Gun violence spreads like an infectious disease, study finds

By Megan Thielking @megaphone
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Gun violence in Chicago spreads like an infectious disease — and now, researchers have figured out a way to predict who’s most likely get sick next.

With infectious diseases, predictions are fairly simple: The more relationships an individual has with sick people, the more likely he is to be infected. The longer it’s been since exposure, the less likely infection becomes.

Now, researchers at Harvard and Yale have adopted that same type of mathematical model to predict potential victims of gun violence in Chicago. In 63 percent of the shootings they studied, they found that social contagion played a key role. Their study was published Tuesday in JAMA Internal Medicine¹.

“This paper is really one of the first to prove gun violence functions like a disease and deserves public health and medical resources,” said Charles Branas, an epidemiologist at the University of Pennsylvania who has studied the relationship between human geography and violence. Branas, who wasn’t affiliated with the study, penned an accompanying editorial on how to tackle gun violence as disease.

The study examined Chicago police data from from 138,163 individuals who were arrested between 2006 and 2014, nearly 10,000 of whom were also victims of gun violence. The demographics: 75 percent of...
those individuals were black, 82 percent were men, and 26 percent were part of a gang. On average, they were 27 years old at the midpoint of the study.

The new model weaves together demographic risks — such as age, sex, and neighborhood — with social connections that might be playing a role. Specifically, the authors examined co-offending, or being arrested together for a crime. It’s been previously shown that people co-offend with individuals they’re close to, and the new study suggests that connection can be a channel for spreading “infection” — or, in this case, gun violence.

“Say you and I are friends and I’ve just been shot and we’re hanging out. By spending time with me, you’re now being exposed to the risk factors that led to me being shot,” said Ben Green, coauthor of the new paper and an applied mathematician at the Harvard School of Engineering and Applied Sciences.

Time was also a factor. Individuals were more susceptible to gun violence immediately after an associate they’d co-offended with was shot. On average, victims were shot 125 days after their “infector” fell prey to gun violence.

“It’s the same thing with getting a cold. You’re less susceptible the longer it’s been since you were exposed,” Green said.

The research raises a key question: How can communities rein in the epidemic of gun violence?

“Given that we’re able to identify individuals at high risk, that presents an opportunity to target those individuals for social services,” Green said. He listed mental health, educational, and housing services, along with job training, as potential ways to interrupt the risks.

But Branas argued people aren’t necessarily the only target.

“We should think heavily about places, and how we might change places to interrupt gun violence as a disease,” he said. That includes cleaning up neighborhoods and revamping abandoned buildings and vacant lots. Previous controlled trials have shown that fixing up run-down neighborhoods has been successful in reducing violence in cities such as New Orleans.

Branas said he’d like to see more randomized, controlled trials test conditions that could help prevent gun violence, whether that’s adding green spaces or offering new social services. The new study, he said, clearly signals a need for robust scientific research.

“It needs to be done the same way we’ve done with the pharmaceutical industry,” he said. “That’s made a huge difference in other issues with public health.”

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