

# Statistical models for the analysis of temporal patterns in work-related traffic injuries

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Work-related traffic accidents (WTAs) are one of the main causes of injury. WTAs can be divided into two classes, 'in itinere' for commuting and 'in mission' during work time.

In Aragon (Spain), WTAs are the principal cause of sick leave and work-related injuries, with a higher incidence in the industrial parks of the region. Although there are reports that partially summarize the situation, there is no systematic methodology to monitor and analyse patterns in these accidents. This work is part of a collaboration with the Occupational Safety and Health Service of the Government of Aragón (ISSLA) to promote research on this topic.

The aim of the study is to develop statistical models that can be useful to detect and estimate temporal patterns in the events linked to seasonality or light conditions, and other possible causes, such as atmospheric conditions. The response variable is defined as the number of accidents per hour and day in an area. Poisson regression models have been fitted to estimate the WTA rate, considering covariates such as hourly and daily harmonics, location, or meteorological information.

The methodology is applied to analyse the WTA database for the period from 2009 to 2021 in the province of Zaragoza (Aragón). Incremental effects are identified and estimated. Finally, the relative risks are estimated by comparing the rates of the industrial park. The conclusions suggest situations that warn about the need for the authorities to take additional measures to reduce these rates.

**Keywords:** Commuting risk factors, Shift work related risk, Poisson model.