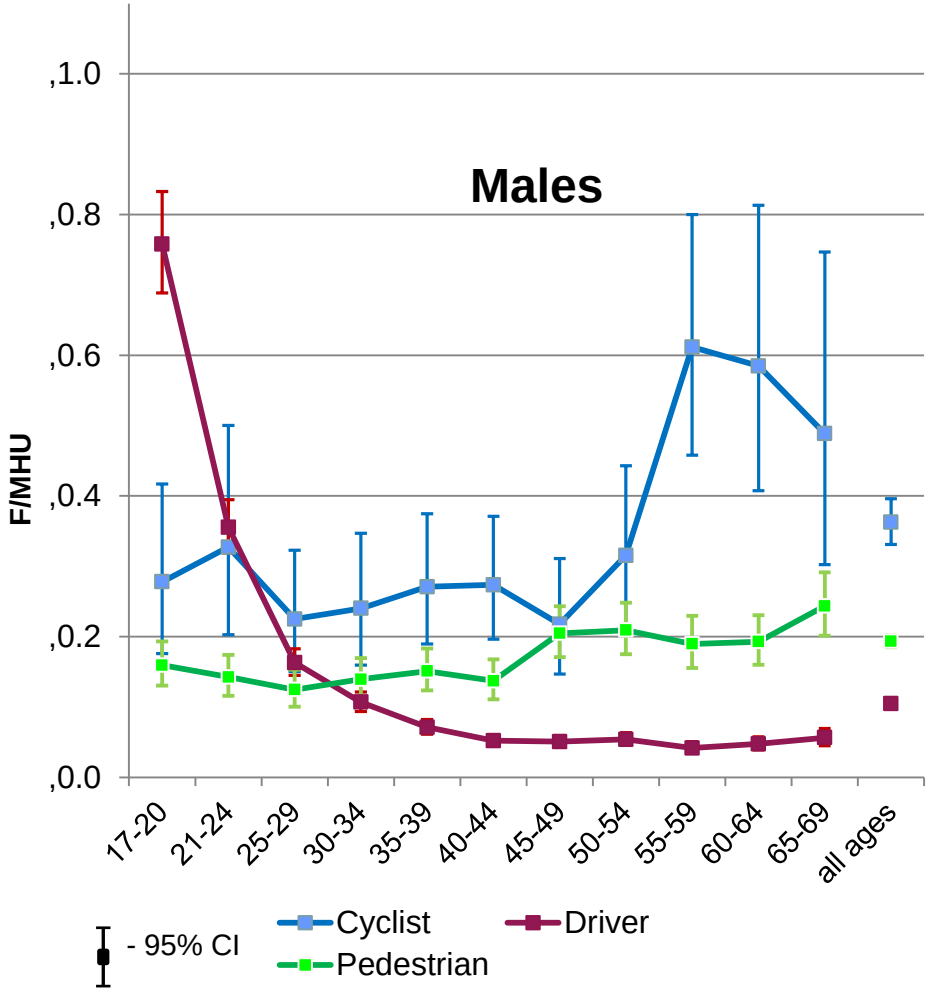
* Minimum age was 17+ (persons in charge of vehicle)

