Statement before the Pennsylvania House Committee on Transportation

Research on automated speed enforcement

Stephen L. Oesch

September 25, 2007

INSURANCE INSTITUTE
FOR HIGHWAY SAFETY
1005 NORTH GLEBE ROAD ARLINGTON, VA 22201
PHONE 703/247-1500 FAX 703/247-1678
www.iihs.org

The Insurance Institute for Highway Safety is a nonprofit research and communications organization that identifies ways to reduce the deaths, injuries, and property damage on our nation's highways. We are supported by the nation's automobile insurers. I am submitting for the record information from the Institute about the use of automated enforcement technology to reduce speeding on high-risk roads.

Speeds are increasing

Speed limits on many US roads are higher than they used to be, and motorists are going faster — in many cases a lot faster — than the posted limits. In 2003 the Institute surveyed vehicle speeds in six states and found many motorists traveling faster than posted limits.[1] On an urban interstate in the Washington, DC, area with a speed limit of 55 mph, 31 percent of vehicles were traveling faster than 70 mph.

New ways needed to reduce speeding on high-risk roads

The perception of the risk of getting a speeding ticket strongly influences motorists' speed choices. Traditional police enforcement can be an effective method of apprehending motorists who travel at excessive speeds. However, many enforcement agencies do not have sufficient resources to mount effective speed enforcement programs. Staffing levels have not kept pace with the growth in motor vehicle travel. Between 1995 and 2005 the estimated number of vehicle miles traveled in the United States increased by 23 percent,[2] but the number of municipal law enforcement officers grew by 12 percent.[3] Other police priorities such as apprehension of violent criminals and, more recently, anti-terrorism efforts can limit resources available for traffic enforcement. In addition, on multilane roads with heavy traffic moving in both directions, it often is dangerous for police to make traditional traffic stops.

Speeding poses multiple risks to everyone on the road

Speeding is one of the most prevalent factors contributing to motor vehicle crashes.[4] It contributes to both crash frequency and severity.[5] Speed increases frequency because at higher speeds motorists have less time to react and stopping distances are longer, and the probability of severe injury in crashes increases sharply with the impact speeds of the vehicles, reflecting the laws of physics.

The risk to pedestrians — the most vulnerable people on the road — increases dramatically as speed increases. Researchers estimate that about 5 percent of pedestrians would die when struck by a vehicle traveling 20 mph; about 40 percent would die when struck at 30 mph; and

Insurance Institute for Highway Safety
1005 North Glebe Road, Arlington, VA 22201
September 25, 2007

about 80 percent would die when struck at 40 mph.[6] Urban areas are prime candidates for speed enforcement because 72 percent of pedestrian deaths in 2005 occurred in urban areas.[7]

How to reduce speeding on high-risk roads

The challenge is to find better methods of controlling speeds, and speed cameras can help. They photograph motor vehicles going a specified amount above the posted speed limit, and violators are ticketed by mail. Camera systems typically consist of a radar unit to measure speeds and a camera to photograph the vehicles that are violating the speed limit. The time, date, location, and speed of the vehicle are recorded. And to increase the deterrent value, prominently posted signs should be used to alert motorists that cameras are being used.

About 30 US communities use cameras to supplement conventional police enforcement of speed limits, especially on high-risk roads. In 2002 the Institute evaluated the effect of a city-wide speed camera program begun in 2001 by the District of Columbia. The program involved 5 vehicles equipped with cameras rotated among 60 enforcement zones throughout the city. Institute researchers measured travel speeds on 7 neighborhood streets before cameras were deployed and again at the same sites 6 months after deployment. At all of the sites the proportion of motorists going fast enough to warrant a ticket (more than 10 mph above the speed limit) went down dramatically. Reductions at the 7 sites ranged from 38 to 89 percent. Institute researchers also measured travel speeds in Baltimore, Maryland, a nearby city that does not use speed cameras. At the same time DC was experiencing a decrease in travel speeds because of the camera enforcement program, the proportion of motorists going more than 10 mph above the speed limit in Baltimore stayed about the same or increased slightly.[8]

Similar results were found in a pilot speed camera program in Beaverton and Portland, Oregon.[9] Engineers compared vehicle speeds before and after implementation of speed cameras. In Beaverton the percentage of vehicles exceeding the posted limit by more than 5 mph decreased 28 percent on streets with speed cameras. Likewise, in Portland the percentage of vehicles exceeding the posted limit by more than 10 mph decreased by 27 percent on streets with speed cameras.

Longer term studies have evaluated crash effects of automated speed enforcement. Research from British Columbia demonstrates that this method of speed control is effective. Evaluating a program that involved 30 cameras, researchers found a 7 percent decline in crashes and up to 20 percent fewer deaths during the first year cameras were used. The proportion of speeding

vehicles at camera sites declined from 66 percent in the year before camera enforcement began to fewer than 40 percent a year later.[10] Researchers also attributed a 10 percent decline in daytime injuries to speed cameras.

The Transportation Research Board and others have reported the following examples of the successful use of speed cameras:

- Victoria, Australia, launched a speed camera program in 1989. A little more than a year later, the frequency of crashes involving injuries or deaths had decreased by about 30 percent.[5]
- On a stretch of Autobahn A3 between Cologne and Frankfurt, Germany, where speed cameras were deployed, total crashes dropped from about 300 per year to fewer than 30. Injury crashes decreased by a factor of 20.[5]
- Speed cameras were deployed on 64 roads in Norway, producing a 20 percent reduction in injury crashes.[5]
- An evaluation of fixed speed cameras on 30 mph roads in the United Kingdom found the average effect was a 25 percent reduction in injury crashes.[11]

One reason cameras are not used more extensively in this country is that many elected officials believe there is an absence of public support. Concerns have been expressed about privacy, with opponents invoking the "big brother" issue. However, a nationwide survey conducted in 2006 found that 60 percent of US residents favor using cameras to enforce speed limit laws.[12] An Institute survey in Washington, DC, after the speed camera enforcement program began, found a majority (51 percent) supported the enforcement program and only a third of respondents opposed it.[13] An evaluation of the speed camera program in Beaverton and Portland, Oregon, found strong public support for the use of cameras in school zones (88-89 percent) and neighborhoods (74-78 percent). The use speed cameras in Pennsylvania can help police enforce speed limits more effectively.

References

1. Insurance Institute for Highway Safety. 2003. On rural and urban roads, motorists are traveling faster and faster, but consequences are forgotten. *Status Report* 38(10):3. Arlington, VA. Available: http://www.iihs.org/sr/pdfs/sr3810.pdf.
2. Federal Highway Administration. 2007. Highway statistics. Washington, DC: US Department of Transportation. Available: http://www.fhwa.dot.gov/policy/ohpi/hss/hsspubs.htm.
3. Federal Bureau of Investigation. 2007. Crime in the United States. Washington, DC: US Department of Justice. Available: http://www.fbi.gov/ucr/ucr.htm#cius.

4. Bowie, N.N. and Waltz, M. 1994. Data analysis of the speed-related crash issue. *Auto and Traffic Safety* 1:31-38.

5. Transportation Research Board. 1998. Special report 254; Managing speed: review of current practice for setting and enforcing speed limits. Washington, DC: National Academy of Sciences.

6. Pasanen, E. 1992. Driving speeds and pedestrian safety – a mathematical model. Technical Report No. REPT-77. Espoo, Finland: Helsinki University of Technology.

7. Insurance Institute for Highway Safety. 2007. Fatality facts 2005: pedestrians. Arlington, VA. Available: http://www.iihs.org/research/fatality_facts/pedestrians.html.

8. Retting, R.A. and Farmer, C.M. 2003. Evaluation of speed camera enforcement in the District of Columbia. *Transportation Research Record* 1830:34-37. Washington, DC: Transportation Research Board.

9. Portland Office of Transportation, City of Beaverton. 1997. Photo radar demonstration project evaluation: cities of Beaverton and Portland. Portland, OR: Oregon Department of Transportation. Available: http://www.portlandonline.com/police/index.cfm?c=cjiha&a=dcdii.

10. Chen, G.; Wilson, J.; Wu, J.; Mehle, W.; and Cooper, P. 1998. Interim evaluation report: photo radar program one year after introduction of the violation ticket phase. Victoria, British Columbia: Insurance Corporation of British Columbia.

11. Mountain, L.J.; Hirst, W.M.; and Maher, M.J. 2004. Costing lives or saving lives? A detailed evaluation of the impact of speed cameras on safety. *Traffic Engineering and Control* 45:280-87.

12. Insurance Research Council. 2007. Public attitude monitor 2007; Public support for laws and devices that promote highway safety. Malvern, PA.

