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FOR HIGHWAY SAFETY

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## Speeding and Speed Enforcement: Turning Knowledge Into Action

Lifesavers Annual Conference

Lake Buena Vista, FL • June 16, 2012

Anne T. McCartt

# Some myths about speeds and speed limits

- Speed variation – not high speed – is the real problem
- Speeding is a problem mostly on high-speed roads
- Raising speed limits eliminates widespread law-breaking without increasing travel speeds
- Roadway safety improvements and advances in vehicle design make it safe to travel at high speeds

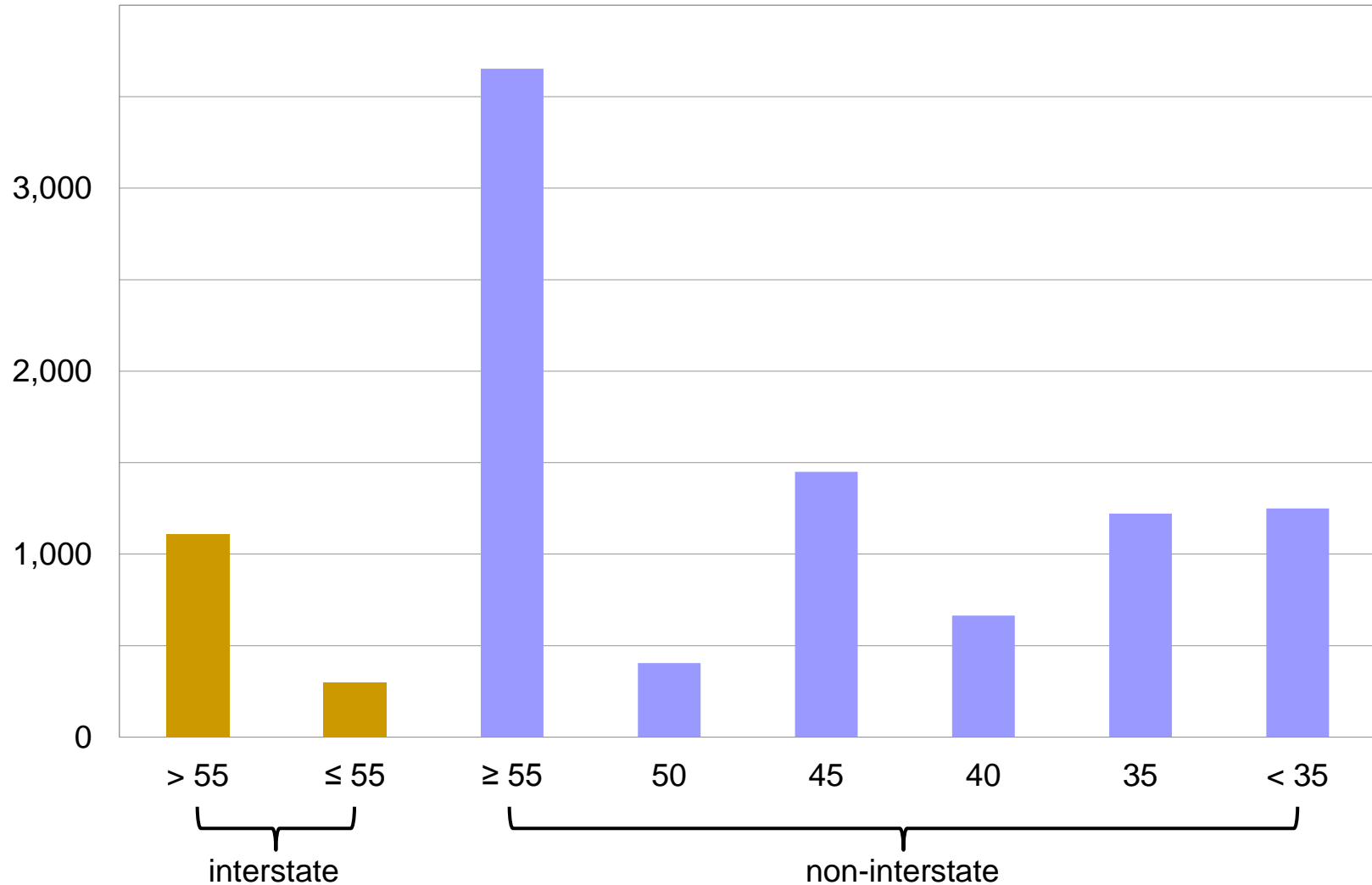
In 2010, about 10,400 people died in speeding-related crashes



