

## Case Study: Seat Belt Laws

The file “seatbelts.csv” contains data on traffic fatalities and seat belt usage collected from all 50 US States, plus the District of Columbia, from 1983–1997. The data set has 765 observations on 12 variables, although some cells in the data frame (denoted “NA”) are missing.

*state*: an abbreviation for the state.

*year*: the year of the observation.

*miles*: millions of miles logged by drivers in the state that year.

*fatalities*: number of traffic fatalities per million miles logged by drivers in that state (thus the absolute number of deaths is fatalities times miles).

*seatbelt*: seat-belt usage rate, as self-reported by respondents to a survey in the state.

*speed65*: whether there is a 65 MPH speed limit on state highways.

*speed70*: whether there is a 70 MPH (or higher) speed limit on state highways.

*drinkage*: whether there was a minimum drinking age of 21 in the state during that year.

*alcohol*: does the state impose a maximum legal blood-alcohol content of 0.08 or lower?

*income*: median per-capita income (in 1997 US dollars).

*age*: mean age of residents in the state that year.

*enforce*: a factor indicating seat-belt law enforcement. The options are: “no,” indicating that seat-belt laws either do not exist, or are not enforced; “secondary,” indicating that officers will write secondary tickets for violation of seat belt laws, but only after pulling someone over for another offense; and “primary,” indicating that officers will initiate a traffic stop if they notice a violation of seat-belt laws, even if no other offense has been committed.

Note: if you want to scrub the missing observations from the data set, you can read in the data and then use the command “seatbelts2 = na.omit(seatbelts)”, which will give you a new data set “seatbelts2” without the NA’s.

Try to quantify the marginal effect of seat-belt policies on traffic fatalities. Then quantify how many lives were saved (if any) in Texas in 1997 by virtue of having a “primary” enforcement policy, compared to a “no enforcement” policy. Think carefully about setting up the problem. Two questions to think about include: whether seat-belt usage rates affect traffic fatalities; and whether seat-belt enforcement appears to affect seat-belt usage rates.