13. Retting, R.A. 2003. Speed cameras — public perceptions in the US. *Traffic Engineering and Control* 44:100-01.

Pennsylvania House Committee on Transportation

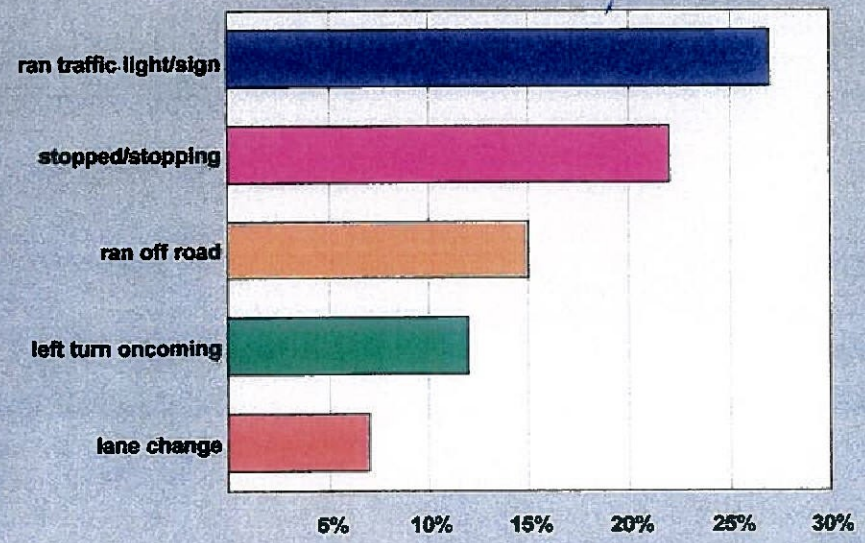
Research on Red Light Cameras and Photo Radar

September 25, 2007

INSURANCE INSTITUTE FOR HIGHWAY SAFETY

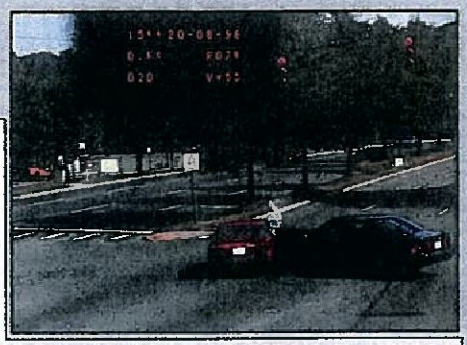
IIHS

Leading urban injury crash types



IIHS

Annual red light running toll, 2005



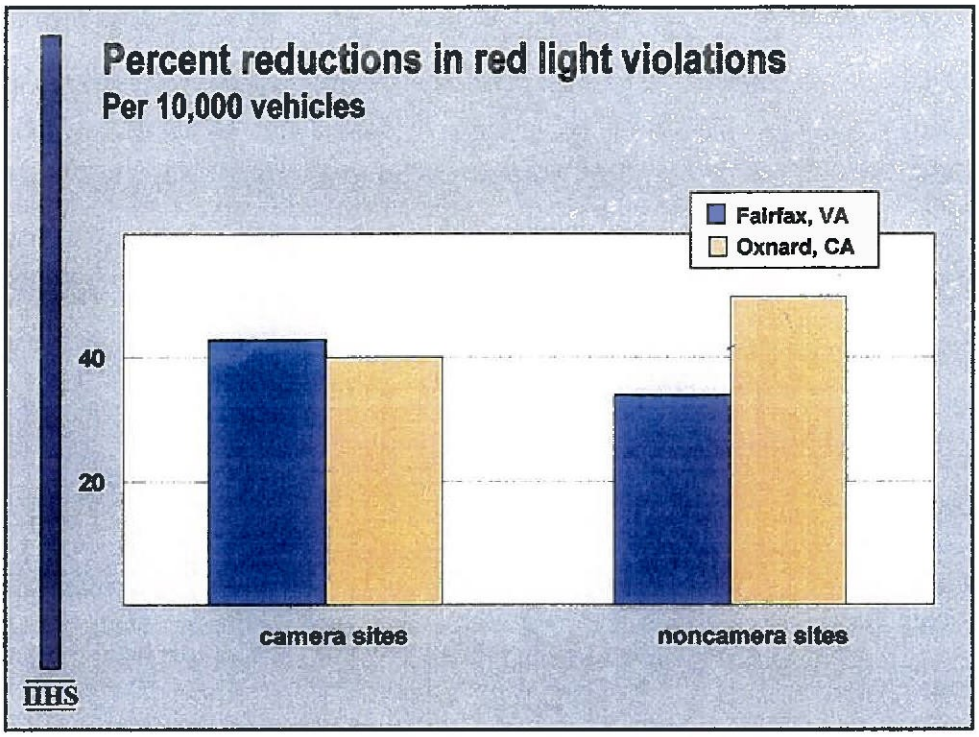
- 192,000 crashes
- 165,000 injuries
- 805 deaths
- About half of the deaths are pedestrians and occupants of other vehicles hit by red light runners

