

## Risk factors for bicycle-motor vehicle collisions in Portugal

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### ABSTRACT

In Portugal the number of bicycles in the traffic is low compared with many other European countries. However, the share of trips being made by bicycle is increasing across the country, especially in the main cities. If the number of fatalities and injuries is not yet a major concern in terms of road safety, mainly due to the low use of the bicycle, it can become a major problem if the number of bicycle users increases significantly. The aim of this work is to identify the main factors affecting cycling safety in Portugal. From the Portuguese accident database for the period 2011-2012, which contains 113 fatalities, 361 severe injuries and 4591 slight injuries, a prospective and a retrospective study using ordinal regression. Also, in-depth investigation and computer simulation of the more common collision scenarios using software PC-Crash are presented in this work. The results show that rear and side collisions represent the main causes of fatalities. Collisions at night and in good weather conditions are factors affecting the severity of the injuries. Also, collisions outside urban areas contribute to increase the injuries. Preventing road accidents and promoting cycling requires some countermeasures. The most important is traffic segregation and the wide implementation of bicycle lanes, as also conspicuity and visibility measures among others. The reduction of the speed limits in urban areas is another important countermeasure to protect vulnerable road users.

**Keywords:** bicycle safety, retrospective analysis, collision simulation, accident reconstruction

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