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Countermeasures That Work – Bicyclists

The National Highway Traffic Safety Administration has published its tenth edition of *Countermeasures That Work* (Venkatraman et al., 2021), a basic reference to assist State Highway Safety Offices (SHSOs) and other highway safety professionals in selecting effective, evidence-based countermeasures for traffic safety problem areas. This Traffic Tech highlights the effective countermeasures concerning bicyclists from Chapter 9, Bicycle Safety.

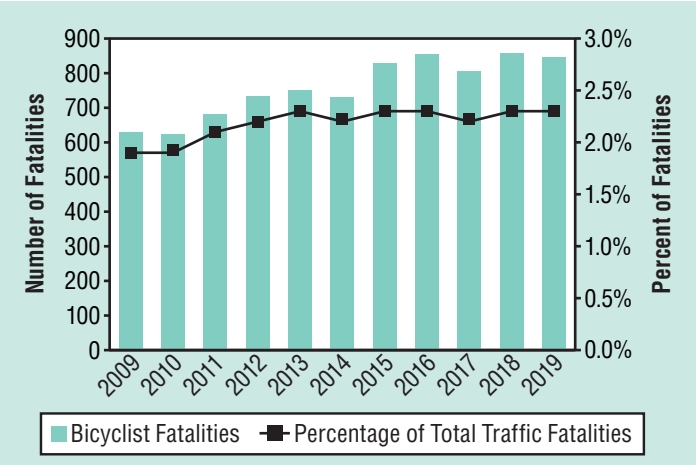
Background

In 2019 there were 846 bicyclists who died in traffic crashes nationwide, a decrease of 2.9 percent from the 871 in 2018 (see Figure 1). In addition, approximately 49,000 bicyclists were injured. Bicyclists accounted for 2.3 percent of total traffic fatalities and 1.8 percent of total injuries.

Of the bicyclist fatalities during 2019:

- The highest fatality rate was for 55-to-59-year-olds;
- Children under 15 accounted for 4.7 percent of all fatalities;
- 86 percent of the bicyclists killed were male;
- 20 percent of bicyclists killed had blood alcohol concentrations (BACs) of .08 g/dL or higher, with alcohol use (BAC of .01+ g/dL) by either bicyclist, driver, or both reported in 34 percent of fatal crashes;
- 78 percent occurred in urban areas; and
- 64 percent occurred at non-intersection locations.

U.S. Bicyclist Fatalities



Source: FARS, NCSA (2019)

Key Factors of Effective Bicyclist Countermeasures

Effective bicyclist countermeasures as identified in *Countermeasures That Work* were noted to be similar to pedestrian countermeasures in that the most effective are comprehensive, targeted (geographically, or to a specific population), and community-based. Most countermeasures focused on improving safety behaviors of both bicyclists and drivers through education and enforcement measures as shown below.

The following sections discuss behavioral countermeasures for bicyclists that have been supported by research as consistently effective across situations (★★★★★), effective in certain situations (★★★★), or promising/likely effective (★★★). For more information on these countermeasures, their effectiveness, cost, use, and time to implement, see the full report.

School-Age Children

Countermeasure	Effectiveness	Cost	Use	Time
1.1 Bicycle Helmet Laws for Children	★★★★★	$$	Medium	Short

Bicycle Helmet Laws for Children increase bicycle helmet use, thereby reducing the number of severe and fatal head injuries to children involved in bicycle crashes. Earlier crash-trend analyses using FARS data suggested that State helmet-use laws for children reduce child bicycle fatalities by about 15 percent. A helmet law is a significant tool in increasing helmet use. A survey by the Centers for Disease Control and Prevention (CDC) found that children living in States with child helmet legislation were more likely to wear a helmet than those in States without legislation (Jewett et al., 2016). Legislation effectiveness is enhanced when combined with supportive publicity and education campaigns or programs. The practical effect of bicycle helmet laws is to encourage parents to require their children to use helmets.