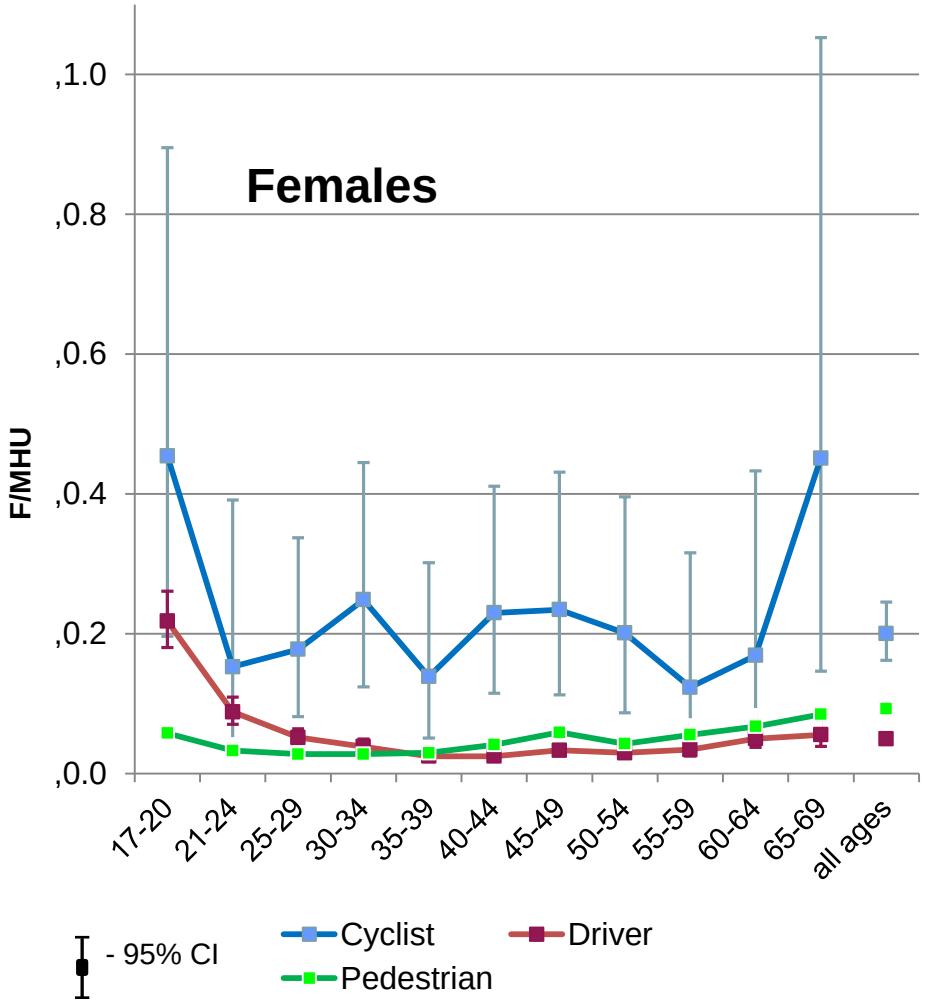
RESULTS

Changes over time 2007-09 to 2010-12

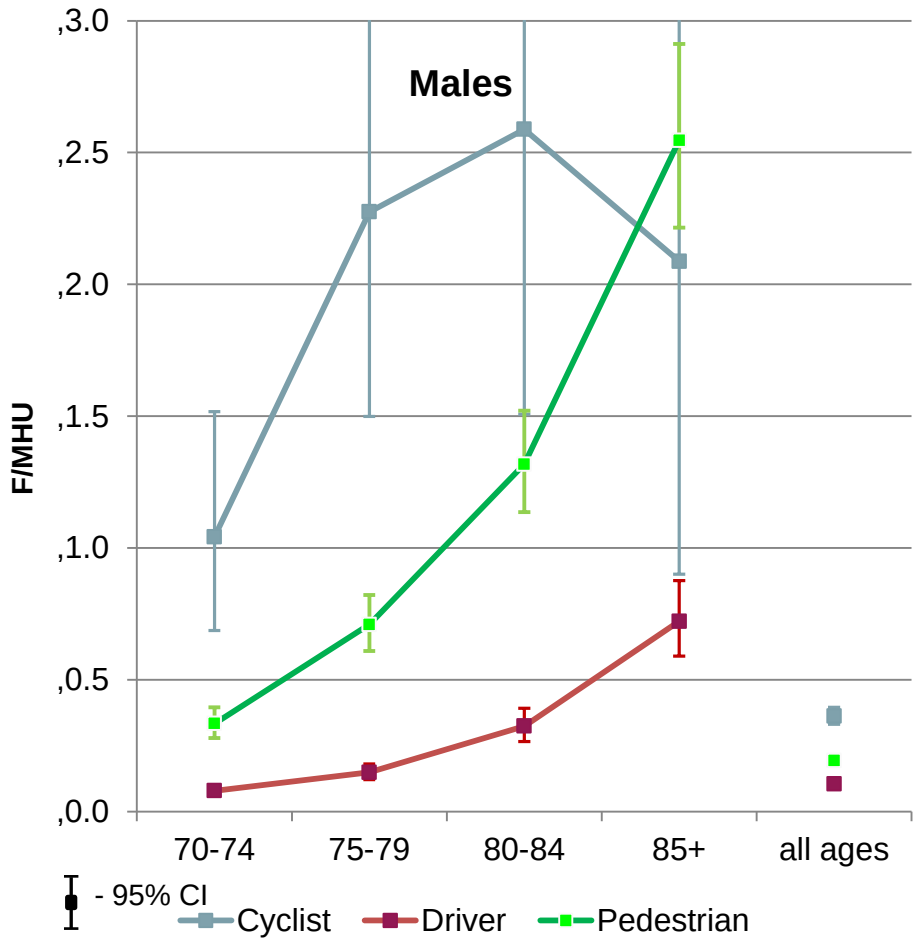
- **Number of deaths:**
  - 29% fall in Number of road travel deaths
  - Patterns by age-group and sex unaltered
  - Largest falls in groups with highest fatality rates
- **Fatality rates, all ages:**
  - Fell in each travel mode
  - except female cyclists (small reductions, NS)

