Speeding and Speed Enforcement: Turning Knowledge into Action

Governors Highway Safety Association Annual Meeting

Scottsdale, AZ ▼September 9, 2008

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INSURANCE INSTITUTE FOR HIGHWAY SAFETY

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 2006, more than 13,500 people died in speeding-related crashes

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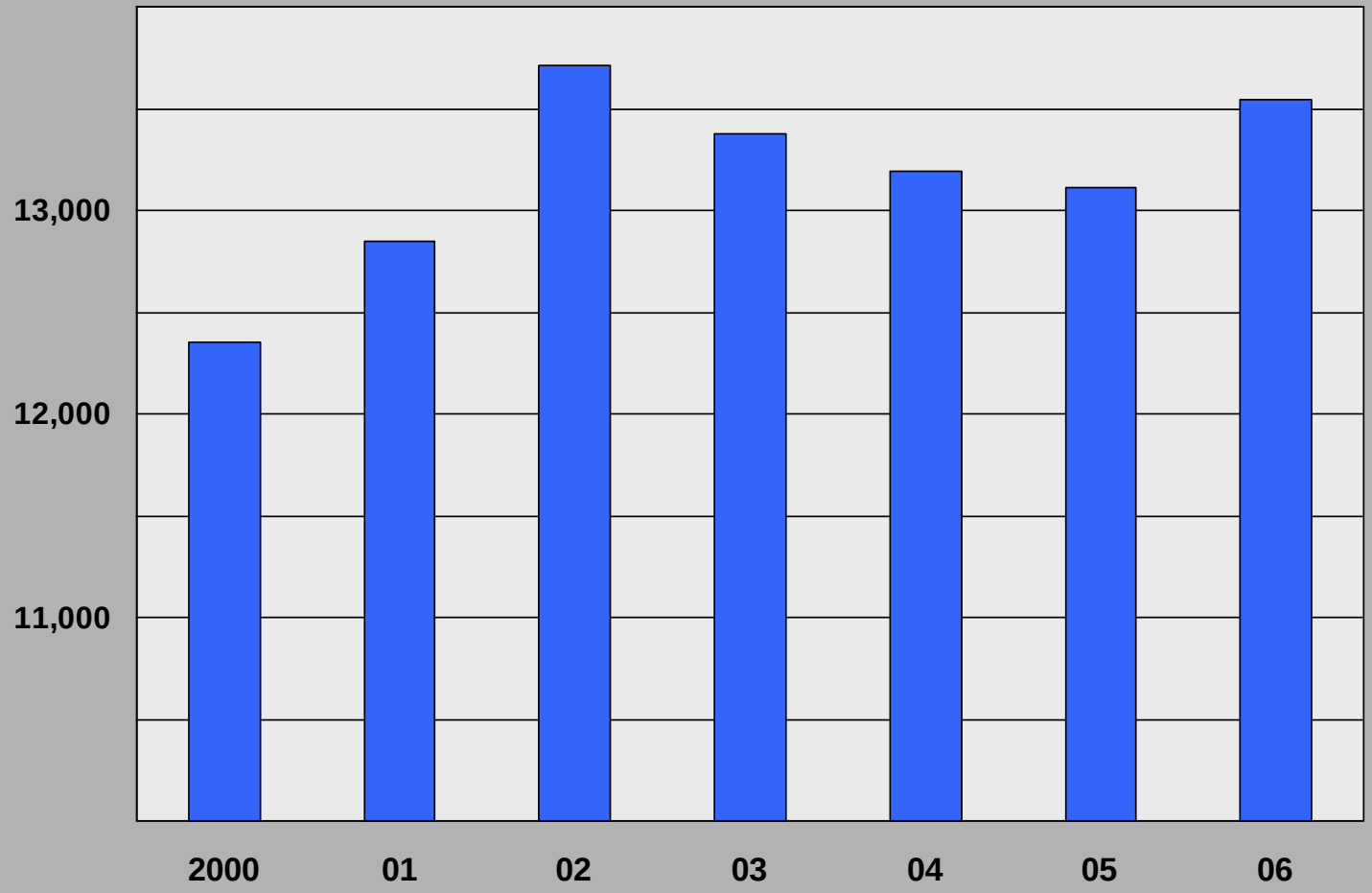
Lives lost in speeding-related crashes

US, 2000-06 (NHTSA)



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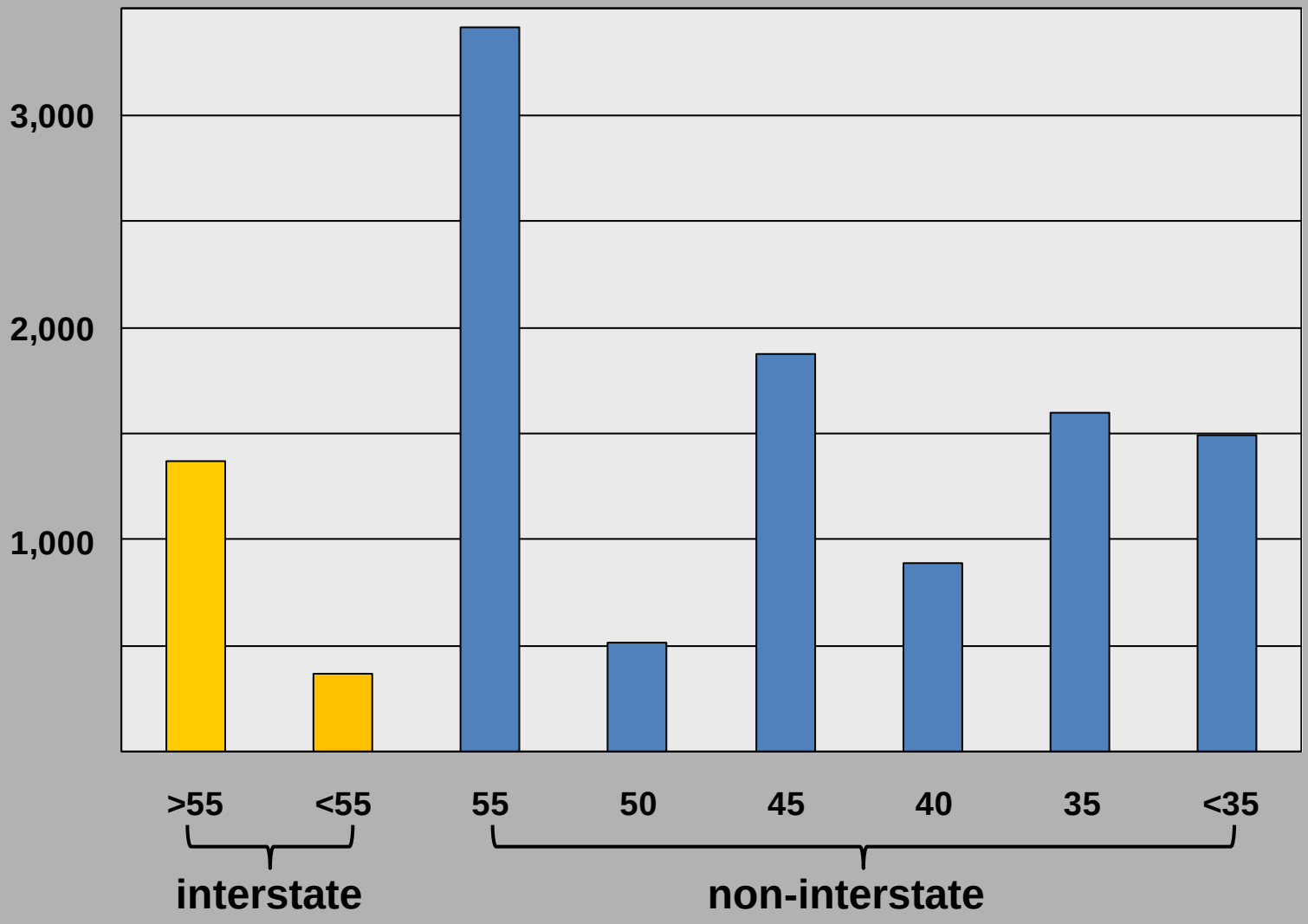
Speeding-related fatalities by speed limit

US, 2006 (NHTSA)



