



"Safe cars for all. Analysis of accidents from a gender perspective (2012-2021)" study

WOMEN HAVE A 17% HIGHER RISK OF DEATH AND ARE TWICE AS LIKELY TO SUFFER A BRAIN INJURY IN A CAR ACCIDENT

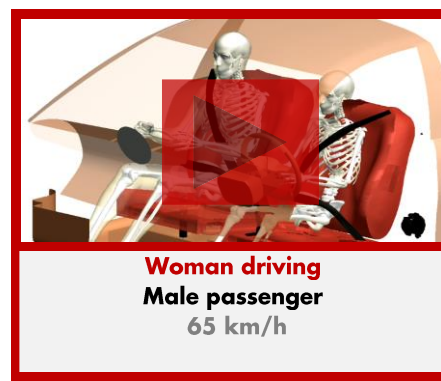
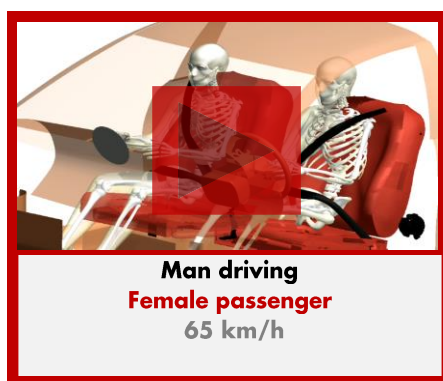
- **Female drivers are 17% more likely to die and twice as likely to suffer serious brain injury. They are also almost 50% more likely to fracture their skull.**
- **Many women are forced to get too close to the steering wheel as they cannot reach the pedals properly. This greatly increases the likelihood of serious injuries to the chest, face and neck if the airbag is activated.**
- **Seat-belt design fosters the "submarining" effect for female drivers: slippage in the seat that can cause significant internal injuries due to the pressure of the lower band on the stomach. Seat belts also do not take into account the female chest or adequately protect women's shoulders.**
- **The female body was not traditionally taken into account in crash tests, as the dummies most commonly used in these tests are two male prototypes from the 50th and 95th percentile, with just one female prototype from the 5th percentile, which is merely an adaptation of the male body.**
- **There are several possible reasons for this: there are more male drivers, they drive more, they generally make the decision to buy the car, and they have worse accident rates. 90% of those killed in traffic accidents in Spain in the last decade, and 85% of those seriously injured, were men.**
- **77% of Spanish motorists believe there is still a lot of prejudice against women drivers. This prejudice is strongest in Extremadura, Valencia and Castilla La Mancha, and weakest in La Rioja, Madrid and the Murcia region.**

Madrid, 7 November 2023. 50th and 95th percentile male dummies and 5th percentile female models, which are simply an adaptation of the male body, were traditionally used in passive safety testing of cars. And this largely determined that **vehicle design is based on the anatomy of men** rather than women.

Being aware of this, the [Línea Directa Foundation](#) and the [Comillas Pontifical University](#) have performed a computerised crash test to reproduce a head-on collision in identical circumstances for both genders: a **female model in the 50th percentile** and a male model in the 50th percentile. This crash test revealed some striking conclusions. Considering the anatomy of each gender (as determined through a Computed Tomography, or CT, scan), female drivers could be **twice as likely to suffer serious brain injury** and **nearly 50% more likely to fracture their skull**

in a head-on collision. Other studies have found that women also have a **17% higher risk of dying** in an accident.

The reasons for this are clear. Women of short or medium stature are forced to **get too close to the steering wheel** as they cannot reach the pedals properly. This greatly increases the likelihood of **serious injuries to the chest, face and neck** if the airbag is activated. The design of seat belts also favours the **"submarining" effect in female drivers**, with slipping in the seat that means the lower part of the seatbelt can cause serious internal injuries in the event of a collision. This is the leading cause of foetal mortality from trauma injuries. Seat belt design also fails to consider the **female chest** and does not protect women's **shoulders** adequately.



These are some of the main findings of the study **"Safe Cars for All. Analysis of accidents from a gender perspective (2012-2021)"**, which was presented today by the **Línea Directa Foundation**. This study was performed with [Centro Zaragoza](#) and the Comillas Pontifical University Technological Research Institute. It analyses the accident rates for each gender, the **official accident statistics** for men and women over the last 10 years, and passive **safety tests**, among other aspects. The report also included a **survey of 1,700 drivers** from all over the country, in which the motorists gave their opinion on the relationship between driving and gender.

