

Firearm Violence in Wilmington

David Chen, MD, MPH

Pediatrician and Internist, Christiana Care Health System; Advisory Board Member, Delaware Coalition Against Gun Violence; Member, Wilmington Community Advisory Board

Abstract

Firearm related assault injuries disproportionately affect young men of color related to a variety of social & ecological vulnerabilities. Delaware, and particularly the city of Wilmington, has experienced a disproportionately high number of these injuries, and this article follows the public health approach in defining the scope of the problem, establishing what is known about the pathophysiology and transmission of injury, describing the effectiveness of newer prevention programs in both public safety and public health, and highlighting important constraints and considerations for program evaluation and research.

Introduction

What is the role of public health in the prevention of violent firearm injuries? Homicide is the leading cause of death for young black Americans and those aged 10-34 years have died at more than 10 times the rate of white Americans,¹ mostly from firearm injuries.² For those who survive their violent injuries, research suggests many are likely to be injured again with one study finding a 44% recurrence rate and 20% mortality rate within 5 years.³ There are few health disparities that are as profound; the American College of Surgeons Committee on Trauma (ACS COT) has plainly stated, “Violent intentional injury is the most poorly addressed public health problem in America.”⁴ However, understanding firearm violence in public health terms is both a novel and complex task. The Violence Prevention Alliance of the World Health Organization⁵ outlines a public health approach to violence in four steps that could be applied to Delaware:

1) Defining the problem

Wilmington’s experience with firearm violence is an outlier compared to the rest of the nation; a high profile article by Jones in Newsweek was literally titled “Murder Town USA (aka Wilmington, Delaware).”⁶ An epidemiologic investigation in Wilmington by the Centers for Disease Control and Prevention notes “Although Wilmington is a moderately-sized city of approximately 71,525 residents, when compared to all large cities in the United States, its homicide rate in recent years has been reported to be as high as 4th overall. In fact, in recent years, the growth in Delaware’s homicide rate (Wilmington is the largest city in Delaware) has outpaced that of every other state.”⁷ Adolescents 12-17 years old in Wilmington have a 3.4/1,000 risk of being a victim of firearm violence (compared to 1.8/1,000 in Chicago) making it the highest in the nation.⁸

Public reporting on firearm violence in Delaware has improved recently. The Delaware News Journal maintains an online application to track publicly reported assault-related firearm injuries in Wilmington,⁹ and in 2018 the city of Wilmington began releasing reports on specific incidents through the online tool CrimeMapping¹⁰ as well as aggregate data comparing weekly crime reports to year-to-date historical trends.¹¹ Delaware received funding in 2016 to participate in the National Violent Death Reporting System,¹² a public health surveillance system meant to pool

information from death certificates, coroner/medical examiners, law enforcement, and toxicology into an anonymous database.¹³

But despite the increasing availability of public information on where and when specific incidents of firearm violence occur, some information is very difficult to obtain or never reliably tracked. Using healthcare information as an example, details about type of weapon, caliber of bullet, and severity of injury may be documented in a trauma registry or police reports, but these are not accessible except for specific research objectives or only if aggregated to de-identify reporting. Circumstantial details (e.g. whether injury was caused by a fight or whether individuals were influenced by alcohol) may be documented as subjective historical data in a patient's chart, but this depends on the initiative of individual providers. Patient medical records are often scattered among institutions and so determination of history of similar injuries or related health issues requires manually requesting and reviewing records, not all of which are available in the Delaware Health Information Network. Studies suggest as many as a third of assault-injured youth are uninsured¹⁴ which would skew any analysis of administrative health insurance data attempting to assess broader utilization patterns. A primary care provider (PCP), who has the greatest liberty in accessing health records, might receive most of this health information, but even an astute PCP would not have default access to most social services or school data (such as from a guidance counselor suggesting recent conflicts there); they are not even routinely notified if their patient becomes incarcerated, related to the incident or not. Any health-related information is heavily protected under the Health Insurance Portability and Accountability Act (HIPAA) and cannot be shared with social service or justice systems without explicit and signed patient consent and is rarely subpoenaed.