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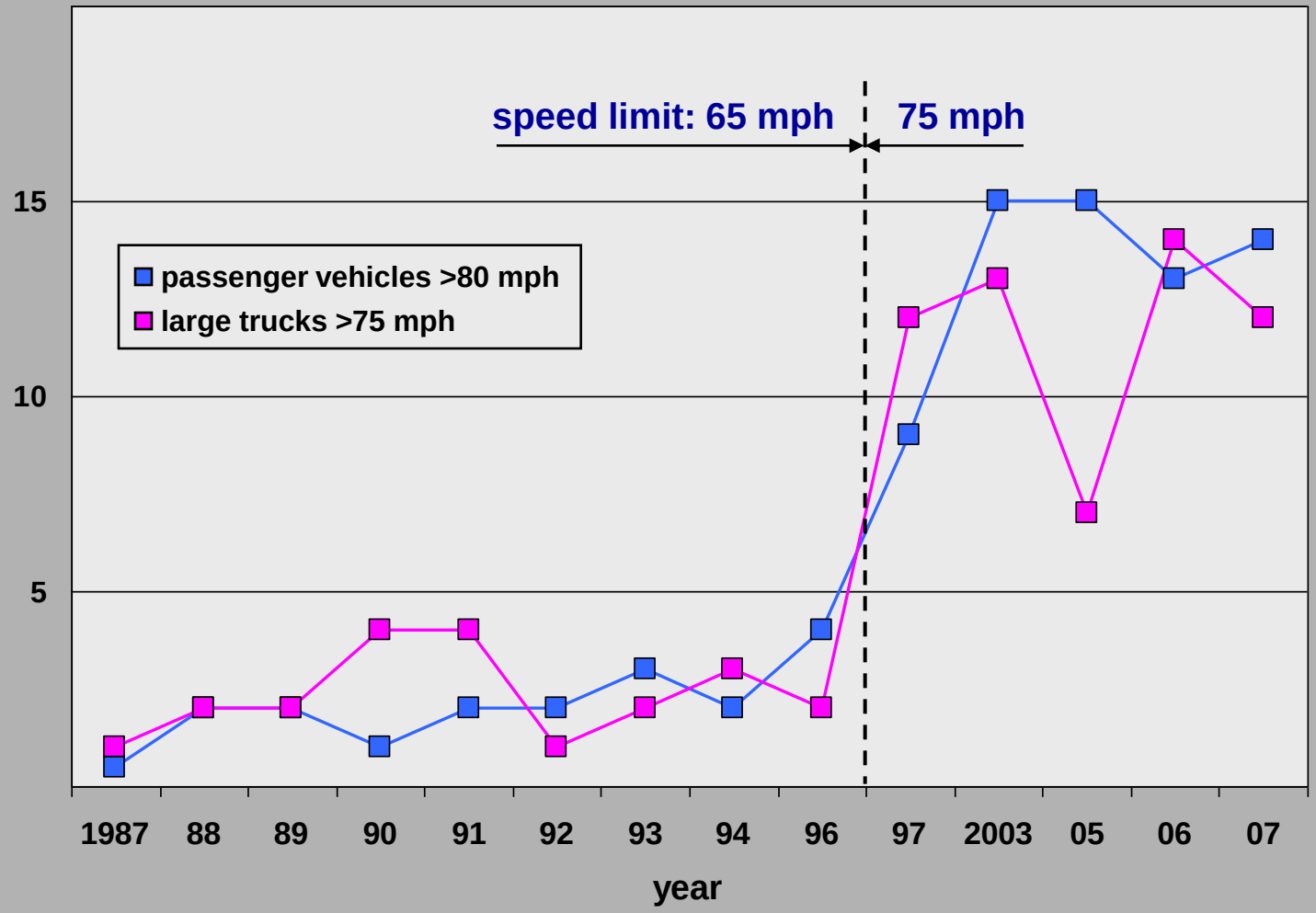
Percent of vehicles exceeding high speeds on New Mexico rural interstates



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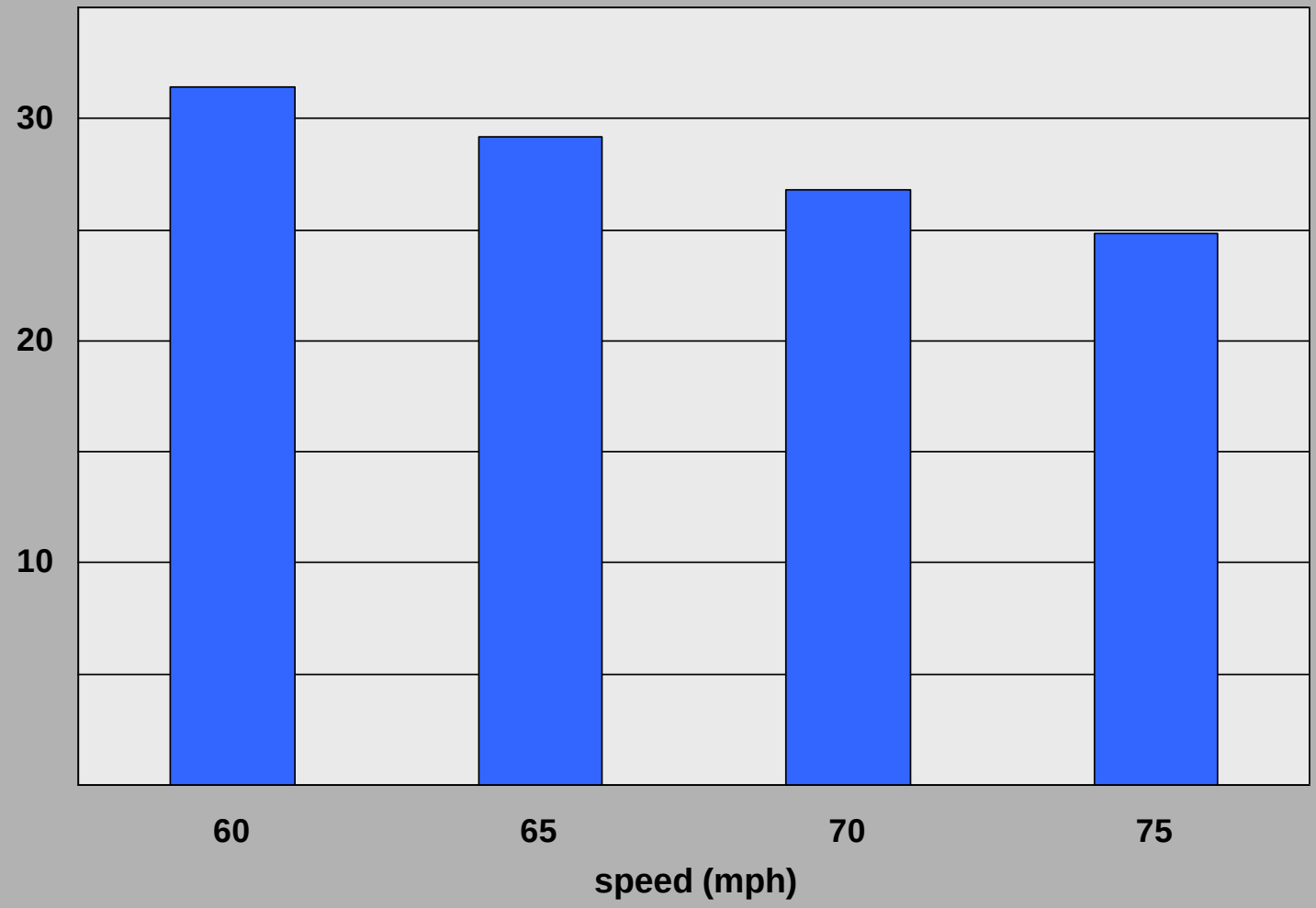
Average fuel economy (mpg) by travel speed for 9 vehicles tested in 1997

