

The Effectiveness of a Community Traffic Safety Program

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Abstract

The *Safe Roads* program is a comprehensive community traffic safety program providing resources, training, and hands-on assistance for the development of education, enforcement, and engineering initiatives toward traffic crash prevention. Funded through the Massachusetts Governor's Highway Safety Bureau, the Safe Roads program provides cooperating towns in western Massachusetts with tools, techniques, and strategies to address the conditions and behaviors that contribute to traffic crashes, their resulting injuries, and the cost of those injuries. Technical assistance is provided along with equipment and educational materials. Quarterly newsletters describe important safety facts and present local, state, and national safety data. Several recent programs have included increased enforcement patrols, neighborhood speed watch programs, and signage evaluation.

This paper provides an overview of the neighborhood Speed Watch program and a preliminary investigation of its potential effectiveness in reducing operating speeds. As part of *Citizen Speed Watch*, local residents were trained in the use of speed monitors and LiDAR laser speed guns and then were allowed to borrow this equipment to collect speed data on a local street. License plate numbers of vehicles exceeding the posted speed were recorded and submitted to the local police department. The police issued an informational letter to the vehicle owner describing the safety consequences of speeding. A before and after analysis of the speed watch program as part of two pilot studies found that average speeds were reduced during and immediately following program activities. Additional facts related to this specific speed study and other important components of the Safe Roads program are provided.

Introduction

According to a National Highway Traffic Safety Administration report entitled, "Traffic Safety Facts 1998", speeding was a contributing factor in 30 percent of all fatal crashes attributing to 12,477 deaths (1). Of those, 85 percent of speeding-related fatalities occurred on roads that were functionally classified as non-Interstate roadways. Furthermore, speed related crashes were responsible for over 711,000 injuries (1). The safety of non-motorized users of the transportation system (i.e., pedestrians and bicycles) is also impacted by speed related incidents. These statistics highlight the need for speed management techniques and the potential safety benefits that can be realized by managing speed on local roadways.

Traffic calming, or the use of physical measures to reduce vehicular speeds, has generally been accepted as an effective means of reducing operating speeds in residential areas (2). Typical traffic calming techniques include width adjustments, vertical and horizontal realignments, route modifications, traffic circles, raised pavement sections, and other geometric modifications. Nevertheless, traffic calming addresses only the engineering element of speed management and

does little to provide the education and enforcement elements that are essential to a comprehensive effort of excess speed control.

To address the education and enforcement needs of speed management, and transportation safety in general, the Safe Roads program was developed. Initiated in 1994, Safe Roads, a *Safe Communities* traffic safety program funded by the Massachusetts Governor's Highway Safety Bureau (Bureau), has a mission to reduce motor vehicle crashes and the resulting injuries, fatalities, and economic costs through various transportation safety programs (3). The Safe Roads program was developed to replicate the success of the Massachusetts *Saving Lives* Program, also a Bureau led effort, on a countywide basis. Serving all of Hampshire County, Massachusetts, each speed safety program begins by developing a *request for response* that is sent to all local communities soliciting interest and participation. Responding communities then complete an informant needs assessment survey. In addition, local traffic crash data is obtained and analyzed to develop a profile of the interested communities' crash history including the identification of high crash locations. Crashes are also analyzed by injury type, time-of-day, operator/passenger age, and gender. Additional points of inquiry include the presence or absence of traffic controls and the type of crash (i.e., vehicle, pedestrian, bicycle). Using both the needs assessment and the available crash data, Safe Roads programs were initiated in four pilot communities – Belchertown, Easthampton, Granby, and South Hadley, Massachusetts.

Over the course of the project, various initiatives of the three traffic safety E's – education, enforcement, and engineering – were conducted in each of the pilot towns. Education topics included the safety effects of seatbelt use, red light running, impaired operation, and speed. Initiative specifics were tailored to the communities' capacities and needs. Safe Roads primary partners in the program were law enforcement agencies, but programming was most successful in communities that drew on a wide variety of players – schools, local governments, business, faith communities and neighborhood groups – to assist in programming efforts. Examples of specific programming included the award of overtime enforcement grants, neighborhood Speed Watch programs, safety belt pledge drives, the loan and use of preliminary breath test units, and informational traffic stops. The pilot project commenced in October 1999 and was the subject to a rigorous evaluation process.

Elements of the Citizen Speed Watch Program

The Citizen Speed Watch program is typically implemented through public officials in communities where an active and motivated neighborhood group has expressed concern over safety on their local streets. In the past, Safe Roads has done an excellent job in the education and enforcement aspects of the three traffic safety E's. Recent support from researchers at the Department of Civil Engineering at the University of Massachusetts (UMass) has provided assistance in the engineering elements to fulfill the third traffic safety E – Engineering. UMass will also be working with Safe Roads through a comprehensive evaluation of the effectiveness of this speed management program. The following sections describe some of the key elements included in the Speed Watch campaign.

