

Lighting for Pedestrian Safety

The Federal Highway Administration (FHWA) created the *Research Report: Street Lighting for Pedestrian Safety* to provide lighting recommendations for pedestrian safety. In developing the lighting recommendations, the effort considered the ability of pedestrians to detect hazards on walkways and crosswalks, the visibility of pedestrians to motorists, and impacts of lighting on pedestrian decisions related to whether to cross a roadway.

FHWA also published the user-friendly companion document *Pedestrian Lighting Primer* as a resource to transportation practitioners interested in lighting to provide for safety and the security of pedestrians.¹ The *Primer* highlights how the results from the FHWA research report *Street Lighting for Pedestrian Safety* can complement commonly used lighting design guides.²

Lighting of pedestrian facilities plays a key role in increasing the safety performance of the road network for all users. Effective pedestrian lighting installations are a means of addressing the vulnerability of pedestrians during dark conditions and improving safety and security for road users of all ages and abilities. Lighting may also increase a pedestrians' confidence in performing certain tasks, such as assessing and selecting appropriate gaps at uncontrolled

crossings and monitoring vehicles approaching and making different movements through both signalized and unsignalized intersections.

In 2020, 76% of all pedestrian-related fatalities occurred during periods of darkness. As figure 1 shows, the frequency of pedestrian fatalities during dark conditions has experienced an increasing trend over the past 10 years.

Minority and disadvantaged communities may experience a disproportionate burden of pedestrian fatalities in dark conditions, as figure 2 shows. These numbers are even more compelling when considering that only 25% of all traffic volume occurs after dark.

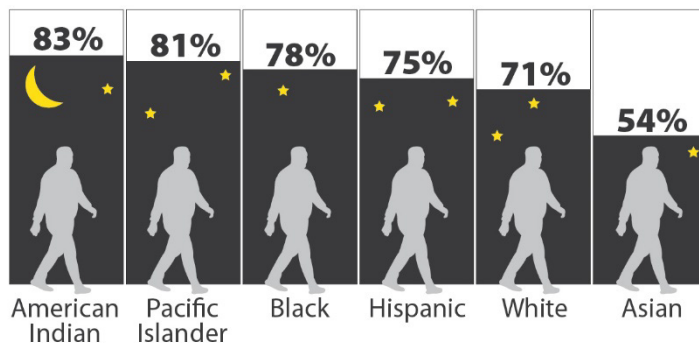


Figure 2. Graphic. Percentage of pedestrian fatalities in dark conditions (i.e., “Dark – Not Lighted,” “Dark – Lighted,” or “Dark – Unknown Lighting”) by race (2008–2018). Source: NHTSA.

In addition to increasing traffic crash risk, dark conditions can have negative effects on pedestrian security. People may avoid walking at night as a precaution against potential crime.³ Darkness is one of the primary factors that influences potential personal risk and heightened fear, as darkness reduces visibility and recognition and creates additional blind spots.

Lighting for pedestrian security is particularly important at locations where the walking space is restricted, ambient light may be blocked, and pedestrian traffic is more separated from the surrounding context. New or improved

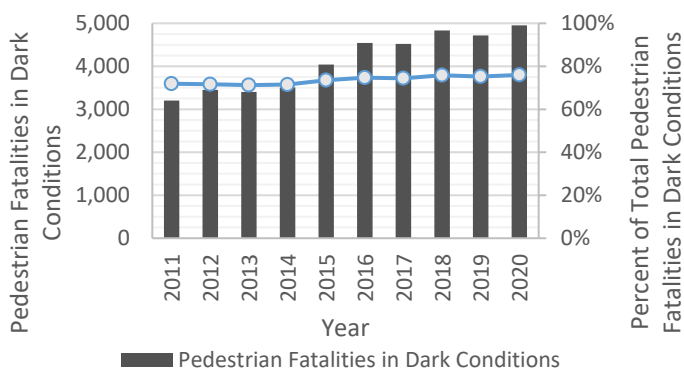


Figure 1. Graphic. Dark condition (i.e., “Dark – Not Lighted,” “Dark – Lighted,” or “Dark – Unknown Lighting”) pedestrian fatalities per year and dark condition pedestrian fatalities per year as a percent of total pedestrian fatalities. Source: NHTSA.

lighting can increase security and encourage pedestrian activity at night, specifically at and near transit stops. This can improve the safety and security of transit riders while boarding, alighting from, or waiting for transit. The American Public Transportation Association (APTA) developed the document *Security Lighting for Transit Passenger Facilities* as a resource for these situations.⁴



Figure 3. Intersection at night with street lighting. Source: WSP.

One pedestrian population that may especially benefit from improved lighting is school-age children. Walking or biking to or from school during the early morning or evening hours may cause students to travel in reduced lighting, increasing the risk of a crash.

Furthermore, children are particularly vulnerable to vehicular traffic as they are not as experienced at judging the direction of sounds, estimating the speed and distance of oncoming vehicles, or anticipating other road users' behavior. Children are often smaller in stature and less visible to motorists, and thus more difficult for motorists to see, particularly at intersections and other crossings. The Safe Routes to School (SRTS) Online Guide identifies pedestrian-scale street lighting as an important measure for improving safety and security for children walking to school <http://guide.saferoutesinfo.org/>.

The Primer presents an overview of a four-step process that involves selecting design criteria, selecting equipment, determining the control strategy, and conducting the

lighting design and verification. As the Primer illustrates, lighting of pedestrian facilities is key to increasing the safety performance of the roadway network for all users. Effective pedestrian lighting, such as that shown in figures 3 and 4, is a means of addressing the vulnerability of pedestrians during dark conditions and improving the safety and security of all road users spanning different ages and abilities. This *Primer*, along with the companion FHWA research report, *Street Lighting for Pedestrian Safety*, can help transportation practitioners realize the benefits of lighting designs and provide safer facilities for pedestrians at night.²

References

1. Federal Highway Administration (2022, April). Pedestrian Lighting Primer. FHWA-SA-21-087. Washington, D.C.
2. Terry, T., Gibbons, R., Kassing, A., Bhagavathula, R., & Lutkevich, P. (2020). *Research Report: Street Lighting for Pedestrian Safety*. Federal Highway Administration. FHWA-SA-20-062. Washington, D.C.
3. Painter, K. (1996). The influence of street lighting improvements on crime, fear, and pedestrian street use, after dark. *Landscape and Urban Planning*, 35, 193-201.
<https://www.sciencedirect.com/science/article/abs/pii/S0169204696003118?via%3Dihub>
4. APTA. (2009). *Security Lighting for Transit Passenger Facilities*. American Public Transportation Association, Washington, DC. https://www.apta.com/wp-content/uploads/Standards_Documents/APTA-SS-SIS-RP-001-10.pdf.



Figure 4. Roadway at night with street lighting. Source: WSP.