Part of this data fragmentation is related to the “silos” in which different databases of information are stored (even within a single sector such as healthcare), but much of it also derives from the fact that while exposure to firearm violence is prevalent, events are both sparse and highly publicized. This makes it difficult for public information systems to disclose individual incident information while protecting anonymity to ensure victim safety. Systems may be reluctant to share information except on a case-by-case basis, and victims themselves may be unwilling to disclose the most pertinent incident details out of the very real fears that “snitches get stitches”, that they may reveal self-incriminating information (especially if gang-affiliated), or that they will be forced to re-live an intensely traumatic experience.¹⁵

What we can draw from public information and prior analyses of crime patterns¹⁶ in the city of Wilmington are relatively simple conclusions: that firearm violence is clustered in several specific neighborhoods within the city (primarily with high rates of poverty)⁸ and is more likely to occur at certain times (night) and during certain months of the year (summer). Moreover, the community impact of firearm injury is difficult to overstate. The People's Report, an ethnographic participatory action research study conducted by residents in Southbridge and Eastside communities, found that 60% of participants had “seen a seriously injured person after an incident of violence,” that 55% had at least one relative killed with a gun, that nearly 60% lost a friend to gun violence, and that the average age in which loss of a friend occurred was 18 years old.¹⁷

In an interview for the News Journal, Dr. Hal Byck at Nemours Jessup Street office described his experiences as a pediatrician in a heavily affected community (the Northside) in this way:

"My purpose is not just to get them to 18 but to have them have a good foundation to get through life. So every time an 18- or 19-year-old is shot, not only does it hurt, but somewhere I didn't do what I needed to do." The Jessup Street office, which serves mostly Wilmington residents, deals with wellness visits and the average childhood struggles. But Byck's team also takes on chronic stress and trauma, the kind associated with seeing a person shot to death outside your home or hearing gunshots regularly ring out down your block. Byck said about 25 to 30 percent of his childhood clients say they have seen someone get shot or die, a question he now asks as a part of childhood physicals. Some have seen this happen four or five times, he said. For many who call Wilmington home, that's just normal.¹⁸

2) Establish why violence occurs

The CDC promotes a social ecological framework in approaching violence prevention that recognizes that prevention must address individual, relationship, community, and societal factors.¹⁹ The investigation by the CDC in 2015, specific to Wilmington, attempted to characterize through a retrospective analysis of those who *perpetrated* a firearm crime what historical risk factors led to the incident.⁷ This found that a combination of factors, including prior *victimization* by violent crime and exposure to structural factors such as disconnection from socioeconomic support systems (e.g. through unemployment, incarceration, suspension/expulsion from the education system), was ultimately more predictive of *perpetration* than any single set of risk factors alone. What this confirms is that, for those living in poverty, structural inequity and disparity amplifies individual level risks of *victimization and perpetration*. This occurred even though the majority of these individuals had already received some form of social assistance program at some point (73%) with the majority having also been recipients of state juvenile services (such as community probation, residential detention, behavioral health services, or managed care services; 54%).⁷ It also suggests that those with the highest risks associated with violent injury, either as victim or as perpetrator, have poor integration with existing medical and social service supports.

On an intrapersonal level, exposure to violence is thought to create pathophysiologic biological and behavioral changes that increase vulnerability to maladaptive behaviors and poor health outcomes. In pediatrics and the study of child maltreatment, the proposed mechanism is that chronic environmental exposure to stressors (such as Adverse Childhood Events (ACEs), "toxic stress", or allostatic load) eventually causes the hypothalamic-pituitary-adrenocortical (HPA) axis to become disordered.²⁰ This and other induced neurobiological changes impact development and are associated with abnormal immune system function (which predispose to medical illness and trauma) as well as changes in the frontal and limbic regions of the brain (which are responsible for emotional regulation and threat perception).²¹ In the context of violent injury, this growing body of research has been adapted to propose that repeated exposures to violence (such as through observation of abuse or by direct victimization) creates maladaptive biological and behavioral patterns over time which, if not treated, may eventually propagate to others through the perpetration of violent injury. Evidence does suggest that exposed children are more likely to carry weapons in adulthood²² and that increased exposures to ACEs also increases

risk for violence perpetration such as bullying, physical fighting, and dating violence as adolescents.²³

