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Problem-Oriented Guides for Police
Problem-Specific Guides Series
No. 3

COPS
COMMUNITY ORIENTED POLICING SERVICES
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Speeding in Residential Areas

2nd Edition

Michael S. Scott
with
David K. Maddox

www.cops.usdoj.gov

Center for
Problem-Oriented Policing

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The Internet references cited in this publication were valid as of May 2009. Given that URLs and web sites are in constant flux, neither the author nor the COPS Office can vouch for their current validity.

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About the Problem-Specific Guide Series

The *Problem-Specific Guides* summarize knowledge about how police can reduce the harm caused by specific crime and disorder problems. They are guides to prevention and to improving the overall response to incidents, not to investigating offenses or handling specific incidents. Neither do they cover all of the technical details about how to implement specific responses. The guides are written for police—of whatever rank or assignment—who must address the specific problem the guides cover. The guides will be most useful to officers who:

- **Understand basic problem-oriented policing principles and methods.** The guides are not primers in problem-oriented policing. They deal only briefly with the initial decision to focus on a particular problem, methods to analyze the problem, and means to assess the results of a problem-oriented policing project. They are designed to help police decide how best to analyze and address a problem they have already identified. (A companion series of *Problem-Solving Tools* guides has been produced to aid in various aspects of problem analysis and assessment.)
- **Can look at a problem in depth.** Depending on the complexity of the problem, you should be prepared to spend perhaps weeks, or even months, analyzing and responding to it. Carefully studying a problem before responding helps you design the right strategy, one that is most likely to work in your community. You should not blindly adopt the responses others have used; you must decide whether they are appropriate to your local situation. What is true in one place may not be true elsewhere; what works in one place may not work everywhere.

- **Are willing to consider new ways of doing police business.** The guides describe responses that other police departments have used or that researchers have tested. While not all of these responses will be appropriate to your particular problem, they should help give a broader view of the kinds of things you could do. You may think you cannot implement some of these responses in your jurisdiction, but perhaps you can. In many places, when police have discovered a more effective response, they have succeeded in having laws and policies changed, improving the response to the problem. (A companion series of *Response Guides* has been produced to help you understand how commonly-used police responses work on a variety of problems.)
- **Understand the value and the limits of research knowledge.** For some types of problems, a lot of useful research is available to the police; for other problems, little is available. Accordingly, some guides in this series summarize existing research whereas other guides illustrate the need for more research on that particular problem. Regardless, research has not provided definitive answers to all the questions you might have about the problem. The research may help get you started in designing your own responses, but it cannot tell you exactly what to do. This will depend greatly on the particular nature of your local problem. In the interest of keeping the guides readable, not every piece of relevant research has been cited, nor has every point been attributed to its sources. To have done so would have overwhelmed and distracted the reader. The references listed at the end of each guide are those drawn on most heavily; they are not a complete bibliography of research on the subject.
- **Are willing to work with others to find effective solutions to the problem.** The police alone cannot implement many of the responses discussed in the guides. They must frequently implement them in partnership with other responsible private and public bodies including other government agencies, non-governmental organizations, private businesses, public utilities, community groups, and individual citizens. An effective problem-solver must know how to forge genuine partnerships with others and be prepared to invest considerable effort

in making these partnerships work. Each guide identifies particular individuals or groups in the community with whom police might work to improve the overall response to that problem. Thorough analysis of problems often reveals that individuals and groups other than the police are in a stronger position to address problems and that police ought to shift some greater responsibility to them to do so. Response Guide No. 3, *Shifting and Sharing Responsibility for Public Safety Problems*, provides further discussion of this topic.

The COPS Office defines community policing as "a philosophy that promotes organizational strategies, which support the systematic use of partnerships and problem-solving techniques, to proactively address the immediate conditions that give rise to public safety issues such as crime, social disorder, and fear of crime." These guides emphasize *problem-solving* and *police-community partnerships* in the context of addressing specific public safety problems. For the most part, the organizational strategies that can facilitate problem-solving and police-community partnerships vary considerably and discussion of them is beyond the scope of these guides.

These guides have drawn on research findings and police practices in the United States, the United Kingdom, Canada, Australia, New Zealand, the Netherlands, and Scandinavia. Even though laws, customs and police practices vary from country to country, it is apparent that the police everywhere experience common problems. In a world that is becoming increasingly interconnected, it is important that police be aware of research and successful practices beyond the borders of their own countries.

Each guide is informed by a thorough review of the research literature and reported police practice, and each guide is anonymously peer-reviewed by a line police officer, a police executive and a researcher prior to publication. The review process is independently managed by the COPS Office, which solicits the reviews.

For more information about problem-oriented policing, visit the Center for Problem-Oriented Policing online at www.popcenter.org. This website offers free online access to:

- the *Problem-Specific Guides* series,
- the companion *Response Guides* and *Problem-Solving Tools* series,
- special publications on crime analysis and on policing terrorism,
- instructional information about problem-oriented policing and related topics,
- an interactive problem-oriented policing training exercise,
- an interactive *Problem Analysis Module*,
- online access to important police research and practices, and
- information about problem-oriented policing conferences and award programs.

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The project team that developed the guide series comprised Herman Goldstein (University of Wisconsin Law School), Ronald V. Clarke (Rutgers University), John E. Eck (University of Cincinnati), Michael S. Scott (University of Wisconsin Law School), Rana Sampson (Police Consultant), and Deborah Lamm Weisel (North Carolina State University.)