Safety professionals can reinforce the need to wear helmets through positive interactions, free or discounted helmet distribution programs (combined with proper helmet fitting), or other positive incentives for helmet use. Publicizing helmet laws and child/parent education on helmet fitting and the importance of wearing a helmet every ride may enhance effectiveness. Educational programs have been shown to increase knowledge about proper use of helmets. As of March 30, 2019, there were 22 States, the District of Columbia, and at least 201 municipalities or counties that have child helmet laws.

Countermeasure	Effectiveness	Cost	Use	Time
1.2 Safe Routes to School	★★★	$	High	Short

Safe Routes to School (SRTS) increases the amount of walking and bicycling trips to and from school while simultaneously improving safety for children. SRTS programs are community-based and are intended to be comprehensive in nature, informing children, school personnel, parents, community members, and law enforcement officers about safe bicycling and walking behavior and safe driving behavior around pedestrians and bicyclists. In addition, programs include enforcement and engineering activities to improve traffic safety and risky elements of the traffic environment around primary and secondary schools so children can safely bicycle or walk to school. Information on the role of law enforcement in SRTS is available on the National Center for Safe Routes to School website (apps.saferoutesinfo.org/lawenforcement).

The CDC has identified SRTS programs as one of eight non-clinical, context-based, community-wide interventions that has the potential to improve population health. See the CDC's Health Impact in 5 Years (HI-5) strategies for health transformation at www.cdc.gov/policy/hst/hi5/index.html.

Adults

Countermeasure	Effectiveness	Cost	Use	Time
2.1 Bicycle Helmet Laws for Adults	★★★★	$	Low	Short

Bicycle Helmet Laws for Adults have been shown to increase helmet use. An analysis that compared bicycle fatalities before and after helmet laws were introduced in Australian states found a 46% reduction in fatalities among bicyclists of all ages. A bicycle helmet, when worn properly, is the single most effective piece of equipment to reduce head injuries in the event of a crash. A recent meta-analysis of 40 studies found that helmet use by bicyclists was associated with 33 to 69 percent reduction in the odds of facial, head, and fatal injuries (Olivier & Creighton, 2017). While the Australia and other studies provide evidence that helmet laws increase helmet use, there are concerns about equitable enforcement and the presentation of barriers to riding. These issues need to be better evaluated and assessed in this context and are important for States and localities to consider, particularly in the context of potential public health and environmental benefits to increased bicycle use.

All Bicyclist

Countermeasure	Effectiveness	Cost	Use	Time
3.1 Active Lighting & Rider Conspicuity	★★★	$	High†	Varies

†High for active lighting laws; unknown for promoting other conspicuity measures.

Improving ***Bicyclist Conspicuity*** is intended to make bicyclists more visible to motorists and to allow motorists more opportunity to see and avoid collisions with bicyclists. A common contributing factor for crashes involving bicyclists in the roadway is the failure of the driver to notice the bicyclist, particularly at night. New bicycles must be sold with reflectors meeting the Consumer Product Safety Commission requirements. The reflectors may improve a bicycle's night-time visibility when they are illuminated by motor vehicle lights approaching from behind. Active bicycle lighting requires the rider to turn it onto activate it versus a passive light (reflector). Active bicycle lighting can also be critical for the detection of a bicyclist coming toward the path of a motor vehicle, because the bicyclist is outside the vehicle's headlight beam until the last moment.

In most States and jurisdictions, bicycles ridden after dark are required to have active white front lights, and most States also require red rear reflectors or active lights. Efforts to increase enforcement of laws requiring use of lights is needed to maximize use. Communications and outreach to the public about State and local laws regarding the use of active bicycle lighting and other conspicuity aids should be provided.

Countermeasures Relating to Each Other

Although countermeasures are often divided by the issue they address, many countermeasures affect the same populations or could be used in the same geographic area jointly. *Pedestrian safety countermeasures* for children could create a well-rounded safety curriculum. *Distracted driving countermeasures* are also important to consider for this population, as visibility of a bicyclist is an important safety issue.

Conclusion

There are several countermeasures that can be used to effectively create safe behaviors, environments, and policies to improve pedestrian safety. The most effective programs rely on comprehensive strategies, targeted implementation, and community based support.

References

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