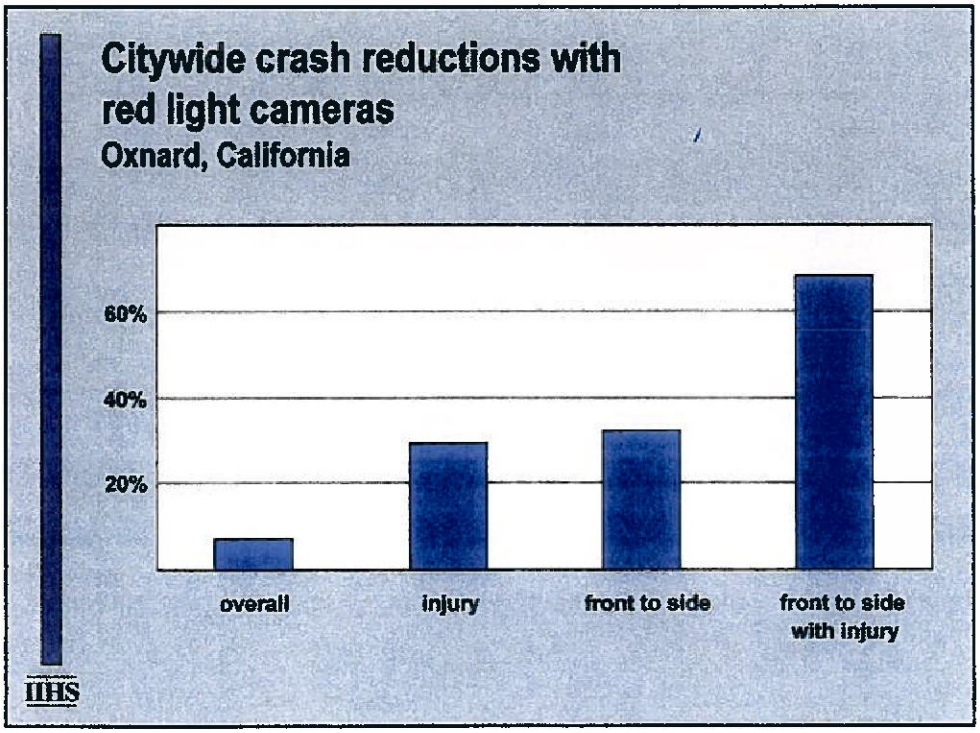
IIHS

Side impact crash test:

Full size pickup (31.8 mph)
into
Volvo S80 (15.8 mph)

IIHS


Percent reductions in red light violations
Per 10,000 vehicles
Fairfax, VA
Oxnard, CA
40
20
camera sites
noncamera sites
IIHS


Citywide crash reductions with red light cameras
Oxnard, California
60%
40%
20%
overall
injury
front to side
front to side with injury
IIHS

Philadelphia red light camera study

IIHS

Background

- Previous research shows that red light violations can be reduced by
  - increasing yellow signal timing to appropriate length
  - implementing red light camera enforcement
- Studies haven't separately evaluated effects on violations of increasing yellow timing and camera enforcement

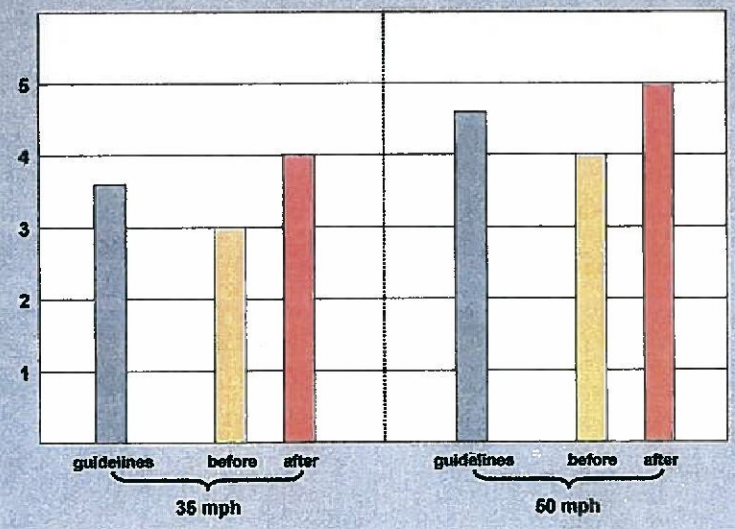
IIHS

Philadelphia red light camera study

- Yellow timing changed December 2004
- Camera enforcement began June 2005
- $100 civil penalty with no points
- Red light violations measured before and after interventions

