

Is Bicycling Getting Safer? Bicycle Fatality Rates (1985-2017) Using Four Exposure Metrics

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The National Highway Traffic Safety Administration cites decreasing bicyclist fatalities in the United States over the past several decades as evidence of improved bicycling safety. However, with users possessing a diverse range of tolerances, purposes, and socio-demographics, bicycle safety is an important yet complex problem, one that does not have a simple yes/no answer. To gain a better understanding, we need to take a variety of perspectives. Traditional bicycle safety analyses take a transportation engineering perspective by using distance-based exposure metrics or those based on the number of trips. But there are other perspectives – such as public health (using population) and transportation planning (using bicycle participation) – that could provide us with a fuller picture. This paper applies four measures of bicycling exposure to take a broad, interdisciplinary perspective on bicycling safety to answer the question of whether bicycling is actually getting safer and, if so, for whom. We first explore age differences with respect to the direction and magnitude of bicyclist fatality rates in the United States between 1985 and 2017. We then investigate whether any safety benefits are shared equally among commuters and recreational riders.

Using fatality data from the Fatality Analysis Reporting System (FARS) and exposure data from the National Household Travel Survey (NHTS), the American Community Survey (ACS), the U.S. Census, and the National Sporting Goods Association (NSGA) – a relatively novel approach to measuring exposure through a comprehensive national bicycling participation survey – we derived trends of age-specific bicyclist fatality rates and corresponding confidence intervals for children and adults. We also compare exposure to fatality outcomes by deriving Pearson's correlation coefficients. This is the first research to provide a longitudinal, age-specific statistical analysis of bicycle fatality rates using these four exposure metrics.

Results suggest that overall declines in bicycle fatality rates have been primarily driven by a sharp decline in child bicyclist fatalities while adult bicycle fatality rates have generally trended upwards (especially for the general population) or remained stagnant (for commuters). This work adds to the understanding of bicyclist safety and gives direction to future research regarding the importance of considering age and exposure sources.