Members of the San Diego; National City, California; and Savannah, Georgia, police departments provided feedback on the guides' format and style in the early stages of the project.

Debra Cohen, Ph.D., oversaw the second edition of this guide for the COPS Office. Karin Schmerler, Rita Varano, Nancy Leach, and Cynthia Pappas oversaw earlier aspects of this project for the COPS Office. Phyllis Schultze oversaw the research for the guide at Rutgers University's Criminal Justice Library. Suzanne Fregly edited this guide.

Contents

The Problem of Speeding in Residential Areas

What This Guide Does and Does Not Cover

This guide addresses the problem of speeding in residential areas, one of the most common sources of citizen complaints to the police. The guide begins by describing the problem and reviewing factors that increase its risks. It then identifies a series of questions to help you analyze your local speeding problem. Finally, it reviews responses to the problem and what is known about them from evaluative research and police practice.[§]

[§]See the companion online learning module on Speeding in Residential Areas at www.popcenter.org/learning/speeding.

Speeding in residential areas is but one aspect of the larger set of problems related to speeding and traffic safety. This guide is limited to addressing the particular harms created by speeding in residential areas. Related problems not directly addressed in this guide, each of which requires separate analysis, include the following:

- Aggressive and reckless driving (commonly referred to as "road rage")
- Drunken driving
- Inattentive driving
- Pedestrian injuries and fatalities
- Running of red lights
- Speeding and traffic crashes on highways
- Speeding and traffic crashes on rural roads
- Street racing
- Traffic congestion around schools.

Other guides in this series—all listed at the end of this guide—cover some of these related problems. For the most up-to-date listing of current and future guides, see www.popcenter.org.

General Description of the Problem

Speeding in residential areas is often community groups' chief concern, largely because of the perceived risks to children. Yet because speeding must compete with other problems for police attention, problems that may appear far more serious, police often do not devote a lot of resources to it.

Speeding in residential areas causes five basic types of harm.

1. It makes citizens fear for children's safety.
2. It makes pedestrians and bicyclists fear for their safety.
3. It increases the risk of vehicle crashes.
4. It increases the seriousness of injuries to a speeder's own passenger(s) and to other drivers and passenger(s), pedestrians and bicyclists a vehicle strikes.
5. It increases noise from engine acceleration and tire friction.

Speeding increases the risks of crashes and injuries for several reasons:

- The driver is more likely to lose control of the vehicle.
- The vehicle safety equipment is less effective at higher speeds.
- The distance it takes to stop the vehicle is greater.
- The vehicle travels farther during the time it takes the driver to react to a hazard.
- Crashes are more severe at higher speeds.[1]

Factors Contributing to Speeding in Residential Areas

Understanding the factors that contribute to your problem will help you frame your own local analysis questions, determine good effectiveness measures, recognize key intervention points, and select appropriate responses.

Even modestly higher speeds can spell the difference between life and death for pedestrians struck by a vehicle. The impact's force on the human body is more than one-third greater at 35 mph than at 30 mph.[2] Each 1-mph reduction in average speeds translates roughly to a 5 percent reduction in vehicle crashes.[3]

Speeders are disproportionately involved in vehicle crashes.[4] Speeding is a contributing factor in about one-eighth of *all* crashes and in about one-third of all *fatal* crashes.[5] Most crashes occur in urban areas, although most fatalities occur on more-remote highways.[6]

Beliefs and Attitudes About Speeding

Many cultures heavily promote speeding, giving it a generally positive social image. Vehicle advertisements often show driving that would be unsafe for average drivers on real roads. Most drivers do not think speeding is a particularly serious or dangerous offense, except in areas where children might be present.[7] Drivers tend to overestimate their driving skills and underestimate the crash risks.[8] Drivers tend to feel they can travel seven to eight mph over the posted speed limit without the police's citing them.[9] Chronic speeders also have a greater likelihood of being involved in crashes.[10]

Speed-related vehicle collisions are more commonly thought of and referred to as "accidents" rather than "crashes," suggesting that collisions are not drivers' fault. Studies in Canada and Australia, as well as in the United States, have found that a driver's risk of a crash increases in direct proportion to the number of times police have cited the driver for speed violations in the past.[11]

Many drivers admit to speeding in residential areas.[12] Their reasons for speeding include running late and wanting to make up for lost time, being unaware of the speed limit and trying to keep up with other traffic.[13] The most important factor in determining speed is the driver's perception of the road environment and of what speed is safe to drive.[14, §] Whatever drivers' specific reasons, it appears they make calculated decisions to speed,[15] creating opportunities for the police to alter their calculations.[§§]

From a wider social policy perspective, reducing speed must be balanced with other goals such as promoting a healthy economy (which partly entails getting goods and services delivered quickly), reducing environmental pollution and promoting healthful behavior (by encouraging walking, running and bicycling).[16]

[§]Traffic engineers take drivers' perceptions into account in setting speed limits. The common standard for a posted speed limit is the speed at which 85 percent of drivers travel at or below, known as the 85th-percentile speed (National Highway Traffic Safety Administration 1997).

[§§]For detailed information on drivers' habits, attitudes and beliefs, see National Highway Traffic Safety Administration (1998); U.K. Department of the Environment, Transport and the Regions (1998); and Corbett and Simon (1992).

