



# Investigation of the Use and Feasibility of Speed Warning Systems

Speeding-related crashes are a serious problem in the United States. Most drivers admit to speeding at least some of the time, but there are subgroups of the driving population who tend to speed more often. Traditional speed management practices have failed to deter many of the more egregious habitual speeders. One promising new approach for addressing this speeding problem is a vehicle-based monitoring and feedback system.

This study examined the feasibility of a speed-monitoring system that provided feedback to at-risk drivers (chronic speeders). The research team first reviewed available monitoring and feedback products and selected a device for use in a naturalistic field study that provided real-time, tailored feedback to drivers on the posted speed limit for roads on which they were driving. A focus group was then conducted with a small group of habitual speeders to explore issues related to the study design and gather feedback on the selected device from the perspective of this target population.

The research team established a cooperative agreement with the Maryland Motor Vehicle Administration to send letters about the study to a random sample of licensed Maryland drivers with multiple speeding citations in the previous three years. Participation was voluntary. Only drivers who called the research team in response to the letter sent by the MVA and met specific criteria (21 or older, had valid driver's license, insured, drove at least 100 miles per week on average, and had at least three speeding citations in previous three years) were eligible for participation. A total of 101 participants enrolled in the study and had the monitoring and feedback devices installed on their vehicles. Data from 18 participants was compromised for a variety of reasons (traveling in work vehicle, license revocation, vehicle damaged, tampering with the study device) and these participants were dropped from the study. The final sample included 83 participants, stratified by age group and gender (see Table 1) that provided usable data.

**Table 1: Age and Gender Distribution of Participants**

	21–29 Years Old	30+ Years Old
Female	19	22
Male	20	22

People agreeing to participate drove their vehicles to the research facility where they completed screening to confirm their eligibility, received an explanation of the study and the

monitoring and feedback devices, and then had their vehicles outfitted with the devices.

### Study Conditions and Data Collection

Participants experienced the speed-warning device under three conditions: (1) a baseline period during which the devices did not provide feedback, (2) a treatment period during which participants received feedback whenever they drove over the posted speed limit of a given roadway by a pre-set threshold selected by researchers (8 mph over the posted speed), and (3) a post-treatment period when the feedback was again turned off. The devices provided the researchers with a continuous data stream of travel and speed data throughout the study for each participant. The study defined data for which the vehicle was driving no lower than 15 mph below the posted speed limit as at-speed, indicating the drivers had the opportunity to speed.

Short-duration participants (n=78) experienced a two-week baseline period, a four-week treatment period, and a two-week post-treatment period. A small subsample (n=5) of long-duration participants experienced an eight-week treatment period. Researchers turned the feedback on remotely when the treatment period started and turned it off remotely when going into the post-treatment period. Researchers informed participants in advance whenever they turned the devices' feedback system on or off. During the treatment period, whenever drivers met or exceeded the 8 mph threshold over the posted speed limit for the road on which they were driving, the device would issue an audible warning stating, "Speeding violation."

### Results

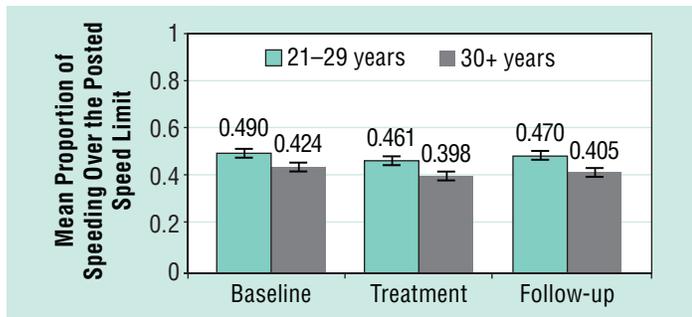
The purpose of this study was to examine the ability of speed warning devices to reduce the speeding of adult drivers who are habitual speeders. The effectiveness of the warning system in reducing speeds was measured by the percentage of travel occurring at a given number of miles per hour above the posted speed limit when the feedback alerts were activated as compared to when the alerts were silenced. Warning system effectiveness was compared under four different speeding conditions: (1) all driving over the posted speed limit, (2) driving up to 8 mph over the posted speed, but below the threshold to activate the warning, (3) driving above 8 mph over the posted speed, and (4) driving above 20 mph over the posted speed. There were no significant differences between males and females with regard to the effectiveness of the warning system. Results for long-duration participants

were similar to those of short-duration participants. *The results reported below are for the short-duration participants only.*

### Driving Over the Posted Speed Limit

On average, short-duration participants exceeded the speed limit 45 percent of the time during the baseline period. This dropped to 43 percent of the time during the treatment period and went up to 44 percent during the post-treatment period. Drivers 30 and older had a significantly ( $p < .01$ ) smaller percentage of speeding over the posted limit than drivers 21 to 29 years old (see Figure 1).