On an interpersonal level, person-to-person risk factors and expressions of violence propagate across relationships and social networks in patterns. Drs. Tracy, Braga, and Papachristos, the leading experts in firearm injury network analysis, summarize the relationships in this way:

The results of our systematic review demonstrate that one's risk of violence, including victimization and perpetration of gun or other weapon violence, is increased through close connection with someone who has either perpetrated or been a victim of violence, with transmission demonstrated across family ties, intimate partner relationships, peer networks, and co-offending networks. Although not restricted to studies specifically using measures of gun violence as exposures and outcomes, this review shows that serious weapon-related violence can potentially arise from exposure to domestic violence in childhood, not just from delinquent and criminal activity among peers. Furthermore, the introduction of weapon violence into an intimate partner relationship signifies an increased risk of severe subsequent violence in that relationship.²⁴

In essence, the best studied interpersonal influences on weapon carrying behavior primarily involve three axes: family/home environment, peers, and co-offending networks. These clearly span community and societal domains, with focus on the latter two in the context of group violence (e.g. violence occurring in the context of gangs and gang affiliation). Innovative research in these networks using formal analysis found that in Boston 85% of all gunshot victims were in a single network representing less than 5% of the community's population,²⁵ and that in Chicago nearly 70% of all nonfatal gun injuries were concentrated in a network representing only 6% of the total population.²⁶ Non-gang members can still be at an elevated risk of firearm injury by "social closeness" rather than gang affiliation,²⁷ and some cities report lower rates of gang affiliation in adolescent assault injuries.¹⁴ Yet using predictive network analysis of co-offending networks to identify those at highest risk of injury is promising, and in Chicago a probabilistic "social contagion model" can identify individuals in a network at heightened imminent firearm injury risk on a real time basis.²⁸

The Delaware News Journal has reported closely on firearm violence and attributes numerous incidents to two specific groups, "Only My Brothers" and "Shoot to Kill", where dozens of members have been indicted since 2016.²⁹ According to claims by the Delaware Department of Justice: "'Our prosecutors, working closely with law enforcement, have identified criminal street gangs as drivers of much of the violence in the city over the past several years.'"

3) Find out what works to prevent violence

Evidence from public safety studies increasingly show that punitive measures alone have limits to their effectiveness and that strategies more similar to public health which change the social & ecological environment will be necessary components in reducing violence. Public safety programs dealing with physical and social disorder, known as "disorder" or "broken windows" policing, can be effective in decreasing crime; a meta-analysis of 28 of these strategies in large and small geographic areas concluded there were "consistent crime reduction effects across a

variety of violent, property, drug, and disorder outcome measures.”³⁰ The effectiveness of these strategies, even though modest, are consistent and suggest that addressing issues of structural inequity (e.g. structural violence) and the ecological environment works. The conclusion of The People’s Report, conducted in Southbridge and East Side, describe these relationships plainly but also highlights how guarded the community may be to increasing public safety presence:

Findings strongly suggest that physical violence in its many forms in Wilmington, Delaware is profoundly tied to structural inequality. A critical mass of residents reported direct and/or indirect experiences with violence in the form of: (1) physical assaults; (2) knifings; (3) shootings; (4) drug use/sales of drugs; and (5) homicide—to more structural forms of violence including: (1) unemployment; (2) poor schooling opportunities; (3) unhealthy living conditions; or (4) “failing” or “corrupt” civic and political leadership. Also, a variant of residents spoke of “unfair” or invasive law enforcement procedures including being: (1) profiled and frisked; (2) caught up in raids or sweeps; (3) detained without detention; (4) arrested; and/or (5) incarcerated. Nonetheless, participants overall were found to demonstrate positively high levels of: (1) psychological well-being; (2) social well being; (3) attitudes toward education; (4) and attitudes toward employment. That is, while community residents reported being overwhelmed with physical violence as well as blocked opportunity or structural violence, these data strongly suggest that they love themselves; they love their communities and families; they want to work and; they want quality educational opportunities.¹⁷

