

Annotated Bibliography: Safety and Vulnerable Users

Research Question: What types of built environments lead to increased or decreased pedestrian/cyclist acute injuries?

Street Design

Asgarzadeh M, Verma S, Mekary R, Courtney T, Christiani D. The role of intersection and street design on severity of bicycle-motor vehicle crashes. *Injury Prevention*. 2016;23(3):179-185.

This study examined whether design variables, such as intersection angles and street width, are associated with bicycle-motor vehicle crash severity. Through the use of geographic information systems, the authors found that certain types of intersections are more likely to result in a severe injury.

Kang B. Identifying street design elements associated with vehicle-to-pedestrian collision reduction at intersections in New York City. *Accident Analysis & Prevention*. 2019;122:308-317.

This study evaluated associations between the installation of 11 street design elements in New York City and any resulting changes in vehicle to pedestrian collisions. Pedestrian refuge islands, pedestrian plazas and curb extensions were found to be associated with reduced collisions.

General Built Environment Factors

Kaplan S, Giacomo Prato C. A Spatial Analysis of Land Use and Network Effects on Frequency and Severity of Cyclist–Motorist Crashes in the Copenhagen Region. *Traffic Injury Prevention*. 2015;16(7):724-731.

This study examined both the frequency and severity of cyclist-motorist collisions in order to delineate factors contributing to both the probability of being involved in a collision and the probability of severe injury from a collision. The study found that encouraging cycling would increase safety, because more cyclists would mean less motorist traffic. Additionally, the authors explained that the design of bicycle infrastructure should focus on bicycle paths which do not share the road, instead of bike lanes.

Mansfield T, Peck D, Morgan D, McCann B, Teicher P. The effects of roadway and built environment characteristics on pedestrian fatality risk: A national assessment at the neighborhood scale. *Accident Analysis & Prevention*. 2018;121:166-176.

This study found that within urban census tracts there was a strong association between high traffic on arterial roadways and pedestrian fatalities. The authors also found that in both urban and rural areas, there was a strong association between retail employment density and pedestrian fatalities.

Miranda-Moreno, L., Morency, P., & El-Geneidy, A. (2011). The link between built environment, pedestrian activity and pedestrian-vehicle collision occurrence at signalized intersections. *Accident Analysis and Prevention*, 43(5), 1624–1634.

This study examined the influence of the built environment on pedestrian vehicle collision occurrence in Montreal. The authors of this paper found that strategies to encourage densification and a mix of land uses and an increase will lead to an increase in pedestrian activity and will also lead to an increase in injured pedestrians if no safety strategies are taken. This paper concludes with a framework that is useful for the identification of pedestrian safety actions, and the appropriate design of new developments which encourage walking.

*Canadian

Motor Vehicle-Pedestrian Collisions and Walking to School: The Role of the Built Environment. *PEDIATRICS*. 2014;133(5).

This study examined the influence of the built environment on the relationship between walking to school and pedestrian collision risk in Toronto. Police reported pedestrian collision data from 2002 to 2011 for children aged 4 to 12 was compared with built environment data. The study found that modification of the built environment can both promote active transportation and make it safer. The results suggested a potential influence of the built environment on collisions.

*Canadian

Stoker P, Garfinkel-Castro A, Khayesi M, Odero W, Mwangi M, Peden M et al. Pedestrian Safety and the Built Environment: A review of the risk factors. *Journal of Planning Literature*. 2015;30(4):377-392.

This article gives an overview of the evidence on the pedestrian risks within the built environment. The article presents a conceptual framework linking the built environment to pedestrian safety. Covered in the framework is density, urban sprawl, pedestrian infrastructure, roadway design, visibility and traffic volumes as they relate to a pedestrian's safety. The authors conclude that different aspects of the built environment interact with each other to increase or decrease a pedestrian's safety, and therefore planners should advocate for pedestrian safety.

Toronto Public Health. Pedestrian and Cyclist Safety in Toronto. June 2015.

This report from Toronto Public Health outlines the health impacts of collisions involving pedestrians and cyclists. The report found that collisions frequently occur on roads with higher speed limits and at intersections. The report also includes strategies to reduce vehicle collisions resulting in pedestrian or cyclist injury. Strategies such as lower speed limits, fewer lanes, and education are discussed.

*Canadian

Spatial and Social Inequalities and Injuries

Hosking J, Ameratunga S, Exeter D, Stewart J, Bell A. Ethnic, socioeconomic and geographical inequalities in road traffic injury rates in the Auckland region. *Australian and New Zealand Journal of Public Health*. 2013;37(2):162-167.

The objective of this study was to describe the ethnic, socioeconomic and geographical differences in road traffic injury within Auckland, New Zealand. The study found ethnic, socioeconomic and geographic inequalities related to injuries. The highest rates of injury were among, minorities, children and those living in socioeconomically deprived neighborhoods. The authors conclude that road safety efforts should prioritize vulnerable communities at the greatest risk.

Morency P, Gauvin L, Plante C, Fournier M, Morency C. Neighborhood Social Inequalities in Road Traffic Injuries: The Influence of Traffic Volume and Road Design. *American Journal of Public Health*. 2012;102(6):1112-1119.

This study examined the extent to which traffic volume and road geometry explains social inequalities in pedestrian, cyclist and motor-vehicle injuries across wealthy and poor urban areas in Montreal. Road users in poorer neighborhoods were found to have a higher exposure to traffic and a greater risk of injury due to the presence of more major roads and 4 way intersections. The results of this study suggest that environmental preventive strategies (traffic reduction, safer road design), could have public health benefits.

*Canadian

Steinbach R, Grundy C, Edwards P, Wilkinson P, Green J. The impact of 20 mph traffic speed zones on inequalities in road casualties in London. *Journal of Epidemiology & Community Health*. 2010;65(10):921-926.

The purpose of this study was to assess the impact of the introduction of 20mph zones on socioeconomic inequalities in road fatalities in London, England. The effect of the 20mph zones resulted in a 41.8% decline in fatalities in the least deprived areas and a 38.3% decrease in the most deprived areas. However, because of the greater number of road fatalities in the deprived areas, the number of fatalities prevented was significantly larger in those socioeconomically deprived areas.