Speed Hotline Phone Number

A dedicated phone line was set up with voice mail and answering machine. Citizens could leave messages regarding speeding vehicles, with information such as license plate number, and location. Local law enforcement personnel reviewed each message and sent informational letters to the owners of speeding vehicles, including a pamphlet on the safety risks of speeding. One component of a safety pamphlet is shown in Figure 1.

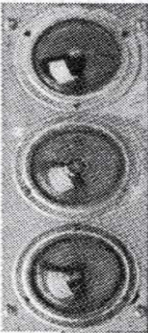
South Hadley Motor Vehicle Crash Snapshot

In 1997:

- In a crash clock analysis, one crash-related injury occurred about every three days.
- More than 1/3 of injuries occurred at red lights, stop signs, or other traffic controls.
- Most of the 324 crashes in 1997 occurred on dry, clear day, indicating that speeding may be a factor.

What can we do?

- **Obey the limits.** Speeding is defined as driving above the posted speed limit or driving too fast for conditions. Speeding reduces a driver's ability to steer safely around curves or objects in the roads and extends the distance necessary to stop a vehicle.
- **Buckle up, Hampshire County.** If everyone properly buckled their safety belt those injury numbers would go down. No ifs, ands or buts about it.
- **Don't drink and drive.** More people are killed in alcohol related crashes per year than are killed by firearms.



SAFE ROADS
The Western Massachusetts Traffic Safety Program

Figure 1. Sample Speed Information Pamphlet (source: Safe Roads Program)

Citizen Radar/Speed Monitor Loaner Program

A group of motivated citizens residing on the street being studied were trained in the use of visual speed display boards (speed boards), and both hand held radar and laser speed-monitoring equipment. These citizens were then encouraged to borrow this speed monitoring equipment to log speed information on their local street. Information collected by the citizens included location, license plate numbers of vehicles traveling in excess of the posted speed, and the speed that they detected. This data was recorded on a monitoring form that was submitted to the local law enforcement agency. As with the Speed Hotline Phone Number, owners of the vehicles traveling in excess of the posted speed were issued an informational letter and an informational pamphlet on the safety risk of speeding.

This Citizen Radar/Speed Monitor Loaner Program was and remains a critical element in the Citizen Speed Watch program. Not only does it mobilize local citizens as part of a speed 'enforcement' campaign, but it also targets educational materials to users of the transportation system who are operating motor vehicles in a potentially unsafe manner (i.e., at speeds greater than the posted speed).

Increased Enforcement by Community Police Officers

Another aspect of the Speed Watch program was enforcement patrols. Law enforcement personnel are enlisted to increase traffic patrols in the area of the study. Funding for the increased patrols is supplied both by the local police department and through an overtime grant provided by the Safe Roads Program.

Analysis of the Citizen Speed Watch Program Effectiveness in Speed Reduction

Pilot studies were commenced on Lyman Street and Brainard Street, in South Hadley, Massachusetts in the summer of 1998. The objective of this study was to evaluate the effectiveness of the Speed Watch program in reducing operating speeds. Traffic classifiers were used to collect speed data before and after the education components of the Citizen Speed Watch program were conducted. During the fall of 1998, traffic classifiers were placed in the field for a one-week period to collect vehicle speed data. This data were used to obtain a speed profile for the locations prior to the start of the Citizen Speed Watch program. Educational elements of the program took place in the summer of 1999, over a one-month period, using the elements of the Speed Watch program previously described. At the completion of the one-month speed intervention, the traffic classifiers were once again placed in the field to obtain speed data. This second set of data was collected during the fall of 1999 to obtain speed profiles for the locations after the completion of the Citizen Speed Watch programming.

Outcome of Pilot Study

Data from the traffic classifiers were downloaded to a software package for analysis. A summary of the results is included in Table 1. Notice that the 85th percentile speed and the percentage of vehicles exceeding the speed limit were reduced after the completion of the Speed Watch program. For example, on Lyman Street, the 85th percentile speed was reduced from 40 mph to 35 mph, and the percent of vehicles exceeding the speed limit dropped from 81.6% to 77.8%.

Figures 2 and 3 give a graphical representation of before and after intervention speed distribution for both Lyman Street and Brainard Street. On Lyman Street, the percentage of vehicles traveling below 30 mph is greater after the Citizen Speed Watch program than before, similarly, the percentage of vehicles traveling over 30 mph is smaller after implementation of the program than before this program. Nearly identical results were found on Brainard Street. These data imply that the Citizen Speed Watch program can be an effective tool in reducing the number of speeding vehicles.