Here, the social determinants of health and public safety overlap and is where the fields can learn from each other. Both bodies of literature are comprised mostly of small studies with varying inclusion criteria, size, methods, quality, and interventions. This sort of heterogeneity can make it difficult to determine which programmatic elements are truly effective. As an example, programs that reduce juvenile recidivism vary widely and include everything from boot camps, cognitive-behavioral therapy, prison visitation, family therapy, drug court, victim-offender mediation, etc. with varying effectiveness; a meta-analytic overview by Lipsey suggested a novel approach to effectiveness research through “identification of factors that characterize the most effective programs” rather than the actual structure of programs themselves. His analysis concluded that “therapeutic” programs (e.g. counseling, mentoring, skills training, etc.) were more effective than those based on coercion/control (e.g. surveillance, deterrence, and discipline), and that among these the *quality* of the program perhaps mattered more than the actual *intervention* itself: “the average program of this rather variable generic sort can be quite effective if implemented well and targeted on high risk offenders. It does not take a magic bullet program to impact recidivism, only one that is well made and well-aimed.”

This lesson, that the quality of a program may matter more than fidelity in replicating successful but specific models, is one that public health is also learning in health behavior programming. It also gives hope that smaller cities and different environments can build successful programs *and* research. To that end, it will be instructive to consider several prototypes of successful models,

drawing from both public safety and public health, to understand which elements can be best adopted in Wilmington.

Focused Deterrence programs begin from the premise that a small number of individuals are responsible for the majority of firearm related violent incidents and that they respond to selective and strategic pressure.³¹ As David Kennedy describes, these programs identify key offenders and “communicate directly and repeatedly with offenders and groups to let them know (a) that they are under particular scrutiny, (b) which acts (such as shootings) will receive special attention, (c) when such attention has, in fact, been given to particular offenders and groups, and (d) what they can do to avoid enforcement action.”³² They are offered services and community supports, many of which can be provided by social service and health systems, but are reminded that firearm violence will result in special enforcement by “any and all legal tools” available to sanction groups.³² Most studies on focused deterrence found effectiveness in reducing youth homicides and violent crime in cities such as Boston, Cincinnati, Indianapolis, and Los Angeles.³¹ A number of these were necessarily quasi-experimental and Braga & Weisburd plainly state, “The positive outcomes of the existing body of evaluations indicate that additional randomized experimental evaluations, however difficult and costly, are warranted.”³¹

By contrast, strictly non-punitive and popular healthcare programs for high-risk individuals are Hospital Violence Intervention Programs (HVIPs). These apply an intervention soon after a violent injury incident and couple it with intensive community-based case management. Promoted by the American College of Surgeons among many others, this approach seizes on the “teachable moment” created by violent injury to match patients to needed resources.³³ Many programs use community health and outreach workers with personal prior experience with crime violence as the frontline engagement staff who can rapidly build rapport and serve as the bridge to connect patients to services. Programs have demonstrated effectiveness in reducing reinjury and hospital readmissions, reducing arrests and convictions for violent crime, and promoting employment.^{34,35} These programs are attractive because they avoid the involvement of law enforcement and focus on supportive rather than punitive or deterrent interventions.

The literature on HVIPs echo some of Lipsey’s observations on juvenile recidivism, finding that the most effective programs maximize impact through peer counseling,³⁶ encourage multimodal strategies that improve community and social organization, and adopt a comprehensive strategy to promoting the health of boys and young men of color.³⁷ Also similarly, research suggests that not all interventions and case-management strategies have equal effect^{38,39}; this heterogeneity suggests that an analysis similar to Lipsey’s examining success of individual program factors rather than the models themselves would be helpful.