Understanding Your Local Problem

The information provided above is only a generalized description of speeding in residential areas. You must combine the basic facts with a more specific understanding of your local problem. Analyzing the local problem carefully will help you design a more effective response strategy.

Stakeholders

In addition to criminal justice agencies, the following groups have an interest in the speeding-in-residential-areas problem, and you should consider the contribution they might make to gathering information about the problem and responding to it:

- Neighborhood and business associations (these associations often receive complaints about speeding and can mobilize support from the local government)
- Local government agencies and committees that deal with traffic engineering, public transportation, planning, and noise abatement (these agencies and committees have useful data, expertise and resources)
- School boards, school administrators and school parent associations (these groups have special interests in protecting students' safety around schools, capacities to mobilize support and resources that they might dedicate).

Asking the Right Questions

The following are some critical questions you should ask in analyzing your particular problem of speeding in residential areas, even if the answers are not always readily available. Your answers to these and other questions will help you choose the most appropriate responses later on.

Crashes and Complaints

- How many crashes occur in residential areas? How many are crashes with other vehicles? Pedestrians? Bicyclists?
- How serious are the injuries?
- What percentage of crashes in residential areas are speed-related?
- How, specifically, do the speed-related crashes occur? A single vehicle's going off the road? Multiple vehicles' crashing into one another? Head-on, rear-end, side-impact crashes?
- Are there multiple factors involved, such as speeding to make it through yellow traffic lights?
- How many complaints do police receive about speeding in residential areas? What, specifically, do citizens complain about? Actual crashes? Fear of walking or riding? Noise?

Speeders

- Who are the most frequent offenders? Area residents? Commuters? Visitors? Why do they say they speed? Where are they coming from? Where are they going?
- Who are the worst offenders? How fast do they drive?

Locations/Times

- On which specific streets or blocks is speeding a problem? On what days and at what times? (Computer mapping software can help you answer many questions about where and when the problem occurs.)
- Is the speed limit prominently posted?
- Is the speed limit proper for road conditions? Too high? Too low? What is the 85th-percentile speed?
- What road conditions make speeding more likely? Can these conditions be modified?
- Do crashes occur at intersections, on straight roads or in curves?

Current Responses

- How much do officers conduct speed enforcement in the problem areas now? What factors determine where they conduct it? Do police conduct speed and crash studies before targeting particular locations for enforcement?
- What is the formal or informal tolerance range before officers issue citations? What do most drivers think it is?
- Do officers give warnings in lieu of citations? Do they officially record those warnings? What criteria do they use in deciding to give warnings?
- Does the law allow police to use speed cameras? If so, do they use them in residential areas?
- What are the typical fines and penalties for speeding in the problem areas? Do they seem to be meaningful consequences for offenders?
- Have officers used speed-display boards in problem areas?
- Do officers work closely with road and traffic engineers to establish speed limits, develop traffic-calming strategies, and identify and correct speed-related problems?

Measuring Your Effectiveness

Measurement allows you to determine to what degree your efforts have succeeded, and suggests how you might modify your responses if they are not producing the intended results. You should take measures of your problem *before* you implement responses, to determine how serious the problem is, and *after* you implement them, to determine whether they have been effective. You should take all measures in both the target area and the surrounding area. (For more detailed guidance on measuring effectiveness, see the companion guide to this series, *Assessing Responses to Problems: An Introductory Guide for Police Problem-Solvers.*)

Speeding, unlike so many other problems the police must address, allows for precise measurement—of speeds, crashes, causes, complaints, etc. Measures of the effectiveness of responses to speeding problems, therefore, can and should be reliable and accurate. The following are potentially useful measures of the effectiveness of responses to speeding in residential areas:

- The average speeds of vehicles (taken in mid-blocks)
- The percentage of vehicles speeding
- The percentage of vehicles exceeding the speed limit by various amounts
- The number of vehicle crashes
- The number of injuries vehicle crashes cause
- The severity of injuries vehicle crashes cause
- The number of citizen complaints about speeding.

The number of citations issued is *not* an appropriate measure of the your responses' impact; it merely provides information about police enforcement levels. Pay attention to your efforts' possible displacement effects: drivers may divert to adjoining areas or roads, with positive or negative results.§

§ See Problem-Solving Tools Guide No. 10, *Analyzing Crime Displacement and Diffusion* for further information.

Responses to the Problem of Speeding in Residential Areas

Your analysis of your local problem should give you a better understanding of the factors contributing to it. Once you have analyzed your local problem and established a baseline for measuring effectiveness, you should consider possible responses to address the problem.

The following response strategies provide a foundation of ideas for addressing your particular problem. These strategies are drawn from a variety of research studies and police reports. Several of these strategies may apply to your community's problem. It is critical that you tailor responses to local circumstances, and that you can justify each response based on reliable analysis. In most cases, an effective strategy will involve implementing several different responses.

Law enforcement responses alone are seldom effective in reducing or solving the problem. Do not limit yourself to considering what police can do: carefully consider whether others in your community share responsibility for the problem and can help police better respond to it. The responsibility of responding, in some cases, may need to be shifted toward those who have the capacity to implement more-effective responses. (For more-detailed information on shifting and sharing responsibility, see Response Guide No. 3, *Shifting and Sharing Responsibility for Public Safety Problems*).