US Department of Energy



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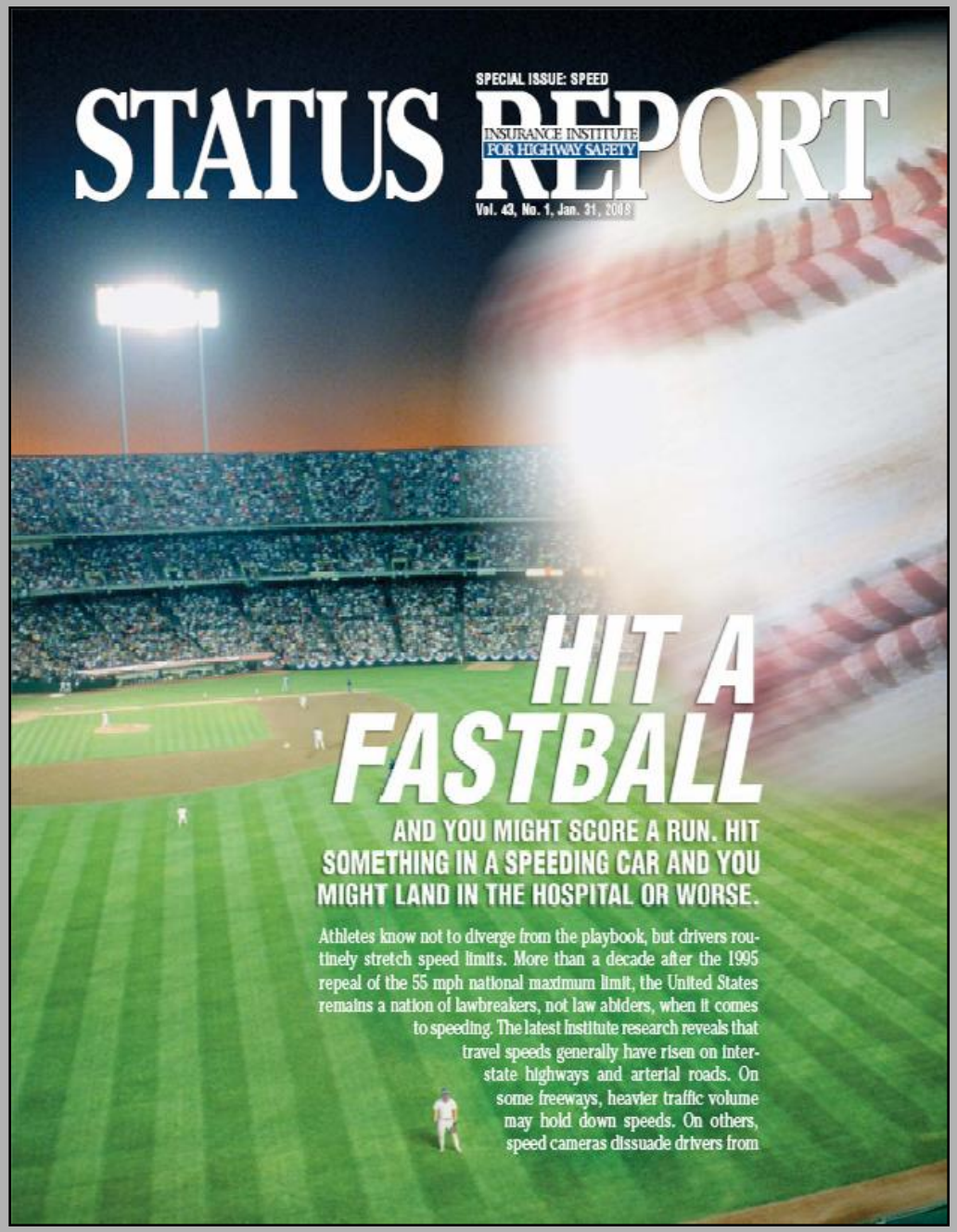
January 31, 2008



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Overview

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

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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

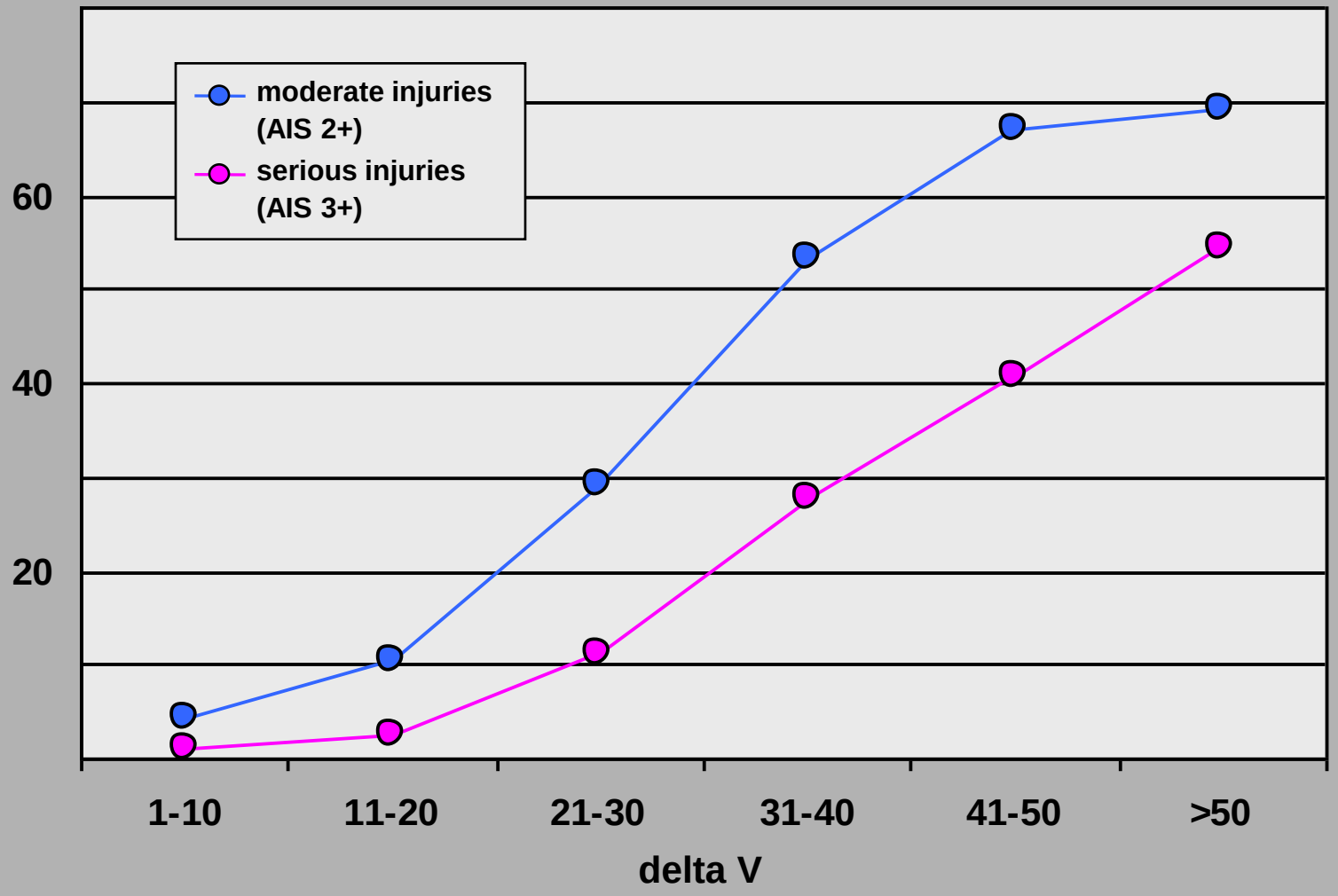
- Analyzed 460 estimates of the relationship between speed and crashes
- Speed has major impact on number of crashes and injury severity
- Relationship between speed and road safety is causal, not just statistical

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 (**Δ**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



