Arizona's Experience with the 65-mph Speed Limit

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Arizona's experience with the 65-mph speed limit is presented in terms of driver behavior and accident experience. The speed limit on Arizona's rural interstate was raised to 65 mph on April 15, 1987. Driver behavior is presented in terms of the speeds at which motorists actually drive on the rural interstate. Before and after data are presented from the last quarter of 1983 through the first quarter of 1988. Vehicle speeds increased by only about 3 mph or less during the four quarters following the speed limit increase. A 5-year history of interstate accident data—from 1983 through spring 1988—is presented that provides a before-and-after comparison. Information on total accidents, fatal accidents, and injuries is presented. Accident rate information is presented to account for the effect of increasing vehicle-miles of travel. Accident data on the urban interstate are presented for comparison purposes.

Speed limits on rural highways has been a topic of intense interest to both the general public and the traffic engineering and enforcement communities during the past 15 years. The national maximum speed limit of 55 mph was enacted in 1974 and remains in effect on most of the nation's rural highway mileage. In April 1987, the United States Congress passed legislation allowing individual states to increase the speed limit on the rural interstate system to 65 mph. To date, about 40 states have chosen to increase the speed limit on the rural interstate.

Increasing the speed limit to 65 mph has led to an intensified debate about the impact of the higher speed limit on safety. Proponents and opponents have engaged in spirited discussion. Quantitative data have been assembled and presented to show changes in the number of accidents but, thus far, the information has been based on relatively short periods. Information on changes in driver behavior (actual speeds driven) has received little attention.

A statistically sound evaluation and appraisal of the accident impacts of increasing the speed limit will require nationwide data from both the states in which the speed limit has been raised and the states in which it has not been raised. It will also require at least 12 months of "after" data from each of the states in which the speed limit has been raised. Because some states raised their speed limits as late as the fall of 1987, the type of rigorous evaluation described above is unlikely to have been completed before the end of 1988.

This paper presents the experience of a single state—Arizona—with the 65 mph speed limit. This single state experience is not intended to be representative of experience in other states. Information is presented on both driver behavior (a before-and-after comparison of the speeds that motorists are actually driving) and accident experience (a before-and-after comparison). The "before" period in Arizona ends on April 15, 1987, the date that the speed limit was raised. The after period begins on April 16, 1987.

Throughout this paper the term "rural interstate" is used to denote those portions of the Arizona interstate system that now have a 65-mph speed limit. "Urban interstate" is used to denote those portions that still have a 55-mph speed limit.

This paper is intended to simply present the facts on changes in driver behavior and actual numbers of accidents. It is not intended to interpret, demonstrate, or imply any cause and effect relationship between changes in the speed limit and accident experience.

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DRIVER BEHAVIOR

The Arizona Department of Transportation has about 76 speed-monitoring compliance locations on its highway system. Thirty-five are located on the rural interstate, 12 are located on the urban interstate, and 29 are located on the rural primary system. Although federal law no longer requires speed monitoring data to be collected on the 65 mph interstate, Arizona has continued to do so.

Fourteen calendar quarters of before speed data and four quarters of after speed data were analyzed, and the results are presented in the following paragraphs. This study used raw speed data collected at speed monitoring sites—data that have not been adjusted in the ways that are used for the 55-mph compliance purposes. For example, the speeds have not been adjusted for speedometer error. In addition, the speeds reported here are only for the rural interstate. Speeds on the urban interstate and on rural primary highways are lower. As a result, the speeds reported herein for the rural interstate are different from, and higher than, those reported by Arizona for speed limit compliance purposes. Overall, Arizona motorists are complying with the 55-mph speed limit.