# Percent of motor vehicle crash deaths involving speeding as a contributing factor, 2001-2010

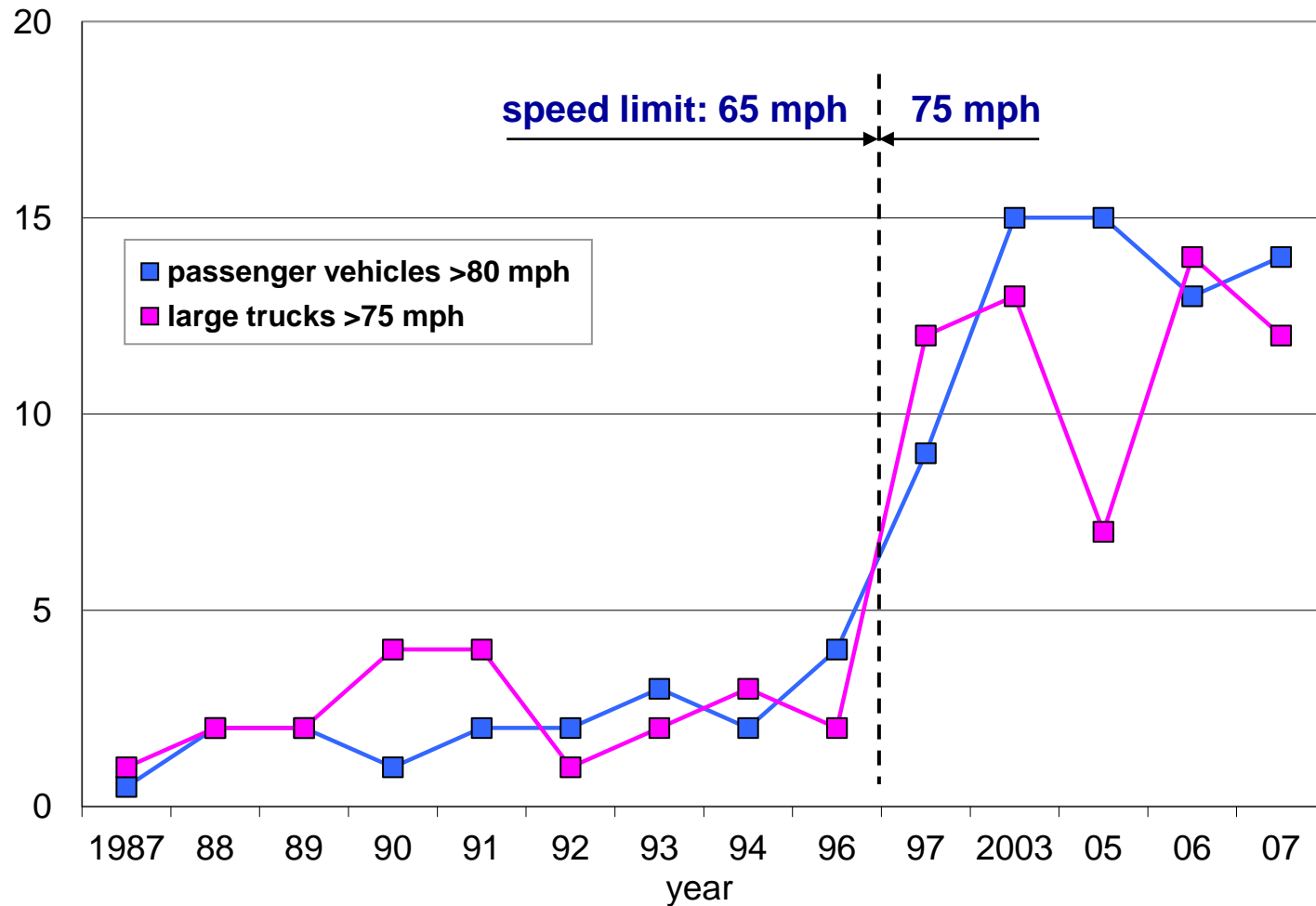


# Speeding-related fatalities by speed limit in 2010



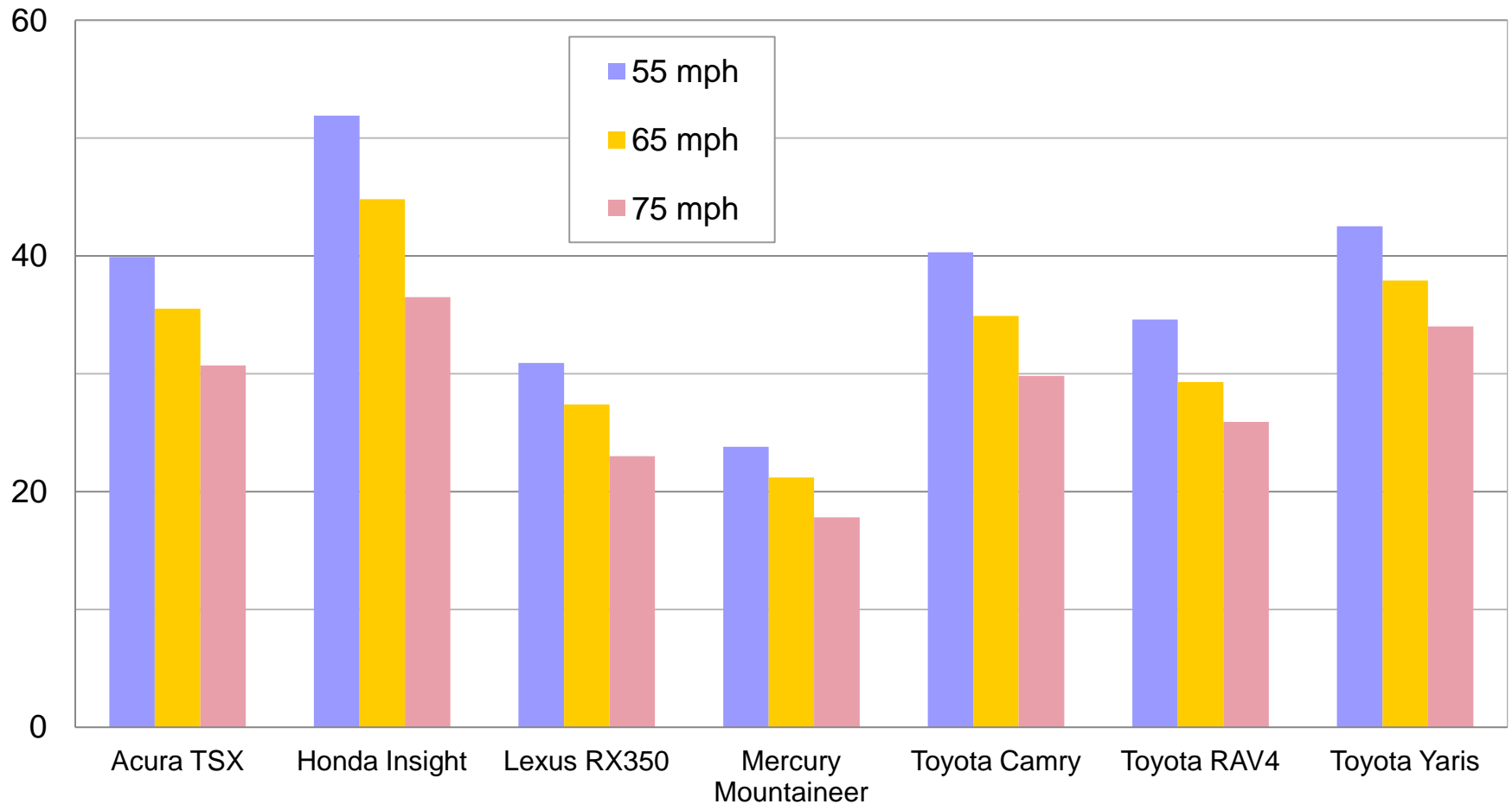
# Percent of vehicles exceeding high speeds on New Mexico rural interstates