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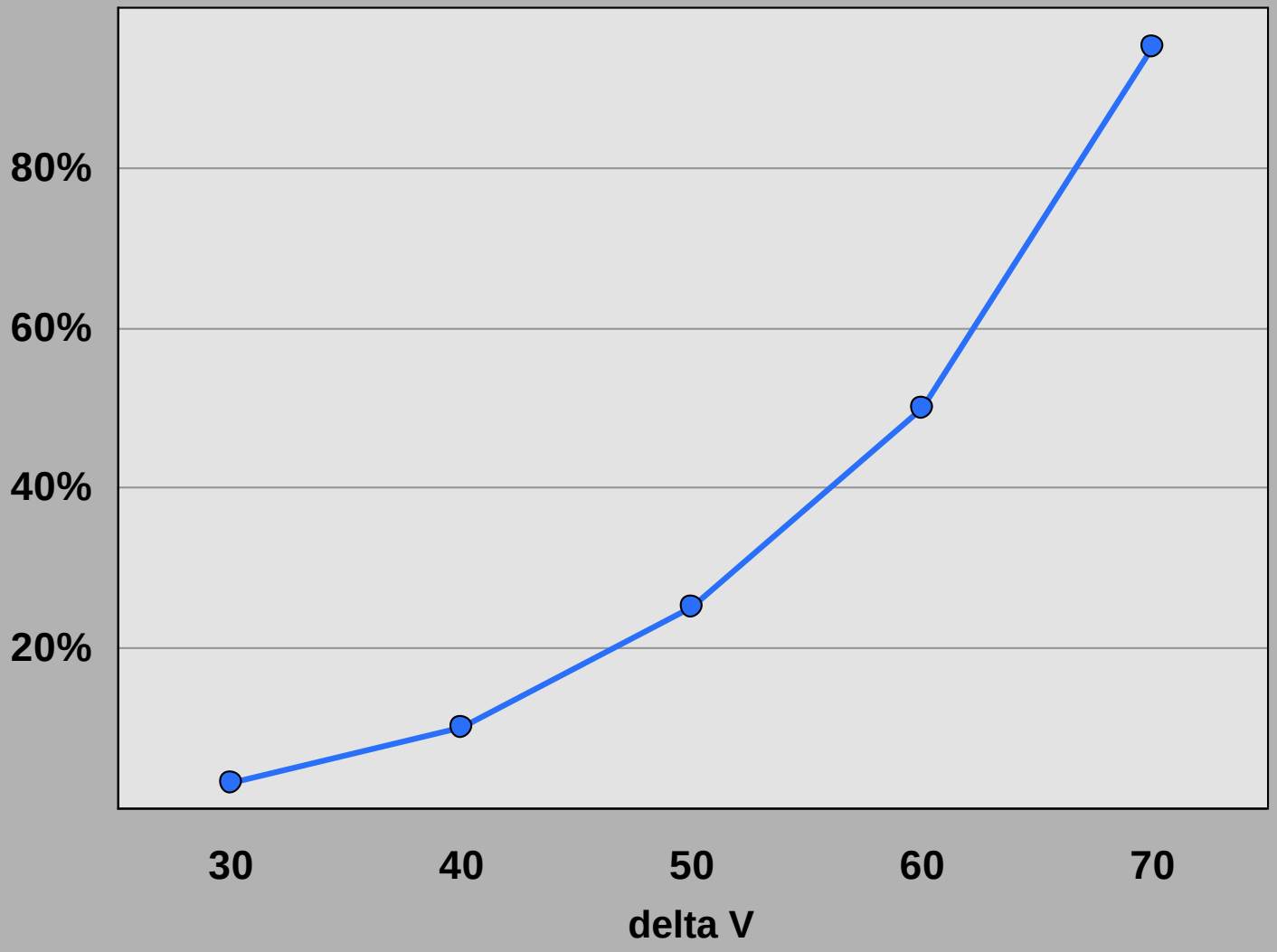
Driver fatality risk in relation to delta V

Probability of death, Joksch (1993)



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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

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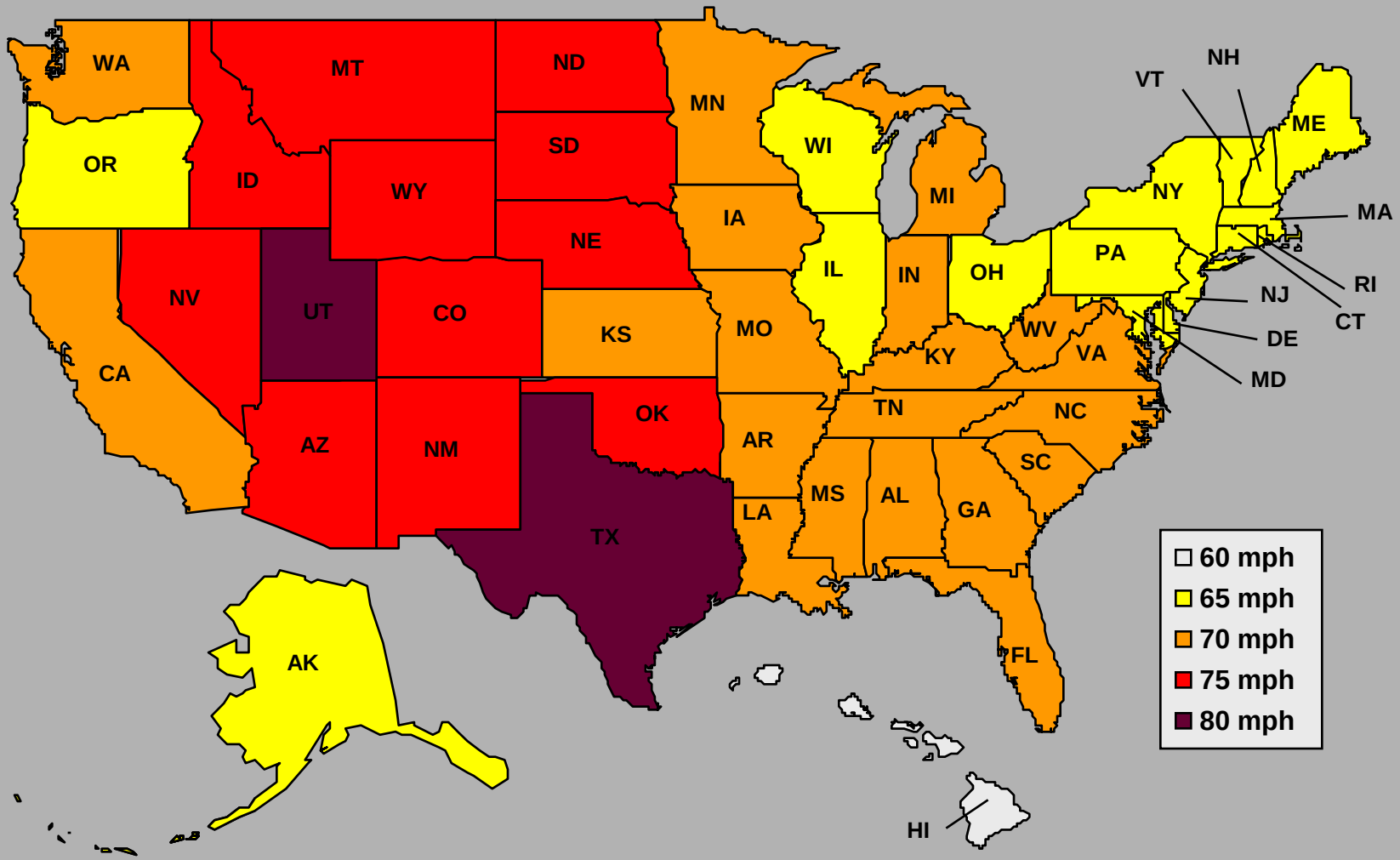
- On urban freeways where limits increased from 55 to 65 or 70 mph:
  - mean and 85th percentile car speeds increased 2-5 mph
  - proportion exceeding 70 mph increased 15-20 percent
  - speed variation increased 5-15 percent
- Fatality rates per vehicle miles traveled increased 17 percent on interstates in 24 states that raised speed limits

Maximum authorized speed limits

August 2008



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Why photo enforcement?

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Traditional police enforcement

- Publicized police enforcement can reduce vehicle travel speeds and crashes
- However, many enforcement agencies do not have sufficient resources to mount and sustain effective speed enforcement programs