Figure 1 presents data on the 50th percentile speed and the 85th percentile speed for a composite of 26 locations on the rural interstate. In Arizona speed is not measured at every speed monitoring station in every calendar quarter. Thus, Figure 1 presents data from sites that varied, to some extent, from quarter to quarter. The percentile speed in a given quarter was computed as the weighted average of the percentile speed at each of the locations (weighted in proportion to the traffic volume at each location). The 50th percentile speed stayed almost constant, at about 59 to 60 mph—from 1984 through 1986. The 85th percentile speed also stayed fairly constant—at about 65 mph. An observable, though small, increase in speeds occurred in the after period. Fiftieth percentile speeds

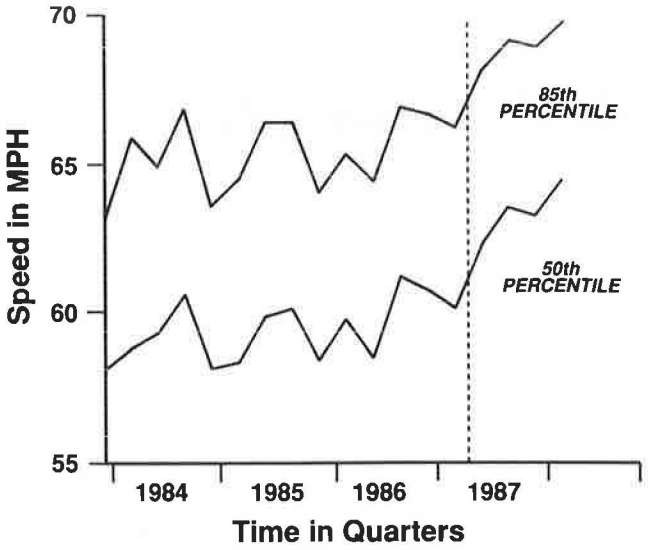

FIGURE 1 Percentile speeds on rural interstate (26 locations).

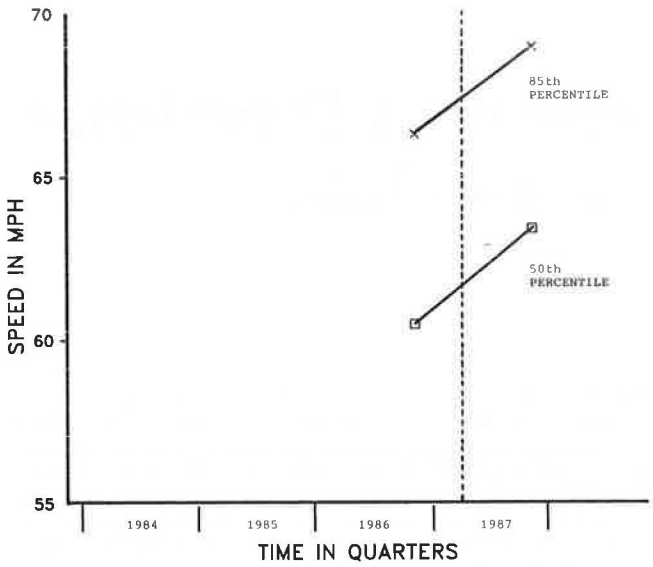

FIGURE 2 Percentile speeds on rural interstate (9 locations).

increased to about 62 to 64 mph and 85th percentile speeds increased to about 68 to 69 mph.

Figure 2 presents 50th and 85th percentile speed data for nine rural interstate locations where data were collected at all nine sites in the fall of 1986 and again in the fall of 1987. Fiftieth percentile speeds increased from 60.5 to 63.4 mph and 85th percentile speeds increased from 66.3 to 69.0 mph. Both cases represent an increase of less than 3.0 mph.

Figure 3 presents, for the composite of 26 interstate locations, the percent of vehicles in the traffic stream that were exceeding 55, 60, and 65 mph. Once again, there appears to be no trend in speeds during the before period. The percent of vehicles exceeding 55 mph increased from about 80 percent in the before period to about 88 to 91 percent in the after period. The percent of vehicles exceeding 60 mph increased from about 50 percent in the before period to about 70 to 76 percent in the after period. The percent of vehicles exceeding 65 mph increased from about 20 percent in the before period to about 37 to 47 percent in the after period.

Figure 4 presents the same type of information for the nine rural locations. The percentages are summarized below:

Percent of Vehicles Exceeding	*Fall 1986*	*Fall 1987*
55 mph	82	89
60 mph	52	71
65 mph	19	38

The data indicate that there is slightly more dispersion of vehicle speeds. In the fall of 1986, 63 percent of the vehicles were traveling between 55 and 65 mph. In the fall of 1987, 51 percent of the vehicles were traveling between 55 and 65 mph.