Examining a third model for violence prevention gives insight into the complexity of research, evaluation, and program development in this field. Cure Violence (CV) seeks to halt the epidemic/transmissible nature of violence through Violence Interrupters who actively mediate and de-escalate street conflicts occurring in real time, an innovative intervention which works in tandem with more traditional outreach workers and case management.⁴⁰ In summarizing the evidence of Cure Violence programs, the authors note broader challenges and limitations to research and program evaluation that are instructive for Wilmington:

- Controlling for confounding factors is crucial but difficult, especially if reduction in shootings is the outcome measure

- To do this, random assignment on the neighborhood level is needed, but would require “as many as 15 or 20 in each condition, perhaps more”
- Random assignment may be impractical, as it would require several years with rigorous program design to monitor program fidelity and ensure no crossover contamination between intervention and control sites
- “...few cities have enough neighborhoods with sufficient numbers of shootings to reliably measure change over time”
- Clustered random assignment with closely matched pairs is impractical because neighborhoods are often contiguous and interventions may require travel across neighborhood boundaries
- Law enforcement interventions or other community actions may change in response to surges in crime, confounding measurement

Their concluding recommendations for Cure Violence programs have direct application to quasi-experimental designs more broadly:

- Implementation measures should encompass regular recording of all program activities...
- Establishing baseline measures is particularly important because, too often, program evaluations begin after the treatment has been implemented, hampering true measurement of pre-intervention outcomes...
- Neighborhoods selected for evaluation should have an average population size of 10,000 residents and report at least 40 shootings per year...
- The CV model is designed to affect not only the behavior and attitudes of program participants but also the behavior and attitudes of individuals in their social networks. Any sampling design for interviews and surveys may need to distinguish at least three types of research subjects: program participants, other high-risk individuals who are known to and socially networked with program participants, and the broader resident populations of high-risk communities...
- Before evaluation commences, researchers should ensure that the local police department is willing to share crime incident data that capture fatal and nonfatal shootings at the address level...
- Ideally, an evaluation would have access to police shooting data at least 60 months prior to and 30 months after CV implementation. These data would allow for interrupted time series analyses as well as difference-in-differences evaluation methods.⁴⁰

4) Implement interventions

Following an all-time high in 2017 for firearm injuries, 2018 has seen a reduction by approximately 60%; this may be attributed to new public safety strategies emphasizing community policing and a data-driven approach (though details on methods are not public), the latent effect of prior arrests, and perhaps some element of regression to mean.⁴¹ While exciting

and hopeful news, the evidence presented here suggests broader systemic changes must take place to sustain changes.

A summary of the strategic efforts from six CDC funded National Centers of Excellence in Youth Violence Prevention (YVPC) makes several important points on how researchers can work to construct “packages” of effective interventions: help communities to understand the role and requirements of evidence-based practice, carefully select programs and cultivate capacity (both innovation-specific and general organizational), and coordinate and align efforts within the community.⁴² For example, in high capacity communities that already had active intervention programs, packaging meant aligning existing resources and adding complementary programs. For low capacity communities, either no interventions existed or could not be easily scaled, trust did not exist between potential partners, or took significant time (for one example 18 months) to build capacity before program implementation could begin. Consequently, the role of researchers also varied: in one context, they helped align and develop program evaluations for existing efforts; in others, they were more directive in selecting programs, developing needs assessments, forming advisory boards, and providing data.

Conclusion

Wilmington is well on its way to building such capacity. Following the work of the original report, the CDC Advisory Council – a broad coalition of 38 representatives from public, private, government, and non-profit agencies – published a blueprint in 2017 for a comprehensive response to youth adult violence, which calls for a combination of care coordination, interventions, and policy changes.⁴³ While these improve the capacity of the community to meet a constellation of needs, one of the critical next steps will be designing a blend or “package” of well-planned programs and evaluations to address populations at different levels of risk in ways that are careful not to profile or stigmatize, especially those at the highest risk of injury: youth offenders transitioning back into communities from juvenile detention, violently injured patients presenting to the hospital for their injuries, individuals with gang affiliation or proximity, and other community-identified members in crisis. There is no better opportunity than now for community engaged researchers to leverage their data-oriented skill and knowledge set to advise the service organizations and institutions represented in the CDC Advisory Council (now known as the Wilmington Community Advisory Council) in carefully designing and implementing these programs. Well-designed research not only serves the community by maximizing effectiveness and yielding actionable data locally, but can help propel the state of Delaware as an innovation leader in eliminating one of our most devastating health disparities.