IIHS

Yellow timing (seconds) before and after intervention compared with guidelines



IIHS

The Philadelphia Inquirer

Ready for your close-up? $100 please

The Philadelphia Inquirer

Smile! You got a ticket for running that light

DAILY NEWS

First red-light camera nails pickup in 3 minutes

The Philadelphia Inquirer

Ground is broken for first red-light camera

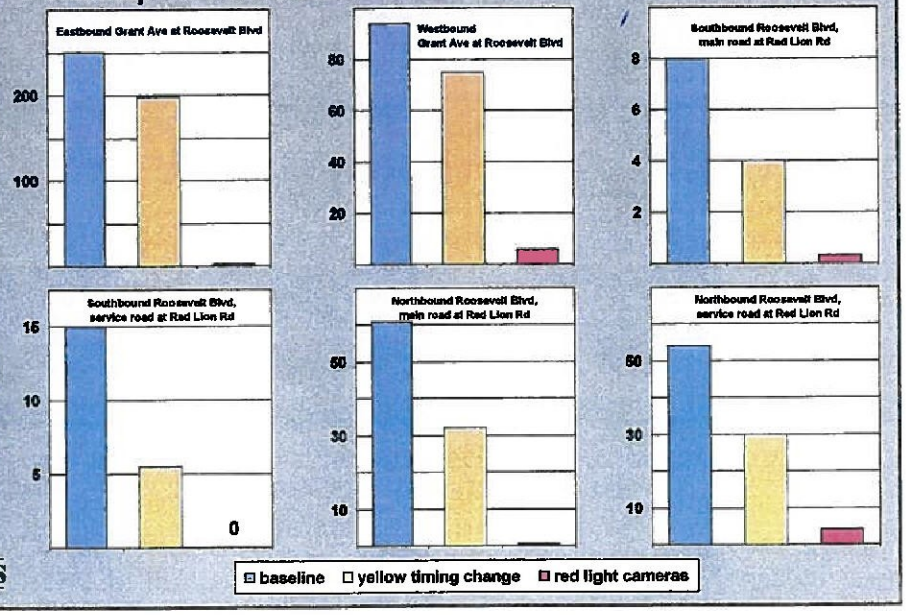
The Philadelphia Inquirer

Cameras see 5,169 run lights;
The numbers for the first month of the red-light operation surprised officials

IIHS

Violations per 10,000 vehicles

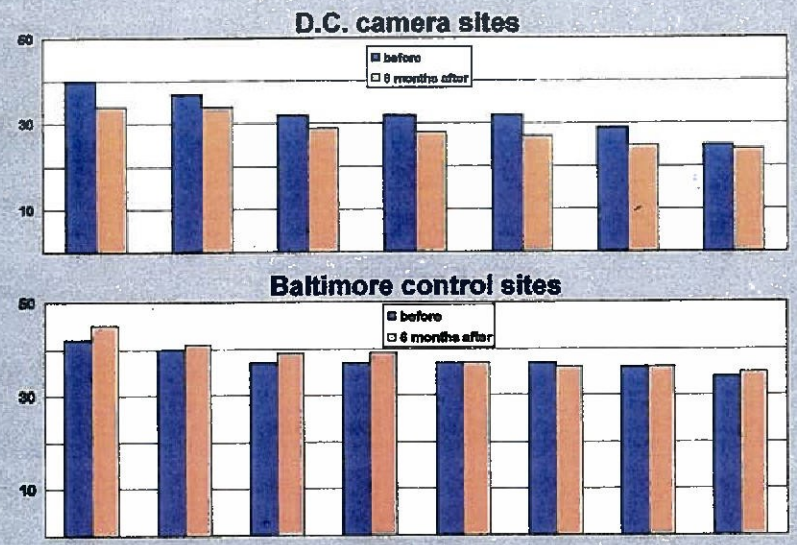
Philadelphia sites with cameras



IIHS

Evaluation of speed cameras in Washington, D.C.