1997-2007



# More fuel is consumed at faster vehicle speeds

Miles per gallon at various speeds, Consumer Reports, 2009



# Overview

- Relation of speeds to crash and injury risk
- Relation of speed limit changes to speed and crashes
- Automated speed enforcement



# How increase in speed affects risk of crash occurrence

- Increases distance vehicle travels from time driver detects an emergency to time driver reacts
- Increases distance needed to stop vehicle once an emergency is perceived
- Reduces driver's ability to steer safely around curves or objects in the road

# Relation of speed to crashes

Elvik, 2005

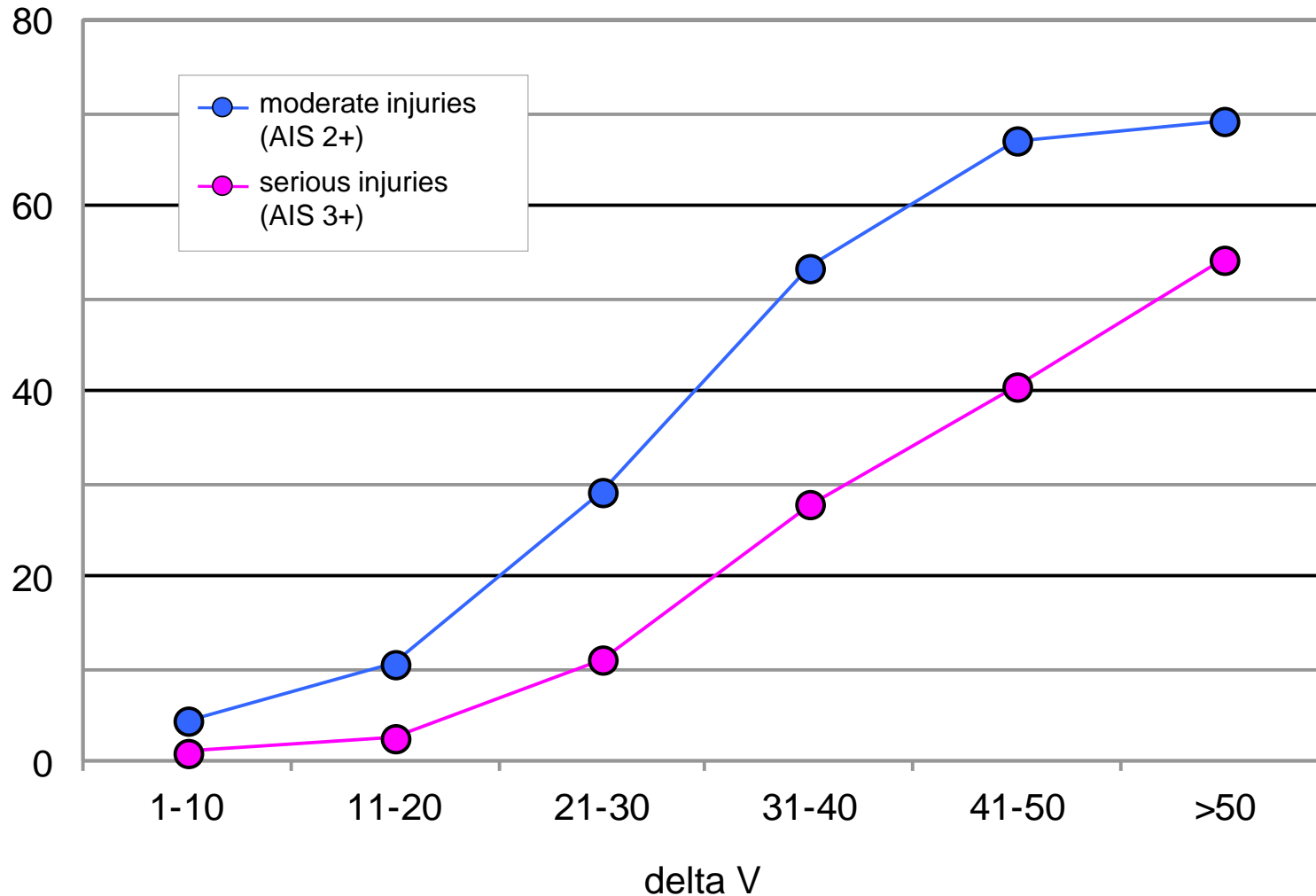
- Analyzed 460 estimates of the relationship between speed and crashes
- Speed has major impact on number of crashes and injury severity
- Relationship between speed and road safety is causal, not just statistical

# Relation of speed to crash severity

- Relationship between vehicle speed and crash severity is unequivocal and based on the laws of physics
- Velocity change in a crash ( $\Delta V$ ) is critical measure of crash severity
- Crash energy increases by square of speeds. When impact speed increases from 40 to 60 mph (a 50 percent increase), energy that needs to be managed increases by 125 percent

