

Get the Facts: Why We Need Female Crash Test Dummies

Q: Do female bodies behave differently in vehicle crashes than male bodies?

- **A:** Yes. Due to differences in [physiology](#) (differing size, bone density, muscle structure, and abdomen and chest physiology) and [driver positioning](#) (because of shorter arms, females sit closer to the steering wheel than males), women's and men's bodies respond differently in a crash.

Q: What's the impact when those differences aren't accounted for in vehicle design?

- **A:** Those differences can be deadly when unaccounted for in vehicle design. Several studies over the years have proven women are far more prone to injury and death than men in a crash. A [2019 University of Virginia study](#) found that women are 73% more likely to be severely injured in a frontal crash than men and, as cited in [DOT's 2022 National Roadway Safety Strategy](#), female drivers are 17% more likely than their male counterparts to be killed in a comparable crash. [Multiple](#) other [studies](#) have come up with similar numbers [showing](#) that women die and are injured at much higher rates than men.

Q: Do women really need to be represented in crash tests in all the same ways?

- **A:** Men and women both deserve the protection of the same tests, and the same quality of crash test equipment. Multiple studies prove differences in crash testing have real impacts on crash safety. In addition, the civil rights laws of the U.S. already prevent the government from testing males and females unequally; the government can't treat two groups unequally under the same law.
- If crash data and legal cites don't persuade detractors to change their thinking, perhaps these statistics will: In the U.S., women make up more than half of drivers, and make over 80% of vehicle purchasing [decisions](#). The U.S. automotive market is highly competitive, with new entrants making their way in. Many new entrants are from Asia, where vehicles are already sized for smaller frames, and manufacturers are embracing new female dummies. Do we really believe these companies won't market their female-friendly vehicles to women?

Q: What are the two policies that are responsible for the fact that women die and are injured at far higher rates than men involved in the same crashes?

- **A:** First, the dummies are unequal. NHTSA has not yet approved biofidelic female dummies. This means no real female dummy is used in the government's own tests, nor must they be used in the tests the government requires automakers to perform on their vehicles. That's right - neither the government's 5-star safety rating (NCAP) program administered by the National Highway Traffic Safety Administration nor the Federal

Motor Vehicle Safety Standards (FMVSS) that automakers must pass use dummies that could be considered biofidelically 'female'. Instead, a scaled-down, re-labeled male dummy, called the Hybrid III F, is used.

- Second, the tests themselves are unequal. For instance, the government does not even use a scaled-down male in the NCAP [driver's seat frontal crash tests or side barrier tests](#). Only males are tested in the driver's seat for frontal and side barrier tests, even though the majority of drivers on the road are [female](#).

Q: Can the government legally administer a federal program that discriminates between women and men?

- Of course not. The outdated NHTSA crash test ratings system creates a regime where females are not tested in the same seating positions, or with the same quality crash test equipment as males. The program treats men and women unequally, and it commits this discrimination based on immutable characteristics. As a result, women suffer from a higher rate of [severe injuries](#) and [fatalities](#) in car crashes than they would if they were treated equally under the law.

Q: Is there crash test dummy technology that represents women's bodies?

- **A:** Yes. The THOR generation of dummies is the '5G' of frontal-crash testing technology, and the female THOR dummy – called the THOR 5th – was designed [with female anatomy in mind](#).
- For example, the THOR 5th takes into account that male necks are more muscular and have greater spinal column strength while female necks use less muscle mass to support heads that are nearly as large and heavy, resulting in women being [significantly more prone](#) to whiplash in an accident. To account for this difference, the neck of the THOR 5th has improved muscle representation and a greater bending shape.
- Additionally, pressure sensors have been embedded in the THOR 5th in places where females experience disproportionate injuries, such as the lower legs, chest and abdomen. Seatbelts rest differently on a female chest, so to help understand the impact of seatbelts on protection and injury, the chest sensors on the THOR 5th detect multi-point deflection. One reason why women may be more prone to abdominal injuries than males is that they have comparatively [less protective fat around their bellies](#). THOR 5th's abdominal pressure sensors provide valuable data testing that hypothesis.
- THOR technology has been thoroughly [researched](#) and vetted by NHTSA for over a decade. The THOR 5th generation of dummies has [passed](#) NHTSA's biofidelity, durability and repeatability tests, and is ready for deployment.