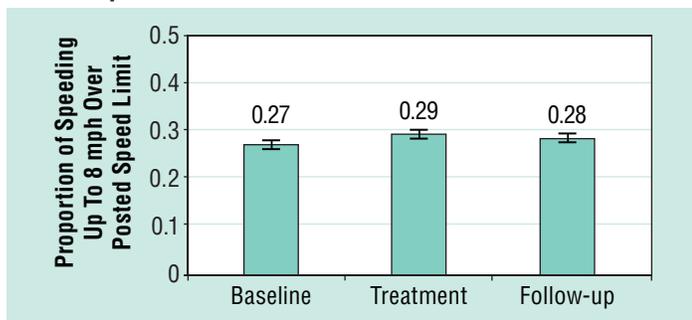
**Figure 1. Mean Proportion of Driving Over the Posted Speed Limit by Age and Phase**



### Driving up to 8 mph Over the Posted Speed Limit

During the treatment period, participants received warnings whenever they were 8 mph or more over the speed limit. There was no statistically significant difference in speeding between the baseline and post-treatment periods; however, there was a significant ( $p < .0001$ ) increase in speeding between the baseline and the treatment period, from 27 percent to 29 percent (See Figure 2).

**Figure 2. Mean Proportion of Driving Up to 8 mph Over the Posted Speed Limit**



There were no significant differences between age groups up to 8 mph over the limit. It is likely that the increase in speeding up to 8 mph over the limit during the treatment phase indicates efforts to avoid warnings from the device.

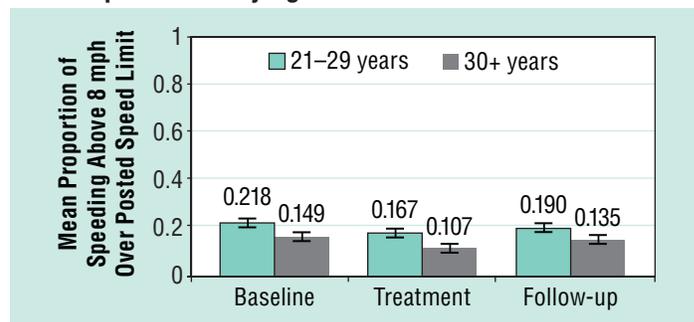


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### Driving Over 8 mph Above the Posted Speed Limit

For speeding over 8 mph above the speed limit, there were statistically significant differences in participant speeding between both baseline to treatment periods and between baseline and post-treatment periods. For short-duration participants, the percentage of speeding over 8 mph went from 18 percent at baseline to 13 percent during treatment and then to 16 percent in post-treatment. There was also a significant difference ( $p < .01$ ) between age groups in this condition (see Figure 3).

**Figure 3. Mean Proportion of Each Trip Driving Over 8 mph Above Speed Limit by Age and Phase**



### Driving at Least 20 mph Over Posted Speed Limit

For trips with participants driving at least 20 mph over the speed limit, there was a significant reduction in speeding during the treatment period, from 26 percent to 18 percent, but the difference between the baseline and post-treatment (22%) was not statistically significant.

### Conclusions

Speeding alerts successfully produced short-term changes in driving behavior, reducing the overall percentage of speeding by participants. Speeding above the alert threshold of 8 mph over the posted limit decreased significantly when the alert was activated. At the same time, drivers increased the amount of speeding under the alert threshold once the alert was activated. For speeding over the threshold but less than 20 mph above the speed limit, there was also a carryover effect when the alert was later turned off. This technology shows promise as an option for use in reducing speeding for some drivers. Note: Driving over the posted speed limit is against the law and not condoned by NHTSA.

### How to Order

To order the *Investigation of the Use and Feasibility of Speed Warning Systems*, prepared by Westat, write to the Office of Behavioral Safety Research, NHTSA, NTI-130, 1200 New Jersey Ave, SE., Washington, DC 20590, fax 202-366-7394, or download from [www.nhtsa.gov](http://www.nhtsa.gov).

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