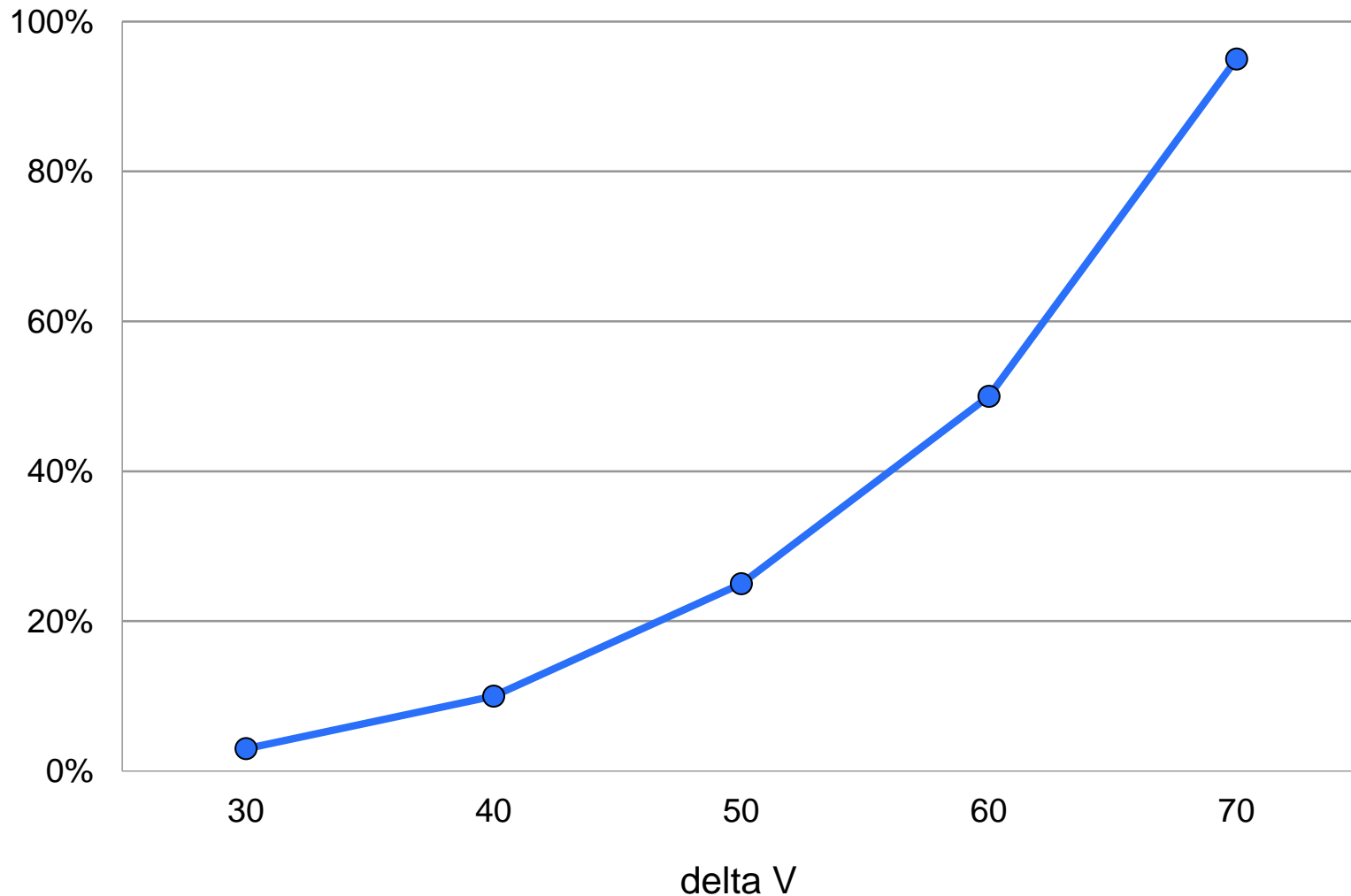
# Injuries per 100 occupants by delta V

Bowie and Walz, 1994



# Driver fatality risk in relation to delta V

Probability of death, Joksch (1993)



# Relation of speed limit changes to speeds and crashes

- Reductions in speed limits reduce vehicle speeds and crash deaths and injuries
- Increases in speed limits increase speed, as well as crash deaths and injuries

# Effects of 1974 National Maximum Speed Limit (NMSL) legislation

- NMSL of 55 mph established to conserve fuel
- Fatalities declined 16 percent, from 54,052 in 1973 to 45,196 in 1974
- Estimated 20,000 to 30,000 lives were saved by NMSL during 1974-1978 (NHTSA-FHWA, 1980)
- Travel speeds were reduced but compliance gradually eroded (TRB, 1984)

