



International Co-operation on Theories and
Concepts in Traffic Safety

Risk for e-bikes vs conventional bikes – analysis of emergency ward data from Norway

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1. Introduction

E-bikes have become very popular and are an important tool for helping cities reach sustainable mobility goals. However, there are concerns that increased use of e-bikes will lead to more accidents than what is observed among conventional bikes. There is some evidence to support such concerns, e.g. a study from Switzerland indicating a doubling in risk for e-biking, as compared to cycling (Hertach, Uhr, Niemann, & Cavegn, 2018). At the face of it such results might seem plausible. E-bikes *can* travel at higher average speeds and are heavier than conventional bikes. Furthermore, it has been suggested that e-bikes may appeal to new groups of cyclists with little cycling experience, which may further impede cyclist safety (Fyhri, Johansson, & Bjornskau, 2019).

Still, the speed and weight of e-bikes is not that much larger than for conventional bikes (top speeds tend to be fairly similar, and weight differences are typically 5-10 kgs). Are these factors large enough to produce substantial risk differences? Several studies have tested and found little or no risk difference. A study (Schepers, Wolt, & Fishman, 2018) found that the odds of being treated in the emergency department following a crash being greater among e-bike users than conventional bike users (OR [95%CI] 1.24[1.03, 1.48]). However, after controlling for distance traveled, there was no difference (OR [95%CI] 1.01[0.83, 1.22]) (Schepers et al., 2018). Similarly, a study using self-report data on accidents and exposure in Norway, found an increased injury risk in women, but not in men (Fyhri et al., 2019).

Crash risk data for cycling in general and e-biking in particular, are notoriously hard to obtain. To derive (time or distance) exposure-adjusted rates, one needs representative travel survey estimates on distance or time traveled by e-bike, as well as e-bike specific crash reports. These data have to be derived from separate large-scale data sources, i.e. household travel surveys and crash registries. Due to the limited number of travel surveys and crash registries distinguishing conventional cycling and e-biking to date, no such findings are published in peer reviewed literature to date.

The current paper aims to cover this knowledge gap by matching two recent data sources on mobility and emergency ward entries specific cities in Norway.

2. Methods

The first data set that is utilized is the regional sample of the National Travel Behaviour survey of Norway. In the capital region, this data set consists of about 8000 respondents and 1000 bicycle trips, where about 1/3 is by e-bike (data set from 2023).

The second data set is collected as part of the CyWalk project and is an ongoing accident registration (starting from May 2024) in collaboration with hospitals and emergency wards in a number of cities, among them the capital region Oslo.

3. Results

The data are collected starting from May 1st, 2024 for the emergency ward data. Data will be harvested first on August the 1st for an initial analysis and setting up of data cleaning protocol, and then finally on October the 1st for a full analysis. We will use TBS data for 2023,



collected in May – Sept. Expected number of cyclist crashes in the data set will be 1000 from May 1st 2024, to August 1st and 1600 from May 1st 2024 to October 1st. These figures contain all types of bicycles (conventional, e-bikes etc.) and are based on hospital recordings from 2021, 2022 and 2023.

4. Conclusions

This study, being among the first to use a representative travel survey estimate on distance traveled by e-bike, as well as e-bike specific crash reports, will give much more conclusive evidence about the relative risk of e-bikes to c-bikes than has hitherto been possible. The results are of great importance for many stakeholders. E.g. the Health Economic Assessment Tool (HEAT) for walking and cycling sponsored by WHO (www.heatwalkingcycling.org) relies on such estimates for providing recommendations about policies for supporting more use of e-bikes.

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