Q: Has this generation of crash test dummy technology proven viable?

- **A:** Yes. The THOR generation of crash test technology has been studied for years and is [proven to be far more biofidelic than previous generations of dummies](#). NHTSA has

[validated](#) THOR 50th technology and it is being used in [Europe](#), Japan, and China. The THOR 5th has passed NHTSA biofidelity, durability and repeatability tests. [Europe has committed to deploying](#) the THOR 5th for use in driver's seat tests in their NCAP roadmap. Now the U.S. needs to commit to implementing it too.

Q: Why isn't it being used by the U.S. government and U.S. ratings groups today?

- **A:** Released in 1976, the first crash test dummy was modeled after a 172-pound, 5-foot-9 male. According to the [NHTSA Administrator at the time](#), the agency started with male dummies because of a limited budget and because men were driving cars more frequently than women. Two decades later, a "female" device was developed and put into regulation, but it was simply a [scaled down version of the male dummy](#) that does not account for women's unique physiology and is not tested in the driver's seat in all car safety tests. Today, the male-designed dummy that is based on the one that debuted in 1976 remains the most widely used automotive crash test dummy in the U.S. and is currently in the driver's seat position in NCAP car safety ratings tests.
- The male bias in testing has had dire consequences: women, [particularly young women](#), are [47% more likely](#) to be severely injured and 71% more likely to be moderately injured, and, depending on the study, [9% to 28% more likely](#) to die in a vehicle crash than men. [Multiple studies](#) have [shown](#) that women are at higher risk for death and injury. When NHTSA created the NCAP program in 1979, it failed to crash test women in the driver's seat. It has failed to update that crash test ratings standard since then.

Q: Do NHTSA / DOT have the legal authority to update their crash testing ratings standards and fix this issue?

- Yes. NHTSA and DOT do not need any additional legal authority to fix this problem – in fact, the Bipartisan Infrastructure Law requires NHTSA to address its NCAP ratings system. That review is currently open. All NHTSA needs to do is update the NCAP program to require up-to-date equipment and test female dummies in the same ways it tests male dummies. In addition, automaker participation in the NCAP is voluntary, which means it is even easier than usual to make changes without triggering administrative hurdles.

Q: What are other countries doing?

- **A:** The THOR 50th – the male THOR dummy – has been deployed in Europe, Australia, Japan and China. They are in wide use today.
- [Europe's NCAP has committed to changing its NCAP tests to reflect female physiology as well.](#)
- Neither THOR device – male or female – has been added to the U.S. NCAP, although no further legal authorization is needed to do so, and the THOR 5th has passed biofidelity, durability, and repeatability tests.

Q: What role can computer-simulated crash test modeling play in making vehicles safer?

- **A:** Simulation will play an increasingly important role in the development of safety technology and crashworthy vehicles, but all simulation and data models need to be validated against a rigorous set of physical tests. The properties modeled in simulation need to be shown to work in real life. Those simulations should be based on the equal tests and the best testing equipment available – which is, at the moment, the THOR generation of technology.
- To adhere to sound testing practices, we cannot rely on computer simulations alone. As the 2015 ‘dieseldgate’ scandal [showed](#), regulators are wise to create independent validation of software-based automotive compliance products.

Q: What are the costs of incorporating the new generation of crash test dummies and updated testing standards?

- **A:** According to analysts, new crash test dummies would increase the cost of a new vehicle for a car buyer by less than a dollar. Industry analysts estimate that total Research and Development accounts for about 6% of the cost of a car. Of that amount, safety testing accounts for 0.73% of Research and Development, and the cost of crash test dummies accounts for about 5.3% of R+D safety testing. In comparison, some manufacturers spend hundreds of dollars per vehicle on marketing alone.