Driver behavior on the Arizona urban interstate was also evaluated by using data from the 12-speed monitoring compliance locations on the urban interstate. This evaluation was done to determine if there was any change in driver behavior in urban areas after the change in the rural interstate speed limit. Since the objective was to measure driver behavior during free-flow, unconstrained conditions, speed data for those hours in which high traffic volumes caused speeds to

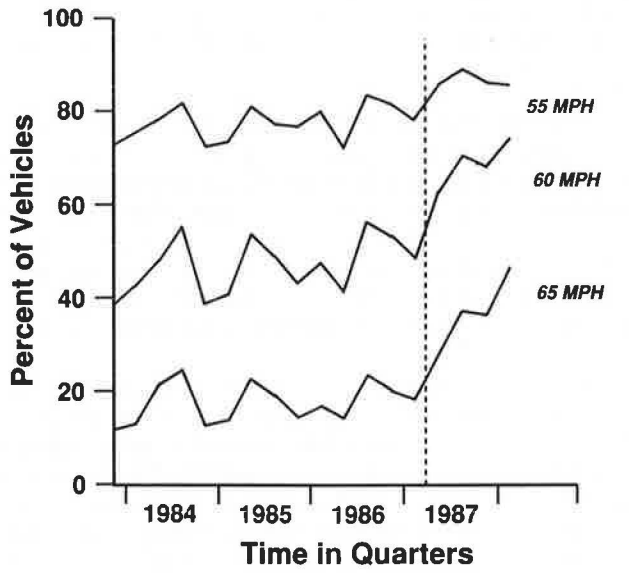

FIGURE 3 Percent of vehicles exceeding given speed (26 locations).

be reduced were not included in the evaluation. The evaluation showed that urban interstate speeds remained the same or exhibited a slight decrease after the rural interstate speed limit was increased.

ACCIDENT EXPERIENCE

Data on numbers of accidents in 1983 through April 15, 1988, are presented in this section. To supplement these data, Table 1 presents information on vehicle-miles of travel on the urban and rural interstate in the same years. The data on numbers of accidents and vehicle-miles of travel are combined to present information on accident rates.

In this section of this paper, the "1-year-after period" refers to the 12 months from April 16, 1987, to April 15, 1988.

Historical accident data, beginning in 1983 and extending through April 15, 1988, are presented in Table 2.

For comparison purposes, Figure 5 presents a 5-year record of accidents on the urban interstate. As shown, there was only a very slight growth in the total number of accidents from 1984 through April 15, 1988. During this period vehicle-miles of travel on the urban interstate increased from 1.360 billion in 1983 to 1.907 billion in the 1-year-after period. As shown in Figure 6, there was a downward trend in the accident rate from 1984 through April 1988.

Figure 7 shows that accidents on the rural interstate stayed fairly constant from 1984 through 1986. An observable increase occurred for the 1-year-after period; vehicle-miles of travel on the rural interstate increased from 3.745 billion in 1983 to 4.966 billion in the 1-year-after period.

When accident rates are plotted (Figure 8), the observable increase in accidents in the 1-year-after period is not so apparent. Although the accident rate in the 1-year-after period is higher than that in 1986, it is virtually the same as the 1983–1985 average. Figure 9 presents a bar chart for fatal accidents on the rural interstate. The figure shows an increase in the

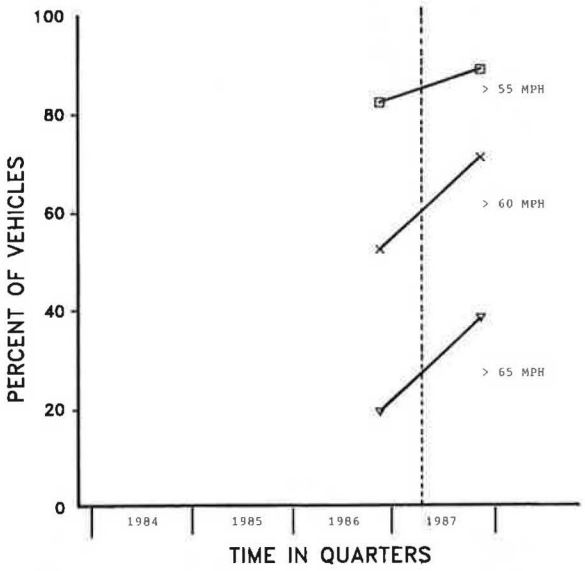

FIGURE 4 Percent of vehicles exceeding given speed (9 locations).