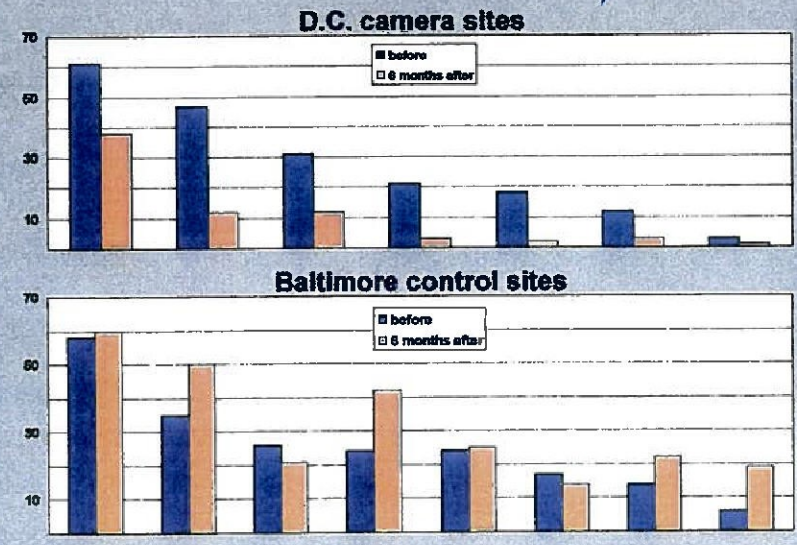
Mean traffic speeds



IIHS

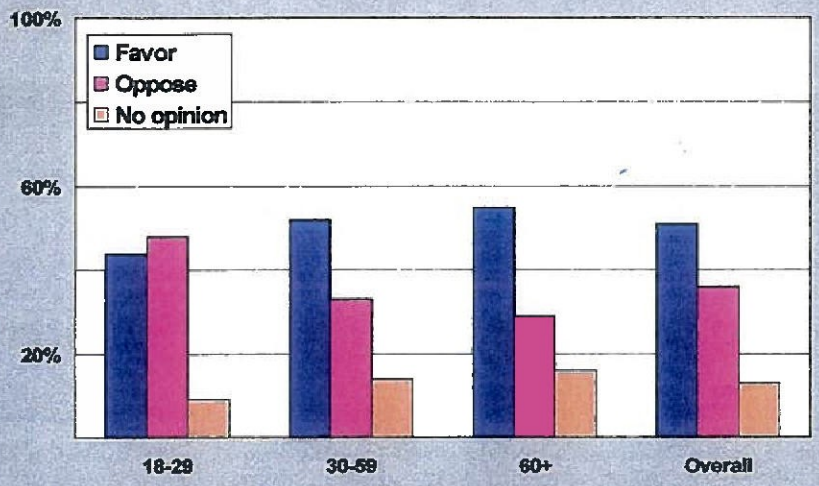
Evaluation of speed cameras in Washington, D.C.

Percentage of vehicles going 11+ mph over speed limit



IIHS

Public opinion regarding speed cameras
9 months after enforcement began in Washington, D.C.



IIHS

Evaluations of speed camera enforcement

British Columbia	7% reduction in crashes 20% reduction in fatalities
Norway	20% reduction in injury crashes
Victoria, Australia	30% reduction in crashes involving injuries or deaths
U.K.	25% reduction in injury crashes on 30 mph roads
Germany	On a stretch of Autobahn between Cologne and Frankfurt, total crashes dropped from about 300 per year to fewer than 30 Injury crashes decreased by a factor of 20

IIHS

Statement before the Pennsylvania House Committee on Transportation

Research on red light cameras

Stephen L. Oesch

September 25, 2007

INSURANCE INSTITUTE
FOR HIGHWAY SAFETY
1005 NORTH GLEBE ROAD ARLINGTON, VA 22201
PHONE 703/247-1500 FAX 703/247-1678
www.iihs.org

The Insurance Institute for Highway Safety is a nonprofit research and communications organization that identifies ways to reduce the deaths, injuries, and property damage on our nation's highways. We are supported by the nation's automobile insurers. I am submitting for the record information from the Institute about the use of red light cameras to reduce crashes in urban areas.

Red light running

The deliberate running of red lights is a common — and a serious — violation. A study conducted at five busy intersections in Fairfax, Virginia, indicates that, on average, a motorist ran a red light every 20 minutes.[1] During peak travel times, red light running was more frequent.

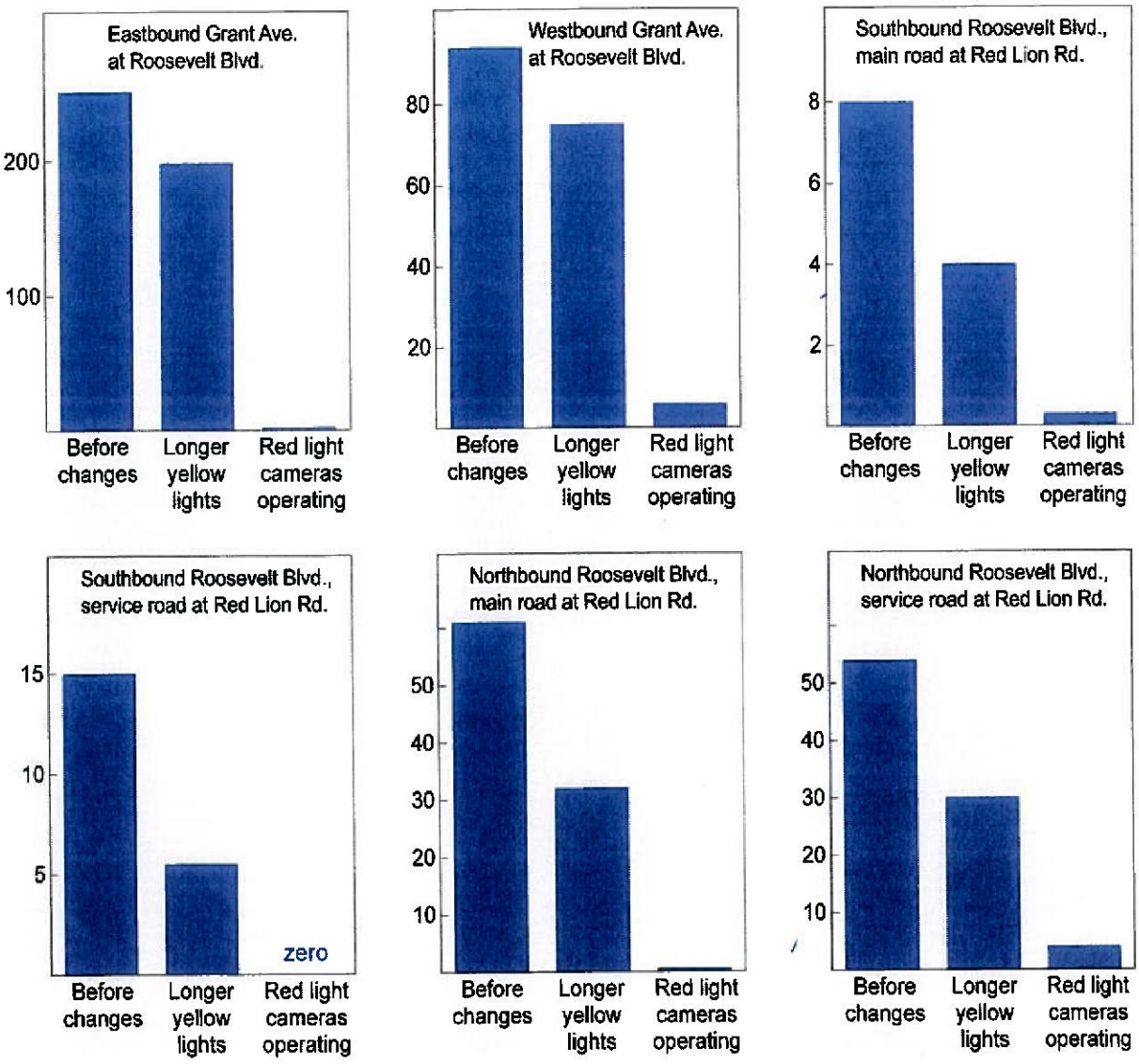
Such violations may seem trivial to the violators, but the safety consequences are real. An Institute study found that, compared with all other types of urban crashes, those involving signal violations are the most likely to cause injuries. Researchers reviewed police reports of crashes in four urban areas during 1990-91, finding that running red lights and other traffic controls is the most common cause of all urban crashes (22 percent) and the leading cause of injury crashes in urban areas (27 percent).[2] On a national basis, Institute research found that drivers who ran red lights were responsible for almost 200,000 crashes in 2005, resulting in nearly 165,000 injuries and more than 800 deaths.[3]

