

# Epidemiology of cycling road injuries-related deaths

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Dear Editor,

There are now several lines of evidence that millions of people around the world use bicycles as a routine means of transportation. In the US alone, for example, the website Statista estimates that 55 million people use bicycles as a primary or complementary mode of transportation, with a trend that has been steadily increasing over the past decade. In addition to the positive environmental impact of cycling as an alternative means of transportation for reducing pollution, cycling also offers numerous health and wellness benefits. Nevertheless, cycling injuries on the road are still a primary health concern, as collisions with motor vehicles or accidental falls can cause serious harm to cyclists. A recent systematic review of road cycling injuries and illnesses found that the most common injuries were abrasions, lacerations, and hematomas (40-60% of the total), followed by fractures (6-15%) and head injuries and concussions (5-15%).<sup>1</sup> However, to our knowledge, there is no recent data on the mortality of cyclists in traffic accidents, we planned an analysis to specifically fill this gap.

We conducted a digital search of the ultimate version of the Global Burden of Disease Collaborative Network,<sup>2</sup> to retrieve data on cyclist road injuries over the past three decades (i.e., over the searchable years 1991 to 2019). We selected “cyclist road injuries”

as the “cause of death or injury”, and stratified our search by sex (“both”, “females”; “males”) and year ranges (“0-14”, “15-49”, “50-74”, and “+75” years). The data were downloaded as comma-separated values (CSV), then converted into a Microsoft Excel file and analyzed graphically, where they were expressed as standardized or crude death rates, when appropriate. This analysis was conducted by the declaration of Helsinki, according to local legislation.

The results of our investigation are summarized in Figure 1. Overall, the age-standardized mortality for cyclist road injuries has substantially decreased, by 13%, from 0.91 (95%CI, 1.16-0.77)  $\times 100,000$  in 1991 to 0.80 (95%CI, 0.90-0.67)  $\times 100,000$  in 2019 (Figure 1a). Throughout the observational period, the cumulative mortality was always higher in men than in women, and the gradual reduction of the death rate over time was found to be more pronounced in males, whose death rate decreased from 1.50 (95%CI, 2.04-1.21)  $\times 100,000$  in 1991 to 1.29 (95%CI, 1.49-1.04)  $\times 100,000$  in 2019 (-14%) compared to females, who displayed a less sustained decrease from 0.36 (95%CI, 0.43-0.28)  $\times 100,000$  in 1991 to 0.33 (95%CI, 0.38-0.28)  $\times 100,000$  in 2019 (-9%), respectively (Figure 1b). As concerns the different age groups, Figure 1c highlights that the highest mortality for these types of injuries involves older people. Specifically, the death for cyclist road injuries has more than halved in the childhood age, from 0.48 (95%CI, 0.70-0.37)  $\times 100,000$  in 1991 to 0.21 (95%CI, 0.26-0.18)  $\times 100,000$  in 2019 (-55%), has decreased by around 11% in the 15-49 years age range, from 0.77 (95%CI, 0.98-0.63)  $\times 100,000$  in 1991 to 0.69 (95%CI, 0.77-0.57)  $\times 100,000$  in 2019, while it has contrarily increased in people aged 50-74 years, from 1.73 (95%CI, 2.22-1.40)  $\times 100,000$  in 1991 to 1.78 (95%CI, 2.06-1.46)  $\times 100,000$  in 2019 (+3%), as well as in those aged 75 years or older, whose death rate has increased from 1.88 (95%CI, 2.22-1.62)  $\times 100,000$  in 1991 to 2.01 (95%CI, 2.31-1.67)  $\times 100,000$  in 2019 (+7%), respectively.

The results of our analysis show that the number of cyclist deaths due to road traffic injuries has globally decreased over time, although there is some heterogeneity in these data since this trend is mainly attributable to the younger age groups. In contrast to the younger population, older and male cyclists continue to have a higher risk of dying from cycling injuries, with the older age group (i.e., those aged  $\geq 75$  years) showing a worrying 7% increase between 1991 and 2019. Therefore, urgent strategies need to be planned to reverse this unfavorable trend, especially among the older population. Reliable statistics suggest that more than 50% of cyclists do not always wear a helmet on the road, and this prevalence increases from 20-30% in the 0-14 age group, to 40-50% in the 15-59 age group, but exceeds 60% in the  $\geq 60$  years age group.<sup>3</sup> To this end, a recent meta-analysis estimated that wearing a bicycle helmet would reduce the risk of serious and fatal head injuries by about 70%.<sup>4</sup> Therefore, we strongly believe that wearing a bicycle helmet must become mandatory in all countries to protect the lives of all cyclists on the road, especially those who are particularly vulnerable to serious injuries, such as the elderly population. Strict controls and fines must be introduced to encourage all cyclists on