# Effects of 1995 NMSL repeal

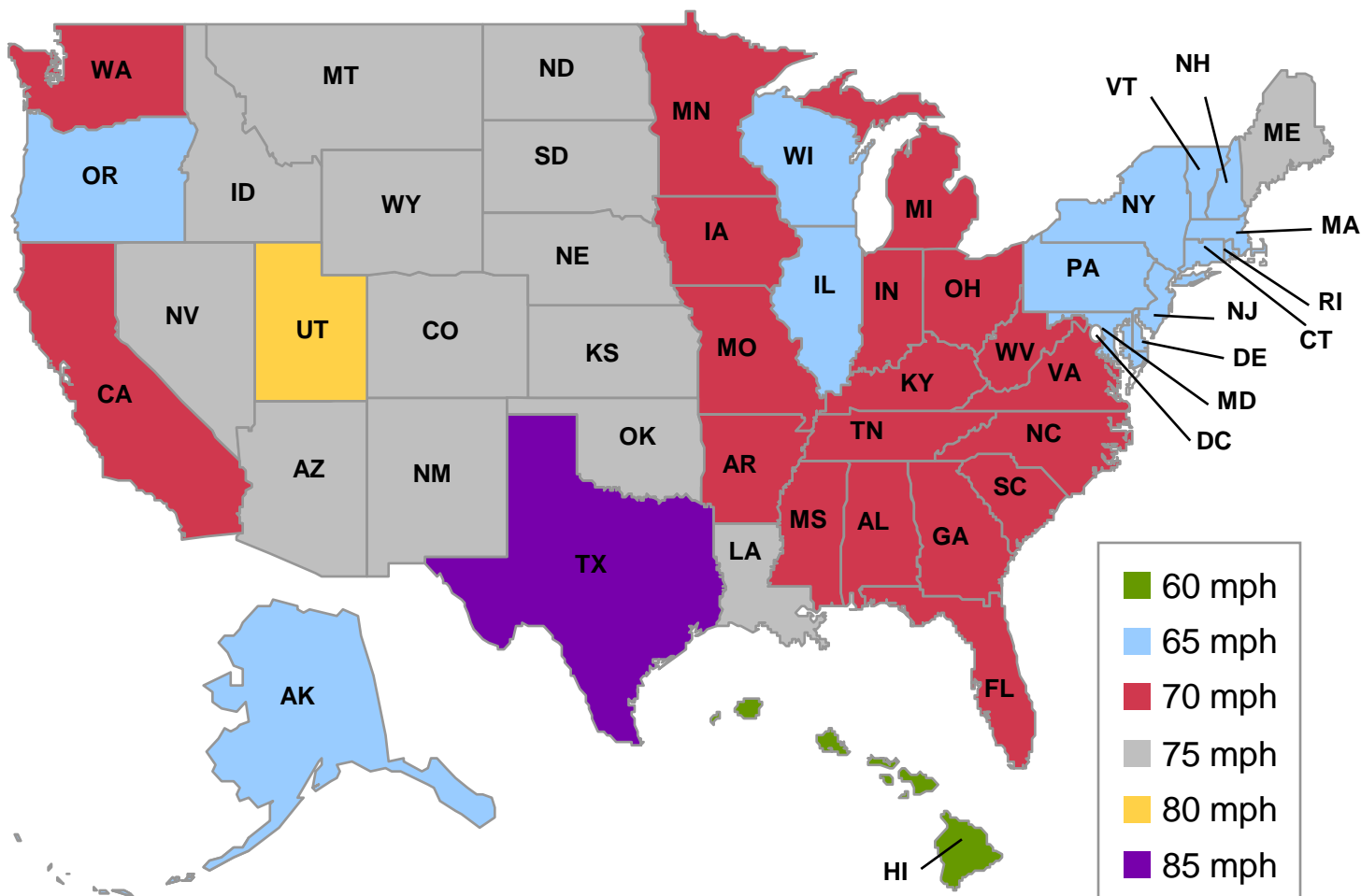
IIHS, 1997, 1999

- On urban freeways where limits increased from 55 to 65 or 70 mph:
  - mean and 85th percentile car speeds increased 2-5 mph
  - proportion exceeding 70 mph increased 15-20 percent
  - speed variation increased 5-15 percent
- On rural interstates where limits increased from 65 to 75 mph, 10 years after change
  - proportion of passenger vehicles exceeding 80 mph tripled
- Fatality rates per vehicle miles traveled increased 17 percent on interstates in 24 states that raised speed limits