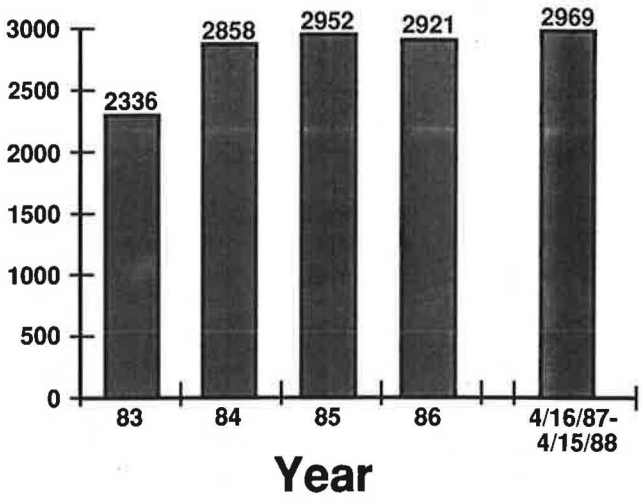

FIGURE 5 Total accidents on urban interstate.

TABLE 1 VEHICLE-MILES OF TRAVEL ON INTERSTATE SYSTEM

	Annual Vehicle-Miles of Travel ($\times 10^6$)					
Type of Highway	1983	1984	1985	1986	1987	4/16/87 through 4/15/88[a]
Urban interstate	1,360.0	1,469.7	1,577.0	1,791.4	1,862.1	1,906.6
Rural interstate	3,745.0	3,991.7	4,128.7	4,619.9	4,869.5	4,966.1

[a]Estimate based on 4-year growth trend in vehicle-miles of travel.

TABLE 2 NUMBER OF ACCIDENTS ON INTERSTATE SYSTEM

	No. of Accidents					
Type of Damage	1983	1984	1985	1986	1/1/87 through 4/15/87	4/16/87 through 4/15/88
Urban interstate						
Property damage only	1,717	2,092	2,124	2,105	681	2,217
Injury	609	750	815	803	215	737
Fatal	10	16	13	13	7	15
Total	2,336	2,858	2,952	2,921	903	2,969
Rural interstate						
Property damage only	1,428	1,654	1,757	1,669	718	1,969
Injury	978	1,052	1,015	1,047	326	1,322
Fatal	71	82	92	97	20	117
Total	2,477	2,788	2,864	2,813	1,064	3,408

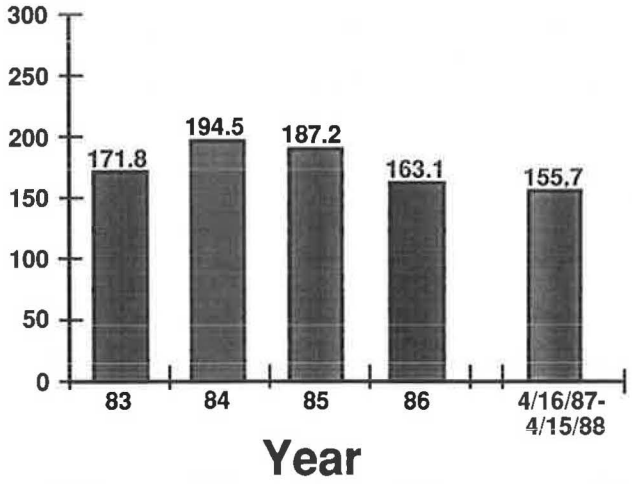

FIGURE 6 Accident rate for total accidents on urban interstate.