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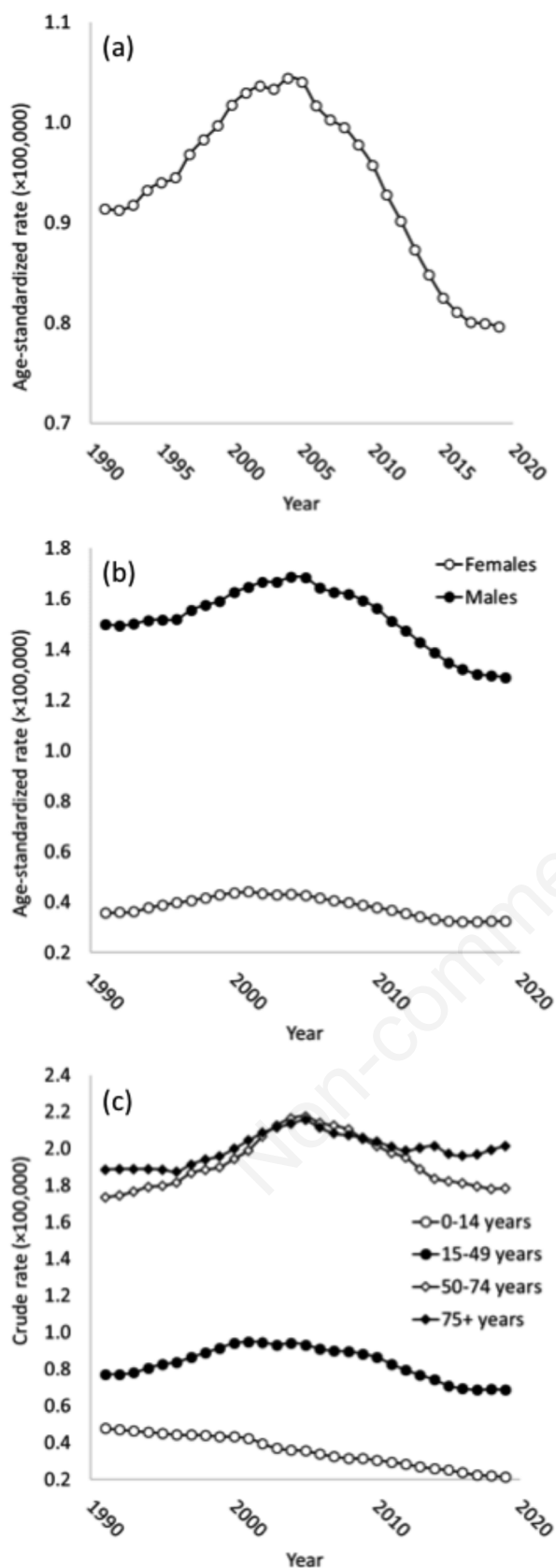
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**Figure 1.** Global epidemiology of deaths caused by road cycling injuries between 1991-2019: (a) overall, (b) stratified by sex, (c) stratified by age.

the roads to use this important means of protecting their health.<sup>5</sup> Finally, drivers must also be educated to adopt a stronger safety culture when using motor vehicles and bicycles, as mutual respect is another cornerstone of accident prevention.

## References

1. Rooney D, Sarriegui I, Heron N. 'As easy as riding a bike': a systematic review of injuries and illness in road cycling. *BMJ Open Sport Exerc Med* 2020;6:e000840.
2. Global Burden of Disease Collaborative Network. Global Burden of Disease Study 2019 (GBD 2019) Results. Seattle, United States: Institute for Health Metrics and Evaluation (IHME), 2020. Last accessed: March 6, 2024. Available from <https://vizhub.healthdata.org/gbd-results/>
3. Jewett A, Beck LF, Taylor C, Baldwin G. Bicycle helmet use among persons 5 years and older in the United States, 2012. *J Safety Res* 2016;59:1-7.
4. Olivier J, Creighton P. Bicycle injuries and helmet use: a systematic review and meta-analysis. *Int J Epidemiol* 2017;46:278-292.
5. Lippi G, Mattiuzzi C. Mandatory wearing of helmets for elite cyclists: new perspectives in prevention of head injuries. *Br J Sports Med* 2004;38:364.