# Maximum authorized speed limits

June 2012

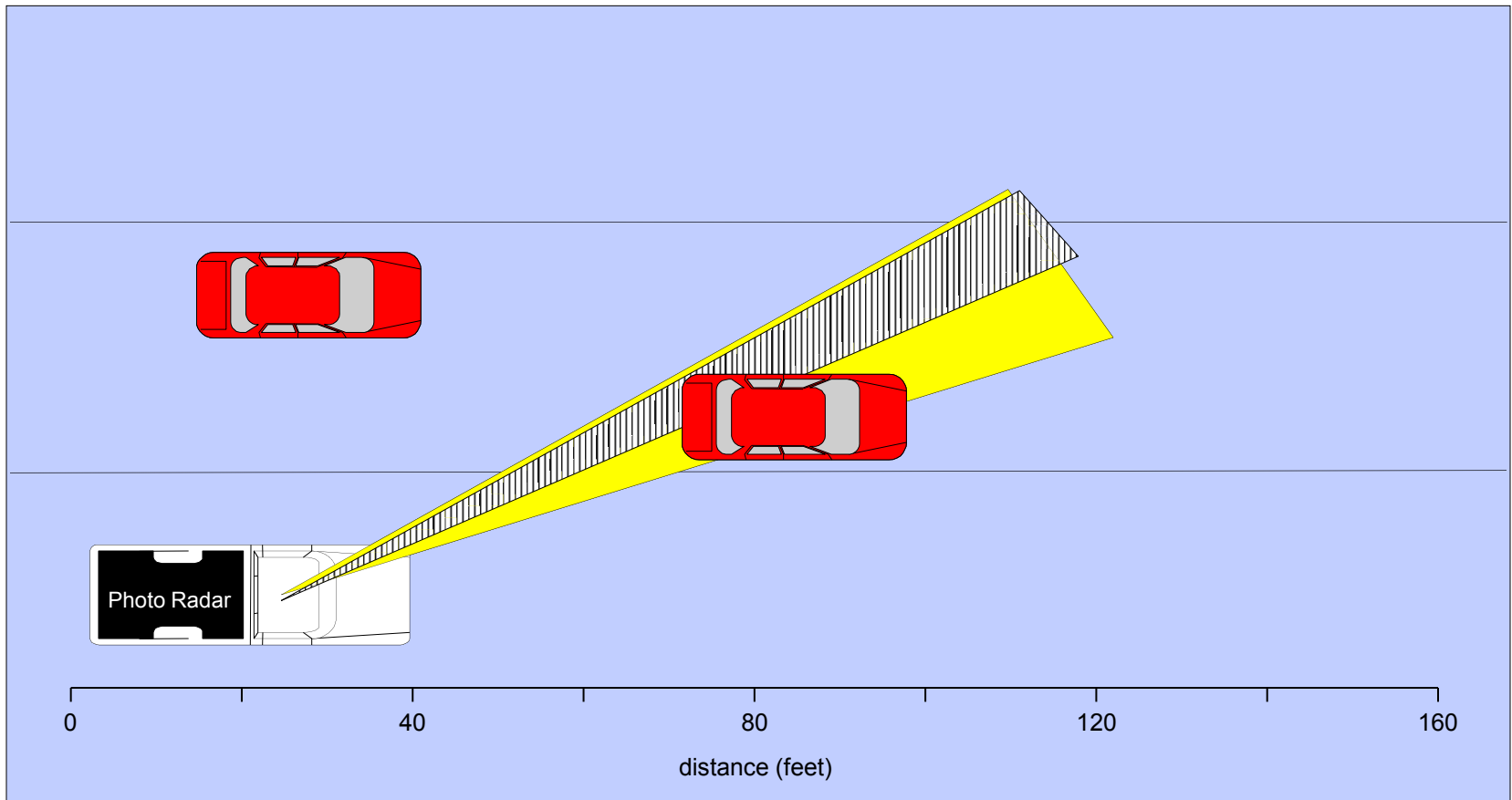




## Why photo enforcement?

# Automated enforcement can supplement conventional speed enforcement

- Publicized police enforcement can reduce vehicle travel speeds and crashes
- Many enforcement agencies lack the resources to mount and sustain effective conventional speed enforcement programs
- With conventional enforcement, it is difficult to observe and stop violators at the worst places and times and in heavy traffic
- High-speed pursuit can be dangerous for police and civilians
- Speed cameras are successfully used throughout the world



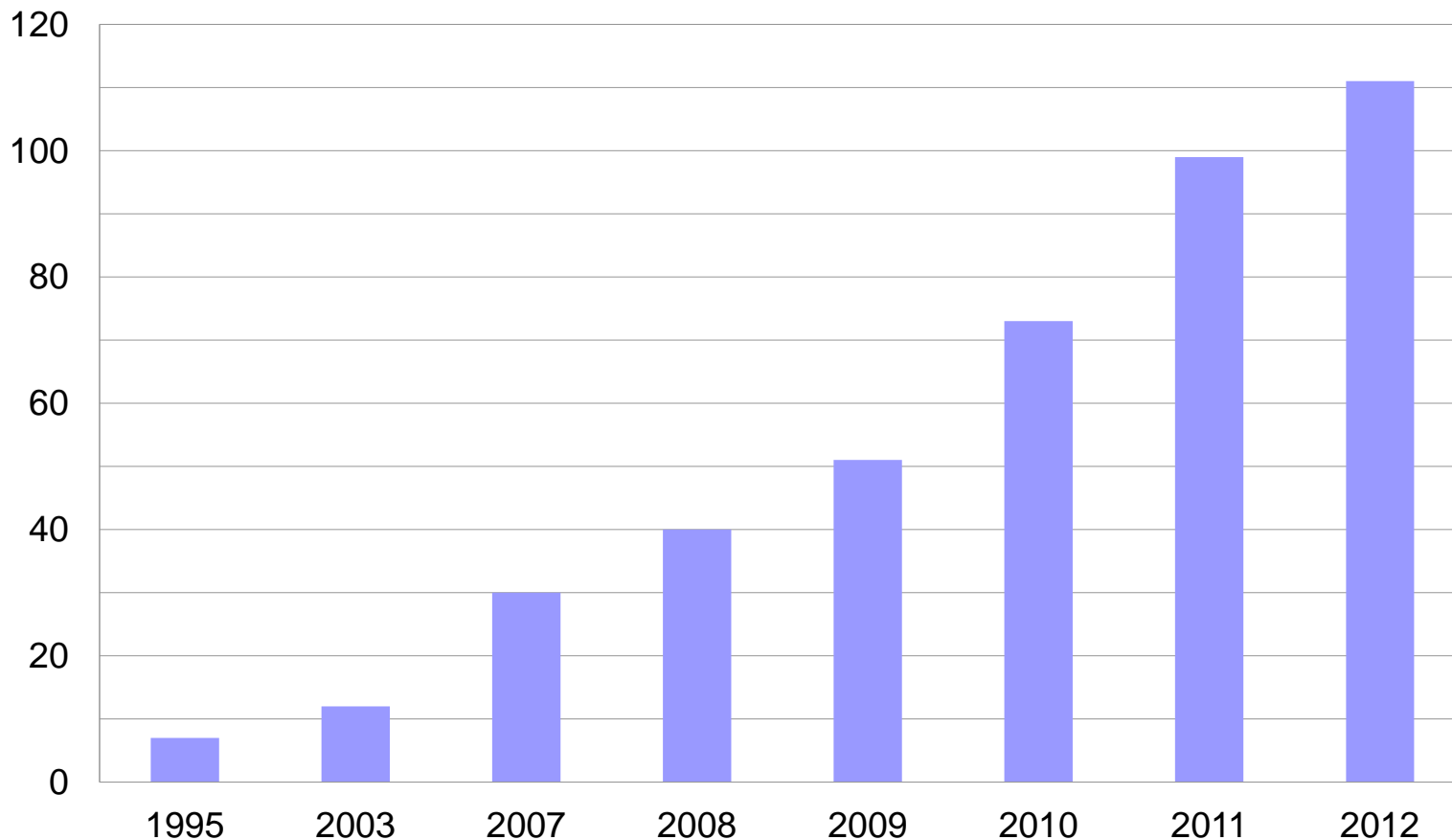
Speed cameras are activated when a vehicle is traveling significantly faster than the posted limit, based on the radar-calculated speed. An image of the vehicle and sometimes video of the vehicle are recorded.