Engineering Responses

1. Using traffic-calming. Traffic-calming describes a wide range of road and environmental design changes that either make it more difficult for a vehicle to speed or make drivers believe they should slow down for safety.[17, §] The measures are also intended to make roads easier and safer for pedestrians and bicyclists to use. Traffic-calming measures are particularly effective at reducing speeds in residential areas.[18] Common traffic-calming measures are divided into three main categories: vertical deflections, horizontal deflections and horizontal narrowing:

[§]The U.S. Transportation Department prepares traffic-advisory leaflets that provide illustrations and technical details about many road design features. There are also a number of useful web-based summaries and descriptions of traffic-calming measures: see, for example, TrafficCalming.org, the Federal Highway Administration, at www.fhwa.dot.gov/environment/tcalm/, and the Los Angeles County Public Works Department's neighborhood traffic-management-plan toolbox, at ladpw.org/TNL/NTMP/.

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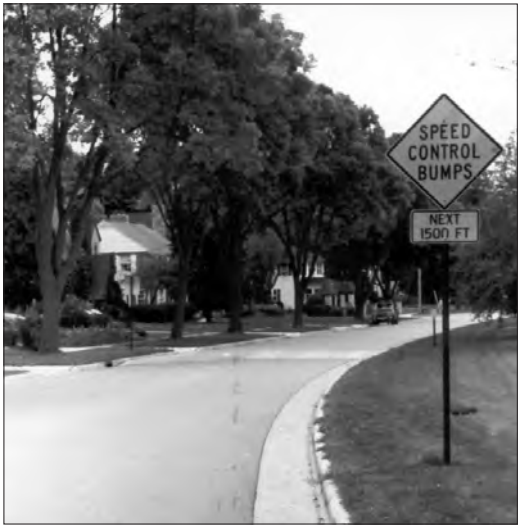

Although the street sign describes them as "speed bumps," these "speed humps" can be crossed safely by cars traveling 20 to 30 mph.

[§]Some jurisdictions have experimented with placing optical illusions of speed bumps, potholes or other obstructions on the road. These devices tend to have at least a short-term effect of reducing speeds until drivers realize they are illusions. There is an obvious risk that drivers might subsequently come to believe that real obstacles are illusions and fail to slow down when they should.

1a. Vertical Deflection

Speed humps. Speed (or road) *humps* are different from speed *bumps*. Speed *humps* are about 12 feet wide and 2 to 3 inches high, and can be crossed safely at 20 to 30 mph. Properly designed, they can accommodate large vehicles such as fire trucks. Speed *bumps* are shorter and narrower, and can be crossed safely only at lower speeds. They can damage large vehicles. They are more appropriately installed in parking lots than on roads.[§]

Speed tables. Speed tables are similar to speed humps, but are usually long enough for the entire wheelbase of a passenger car to rest on top of the flat, top section. They are often made with brick or other textured materials to draw attention to them or improve their appearance.

Raised crosswalks. These are speed tables placed at crosswalks and outfitted with crosswalk markers to improve pedestrian visibility to motorists.

Speed cushions. Speed cushions are narrow, rectangular humps that are placed close enough to reduce the speed of passenger vehicles, but that allow vehicles with wide tracks, such as emergency vehicles and buses, to straddle them and not affect their speed.

Raised intersections. These are similar to raised crosswalks, but cover the entire intersection, identifying it as a pedestrian zone.

Textured pavements. Pavements made from brick or cobblestone can be used for entire street blocks and can substantially reduce vehicle speeds.

1b. Horizontal Deflection

Traffic circles. Traffic circles are raised islands placed at intersections where traffic volume is not a concern.

Roundabouts.§ Roundabouts are similar to traffic circles but are used in areas where traffic volume is also a consideration.

Chicanes. Chicanes are traffic deflections that narrow or redirect the road.

Realigned intersections. Realigning intersections involves putting bends and curves in the road at "T" intersections to help reduce speeds.

§It is essential that vehicles traveling *in* the roundabouts have the right-of-way, rather than those *entering* the roundabouts, for them to be effective in reducing crashes (National Highway Traffic Safety Administration 1999).

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Traffic circles, of varying sizes, reduce speeds and crashes in residential areas.

1c. Horizontal Narrowing

Neckdowns. Neckdowns are built-out curbs at intersections that reduce the width of the road and the distance needed for pedestrians to cross.

Center islands. These are raised islands in the centerline of a road. They can be installed as gateways to residential neighborhoods.

Chokers. These are mid-block build-outs (sidewalk-area extensions into the road).

Other strategies include:

- Marking the road to create the illusion that it is narrowing
- Planting trees and other foliage along roadsides
- Permitting parking on both sides of residential streets §
- Timing traffic signals for vehicles traveling the desired speed
- Erecting mid-block barriers that create two cul-de-sacs.

§The speed reductions achieved by permitting parking must be offset against the increased risk to pedestrians who dart into the road from between parked vehicles.

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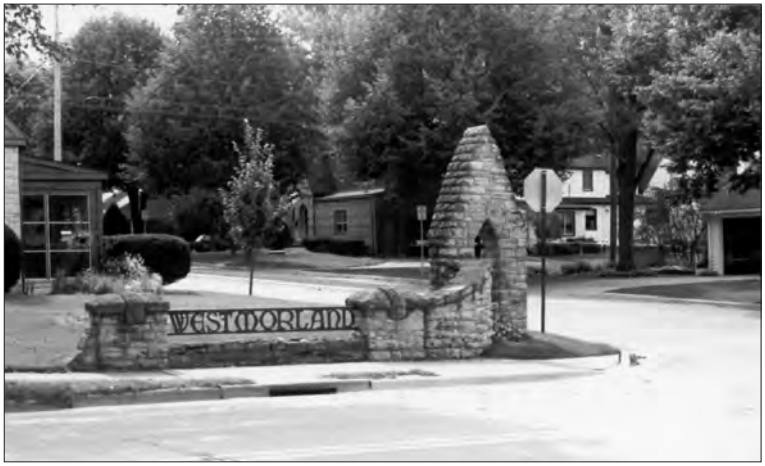

Neighborhood gateways remind drivers that they are entering residential areas where lower speeds are appropriate.