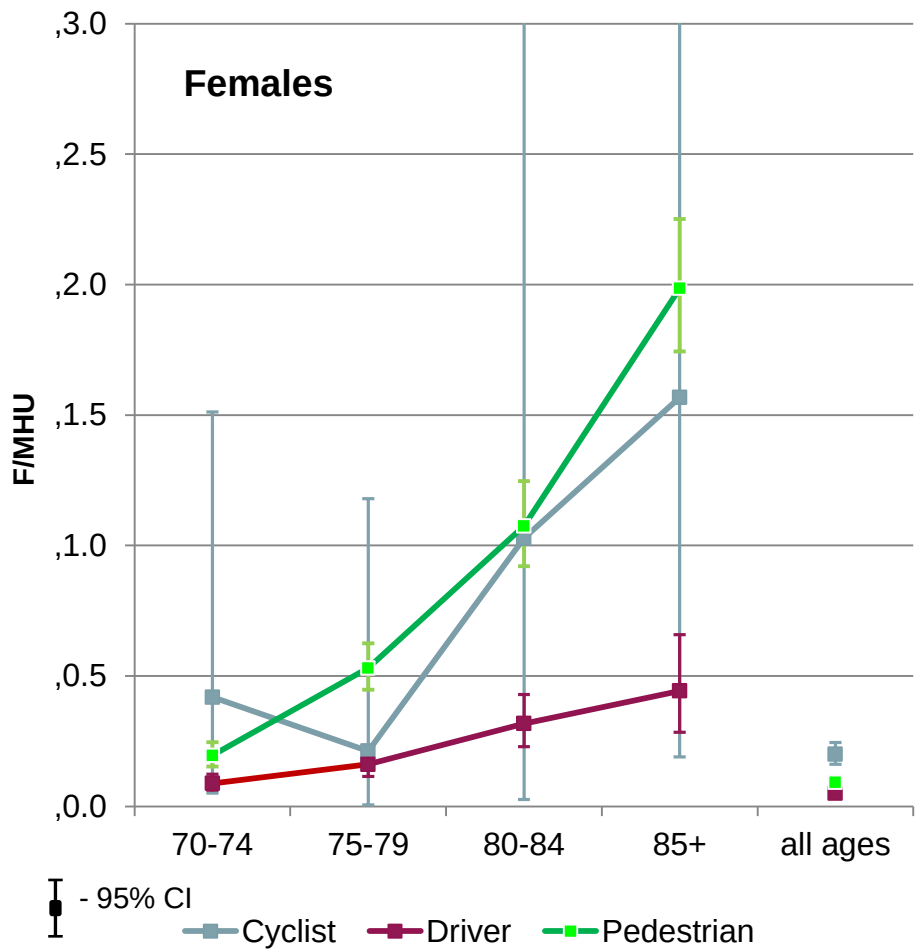
Fatalities per million hours use by mode and sex: age 17-69 (2007-12)