Acknowledgements

This work was supported in part by an Institutional Development Award (IDeA) from the National Institute of General Medical Sciences of the National Institutes of Health under grant number U54-GM104941 (PI: Binder-Macleod)

References

1. Sheats, K. J., Irving, S. M., Mercy, J. A., Simon, T. R., Crosby, A. E., Ford, D. C., . . . Morgan, R. E. (2018, October). Violence-related disparities experienced by black youth and young adults: Opportunities for prevention. *American Journal of Preventive Medicine*, 55(4), 462–469. [PubMed https://doi.org/10.1016/j.amepre.2018.05.017](https://doi.org/10.1016/j.amepre.2018.05.017)

2. Centers for Disease Control and Prevention (CDC). (2013, July 12). Homicide rates among persons aged 10-24 years - United States, 1981-2010. *MMWR. Morbidity and Mortality Weekly Report*, 62(27), 545–548. Retrieved from <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6227a1.htm> [PubMed](#)
3. Sims, D. W., Bivins, B. A., Obeid, F. N., Horst, H. M., Sorensen, V. J., & Fath, J. J. (1989, July). Urban trauma: A chronic recurrent disease. *The Journal of Trauma*, 29(7), 940–947. [PubMed](#) <https://doi.org/10.1097/00005373-198907000-00006>
4. Stewart, R. M., Kuhls, D. A., Rotondo, M. F., & Bulger, E. M. (2018, August). Freedom with responsibility: A consensus strategy for preventing injury, death, and disability from firearm violence. *Journal of the American College of Surgeons*, 227(2), 281–283. [PubMed](#) <https://doi.org/10.1016/j.jamcollsurg.2018.04.006>
5. Violence Prevention Alliance. (2011). The public health approach. Retrieved October 19, 2018, from http://www.who.int/violenceprevention/approach/public_health/en/
6. Jones, A. (2014, December 9). Murder town USA (aka Wilmington, Delaware). *Newsweek Magazine*. Retrieved from <https://www.newsweek.com/2014/12/19/wilmington-delaware-murder-crime-290232.html>
7. Sumner, S., Mercy, J., Hillis, S., Maenner, M., & Socias, C. (2015, November). Elevated rates of urban firearm violence and opportunities for prevention—Wilmington, Delaware. Centers for Disease Control and Prevention. Retrieved from <http://dhss.delaware.gov/dhss/cdcfinalreport.pdf>
8. Linderman, J., Horn, B., Parra, E., & Fenn, L. (2017, September 8). Growing up under fire: Wilmington, Delaware, leads U.S. in teen shootings. *USA Today*. <https://www.usatoday.com/story/news/2017/09/08/wilmington-delaware-leads-u-s-teen-shootings/619458001/>
9. Wilmington Shootings. (n.d.). Retrieved October 12, 2018, from <https://data.delawareonline.com/webapps/crime/>
10. Read, Z. (2018, June 11). Wilmington crime mapping tool aims at improving transparency. Retrieved from <https://whyy.org/articles/wilmington-crime-mapping-tool-aims-at-improving-transparency/>
11. Compstat reports. (n.d.). Retrieved October 12, 2018, from <https://www.wilmingtonde.gov/government/public-safety/wilmington-police-department/compstat-reports>
12. State by State. (n.d.). Retrieved October 12, 2018, from National Violence Prevention Network website: <http://www.preventviolence.net/statebystate/delaware.html>
13. National violent death reporting system. (2017, September 18). Retrieved October 12, 2018, from <https://www.cdc.gov/violenceprevention/nvdrs/index.html>
14. Cunningham, R. M., Ranney, M., Newton, M., Woodhull, W., Zimmerman, M., & Walton, M. A. (2014, January). Characteristics of youth seeking emergency care for assault injuries. *Pediatrics*, 133(1), e96–e105. [PubMed](#) <https://doi.org/10.1542/peds.2013-1864>
15. Parra, E. (2015, March 22). In Wilmington, police aim to break the silence. *The News Journal*. Retrieved from