Limitations of conventional traffic enforcement

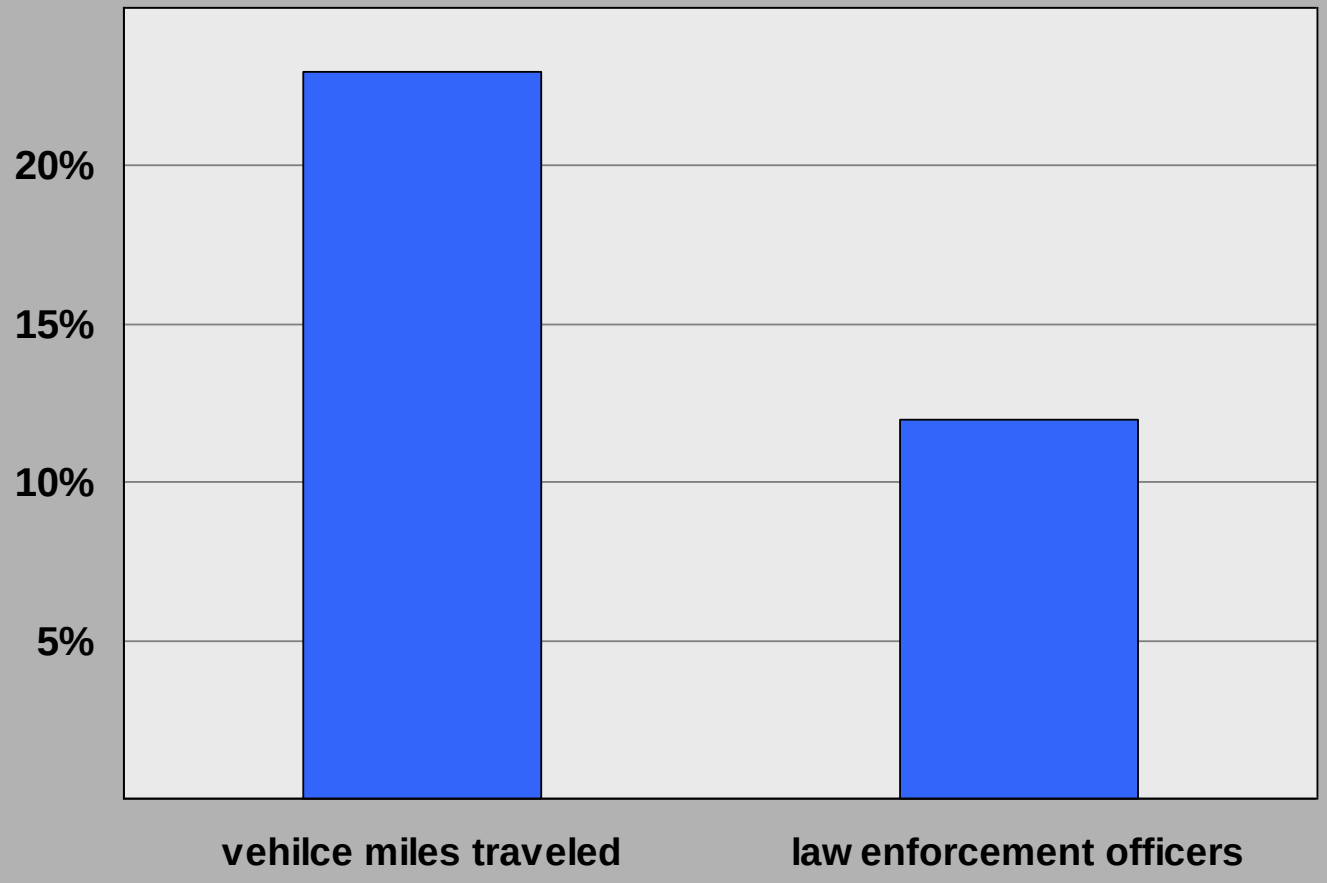
- Time consuming
- Other priorities such as violent crime and homeland security limit resources for traffic enforcement
- Difficult to observe and stop violators at the worst places and times and in heavy traffic
- High-speed pursuit can be dangerous for police and civilians

Effects of conventional traffic enforcement often are localized and temporary

- Barnes (1984): speed reductions in vicinity of enforcement site lasted for about 4 to 6 km
- Hauer (1982): reductions in mean speeds up to 28 percent at enforcement site, but effects lasted only for several kilometers
- Unless increased enforcement sustained, crash reduction benefits soon revert to pre-enforcement levels (Axup, 1990)

Police resources have not kept pace with vehicle travel

Growth in municipal law enforcement personnel vs. vehicle miles traveled: U.S. 1995-2005



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Speed cameras

- Proven countermeasure against speed violations and crashes
- Widely used throughout the world
- Can be accompanied by police or placed unattended

Do speed cameras affect traffic speeds?

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Speed camera evaluations in Washington DC and Montgomery County, Maryland

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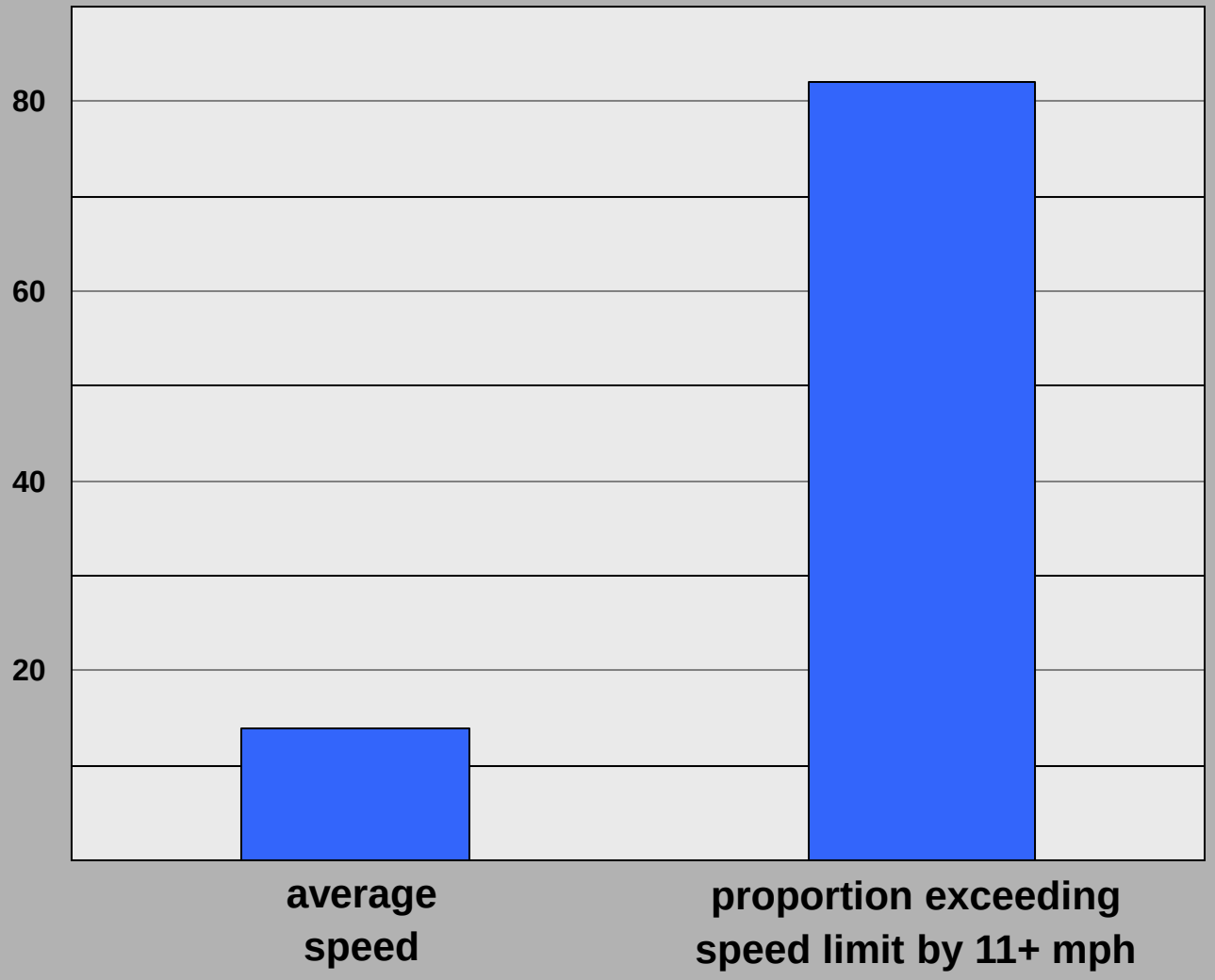
Washington, DC speed camera study

2003

- Speeds monitored at randomly selected sites subject to mobile camera enforcement
- Camera enforcement on streets with 25-35 mph speed limits
- Civil penalty of $30-$200 depending on how many mph above speed limit; no driver license points
- Comparison sites in Baltimore, MD, where speed cameras were not in use

Percent reduction in speeds associated with speed cameras in Washington, DC

Relative to Baltimore comparison sites



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Montgomery County, MD speed camera study
2008

- First Maryland community to use speed cameras
- Camera enforcement limited to school zones and residential streets with speed limits 35 mph or less
- $40 civil penalty issued to registered vehicle owner; no driver license points
- Program included publicity campaign; mobile and fixed speed cameras

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Typical study site on residential street