# Loop 101 speed camera program



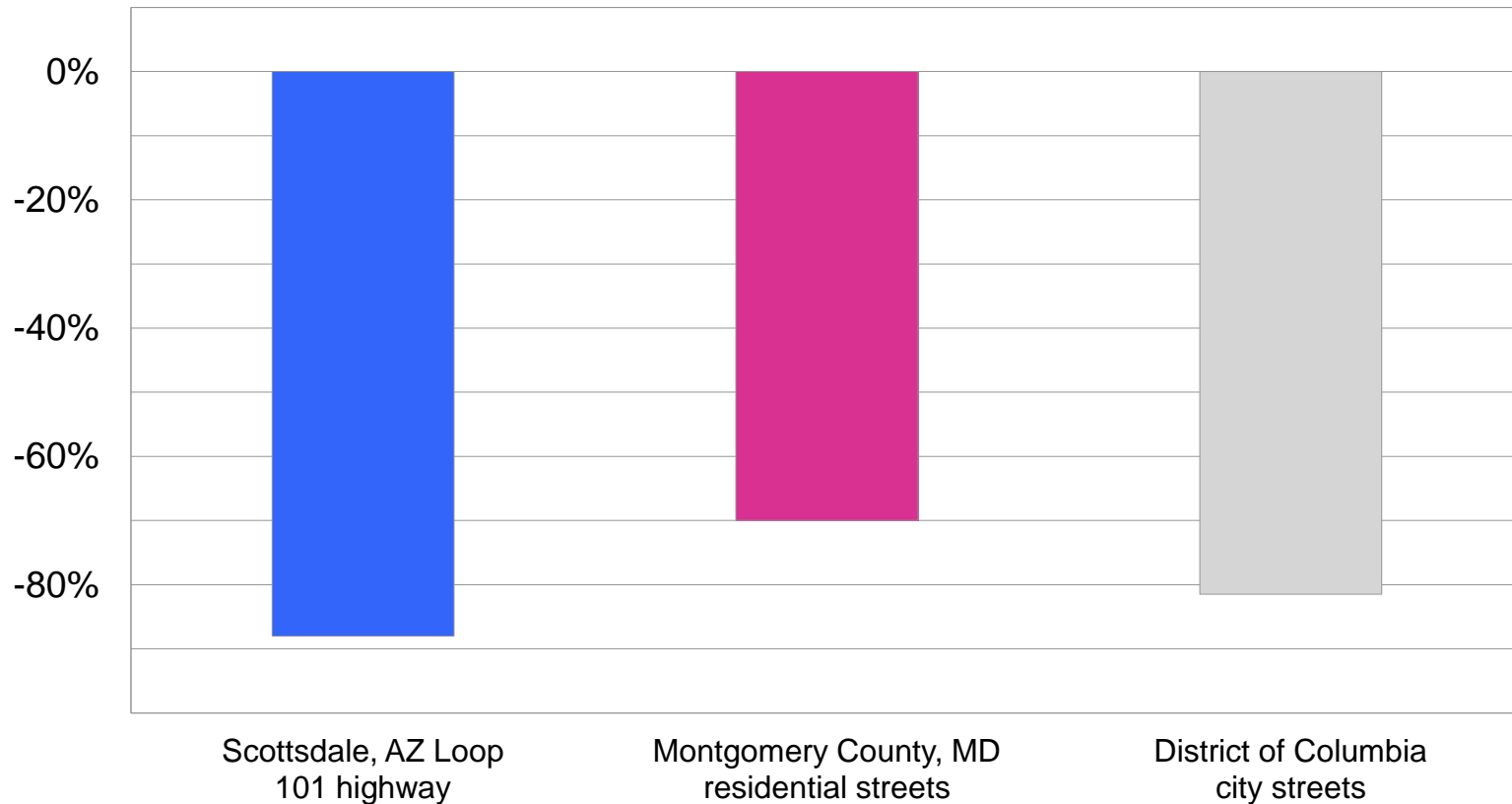
# US communities with speed cameras

1995-2012



# Reductions in proportion of vehicles exceeding speed limit by more than 10 mph after camera enforcement

Relative to comparison sites, IIHS (2003, 2008a, 2008b)



# Montgomery County, MD speed camera study

IIHS, 2008

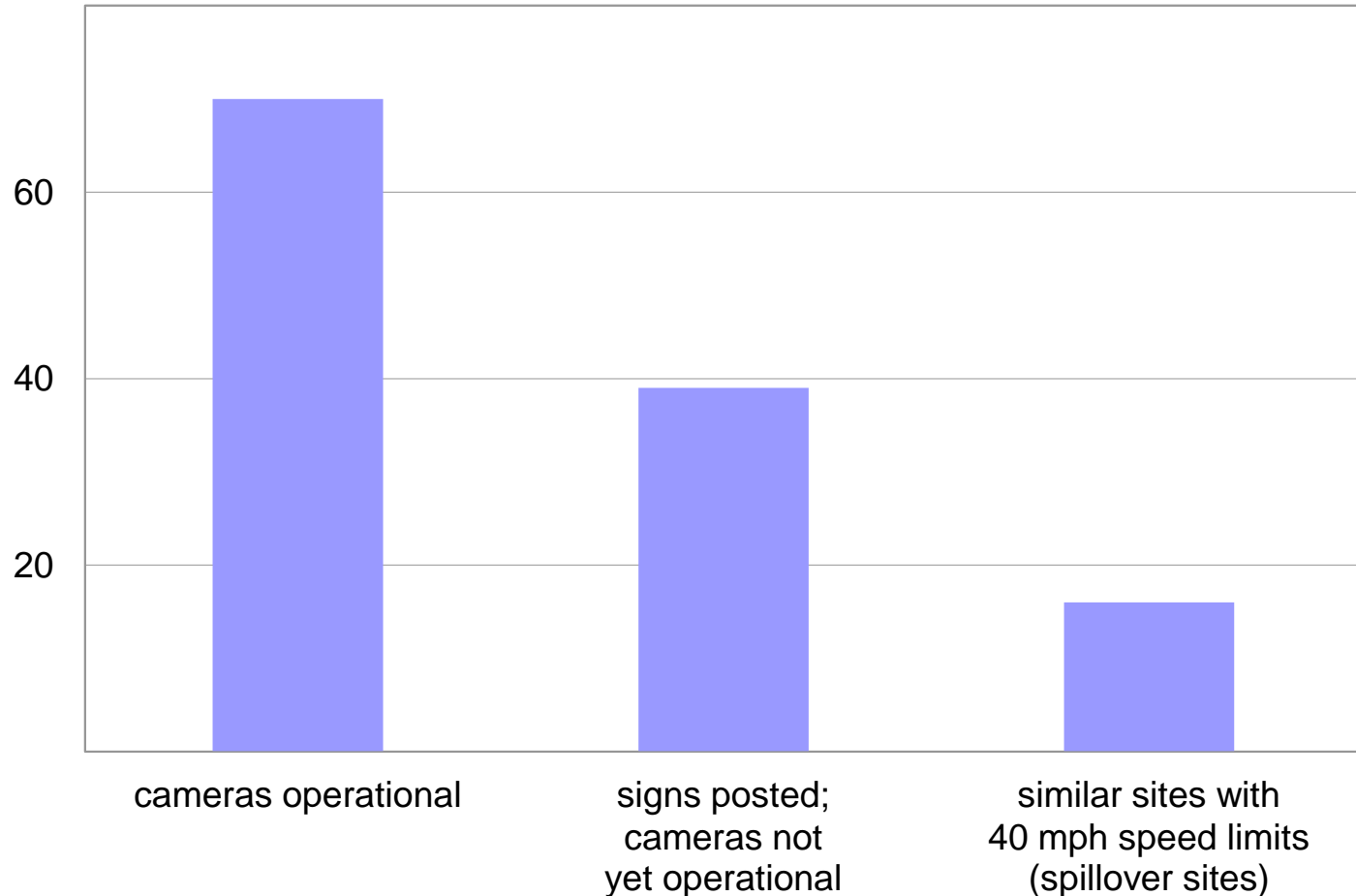
- First Maryland community to use speed cameras
- Camera enforcement limited to school zones and residential streets with speed limits 35 mph or less
- Program included publicity campaign; mobile and fixed speed cameras