Traffic-calming measures can be expensive, however, so you must determine their cost-effectiveness over the long term. Traffic-calming measures work best if they are understood and accepted by the public, take into account the special requirements of emergency response vehicles and are reinforced with adequate levels of police enforcement.[19] Properly designed, traffic-calming measures can also reduce noise levels by reducing vehicle acceleration. Without traffic-calming measures, it is difficult for police to reduce average vehicle speeds below 25 mph.[20]

2. Posting warning signs and signals. Painting speed limits or "SLOW" on the road surface, in combination with posting roadside signs, can help reduce speeds.[21] Transverse pavement markings create the illusion of high speed, and when placed ahead of traffic hazards, have been shown to cause drivers to slow down.[22] Strobe-light signals, flashing signals and warning signs painted in eye-catching fluorescent colors can improve drivers' awareness of special hazards and reduced speed limits.[23] Where there are many other signs and sights competing for drivers' attention, it is hard to get drivers to notice speed warnings. Warning signs and signals are more effective if they convey why drivers should slow down (e.g., curve ahead, school zone, road construction).[24] Other signs, such as those that warn of children in the area, are not known to effectively reduce speeds.[25]

3. Blending motor and non-motor vehicle uses of public space through urban design. In some communities, urban planners are rethinking the conventional separation of driving and nondriving uses of public space. They are removing standard barriers, signs and road markings that delineate where vehicles, bicycles and pedestrians belong, replacing them with gateways, new surface materials and street furniture, such as benches, short posts or pillars, streetlamps, waste bins, fountains, and bus stops. This reduces the traditional separation between motorists, bicyclists and pedestrians by eliminating wide, straight routes and blurring the lines between public and private space. The results are greatly reduced speeds because motorists recognize that they are sharing the space with non-motorized users and therefore must be more cautious.[26] First pioneered by the Dutch, these designs are being used successfully in the United States in Seattle; Portland and Eugene, Oregon; and West Palm Beach and Sarasota, Florida.

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Warning signs such as these pedestrian-crossing and school-zone signs remind drivers to slow down.

Education Responses

The goal of education responses is to make speeding socially unacceptable. But given the current acceptability of speeding, there is the potential for a negative backlash against antispeeding campaigns.[27]

4. Conducting antispeeding public awareness campaigns. Antispeeding public awareness campaigns have been recommended, even though their effects may not be immediate and substantial; they can help change the social acceptability of speeding and alter drivers' beliefs that they are better and safer than other drivers.[28] Public awareness campaigns need not be overtly accusatory, but should convey facts about the dangers and consequences of speeding so as to debunk common myths about speed and driving. Because many drivers say they speed merely to keep up with traffic, encouraging voluntary compliance with speed limits can help slow down those drivers who consciously or subconsciously follow other drivers' lead.

Targeted information campaigns can be even more effective than publicly broadcast campaigns. Police can issue warnings and requests directly to groups of chronic speeders if they can identify them. For example, Raleigh, North Carolina, police determined that students' parents were the most common speeders near schools: police set up warning signs in the school zones, published speeding education information in the school newsletters, and distributed warning and education information to parents stopped for speeding and those dropping off their children at school, resulting in a doubling of the percentage of drivers obeying the speed limit.[29]

A twist on the conventional public awareness campaign that *discourages* speeding is a campaign that *encourages* obeying the speed limit. In some campaigns of this sort, police have achieved positive results by stopping drivers and thanking them for obeying the speed limit; in others, signs have been posted indicating the percentage of drivers obeying the speed limit.[30]

An interesting method for making the public aware of the hazards of speeding in school zones comes from Lithuania. There, drivers are required to keep their headlights on at all times during the first week school is in session as a reminder to one another to drive carefully where children are present.

Some public awareness campaigns are professionally developed, using television, radio, and billboards. These campaigns typically convey official, government-sanctioned messages about speeding risks. Antispeeding campaigns developed at the grassroots level are potentially even more effective than official campaigns. Using simple lawn signs, speed display boards, warning letters, or personal appeals to speeders who have been stopped, these campaigns can convey more heartfelt messages to speeders about the risks they create.

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Grassroots antispeeding signs convey more heartfelt messages to speeders.

5. Informing complainants about actual speeds. Complainants do not always estimate vehicle speeds accurately. Vehicle speed almost always seems faster to a stationary pedestrian than to a moving motorist. Where you suspect that complainants' concerns may be exaggerated, you might have a police officer monitor speeds with complainants present. Some complainants may be surprised to learn that vehicles are in fact traveling the speed limit. This does not necessarily mean that speeds are appropriate for the conditions, but at a minimum it helps complainants better understand what responses might be most appropriate to remedy the problem.

6. Providing realistic driver training. Realistic driver training similar to what police officers receive can help drivers better appreciate speed's effects on their ability to control a vehicle.[31] Proper, realistic training courses require skilled instructors, special safety equipment and protected driving areas.