One important element to the effectiveness of the program is the long-term speed effects. In other words, how long after the speed management program is complete will operating speeds be maintained at the achieved levels. To date, no attempt has been made to correlate speed reduction with duration after the end of Citizen Speed Watch Program. The pilot studies did however find operating speed reductions nearly three months after the educational campaign. Therefore, it is believed that this program can become more effective with emphasis on long-term enforcement, education, and engineering management.

Table 1 Speed Statistics.

Location	ADT	Posted Speed (mph)	Before Intervention			After Intervention		
			Average Speed (mph)	85th Percentile Speed (mph)	Percent Exceeding Speed Limit (%)	Average Speed (mph)	85th Percentile Speed (mph)	Percent Exceeding Speed Limit (%)
Lyman Street	2000	25	32	40	81.6	31	35	77.8
Brainard Street	1500	30	38	45	83.0	36	40	68.9

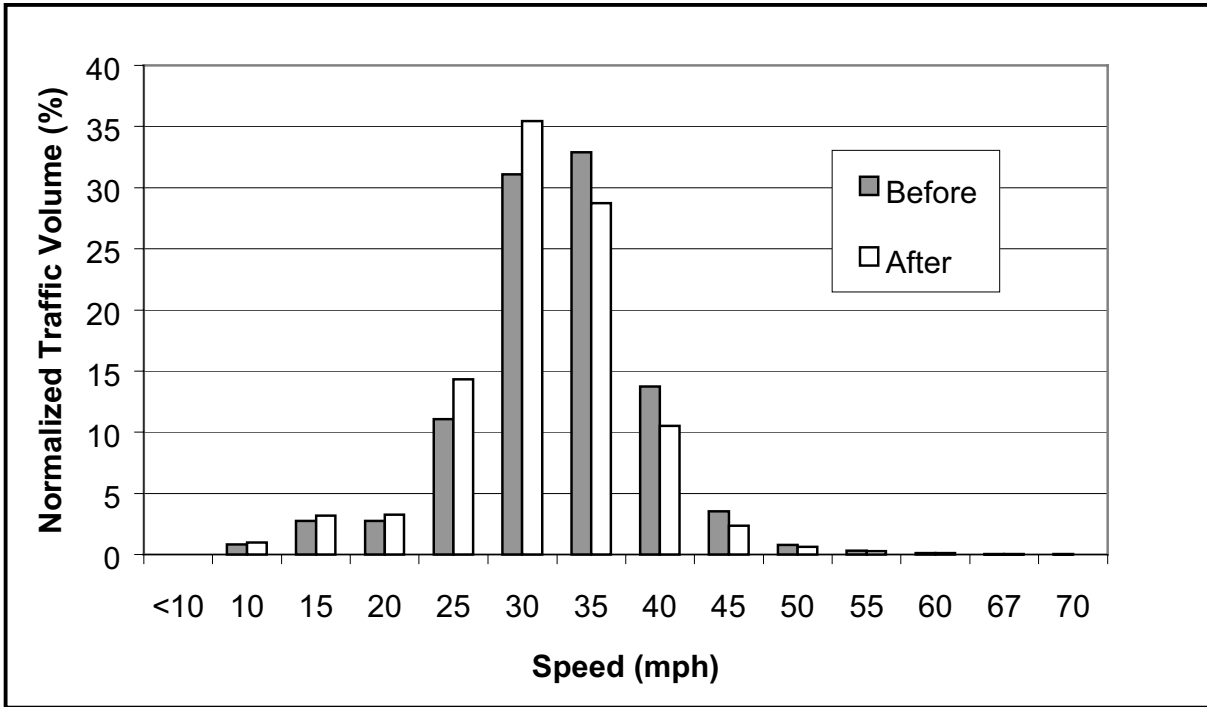


Figure 2. Before and After Speed Distribution on Lyman Street

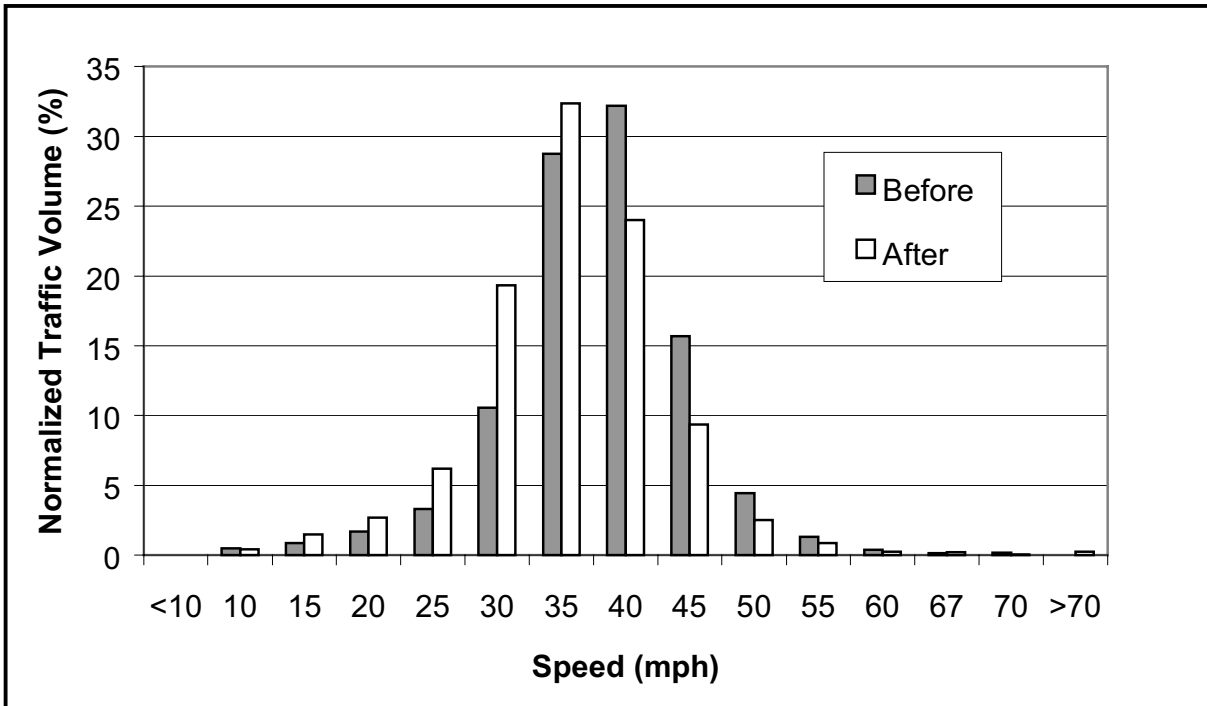


Figure 3. Before and After Speed Distribution on Brainard Street

Future Citizen Speed Watch Program Activities

Due to the positive outcome of the pilot studies, further Speed Watch programs are being planned for the summer of 2000. The program will include all of the elements of a Speed Watch program that were used in the previous pilot studies, and will involve a more intensive data analysis through the involvement of UMass.

During the writing of this paper, preliminary data were obtained and speed intervention started for three new locations. The Speed Watch locations planned for the summer of 2000 are Amherst, Holyoke, and Westfield, Massachusetts. The Amherst site is a urban collector with a posted speed of 30 mph and an average operating speed of 45 mph. The Westfield site is a rural collector and the Holyoke site is an urban local roadway, both with similar speed management concerns. These locations were chosen due to a history of operating speeds in excess of posted speeds and also because of community officials and law enforcement agencies interest in the program.