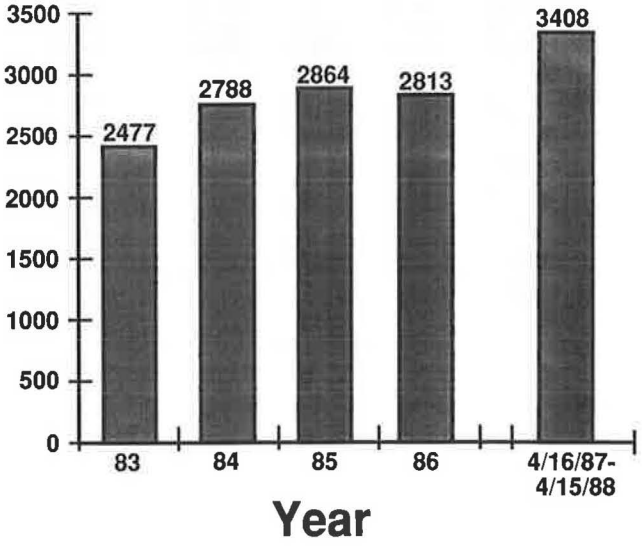

FIGURE 7 Total accidents on rural interstate.

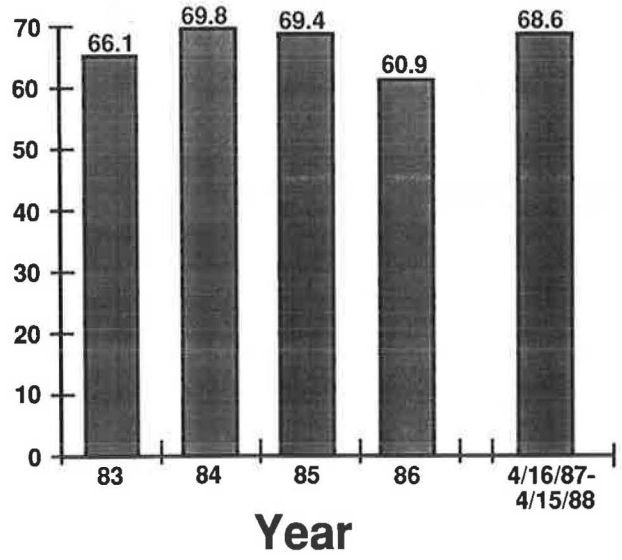

FIGURE 8 Accident rate for total accidents on rural interstate.

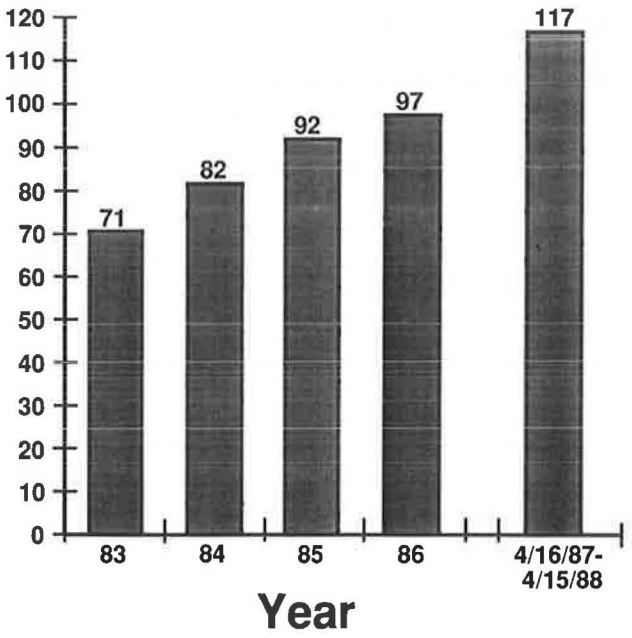

FIGURE 9 Fatal accidents on rural interstate.

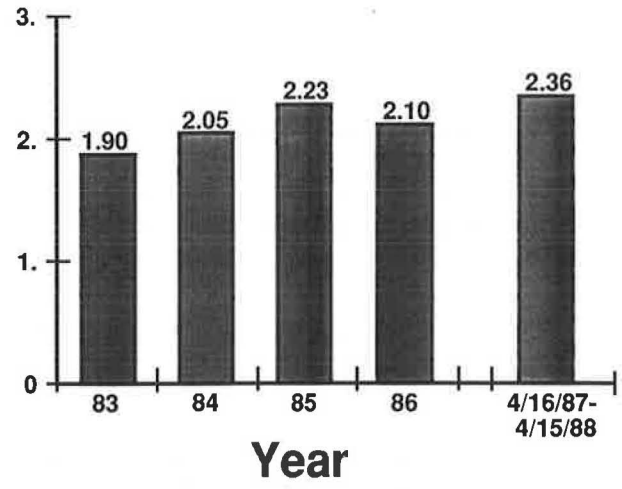

FIGURE 10 Accident rate for fatal accidents on rural interstate.

number of fatal accidents from 1983 to 1986. An additional increase is found in the number of fatal accidents for the 1-year-after period. When adjusted for vehicle-miles of travel there is still an upward trend. Figure 10 shows that the fatal accident rate generally increased from 1983 through April 1988.

Injury accidents (Figure 11) show little change from year to year from 1984 through 1986. An increase is found for the 1-year-after period. Figure 12 presents the injury accident rate. When presented in this form, the increase in accidents in the 1-year-after period is not so apparent. The accident rate in the 1-year-after period is more than that in 1986 and 1985 but it is about the same as that in 1984 and 1983.

Figures 13 and 14 present comparisons of changes in the number of accidents on the rural interstate versus that on the urban interstate. As shown in Figure 13, fatal accidents

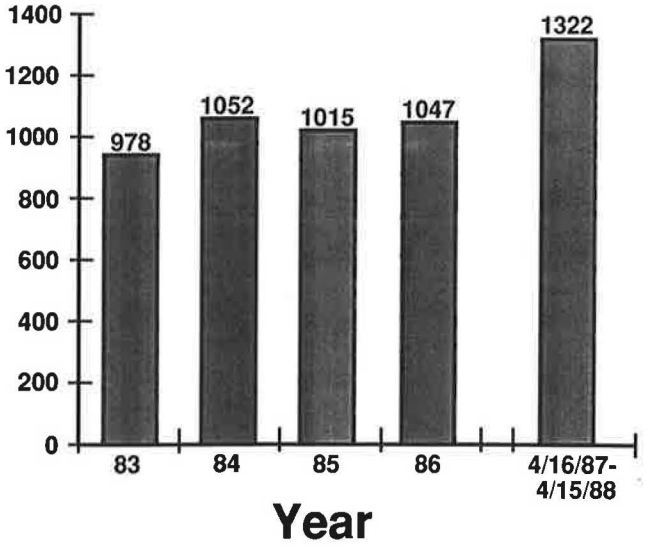

FIGURE 11 Injury accidents on rural interstate.

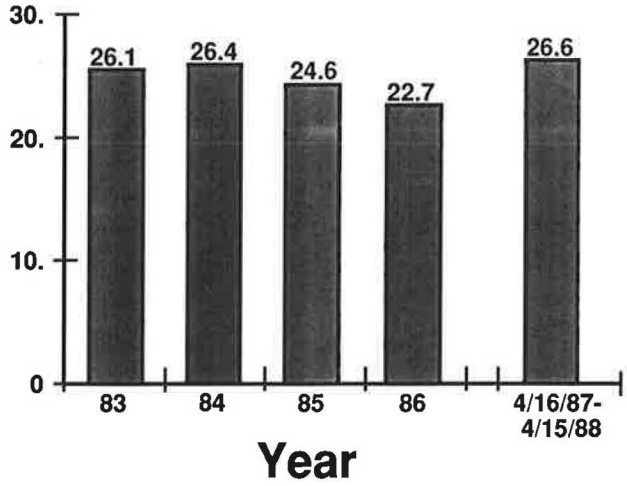

FIGURE 12 Accident rate for injury accidents on rural interstate.

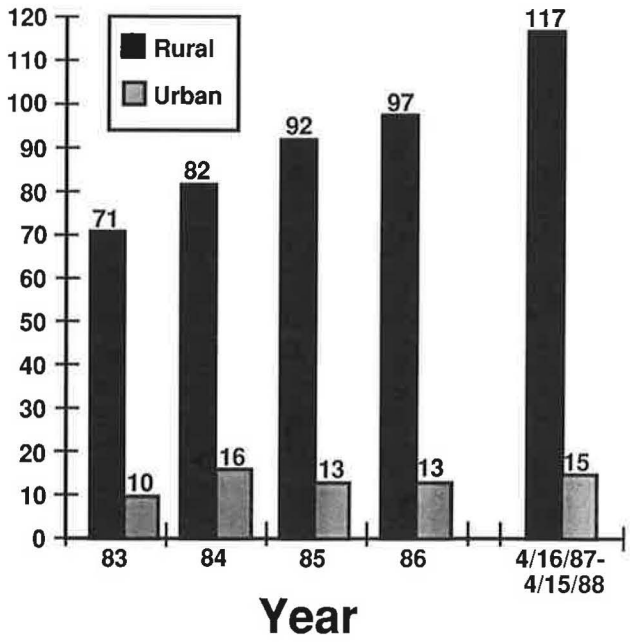

FIGURE 13 Interstate fatal accidents, urban versus rural.

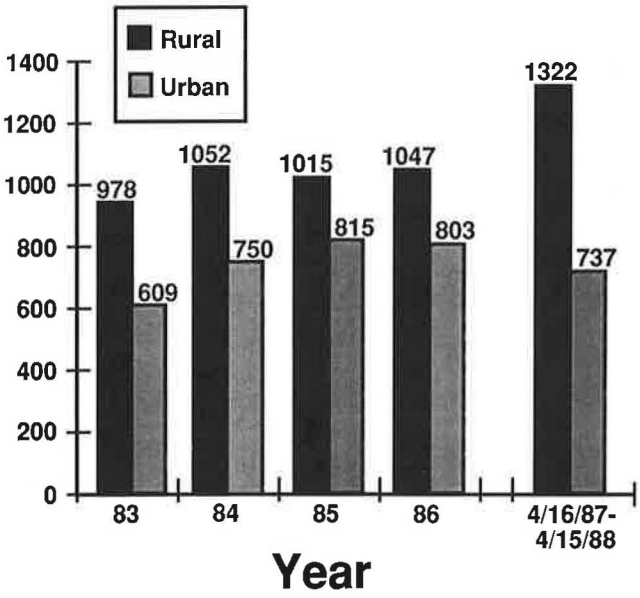

FIGURE 14 Interstate injury accidents, urban versus rural.

remained fairly constant on the urban interstate. During the same time periods, rural fatal accidents increased during the before years and increased after the speed limit was raised. Although urban injury accidents exhibited a slight decline after the increase in the speed limit, rural injury accidents increased.

CONCLUSIONS

1. Actual speeds driven by motorists on Arizona's rural interstate stayed almost constant during the 3 years before the speed limit was increased.
2. Actual speeds driven increased by only about 3 mph or less during the four quarters after the increase in the rural interstate speed limit.
3. There is slightly more dispersion in vehicle speeds now than there was before the speed limit was increased.
4. The number of accidents on the urban interstate changed very little during the 3 years before and the 1 year after the speed limit was increased on the rural interstate.
5. The accident rate on the urban interstate was on the decline beginning in 1984 and continuing through the 1-year-after period.
6. The number of accidents on the rural interstate increased after the speed limit was increased.
7. The accident rate on the rural interstate increased for total accidents and for injury accidents when the 1-year-after

period was compared with that for 1986. However, the accident rate was approximately the same as that for 1984.

8. The fatal accident rate on the rural interstate was higher in the 1-year-after period than in any of the years between 1983 and 1986.

9. The information presented in this paper does not prove or disprove a cause and effect relationship between actual speeds driven and accident experience. Many other factors—including factors not addressed in this paper, such as seat belt use, alcohol involvement, and weather conditions—have an influence on accident experience.

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