Enforcement Responses

7. Enforcing speeding laws. Long-term changes in drivers' attitudes toward speeding depend on drivers' perceived risk of being stopped.[32] However, a considerable investment of resources is required to significantly increase the risk of getting caught.[33] The public generally supports speed enforcement, especially in residential areas and other areas where there are children.[34] Speed enforcement works best if:

- Drivers believe it will occur
- It has meaningful costs to offenders
- Police apply it generally, rather than at specific times and locations
- Drivers are not tipped off by cues as to when it is or is not happening.[35]

With respect to the last condition above, you must balance making the public aware of the enforcement campaign against allowing drivers to anticipate precisely where and when officers are conducting enforcement. For example, you might consider advertising on the radio that the police will be enforcing speeding laws on particular roads on particular days, but not give visual cues to drivers of the exact location of the speed detection devices and officers. This will enhance the deterrent effect for drivers listening to the radio, without reducing the deterrent effect for those who are not. You should vary the enforcement times and locations enough so that drivers do not become confident that they can avoid detection. Advance publicity of enforcement campaigns also increases public support for enforcement by establishing a sense of fairness to drivers. Explaining why police have targeted particular locations for enforcement (e.g., there's a high rate of crashes or citizen complaints) also increases public support.[§] You should conduct enforcement both at problem locations and at randomly selected locations to maximize deterrence.[§§] Stationary marked police vehicles are more effective than moving marked police vehicles in reducing speed.[36]

[§]The Silverthorne, Colorado, Police Department surveyed the community to determine the thresholds at which the public believed the police should issue speeding citations at specific locations. The police issued the survey results to drivers stopped for speeding, thereby enhancing police authority to enforce speeding laws and minimizing citizen complaints about speed enforcement.

[§§]An Australian study concluded that posting police officers in marked police vehicles on randomly selected stretches of road at random times generally is a cost-effective way to maximize deterrence and reduce traffic crashes (Leggett 1997).

Police enforcement is expensive to maintain consistently, and it quickly loses its effect where the enforcement effort is not visible to drivers.[37] Intensive speed enforcement also loses its effectiveness because of the typical incentive system for traffic officers—they are rewarded for issuing citations rather than for maintaining reduced average speeds. Consequently, as soon as the enforcement effort has the positive effect of reducing speeds, there are fewer violations and traffic officers move on to other locations, after which speeds quickly resume their preenforcement levels.[38]

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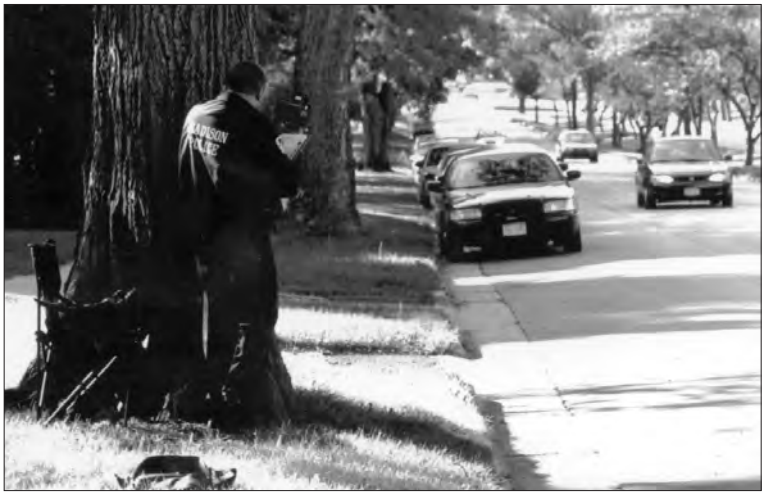

Drivers should not be able to easily detect when and where police are enforcing speed limits.

8. Enforcing speeding laws with speed cameras. Speed cameras, also referred to as *photo radar*, are cost-effective in reducing speeds, crashes, injuries, and fatalities, particularly when detected violations are prosecuted.[39] Police determined that speed cameras, used in conjunction with other responses, have proved effective in reducing the percentage of speeders, vehicle crashes, injuries, and fatalities in Victoria, Australia.[40] There, police mounted speed cameras either in unmarked police vehicles or on tripods along the roadside, without advance warnings to drivers about the cameras' location. The police could move the cameras around so drivers

could not predict where they placed them. Speed-camera use can be effective in residential neighborhoods as well as on major arteries and highways.[41] Some drivers slow down when approaching speed cameras, but quickly speed up once they pass.[42] This can be countered by hiding the cameras better and otherwise preventing drivers from knowing exactly where they are. In some jurisdictions, the relatively inexpensive protective boxes in which speed cameras are placed are mounted in many locations, leaving drivers uncertain as to which boxes actually contain cameras at any particular time.

The public has generally accepted the use of speed cameras, especially in high-risk zones, although there are some strong objections to the invasion of privacy and preferences for personal interactions with enforcers.[43] Some jurisdictions have experienced significant vandalism to speed cameras.[44] The United Kingdom first authorized speed cameras by law in 1991; now, all British police forces use them. Norway has used them effectively since 1988.[45] Not all U.S. jurisdictions have specifically authorized speed cameras for prosecution, and some states and municipalities have specifically rejected proposals for their use. You should first gauge public support for speed cameras before formally attempting to use them. In addition, some issues exist regarding the fees companies that install and operate speed cameras charge, and how the jurisdiction uses revenue generated from fines.