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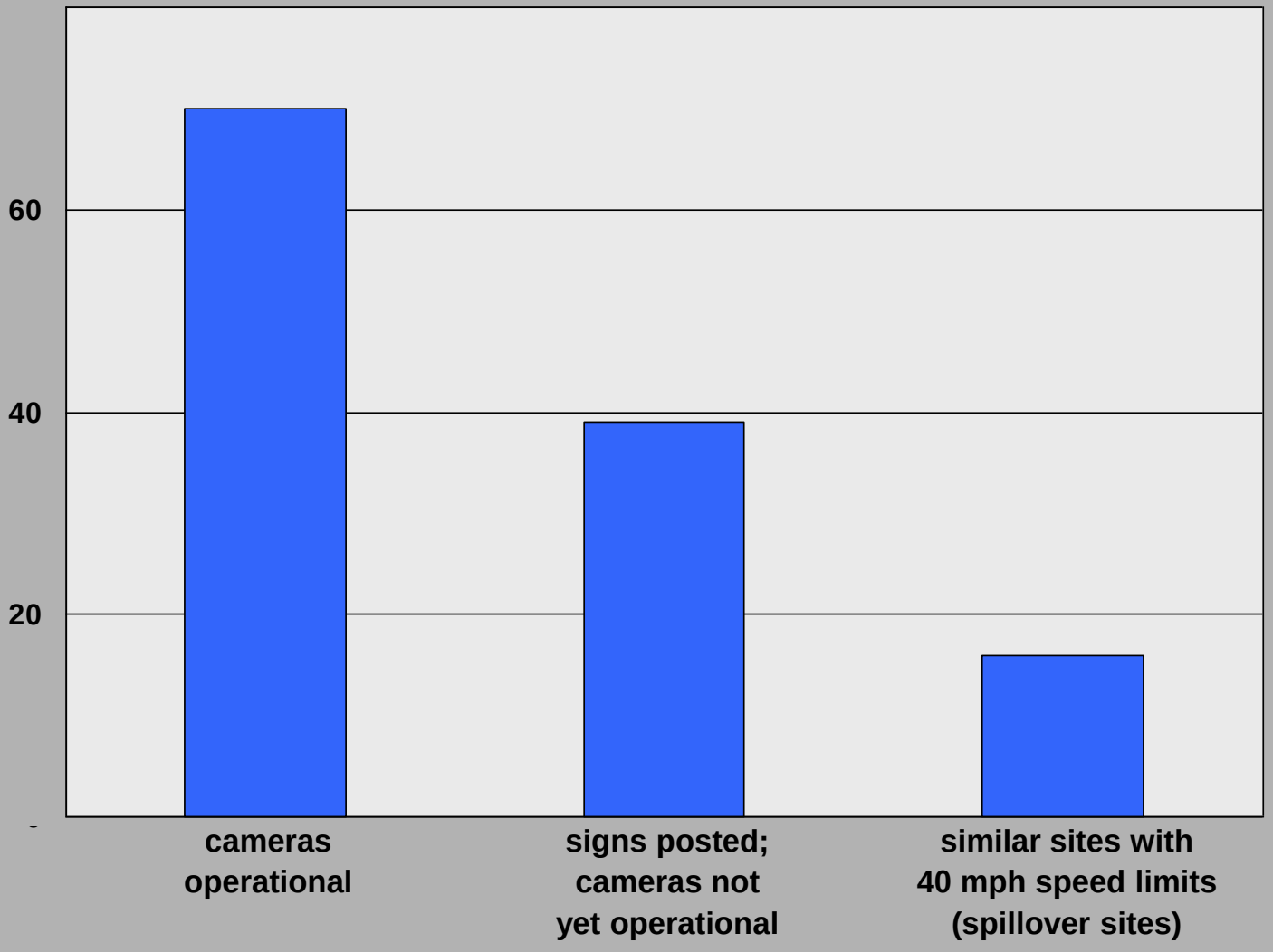
Percent reduction in odds of exceeding speed limit by more than 10 mph associated with camera enforcement

Relative to Virginia comparison sites



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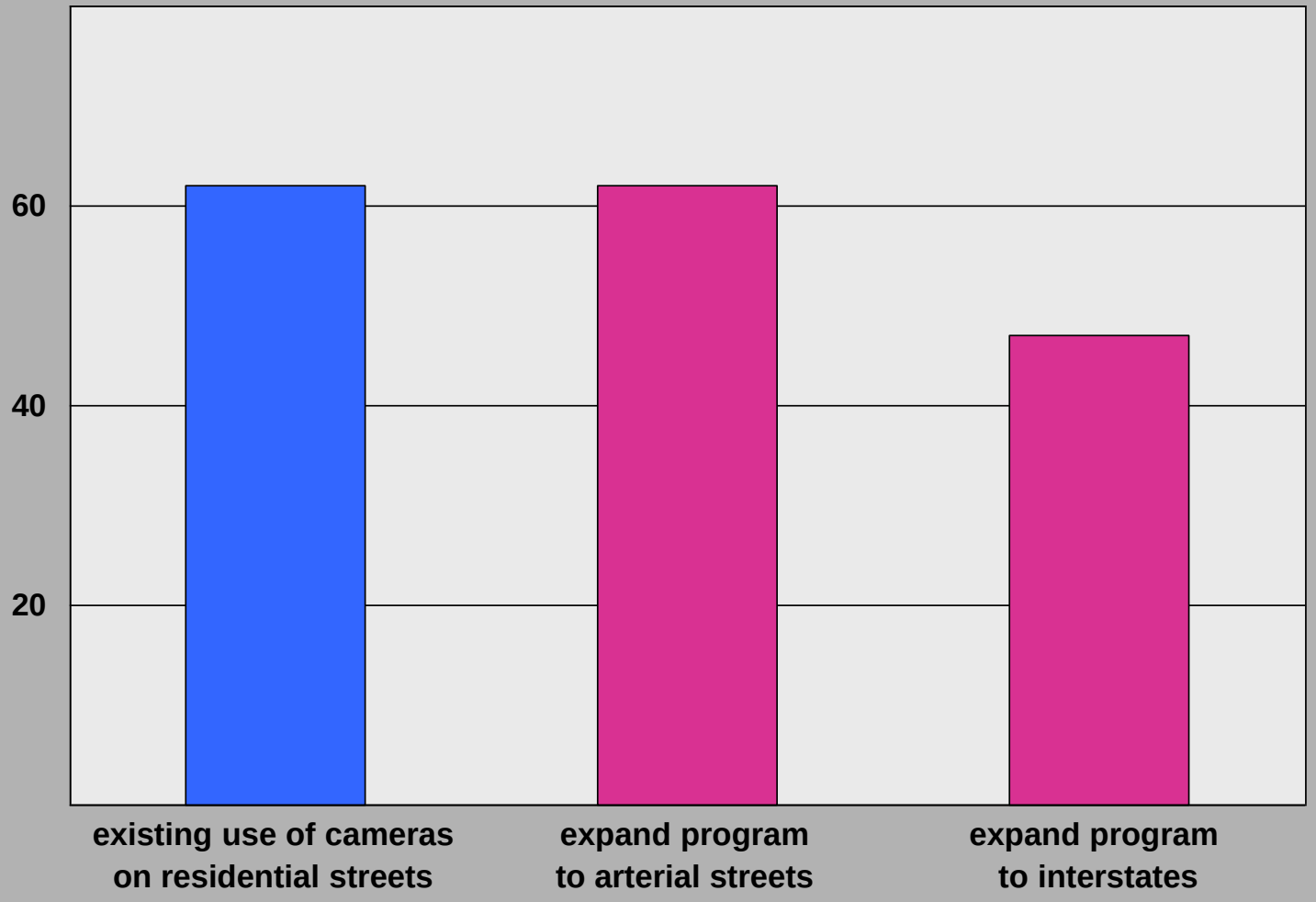
Percent of drivers in favor of speed cameras by road type

6 months after start of enforcement



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Scottsdale, AZ Loop 101 speed camera study
2008

- 9-month pilot program
- First fixed speed cameras on US controlled access highway
- 65 mph speed limit
- 150,000 vehicles per day

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Loop 101 speed camera program

