

Study is first to map of paths of hundreds of urban males on violence risk

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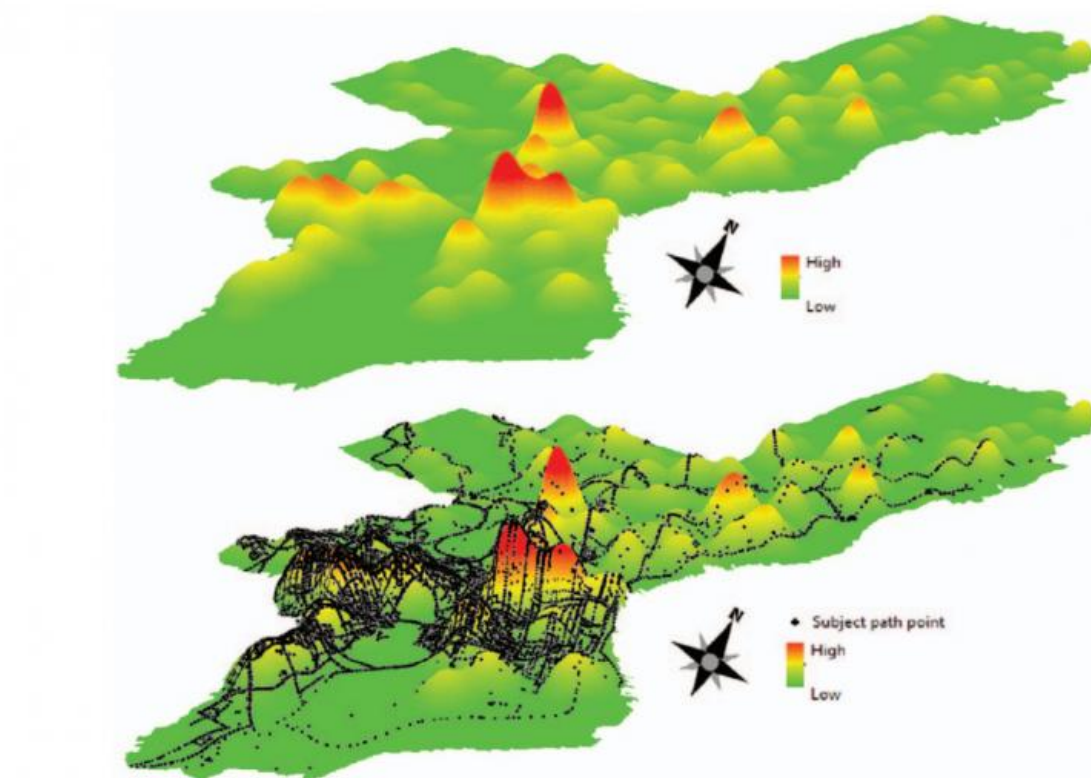


FIGURE 3. Raster surface layer of the level of a risk factor in the urban landscape as demonstrated using off-premise alcohol outlets (*top*). Raster surface layer of the urban landscape overlaid with path points marking locations of the daily activities of 632 study subjects (*bottom*).

This image shows the surface layer of the level of a risk factor in an urban landscape (top) and surface layer of urban landscape with paths of daily activities of 632 study subjects. Credit: Penn Medicine

Gunshot violence is the leading cause of death among 10- to 24-year-old African American males and the second leading cause of death among 10- to 24-year-olds males overall in the United States. A new Penn Medicine study is the first to outline the details of how an individual's location and activities influence that risk.

The research maps the 24-hour paths and activities of more than 600 10- to 24-year-old males, primarily African Americans. 143 had been shot with a gun, 206 were injured with another weapon, and 283 were unharmed controls. Those assaulted were recruited after being cared for in the emergency departments of the level-one trauma centers at the Hospital of the University of Pennsylvania and the Children's Hospital of Philadelphia.

Researchers asked the young men to recount the 24 hours before they had been attacked, and the control subjects described a random day within three days of their interview. Reported in the journal *Epidemiology*, the findings showed that subjects' locations and activities either protected them or dramatically increased their likelihood of assault - indicating that just one turn down a certain city street can dramatically increase the risk of being a victim of violent crime.

Risk of gun assaults was higher in those who were alone, those who recently acquired a gun, and those located in an area experiencing many vacancies and/or a history of violence and vandalism. Risk for non-gun assaults was higher near recreation centers, among individuals who recently consumed alcohol, and in areas of high vacancy, overall violence, and vandalism.

"Even once risks are pinpointed, it may be hard to get people to change behavior—to have them not walk down a certain street or not carry a gun, for instance," said the study's lead author, Douglas J. Wiebe, PhD, an associate professor of epidemiology in the department of Biostatistics

and Epidemiology, a senior scholar in the Center for Clinical Epidemiology and Biostatistics. "But if we can change [urban environments](#) to make them safer, we can protect all people who come into contact with those places."

Areas with neighborhood connectedness—where subjects reported that residents worked together on projects such as neighborhood watches and block parties—experienced lower rates of gun and non-gun related assaults. Additionally, the control group spent more hours in their homes than the other participants did.

The team developed an original geography software application to comprehensively plot out each subject's location by latitude and longitude, and superimposed a map layer that showed the characteristics—risky or protective—of the areas they moved through.

Researchers have long understood that activities and locations can influence the likelihood that adolescents will engage in risky behaviors and be exposed to dangerous environments, but this study is the first to retrace the paths of victims, and compare to those of controls, to show the precise mechanisms and details of how influential environmental factors can impact someone's safety.

The study aligns with ongoing efforts at Penn's Injury Science Center and Urban Health Lab, and other increasing evidence that changing features of urban environments can produce lasting reductions in violence in those areas.

This study's findings support earlier findings from co-author Charles Branas, PhD, a professor of Epidemiology and director of Penn's Urban Health Lab, and Eugenia C. South, MD, MHSP, an Emergency Medicine resident at Penn Medicine, on the positive health effects of greening lots.

Wiebe notes that the team's findings support interventions which are structural, scalable and sustainable at low cost, but that additional research can yield profound further insights in violence prevention.

For example, the study defined the induction period, or time from exposure to risk onset, as 10 minutes, based on earlier research on adolescent behavior. Future research going back 20, 30, 40, 50 and 60 minutes may provide valuable new data to act upon.

"If I tell you I'm a smoker but you know I don't have cancer, that's not a reason to stop worrying about me. I might have just started smoking yesterday and you're going to see me get sick in five years," Wiebe explains. In the same way, there may be a lag between engaging in a risky activity or contacting an environmental feature and, later, being assaulted.

More information: *Epidemiology*, journals.lww.com/epidem/Fulltext.aspx?doi=10.1093/epidem/kix077

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