The first generation of speed cameras required that someone take film from the cameras, to be processed. More-advanced technology allows for more-efficient remote-image processing.[46]

9. Using speed display boards. Speed display boards measure oncoming vehicles' speeds and prominently display the speeds to drivers. Research has shown that speed display boards reduce speeds and crashes, seem at least as effective as speed cameras and are more cost-effective.[47] Speed display boards are particularly effective with drivers who do not pay attention to their speed. Large, changeable-message signs that combine site-specific messages with speed displays have effectively reduced speeds by as much as nine mph in and around school speed zones.[48] They are more effective when supplemented with police enforcement—in this combination, the effect can last several weeks after they are removed. Unattended display boards, however, are vulnerable to vandalism.

Kip Kellogg

Speed display boards are a cost-effective way to reduce speeds.

10. Arresting the worst offenders. As one method for changing public attitudes toward speeding, some police agencies have amended their policies and arrested serious offenders (those driving much higher than the speed limit) rather than merely releasing them with a citation. The intent is to convey a strong message that driving well over the speed limit is a seriously dangerous offense and not a harmless technical infraction.[§] This response may require special legislation and policies.

11. Having citizen volunteers monitor speeding. Some police agencies have recruited and trained citizen volunteers to operate speed detection devices in residential areas.[49] The volunteers record the vehicle speeds and license plate numbers and turn them over to the police. Police then send official warning letters to the registered vehicle owners. Other police agencies, such as the Madison, Wisconsin, Police Department, have had citizens join police officers on traffic stops to explain the community's concerns about speeding to drivers.

Responses With Limited Effectiveness

12. Reducing speed limits. Speed limits alone have little effect on actual vehicle speeds. Reducing posted speed limits will typically decrease actual average vehicle speeds by only one-fourth of the reduction.[50] So, for example, reducing the posted speed limit from 30 to 25 mph will reduce actual average vehicle speeds by only a little more than one mph. When police set speed limits lower than what most drivers consider safe (typically, the 85th percentile), the net effect is to cause many drivers to ignore those speed limits, as well as other posted speed limits;[51] if police enforcement of the reduced limits fails to establish a credible deterrent, drivers may increasingly lose respect for *all* speed limits. In some jurisdictions, a posted speed limit lower than the 85th-percentile speed may constitute a legal defense to enforcement. Researchers should conduct careful speed studies before police change speed limits. Similar roads should have similar speed limits so drivers do not come to believe that police arbitrarily set speed limits.[52, §§]

[§]The Glendale, Ariz., Police Department (1998) used this response as part of a comprehensive strategy to reduce speeding. State law specifically authorized the police department's custodial arrest policy.

[§§]The Wisconsin Transportation Information Center (1999) published a guide for setting speed limits on local roads. Although it specifically refers to Wisconsin, much of the information applies to any jurisdiction.

Traffic and road engineers may inadvertently increase vehicle speeds when they build extra safety margins into the road design and speed limit.[53] For example, if they want vehicles to travel 25 mph along a particular road, they might set the speed limit at 25 mph, but design the road using accepted guidelines for 30-mph travel, thinking this will provide an extra safety margin. However, the accepted guidelines already have a safety margin factored into them, resulting in a double safety margin that actually makes the road seem travel-safe at 35 to 40 mph. Because most drivers travel at what they perceive as safe speeds rather than the posted speed limit, they will end up driving 10 to 15 mph faster than the engineers originally intended. This unintended effect reflects an underlying tension in road safety—a desire on the one hand to build roads that encourage drivers to drive at slower, safer speeds, and a desire on the other hand to make roads safe enough for drivers who choose to drive faster. Road and traffic engineers have often tried to resolve this tension by making roads wider, straighter and more obstruction-free. More recent trends have turned in the opposite direction, to get drivers to slow down.

13. Increasing fines and penalties. Higher fines and penalties, beyond the threshold that offenders consider meaningful, do not continue to reduce speeds.[54]

14. Erecting stop signs. Many aggrieved citizens believe that erecting stop signs along residential roads will force drivers to slow down. They pressure elected officials and traffic engineers to erect new stop signs. However, the unintended effects may be that drivers speed up mid-block to make up for lost time, thereby keeping average speeds high, increasing acceleration noise and decreasing fuel efficiency.[55]

15. Installing speed bumps or rumble strips. Speed *bumps*, as opposed to speed *humps*, do not effectively reduce speeds, and can prove hazardous.[56] Rumble strips—intermittent series of bumps across the road—do not reduce speeds directly; they serve merely to warn drivers of a hazard ahead.[57]

16. Reengineering vehicles. New vehicle technology holds some potential to control speeding, but most features are not yet standard or widely accepted by the public.[58] *Speed limiters* prevent a vehicle from going faster than a set speed. Speed limiters can be programmed to receive electronic signals from transmitters along the road and adjust maximum speeds automatically. So-called *smart cards* can electronically record a vehicle's speed and automatically report it to police. *Electronic speed indicators*, reading electronic roadside signals, warn drivers they are speeding, or speed indicators in the vehicle electronically trigger roadside warning signals.

There is currently available more practical and increasingly popular in-vehicle technology that records speeds and other data for later or real-time monitoring by drivers' guardians, commonly teenage drivers' parents. Prosecutors might also consider such technology as a conditional sentence for convicted chronic speeders.