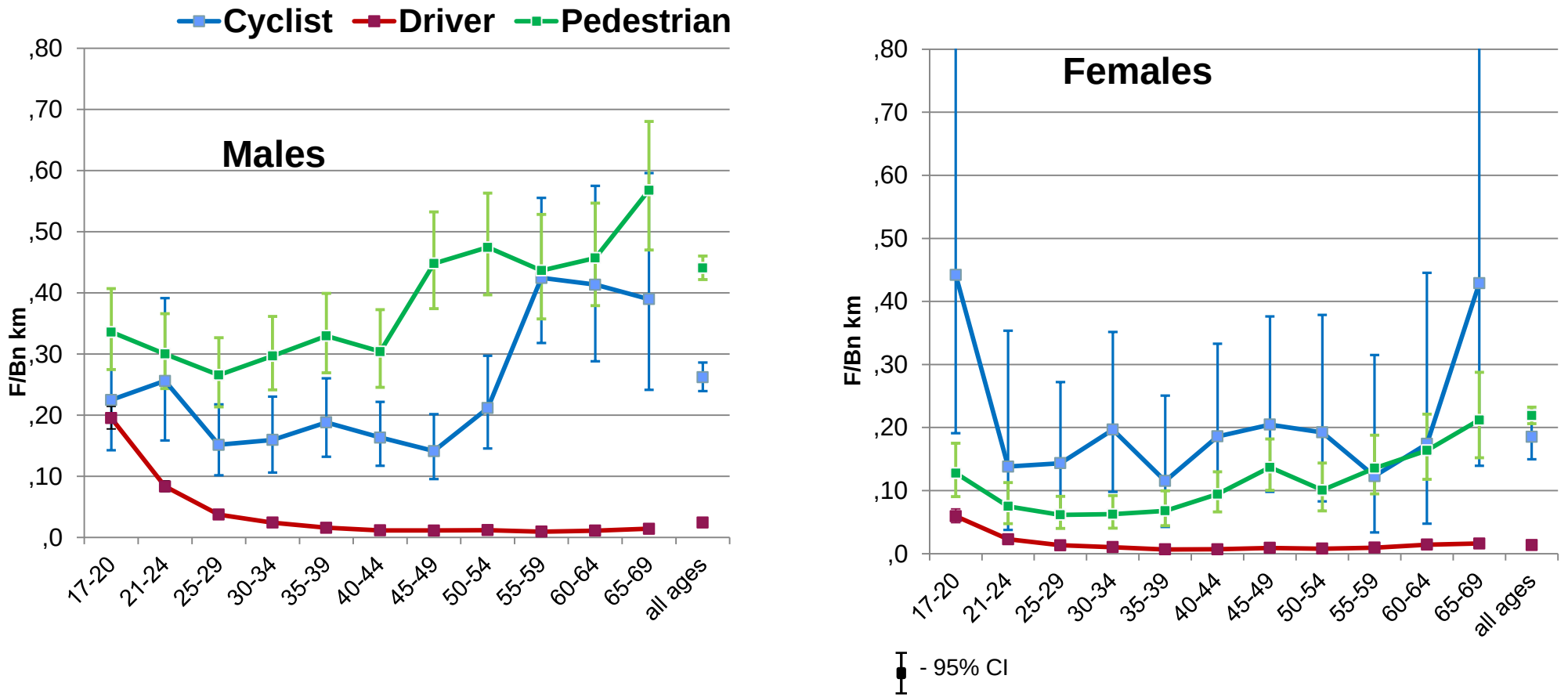


Fatalities per million hours use by mode and sex: aged 70+ (2007-12)