# Typical study site on residential street



# Percent reduction in odds of exceeding speed limit by more than 10 mph associated with camera enforcement Relative to Virginia comparison sites



# Reviews of international research show that speed camera enforcement reduces injury and fatal crashes

Cochrane Review  
(Wilson et al., 2010)  
28 studies

- 8-50% reduction in injury crashes in the vicinity of camera sites
- 11-44% reduction in fatal or serious injury crashes in the vicinity of camera sites
- 17-58% reduction in fatal or serious injury crashes over wider areas

# Controversies and speed cameras: international lessons

IIHS study of cameras in Australia and Great Britain, 2005

- Wherever speed cameras have been used, they have been controversial
- Some controversies relate to attitudes about speed enforcement, but most relate specifically to camera use
- Primary barrier to implementation is public acceptance and consequent political ambivalence
- Based on successful programs in Victoria, Australia, the Great Britain, and elsewhere, success depends on political will and sustained government commitment, based on research evidence that speed cameras reduce both speeds and crashes

# Opinions of residents during speed camera enforcement programs

	Montgomery County, Maryland	Scottsdale, Arizona
think speeding is a problem on targeted roads	74%	79%
aware of speed cameras	60%	90%
favor speed camera use on targeted roads	62%	77%

# Privacy issues

- Opponents of camera enforcement often raise privacy concerns, but there appear to be no inherent constitutional barriers
- Driving is a regulated activity on public roads
- Photo enforcement does not appear to violate constitutional rights of privacy
- Cameras are widely used in public places such as airports and transit terminals for safety purposes; these applications observe each person simply passing by, whereas traffic enforcement cameras are limited to traffic violators



The Daily Show

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# Implementation is important factor in public acceptance

- Identification of safety as the primary objective
- Educating public about the problems of speeding in the community
- Transparent process for selecting camera sites
- Warning period before citations issued
- Amount of fine and thresholds for issuing citation
- Where fine money goes
- Whether cameras are highly visible
- Warning of camera presence
- Do we set different expectations for automated enforcement compared to conventional enforcement?



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## Speed

### US communities using speed cameras

### Q&As

[Speed and speed limits](#)

[Speed: law enforcement](#)

### State laws

[Automated enforcement laws](#)

[Automated enforcement myths](#)

[Speed limit laws by state](#)

[Summary of decisions concerning camera enforcement](#)

### Informational video

[Automated traffic law enforcement](#)

### Selected research bibliography

[Highlights from the Institute's research since 1969](#)

### News releases

[January 14, 1999 Motor vehicle deaths 15 percent higher on roads in 24 states that raised speed limits](#)



[October 10, 1997 Motor vehicle fatalities in 1996 were 12 percent higher on interstates, freeways in 12 states that raised speed limits](#)



### Status Report newsletter special issues

[Vol. 43, No. 1, January 31, 2008: Special issue: speed](#)

[Vol. 42, No. 5, May 12, 2007: Special issue: one day of crashes — the stories of some of the 119 people killed in crashes on June 7, 2005](#)

[Vol. 38, No. 10, November 22, 2003: Special issue: speeding](#)

[Vol. 37, No. 5, May 4, 2002: Special issue: automated enforcement](#)

### Status Report newsletter articles

[Vol. 45, No. 12, December 2, 2010: Drivers say texting, speeding, and running red lights are risky but admit to doing them anyway](#)

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## Q&A: Speed — law enforcement

February 2011

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- 2 | [What are radar detectors?](#)
- 3 | [What's the problem with radar detectors?](#)
- 4 | [Who uses radar detectors?](#)
- 5 | [Are there laws banning radar detectors?](#)
- 6 | [Why are radar detectors banned in large trucks?](#)
- 7 | [Is banning radar detectors constitutional?](#)
- 8 | [Do other countries permit the use of radar detectors?](#)
- 9 | [What are radar detector-detectors?](#)
- 10 | [What are the advantages of speed cameras?](#)
- 11 | [How effective are speed cameras at reducing crashes?](#)
- 12 | [Are speed cameras used to ticket motorists going 1 or 2 mph faster than the speed limit?](#)
- 13 | [Are speed cameras widely used in the United States?](#)
- 14 | [Does the public support the use of speed cameras?](#)
- 15 | [Are there other technologies that could aid in enforcing speed limits?](#)

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