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Vehicle traveling 101 mph

Scottsdale Loop 101

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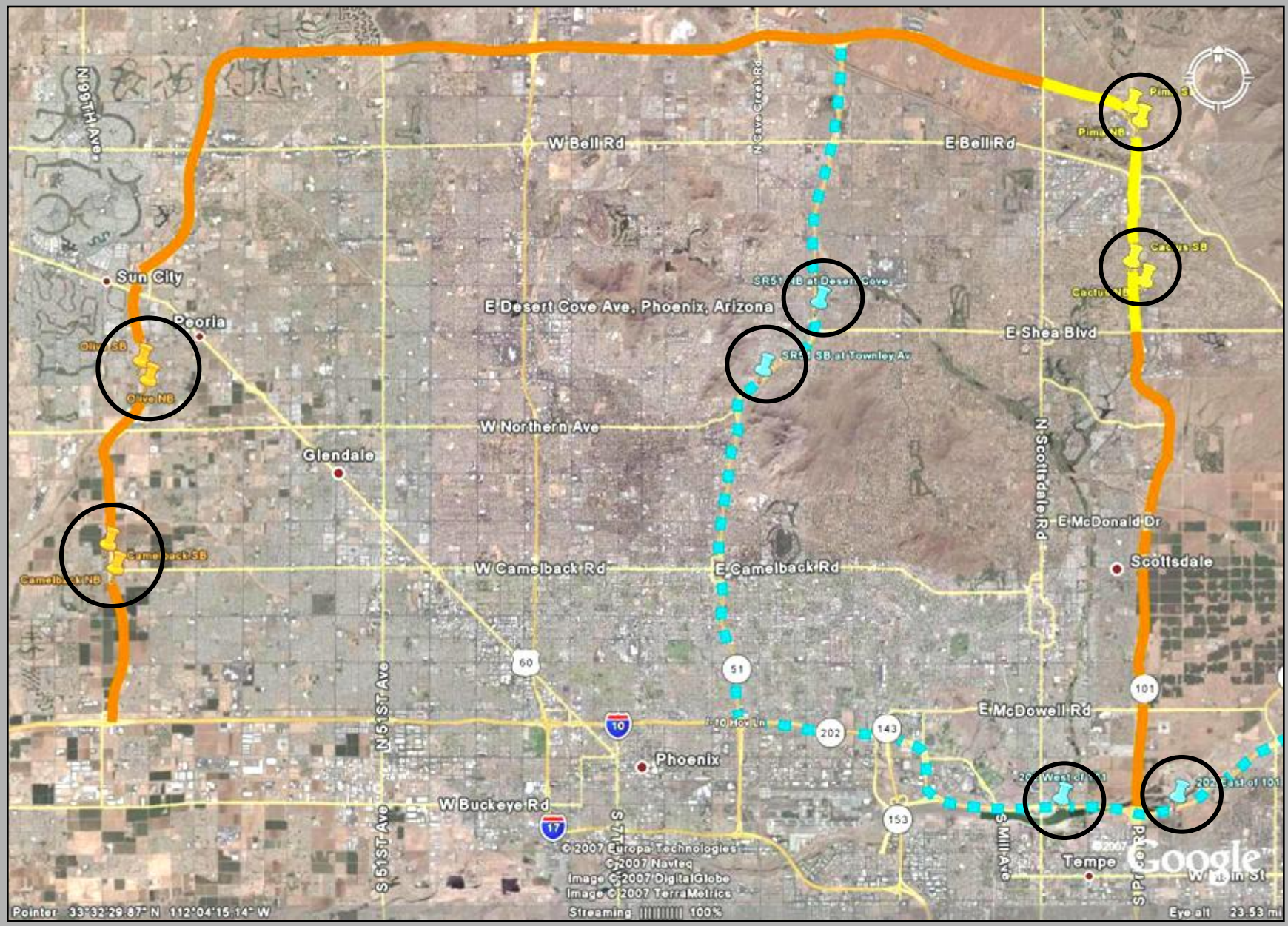
Study sites



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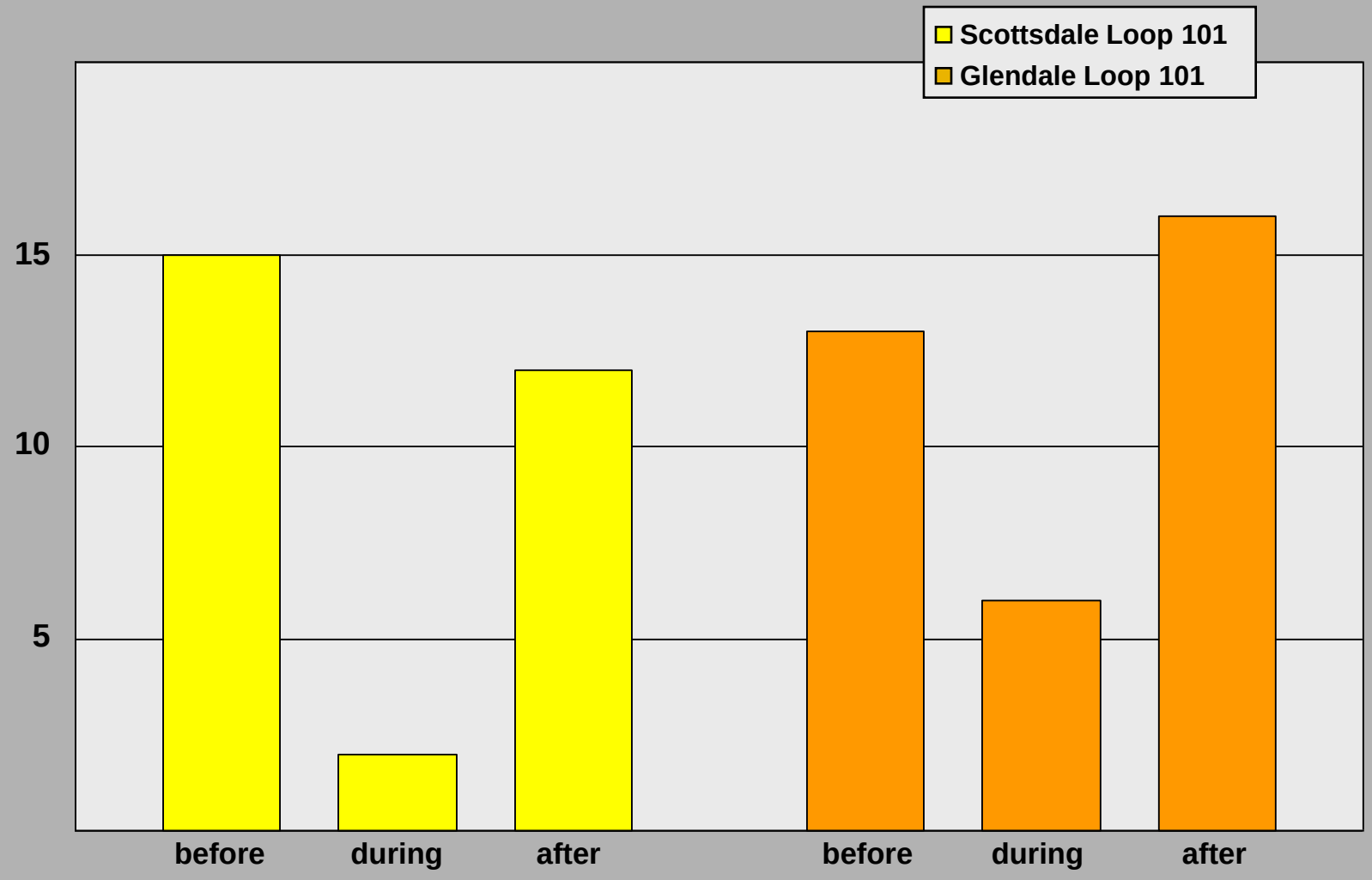
Percent exceeding 75 mph