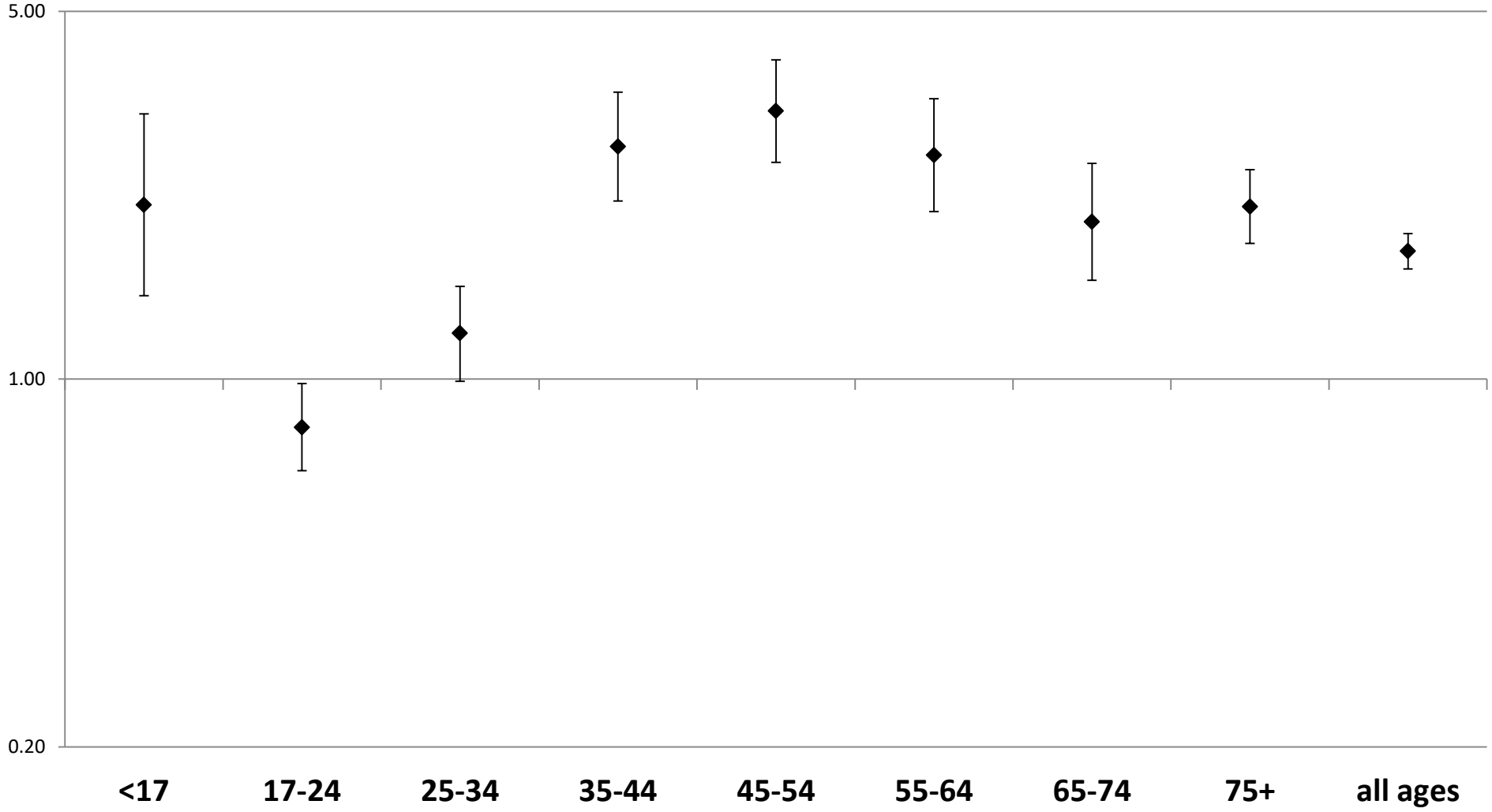


Fatalities per billion km by mode and sex, aged 17-69 (2007-12)