The data obtained as part of the summer 2000 program will include volume, speed, and vehicle classification. Adding vehicle classification to this study will allow the researchers to develop speed to vehicle classification comparisons. This data will be collected at all three locations identified. Additionally, speed data will also be collected at control locations where no speed intervention is planned to identify normal variation in average traffic speed.

As previously mentioned, a key element in the analysis will be the long-term effects of the Citizen Speed Watch Program. Therefore, the effective duration of the speed intervention will be closely monitored. Data will be collected immediately after the study and at six and 12 month periods after the completion of the program. The intent is to provide insight into the long-term effects of this educational and enforcement based speed intervention.

The outcome of this study will be a relationship between intervention and duration of effectiveness. Other important aspects that will be noted include unexplained changes in traffic volume, repeat offenders, vehicle classification, and crash statistics at and in the vicinity of the speed intervention.

Conclusion

The Citizen Speed Watch Program can be an effective method for controlling speed in local communities. The outcome of the pilot study provides initial evidence to the potential effectiveness of a community Traffic Safety Program. The authors anticipate that the summer 2000 project will reinforce the findings and hope that positive outcomes will lead other communities to consider similar programs. Building on the success of Safe Roads, the Bureau has expanded the program's mandate to include serving two counties in a regional technology transfer model. The Citizen Speed Watch program is one campaign targeted for replication in the new Safe Roads model.

References

- (1). *Traffic Safety Facts 1998*. Report DOT HS 808 960, National Highway Traffic Safety Administration, U.S. Department of Transportation, 1998.
- (2). *Effective Traffic Calming Applications and Implementation*. Minnesota Local Road Research Board. October 1998.
- (3). Safe Roads Program. Governor's Highway Safety Bureau, Northampton, MA.

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