Red light cameras

Red light cameras used for enforcement are effective in modifying driver behavior. Institute evaluations of camera programs in two US cities — Oxnard, California, and Fairfax City, Virginia — found that violation rates decreased by about 40 percent during the first year of enforcement.[1,4] Increases in driver compliance with signals were not limited to camera-equipped sites but spilled over to nonequipped intersections as well.

In January 2007 the Institute released results of its study on the effectiveness of red light cameras at two intersections on Philadelphia's Roosevelt Boulevard. Institute researchers separated camera effects from the effects of extending the yellow light phase to give approaching motorists more warning that the signals were about to turn red. Sometimes these two measures have been introduced simultaneously, which has caused confusion about their relative benefits. The new study shows that both measures reduce signal violations, but cameras make by far the bigger difference (see figure). Researchers tallied signal violation rates at intersections before and after extension of yellow lights and again after red light camera enforcement had been in effect for about a year. They found that extending the yellow light reduced signal violations by 36 percent and that camera enforcement reduced the remaining violations by 96 percent.

Red light violations per 10,000 vehicles at Philadelphia sites with cameras



The key question is, would wide use of red light cameras improve the safety of our urban streets? Findings from Institute research indicate they do. Significant citywide crash reductions followed the introduction of red light cameras in Oxnard, California. This is the major finding of the first US research on the effects of camera enforcement on intersection crashes.[5] Injury crashes at intersections with traffic signals were reduced by 29 percent after camera enforcement began in Oxnard in 1997. Front-into-side collisions — the crash type most closely associated with red light running — were reduced by 32 percent, and front-into-side crashes involving injuries were reduced by 68 percent. Crashes declined throughout Oxnard even though only

11 of the city's 125 intersections with traffic signals were equipped with cameras. Previous studies of red light running violations in Oxnard and elsewhere found similar spillover effects. That is, the violations dropped in about the same proportions at intersections with and without cameras, attesting to the strong deterrent value of red light cameras when introduced on a community-wide basis and their ability to change driver behavior.

An Institute review of the international literature provides further evidence that red light cameras can significantly reduce violations and related injury crashes.[6] A detailed assessment of camera effectiveness indicates that red light camera enforcement reduces violations by an estimated 40-50 percent and reduces injury crashes by 25-30 percent.

A 2005 study sponsored by the Federal Highway Administration evaluated red light camera programs in seven communities (El Cajon, San Diego, and San Francisco, California; Howard County, Montgomery County, and Baltimore, Maryland; and Charlotte, North Carolina).[7] The study found that right-angle crashes decreased by 25 percent while rear-end collisions increased by 15 percent. Because the types of crashes prevented by red light cameras tend to be more severe and more costly than the additional rear-end crashes that can occur, the study found a positive societal benefit of more than $14 million. The authors concluded that the increase in rear-end crash frequency did not offset the societal benefit resulting from the decrease in right-angle crashes targeted by red light cameras.