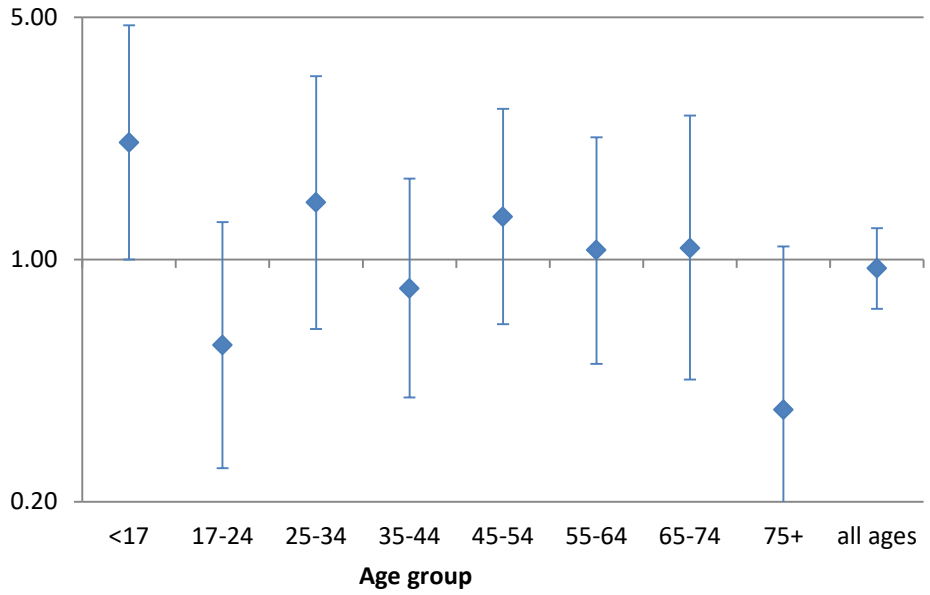


'all ages' = 17+

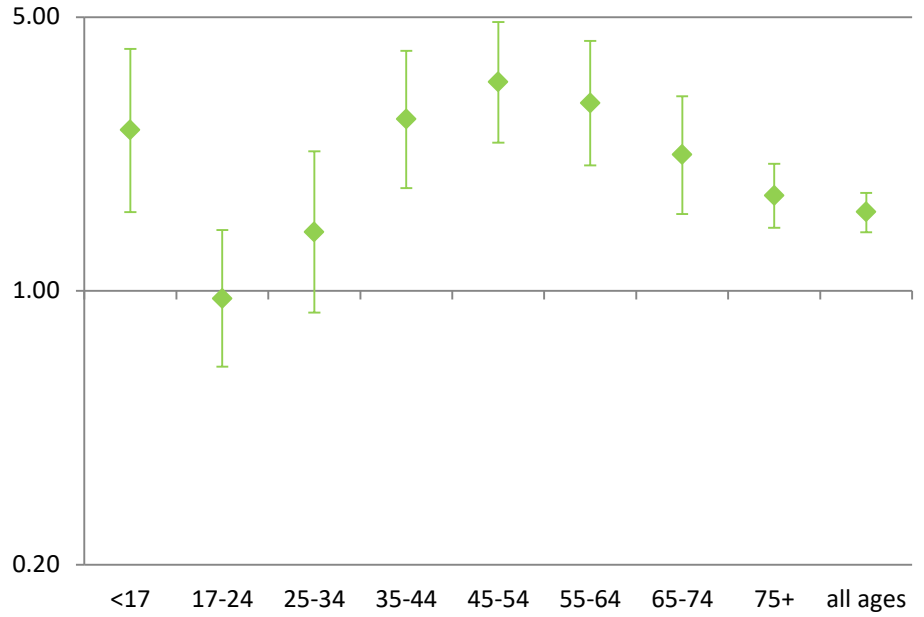
Rate ratios for most vs least deprived areas of residence, by time spent travelling: a) all modes



b) Cycling



c) Walking



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EDITORIAL

Why we need to view road safety through a public health lens?

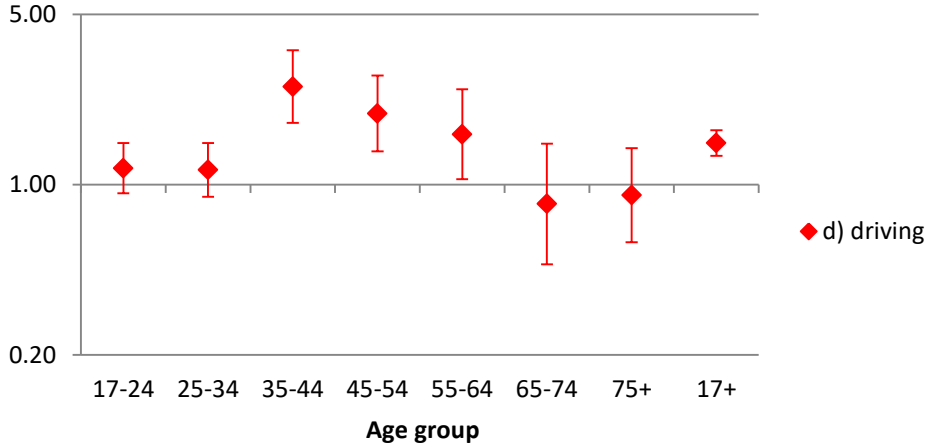
Transport poses a public health risk and the burden is greatest on the poorest in society. There is a strong relationship between social class and the likelihood of road traffic injury. In 1980, the *Black Report*, published by the government department responsible for health in England, identified a strong socioeconomic gradient between child pedestrian fatalities and social class, with children from the lowest social class being five times more likely to die compared to their counterparts the highest social class. The *Black Report* brought attention to the fact that this did not occur by chance:

> While the death of an individual child may appear a random misfortune, the overall distribution indicates the social nature of the phenomenon. (Townsend and Davidson, 1982, p. 127)

Since then further research suggests the relationship between socioeconomic factors and injury persists and has been observed using ecological measures of deprivation for pedestrian casualties, older pedestrians and young drivers.

Identifying such health inequalities and advocating policies to address them is raison d'etre for public health practitioners. However, in the U.K., health inequalities related to road fatalities have not come under the scrutiny of the road safety community largely because the existing database (STATS19) used to inform road safety policy and practice does not routinely collect socioeconomic data. Furthermore, the data variables focused on what "accident" theorists would describe as "active" human errors – at the end of the casual chain. For example, in the case of child pedestrians the event might be described in terms of active errors committed by the collision partners, such as failure of the child to look and see vehicles or the driver speeding or driving whilst impaired. However, little attention was given to upstream latent conditions that gave rise to these events such lack of safe play areas or failure of the local authorities (LAs) to proactively manage safety by implementing measures to reduce speed or enforce speed limits and drink drive legislation.

d) Driving



Strengths and limitations

- National, high quality data
  - Mortality data are complete, with rigorous QA
  - NTS: nationally-representative general population sample allowing estimation of actual time spent travelling
- Data quality:
  - Issues for walking (numerator and denominator)
  - Not able to quantify mode of travel exposure by type of road (i.e. motorways and non-motorways)
  - Comparisons between modes should account for deaths to other road users

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Comparative fatality risk for different travel modes by age, sex, and deprivation

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ABSTRACT

Background: Cycling is perceived as an unsafe travel mode in many countries. However, road deaths in England have fallen sharply since 2007. We explored whether differences in fatality rates by age, gender and mode persist, and the associations of deprivation with these.
Methods: Using ONS (cycling, pedestrian) and Stats19 (driving) 2007–2012 data for travel-related deaths, including pedestrian falls, and National Travel Surveys 2007–2012 travel data, we calculated fatality rates for England by distance (f/bnkm) and time travelled (million hours' use, f/mhu) by age, travel mode, and gender or residential Index of Multiple Deprivation.
Results: Fatality rates fell significantly 2007–2009 to 2010–2012: male f/bnkm from 2.8 (95%CI 2.7–2.9) to 2.0 (1.9–2.1) for driving; 32.1 (28.5–36.0) to 20.8 (18.1–23.9) for cycling; and 51.4 (48.5–54.4) to 36.7 (34.3–39.3) for walking. Fatality rates varied by age, gender, and mode. Driving and walking fatality rate ratios were generally higher for males than females. For males 17–20y, fatality rates were 0.76 (0.69–0.83)/mhu for driving and 0.28 (0.18–0.42)/mhu for cycling but were similar by distance. Age-specific rates were J-shape for cycling, U-shape for driving, and increased exponentially with age for walking. Fatality rates aged 80 + were an order of magnitude higher in each mode than the all-age mean. Compared with those aged 17–20, rate ratios were significantly lower for male drivers 21 + and female drivers 21–74, but were higher for male cyclists aged 55 + and pedestrians 45 + (male) and 65 + (female). People living in the most deprived quintile generally had higher fatality rates than those in the least deprived quintile overall (three modes combined) and for walking but not for cycling; Rate ratios were highest for pedestrians 35–64 and drivers 35–54.
Conclusions: Fatality rates for walking, cycling and driving are higher for males than females at almost every age and vary more by age than by travel mode. Deprivation exacerbates walking and driving fatality rates.

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