Before, during, and after speed camera enforcement



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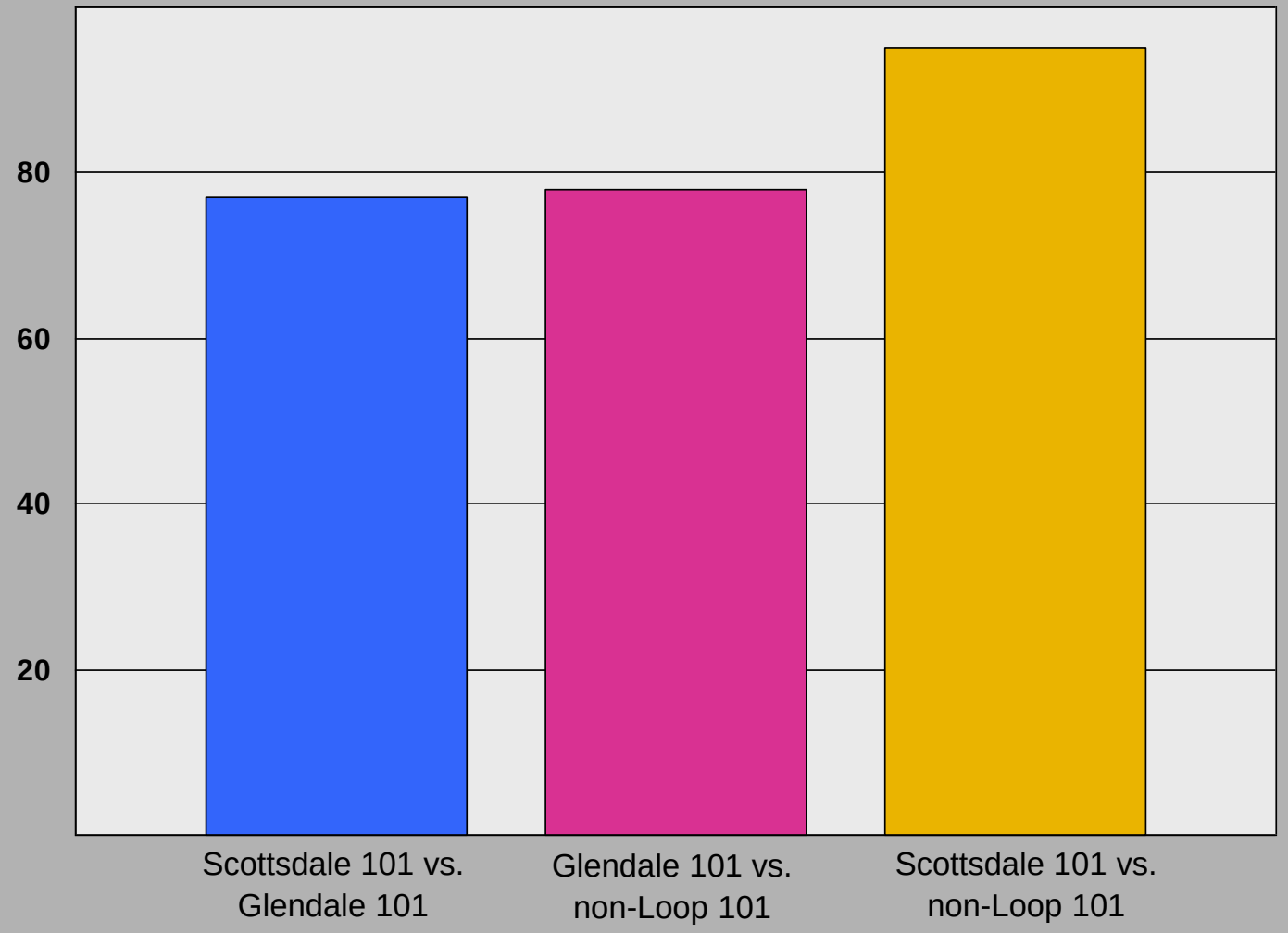
Percent reduction in odds of exceeding 75 mph associated with camera enforcement



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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	62%	77%

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Systematic literature reviews indicate speed camera enforcement can reduce injury crashes

Pilkington and Kinra, 2005 (British Medical Journal) 14 studies	◆ 12-65% reduction in injuries ◆ 17-71% reduction in deaths
Willis et al., 2006 (Cochrane Review) 21 studies	◆ 8-46% reduction in injury crashes ◆ 40-45% reduction in fatal or serious injury crashes
Decina et al., 2007 (NHTSA) 13 studies	◆ 20-25% reduction in injury crashes atn fixed camera sites ◆ 21-51% reduction in injury crashes with mobile speed cameras

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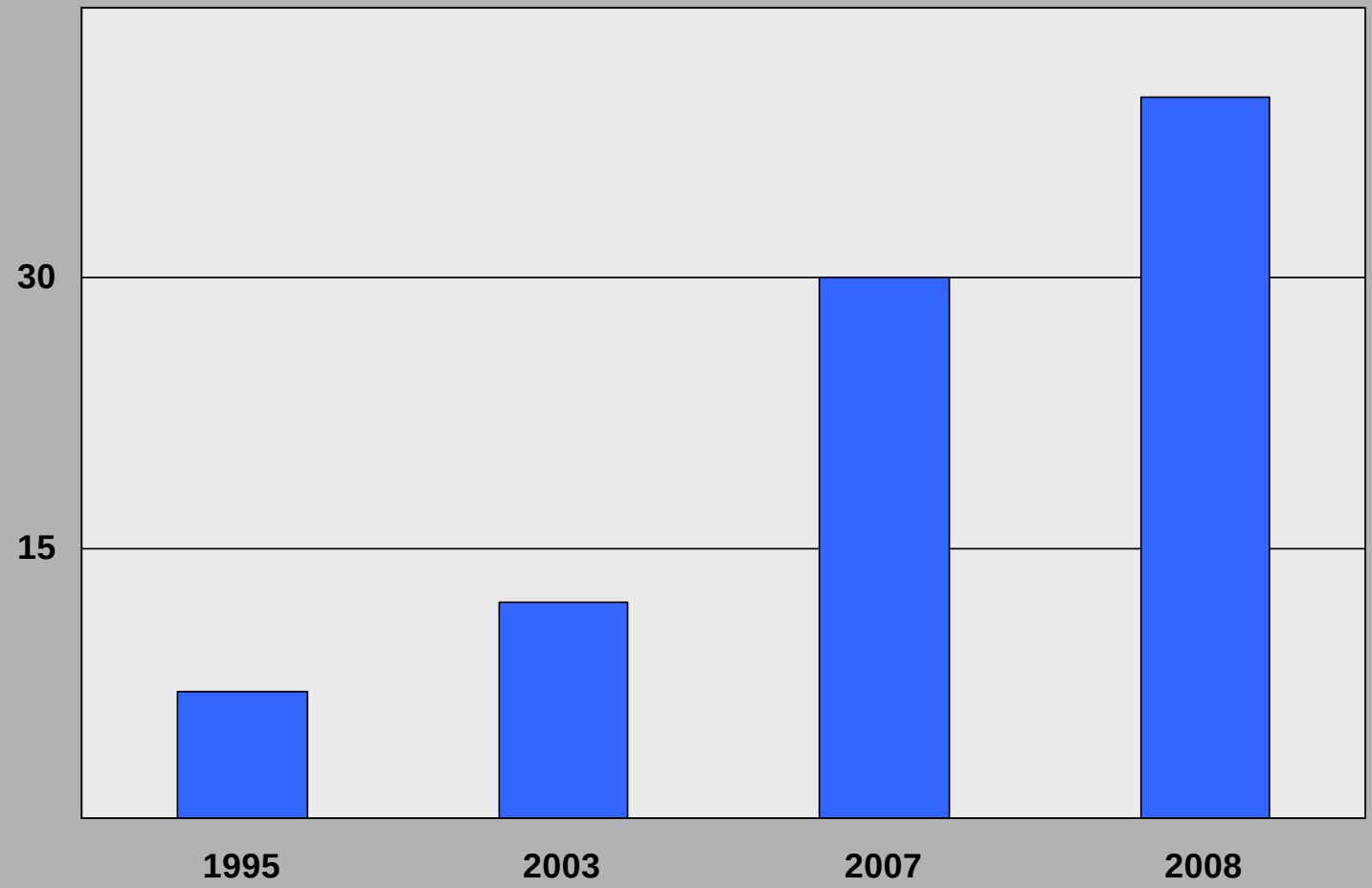
Despite legal challenges, no court has found the concept of photo enforcement unconstitutional

- Driving is regulated activity on public roads
- No expectation of privacy in motor vehicle
- Photo enforcement does not violate presumption of innocence, which attaches at trial, not before
- Courts have found legitimate public safety concerns outweigh privacy concerns

Number of US communities with speed cameras

1995-2008



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Summary

- Despite advances in vehicle crashworthiness and occupant restraints, speeding is a major and persistent factor in crash deaths
- Many drivers travel at high speeds in violation of posted limits
- Effects of conventional traffic enforcement on driver behavior are often localized and temporary
- Supplementing limited police resources with highly visible speed camera programs can significantly reduce speeding behavior and injury crashes

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