Appendix: Summary of Responses to Speeding in Residential Areas

The table below summarizes the responses to speeding in residential areas, the mechanism by which they are intended to work, the conditions under which they should work best, and some factors you should consider before implementing a particular response. It is critical that you tailor responses to local circumstances, and that you can justify each response based on reliable analysis. In most cases, an effective strategy will involve implementing several different responses. Law enforcement responses alone are seldom effective in reducing or solving the problem.

Response No.	Page No.	Response	How It Works	Works Best If…	Considerations
Engineering Responses					
1	9	Using traffic-calming	Makes it more difficult for vehicles to speed, or makes drivers believe they should slow down for safety	…road and environment changes are made in compliance with recommended specifications, the affected public supports the changes, and potential negative impacts are considered and minimized	Some changes to the environment require high capital expenditures; cost-effectiveness must be considered over the long term
2	13	Posting warning signs and signals	Encourages drivers to slow down by reminding them of the speed limit and calling their attention to hazards on the road ahead	…the signs or signals stand out from other road signage, they convey the reason for the reduced speed, and they are supplemented by police enforcement	Where there are many other signs and sights competing for drivers' attention, it is not easy to get drivers to notice speed warnings
3	14	Blending motor and non-motor vehicle uses of public space through urban design	Reduces the traditional separation between motorists, bicyclists and pedestrians, greatly reducing motorists' speed	…urban planners have the funds to change urban design, and drivers are willing to reduce their speed	Some jurisdictions may not have the funds to change urban design; some drivers may still refuse to adhere to posted speed limits

Response No.	Page No.	Response	How It Works	Works Best If…	Considerations
Education Responses					
4	15	Conducting antispeeding public awareness campaigns	Intended to change the social acceptability of speeding	…campaigns are carefully tailored for various target audiences (e.g., commuters, young male drivers)	Effects are usually not immediate and substantial; the messages need not be overtly accusatory, but may convey facts about the dangers and consequences of speeding to debunk myths about speed and driving
5	16	Informing complainants about actual speeds	Improves complainants' understanding of the exact nature of the problem	…you suspect that complaints are exaggerated or unrealistic	Proving that vehicles are traveling the speed limit does not necessarily mean that speeds are appropriate for conditions, but might suggest that responses other than enforcement are more appropriate
6	16	Providing realistic driver training	Helps drivers better appreciate speed's effects on their ability to control a vehicle	…drivers can actually feel speed's effects on their driving skills	Requires skilled instructors, special safety equipment and protected driving areas
Enforcement Responses					
7	17	Enforcing speeding laws	Increases drivers' risks of being stopped	…drivers believe it will occur, it has meaningful costs to offenders, police apply it generally rather than only at specific times and locations, and drivers are not tipped off by cues as to when enforcement is or is not happening	Requires a lot of resources initially to change drivers' perceived risks of getting stopped; giving the public advance notice must be balanced against not allowing drivers to anticipate where and when enforcement is occurring; expensive to do consistently

Response No.	Page No.	Response	How It Works	Works Best If…	Considerations
8	18	Enforcing speeding laws with speed cameras	Significantly increases the level of speed monitoring and enforcement, thus increasing drivers' perceptions of the risk of getting caught speeding, and serving as a deterrent	…camera placement is not too obvious, and locations are changed periodically	Drivers slow down when they know they are approaching a speed camera, but quickly speed up once they have passed it; some strong public concerns exist about invasions of privacy and absence of personal interaction in enforcement; usually requires special legislative authorization for cameras' use as evidence in prosecution; financial issues exist related to fees and uses of fine revenue
9	20	Using speed display boards	Encourages drivers to slow down by measuring vehicle speeds and prominently displaying them	…a high percentage of drivers speed inadvertently, and police enforcement supplements the speed display boards	Unattended speed display boards are vulnerable to vandalism
10	21	Arresting the worst offenders	Helps change the common belief that speeding is not a serious offense	…sufficient public support exists	May require special legislative and policy authorization
11	21	Having citizen volunteers monitor speeding	Enhances informal social disapproval of speeding	…citizens directly affected by the speeding participate	Citizens must be properly trained for the specific tasks
Responses With Limited Effectiveness					
12	21	Reducing speed limits	Intended to slow drivers' speeds through posted signs and police enforcement	…adequate levels of police enforcement exist	Reducing speed limits by itself will reduce average speeds only by small amounts; some speed limits are too low rather than too high, inviting disrespect for them; police should conduct careful speed studies before changing speed limits

Response No.	Page No.	Response	How It Works	Works Best If…	Considerations
13	22	Increasing fines and penalties	Creates meaningful consequences for speeders, thereby deterring all drivers, generally, and those cited, specifically	…the fines and penalties are set high enough to get drivers' attention, but not so high as to compromise public support for them	Beyond a certain threshold, higher fines and penalties do not continue to reduce speeds
14	22	Erecting stop signs			The effects are to increase speeds mid-block and increase noise from vehicle acceleration
15	22	Installing speed bumps or rumble strips			They do not reduce speeds directly, but merely warn drivers of hazards ahead
16	23	Reengineering vehicles	Technological devices can restrict vehicles' maximum speed, automatically notify authorities that vehicles are speeding, or trigger warning signals to drivers when they are speeding	…consumers are willing to accept this technology and pay for it	To date, few vehicles or roads are equipped with this technology, and public support for it is not yet certain

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