FREAKONOMICS BY STEPHEN J. DUBNER AND STEVEN D. LEVITT

How Many Lives Did Dale Earnhardt Save?

Nascar goes on a crash diet.

Calculating a Driver's Risk

Five years ago this weekend, Dale Earnhardt crashed into a wall during the final lap of the Daytona 500 and was instantly killed. One of the most successful, beloved and intimidating drivers in Nascar history, Earnhardt is still actively mourned. (If you watch today's Daytona 500, the first and most prominent race of the Nascar season, you will surely see his No. 3 everywhere.) Earnhardt's death was to Nascar as 9/11 was to the federal government: a wake-up call leading to a radical overhaul of safety measures. "There were three or four bad accidents in a row there over two or three years," says Matt Kenseth, an elite Nascar driver. "Nascar was always working hard on safety, but that" — Earnhardt's death — "really sped things up."

Stephen J. Dubner and Steven D. Levitt are the authors of "Freakonomics: A Rogue Economist Explores the Hidden Side of Everything." More information on the research behind this column is at www.freakonomics.com.

Driving a race car is an obviously hazardous pursuit. When Earnhardt died, he was the seventh driver within Nascar's three major divisions — the Craftsman Truck Series, the Busch Series and the premier circuit now known as the Nextel Cup Series — to die within a period of seven years.

And how many drivers have been killed since his death in 2001?

Zero. In more than six million miles of racing — and many, many miles in practice and qualifying laps, which are plenty dangerous — not a single driver in Nascar's three top divisions has died.

On U.S. roads, meanwhile, roughly 185,000 drivers, passengers and motorcyclists have been killed during this same time frame. Those 185,000 deaths, though, came over the course of nearly 15 *trillion* miles driven. This translates into one fatality for every 81 million miles driven. Although traffic accidents are the leading cause of death for Americans from ages 3 to 33, this would seem to be a pretty low death rate (especially since it includes motorcycles, which are far more dangerous than cars or trucks). How long might it take one person to drive 81 million miles? Let's say that for a solid year you did nothing but drive, 24 hours a day, at 60 miles per hour. In one year, you'd cover 525,600 miles; to reach 81 million miles, you'd have to drive around the clock for 154 years. In other words, a lot of people die on U.S. roads each year not because driving is so dangerous, but because an awful lot of people are driving an awful lot of miles.

So Nascar's record of zero deaths in five years over six million miles is perhaps not as remarkable as it first sounded. Still, driving a race car would seem to be substantially more dangerous than taking a trip to the supermarket. What has Nascar done to produce its zero-fatality record?

It's a long list. Well before Earnhardt was killed, each driver was already wearing a helmet, fireproof suit and shoes and a five-point safety harness. Months after Earnhardt's death, Nascar began requiring the use of a head-and-neck restraint that is tethered to a driver's helmet and prevents his head from flying forward or sideways in a crash. (Like many race-car drivers who are killed, Earnhardt suffered a fracture to the base of the skull.) It erected safer walls on its race tracks. And it began to zealously collect crash data. This Incident Database (which Nascar politely declined to let us examine) is gleaned from two main sources: a black box now mounted on every vehicle and the work of a new Field Investigation unit. These field investigators meticulously take key measurements on every car before every race, and then if a car is involved in a crash, they retake those measurements.

"In the past, a car would be in an accident, the driver would have no injuries and the team would load up the car and go home," says Gary Nelson, who runs Nascar's research and development center. "But now they measure every car in certain areas, and we make a log of that. Like the width of the seat — it seems simple, the width of the headrest from left to right. But in an accident, those things can

Nascar's recent safety measures seem to have considerably reduced the likelihood of being killed on the track. So could it be that drive are now willing to be more reckless?

bend, and the amount they bend can help us understand the energy involved. When we began, we thought our seats were adequately strong, but we found these things to be bending more than we thought. So we've come back since and rewritten the regulations."

Although it is wildly reductive to put it this way, a Nascar driver has two main goals: to win a race and to not be killed. Nascar's recent safety measures seem to have considerably reduced the likelihood of being killed. So could it be that drivers are now willing to be more reckless? When crashing is made less costly, an economist would fully expect drivers to be crashing like crazy; could it be that Nascar's safety measures have led to fewer deaths but more crashes?

A quick look at the data seems to suggest so. In last year's Nextel Cup races, there were 345 cars involved in crashes, an all-time high. But, as Matt Kenseth points out, the two cup races held during 2005 at Lowe's Motor Speedway near Charlotte, N.C., were unusually brutal — the track had a new surface that caused numerous flat tires — and may have aberrationally affected the crash count. "In Charlotte, pretty much everybody wrecked in both races," he says. "It was the fault of the track and the tires — but if you take those races out of it, crashes are probably about even." And there were actually fewer crashes in 2004 than there were in 2003. While the number of overall crashes are up a bit since Earnhardt's death (Nascar will not release annual crash counts, but one official did confirm this trend), they haven't increased nearly as much as an economist might have predicted based on how Nascar's safety measures would seem to have shifted a driver's incentives.

Maybe that's because there are other, perhaps stronger, incentives at play. The first is that Nascar has increased its penalties for reckless driving, not only fining drivers but also subtracting points in their race for the cup championship. The other lies in how the cup championship itself has been restructured. Two years ago, Nascar gave its 36-race season a playoff format. In order to qualify for the playoffs — and have a chance at winning the $6 million-plus cup championship — a driver must be among the points leaders after the first 26 races of the season. While a couple of 20th-place finishes during those first 26 races won't necessary ruin your championship hopes (each race fields a slate of 43 cars), a few bad crashes might.

So Nascar has reduced a danger incentive but imposed a financial incentive, thus maintaining the delicate and masterful balance it has cultivated: it has enough crashes to satisfy its fans but not too many to destroy the sport — or its drivers. (Nascar fans love crashes the way hockey fans love fights; when you watch the Speed Channel's edited replays of Nascar races, the plot is always the same: green flag, crash, crash, crash, crash, crash, checkered flag.)

And here lies the most startling statistic concerning Nascar and driver safety. In the past five years, more than 3,000 vehicles have crashed in Nascar's three top divisions, with zero fatalities. How does this compare with crashes on American highways? For interstate travel, there are 5.2 driver deaths per 1,000 crashes. At this rate, it would seem likely that those 3,000 Nascar crashes would have produced at least 15 deaths — and yet there have been none. To be sure, there are significant differences between Interstate driving and Nascar driving. A driver on the Interstate has to contend with poor weather, drunken drivers and cars coming at him in the opposite direction. On the other hand, a driver in the Daytona 500 is often traveling at 180 miles per hour in bumper-to-bumper traffic.

With more than 37,000 Americans dying in traffic accidents each year, it might be tempting to impose some of Nascar's safety regulations on the average driver. But considering how relatively safe it is to drive in this country, the added costs, measured in both dollars and comfort, would be steep. You might be willing to wear a five-point safety harness instead of the typical three-point lap-and-shoulder belt, and you would almost certainly be safer if you did. But are you ready to put on a helmet and fireproof suit every time you drive to the supermarket? ■