A 2003 report conducted for the Ontario Ministry of Transportation evaluated a two-year pilot program using red light cameras in six communities in Ontario.[8] The study found a 7 percent decrease in fatal and injury collisions and an 18 percent increase in property-damage-only collisions. Researchers found that the positive societal benefit resulting from the decrease in fatal and injury crashes was greater than the cost associated with the increase in property-damage-only crashes. The report concluded that the program "has been shown to be an effective tool in reducing fatal and injury collisions" and recommended its continuation. Based on the results, the transportation minister authorized the use of red light cameras throughout Ontario.

In 2005 the Cochrane Collaboration, an international nonprofit organization that conducts systematic reviews of the scientific literature on public health issues, reviewed 10 controlled before-after studies of red light camera effectiveness from Australia, Singapore, and the United States.[9] The authors reported that those studies showed a 16 percent reduction in all types of injury crashes and a 24 percent reduction in right-angle crashes. The review did not find a statistically significant change in rear-end crashes.

Privacy issue

Photographing vehicles whose drivers run red lights does not violate anyone's protected privacy interest. Most red light cameras record only the rears of vehicles, not the occupants. Besides, driving is a regulated activity on public roads. Neither the law nor common sense suggests that drivers should not be observed on the road or that their violations should not be recorded.

Public support

Like other government policies and programs, red light camera enforcement requires acceptance and support from the public and elected leaders. Although the "big brother" issue is raised by some opponents of automated enforcement technology, public opinion surveys consistently reveal wide acceptance and strong public support for red light cameras. Telephone surveys in US cities found more than 75 percent of drivers supported red light cameras.[10] The Virginia Transportation Research Council conducted a public opinion survey at six locations throughout Virginia. Almost two-thirds of the respondents supported red light camera programs.[11] Similar public opinion surveys in Europe and Canada revealed that the majority of drivers support red light cameras.[12]

A extensive body of scientific research demonstrates the effectiveness of automated red light camera enforcement in reducing red light violations and related serious injury crashes, especially right-angle injury crashes. The citizens of Pennsylvania will benefit from the continuation of these programs.

References

1. Retting, R.A.; Williams, A.F.; Farmer, C.M.; and Feldman, A.F. 1999. Evaluation of red light camera enforcement in Fairfax, Va., USA. *ITE Journal* 69:30-34.
2. Retting, R.A.; Williams, A.F.; Preusser, D.F.; and Weinstein, H.B. 1995. Classifying urban crashes for countermeasure development. *Accident Analysis and Prevention* 27:283-94.
3. Insurance Institute for Highway Safety. 2007. Q&As: red light cameras. Arlington, VA. Available: http://www.iihs.org/research/qanda/rlr.html.
4. Retting, R.A.; Williams, A.F.; Farmer, C.M.; and Feldman, A.F. 1999. Evaluation of red light camera enforcement in Oxnard, California. *Accident Analysis and Prevention* 31:169-74.
5. Retting, R.A. and Kyrychenko, S.Y. 2002. Reductions in injury crashes associated with red light camera enforcement in Oxnard, California. *American Journal of Public Health* 92:1822-25.
6. Retting, R.A.; Ferguson, S.A.; and Hakkert, A.S. 2003. Effects of red light cameras on violations and crashes: a review of the international literature. *Traffic Injury Prevention* 4:17-23.
7. Federal Highway Administration. 2005. Safety evaluation of red-light cameras. Report no. FHWA-HRT-05-049. Washington, DC: US Department of Transportation.
8. Ontario Ministry of Transportation. 2003. Evaluation of the right light camera enforcement pilot project. Final technical report. Downsview, Ontario.

9. Aeron-Thomas, A.S. and Hess, S. 2005. Red-light cameras for the prevention of road traffic crashes (review). *The Cochran Database of Systematic Reviews*, Issue 2, Art. no. CD003862.pub2. Hoboken, NJ: John Wiley & Sons Ltd.

10. Retting, R.A. and Williams, A.F. 2000. Red light cameras and the perceived risk of being ticketed. *Traffic Engineering and Control* 41:224-25,227.

11. Garber, N.J.; Miller, J.S.; Eslambolchi, S.; Khandelwal, R.; Mattingly, K.M.; Sprinkle, K.M.; and Wachendorf, P.L. 2004. An evaluation of red light camera (photo-red) enforcement programs in Virginia. Charlottesville, VA: Virginia Transportation Research Council.

12. Muskaug, R. 1993. Driver acceptance of automatic traffic surveillance. *Traffic Engineering and Control* 34:243-46.