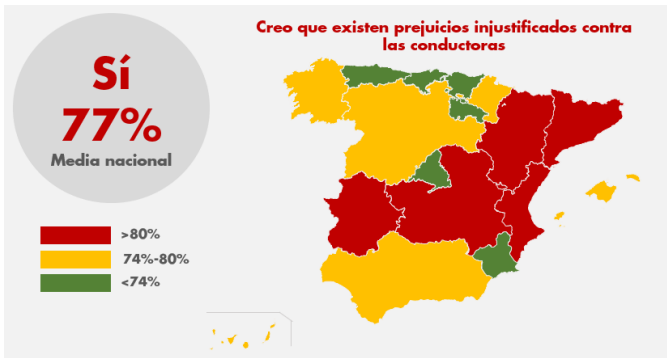
Why have cars traditionally been designed for men?

The main reasons why cars are more focussed on the male anatomy are historical. There are **more male than female drivers** (56% men to 44% women, a proportion that increases significantly with age); men spend **more time driving** (+70%); men have **more weight in car-buying decisions** (+22 p.p.); and men have **higher accident, injury and mortality rates**.

According to official Department of Transport (DGT) figures, **90% of drivers killed** in traffic accidents in the last decade in Spain, and **85% of those seriously injured were men**, with the fatality rate being **four times higher** than for women. **92% of drivers** who died in traffic accidents in 2022 who tested positive for drugs or alcohol **were men** and **73% of those penalised** were also men.

There are also significant differences between the genders in the **most frequent fatal accidents**. The most common cause for **women** is a **head-on collision** (22%) with a car (77%), while the most common fatal accident for **men** is a **collision caused by leaving the carriageway** with a collision (23%) with another vehicle, although in a much smaller proportion (46%).

What do Spanish men think about female drivers?



77% of Spanish motorists believe that there is still **a lot of prejudice against female drivers**, a percentage that, in the case of women, reaches **86%**. This prejudice is strongest in **Extremadura, Valencia and Castilla La Mancha**, and weakest in **La Rioja, Madrid and the Murcia region**.

Female drivers attribute the **higher accident rate among men** to the fact that, in general, they **"drive faster and break the rules more"** (34%), while men believe that it is because they **"drive a lot more kilometres"** (26%), something they usually do "out of **habit**" (55%). Some attitudes persist among male drivers, as **one in five** of them admit to having **insulted a female driver** by alluding to her gender.

Methodology

The accident rates were obtained from computerised crash testing using the VIVA+ model with male and female models from the 50th percentile: "Research on biomechanical differences between men and women through finite element simulation" (MOBIOS IIT, Pontificia Comillas University), using the HIC, DAMAGE, BriC and Cmax models to assess bodily injury. The accident rates were obtained in collaboration with Centro Zaragoza, drawing on the DGT's ARENA database. This involved identifying the number of accidents, deaths and injuries by gender between 2012 and 2021, and analysing the age and gender of the drivers, the type of road, and the time and location of the accident. The evolution of the dummies used (design, weight and dimensions) was also considered, with special attention to the biological representativeness of the main models according to gender. The mortality risk was determined through analysis of the scientific literature. The population projections are based on the DGT's 2022 census of drivers by gender. Data was also provided from analysis of the 2022 INTCF report and DGT data on penalties and offences (2013-2022).

The survey was designed by the Línea Directa Foundation and performed by the consultancy MDK. It included 1,700 interviews with quotas by gender, age and Autonomous Community, with a sampling error of +/- 2.37% ~ 3.1% and a confidence level of 95%. The fieldwork was carried out between 29 September and 4 October 2023.

About Línea Directa Foundation

Línea Directa Foundation is a non-profit institution that was created in 2014 with the aim of helping to build a better and safer society by promoting various initiatives with road safety as its main area of action. The Foundation was set up by Línea Directa Aseguradora as a further show of its commitment to reducing traffic accidents.

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This initiative applies to the following **Sustainable Development Goal (SDG)**:

