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Traffic speeds associated with implementation of 80 mph speed limits on West Texas rural interstates

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Abstract

Problem: In 2006 Texas raised the daytime speed limit for passenger vehicles on segments of I-10 and I-20 from 75 to 80 mph. *Methods:* Traffic speeds were measured before and 3, 12, and 16 months after the limit was changed. *Results:* During the 16-month period following the speed limit increase, mean speeds of passenger vehicles on I-20 increased by 9 mph relative to the comparison road, where no speed limit change occurred and traffic speeds declined. On I-10 mean speeds increased by 4 mph relative to the comparison road. Limiting the analysis to the month before the speed limit change and 1 year later, the proportion of drivers exceeding 80 mph was 18 times higher on I-20 and 2 times higher on I-10. *Discussion:* The smaller speed increases on I-10 may be related to its proximity to the U.S. border with Mexico. Highly visible border patrol activity coincided with posting of the higher speed limit. Long-term monitoring in other states suggests that traffic speeds in Texas are likely to continue to increase. *Impact on Industry:* The present study adds to the wealth of evidence that increased speed limits lead to increased travel speeds. The primary countermeasures to reduce the risk of speed-related crashes include highly visible police traffic enforcement and the use of speed cameras accompanied by publicity.

Keywords: Speed limits; Travel speeds; Automated enforcement; Motor vehicle crashes; National maximum speed limit

1. Background

In 1995 Congress repealed the national maximum speed limit (NMSL), restoring to states the authority to set speed limits for the first time in more than 20 years. In response many states raised speed limits on rural interstate highways from 65 mph to 70 and 75 mph. Numerous studies showed significant increases in traffic speeds and fatalities. Retting and Greene (1997) measured traffic speeds in Texas and California — two states that raised limits right after NMSL was abolished. During the first year after 55 mph speed limits for passenger vehicles on urban freeways were increased by 10-15 mph, the percentage of passenger vehicles exceeding 70 mph increased from 15% to 50% in Texas and from 29% to 41% in California. In Kansas, where speed limits were raised from 65 to 70 mph on rural interstates and from 55 to 65 mph on urban interstates, Najjar, Stokes, Russell, Ali, and Zhang (2000) reported increases in traffic speeds. Farmer, Retting, and Lund (1999) estimated a 15% increase in fatalities on interstates and freeways in 24 states that raised speed limits during 1995-1996. Patterson, Frith, Povey, and Keall (2002) estimated a 38% increase in the fatality rate (per million vehicle miles traveled) in states that increased speed limits to 75 mph and a 35% increase in states that increased speed limits to 70 mph.

Prior to enactment of NMSL in 1973, only one state, Kansas, is known to have posted 80 mph limits, along sections of the Kansas Turnpike (Kansas Department of Transportation, 2007). Since repeal of NMSL only two states have permitted travel speeds in excess of 75 mph. Between 1995 and 1999 Montana eliminated numeric speed limits for passenger vehicles on rural interstate highways during daytime hours, requiring only that drivers travel at "reasonable and prudent" speeds (Retting & Greene, 1997). Large trucks were limited to 65 mph. In 1999 the daytime speed limit for passenger vehicles was changed from no numeric limit to 75 mph. In 2005 the Texas legislature authorized the Texas Transportation Commission to establish a speed limit of 80 mph during daytime hours on sections of I-10 and I-20 within 10 western counties, if the commission determined this was a reasonable and safe speed for that part of the highway. In May 2006 the commission authorized the

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Texas Department of Transportation to raise speed limits for passenger vehicles from 75 to 80 mph during daylight hours on eligible segments of rural interstates (Fox News, 2006). The daytime limit for large trucks remained at 70 mph, and a nighttime limit of 65 mph remained in effect for all vehicles. The increase took effect on Memorial Day weekend in 2006.

Prior studies that monitored effects of rural interstate speed limit changes on traffic speeds evaluated settings where speed limits were increased to 65, 70, or 75 mph. The present study examined traffic speeds before and after posting of 80 mph speed limits on rural interstates in Texas.

2. Methods

2.1. Study sites

Traffic speeds were measured at both experimental sites and comparison sites. There was limited advance notice of the speed limit increase. Baseline speed data were collected in May 2006, immediately before the speed limit change took effect, at five sites on I-10 and I-20 where passenger vehicle speed limits were expected to increase to 80 mph. On I-10 three sites (one westbound, two eastbound) were selected within a 6-mile segment in Hudspeth County, approximately 70 miles east of El Paso and the westernmost segment of I-10 eligible to receive 80 mph limits. Sections of I-10 west of Hudspeth County were not eligible for 80 mph speed limits. By the time potential study sites were being identified in May 2006, it was not possible to collect baseline data east of Hudspeth County on I-10 because the Texas Department of Transportation already had begun placing 80 mph decals over the 75 mph signs and temporarily covering the signs in anticipation of the new 80 mph limits. However, 75 mph speed limit signs remained visible in the Hudspeth County study area. On I-20 two sites (one eastbound, one westbound) were chosen within a 6-mile segment near Pecos.

Traffic speeds also were sampled at five comparison sites (two northbound, three southbound) located along a 10-mile segment of Route 385, a limited-access highway located between the west Texas cities of Odessa and Lubbock, where daytime speed limits throughout the study were 75 mph for passenger vehicles and 70 mph for large trucks. Although Route 385 is not an interstate, it was selected as a comparison site because it had the same speed limits as those in effect on I-10 and I-20 during the baseline period, and because its design characteristics were similar to those of I-10 and I-20. All 10 speed monitoring sites were located in sparsely populated rural areas where traffic flow was seemingly unaffected by peak-hour traffic congestion. All sites on both the target and comparison roads were divided highways with two lanes in each direction and no curves or significant grades.

2.2. Instrumentation

Vehicle speeds were measured with American Traffic Solutions® photo radar mounted on a tripod and positioned off the right roadway shoulder, hidden behind vegetation or highway barriers. Speeds of passing vehicles were recorded electronically, but photographs were not taken and no strobe light was triggered. The electronic files contained the time of measurement, vehicle speed, and a crude classification as passenger vehicle or large truck. Some large pickup trucks, large SUVs, and passenger vehicles pulling trailers may have been classified as large trucks based on their radar profile. However, vehicles classified as passenger vehicles generally were cars, passenger vans, and light trucks and not large trucks.

2.3. Data Collection

Following collection of baseline data in May 2006, three rounds of "after" data were collected, approximately 3 months (August 2006), 1 year (May 2007), and 16 months (September 2007) after 80 mph speed limits were posted. The same equipment and technician were used for all study periods. Although an effort was made to collect all data on weekdays, 2 of the 40 samples were collected on Saturdays (one on I-10 during May 2007 and one on I-20 during September 2007). Because the sites were located in sparsely populated rural areas seemingly unaffected by weekday rush hours, collection of speed data on Saturdays represented a minority of the overall data collected during each of the two affected study periods and did not appear to be problematic.

Speeds were measured during daylight hours free of rainfall and traffic congestion. The time of day during which data were collected (morning, midday, evening) varied considerably across the 10 study sites, with the earliest deployment beginning around 8:30 a.m., and the latest deployment beginning around 7 p.m. The start times for data collection at each site were fairly consistent across the four study periods, from within 1 hour for 7 of the 10 sites to within 2 hours for all sites. An effort was made to keep the duration of sample periods consistent for the four study periods, but the duration varied somewhat. The shortest sample period was 119 minutes, on May 26, 2006 at one of the Route 385 southbound sites, and the longest was 340 minutes, on September 15, 2007 on I-20 eastbound.

A total of 29,905 speed measurements were recorded. Analyses were conducted using a subset of the speed samples to equalize the duration of the sample periods and to reduce potential effects on traffic speeds associated with setup and takedown of the measurement equipment. The subset consisted of the core 95-100 minutes from each of the speed sample sets. This resulted in 15,565 speed measurements retained for analysis.

2.4. Data Analysis

Speed measurements from the individual data collection sites on each corridor were combined to form three study sites: two experimental sites (I-10 and I-20) and one comparison site (Route 385). Descriptive statistics of traffic speed data were computed for each of these three groups of study sites including mean, standard deviation, and proportion of vehicles exceeding specified speeds.

To estimate the rates at which mean speeds changed on I-10 and I-20 following the speed limit increase, while using travel speeds on Route 385 as a comparison, two general linear analysis