<https://www.delawareonline.com/story/news/crime/2015/03/22/wilmington-police-aim-break-silence/25207437/>

16. The Police Foundation. (2015, Mar 31). Wilmington public safety strategies commission: final report. Retrieved from https://cjc.delaware.gov/wp-content/uploads/sites/61/2017/06/WPSSC_Final_Report_3_31_15_min-min.pdf
17. Payne, Y. A. (2013, September 16). The people's report: the link between structural violence and crime in Wilmington, Delaware. Retrieved from http://www.thepeoplesreport.com/images/pdf/The_Peoples_Report_final_draft_9-12-13.pdf
18. Horn, B. (2018, September 10). In Wilmington, doctors try to undo effects of children living amid violence. *The News Journal*. Retrieved from <https://www.delawareonline.com/story/news/local/2018/09/10/wilmington-doctors-try-undo-effects-childhood-trauma/981133002/>
19. The social-ecological model: a framework for prevention. (2018, February 20). Retrieved October 12, 2018, from <https://www.cdc.gov/violenceprevention/overview/social-ecologicalmodel.html>
20. Shonkoff, J. P., & Garner, A. S., & the Committee on Psychosocial Aspects of Child and Family Health, & the Committee on Early Childhood, Adoption, and Dependent Care, & the Section on Developmental and Behavioral Pediatrics. (2012, January). The lifelong effects of early childhood adversity and toxic stress. *Pediatrics*, *129*(1), e232–e246. [PubMed](#) <https://doi.org/10.1542/peds.2011-2663>
21. Moffitt, T. E., & the Klaus-Grawe 2012 Think Tank. (2013, November). Childhood exposure to violence and lifelong health: Clinical intervention science and stress-biology research join forces. *Dev Psychopathol*, *25*(4Pt2), 1619–1634. [PubMed](#)
22. Casiano, H., Mota, N., Afifi, T. O., Enns, M. W., & Sareen, J. (2009, November). Childhood maltreatment and threats with weapons. *The Journal of Nervous and Mental Disease*, *197*(11), 856–861. [PubMed](#) <https://doi.org/10.1097/NMD.0b013e3181be9c55>
23. Duke, N. N., Pettingell, S. L., McMorris, B. J., & Borowsky, I. W. (2010, April). Adolescent violence perpetration: Associations with multiple types of adverse childhood experiences. *Pediatrics*, *125*(4), e778–e786. [PubMed](#) <https://doi.org/10.1542/peds.2009-0597>
24. Tracy, M., Braga, A. A., & Papachristos, A. V. (2016). The transmission of gun and other weapon-involved violence within social networks. *Epidemiologic Reviews*, *38*(1), mxv009–mxv86. [PubMed](#) <https://doi.org/10.1093/epirev/mxv009>
25. Papachristos, A. V., & Wildeman, C. (2014, January). Network exposure and homicide victimization in an African American community. *American Journal of Public Health*, *104*(1), 143–150. [PubMed](#) <https://doi.org/10.2105/AJPH.2013.301441>
26. Papachristos, A. V., Wildeman, C., & Roberto, E. (2015, January). Tragic, but not random: The social contagion of nonfatal gunshot injuries. *Soc Sci Med*, *125*, 139–150. [PubMed](#) <https://doi.org/10.1016/j.socscimed.2014.01.056>
27. Papachristos, A. V., Braga, A. A., Piza, E., & Grossman, L. S. (2015). The company you keep? The spillover effects of gang membership on individual gunshot victimization in a co-offending network. *Criminology*, *53*(4), 624–649. <https://doi.org/10.1111/1745-9125.12091>

28. Green, B., Horel, T., & Papachristos, A. V. (2017, March 1). Modeling contagion through social networks to explain and predict gunshot violence in Chicago, 2006 to 2014. *JAMA Internal Medicine*, 177(3), 326–333. [PubMed](#)
<https://doi.org/10.1001/jamainternmed.2016.8245>
29. Horn, B., Wilson, X., & Parra, E. (2018, September 6). Feuds drive Wilmington's cycle of gang violence, despite dozens of charges. Delaware News Journal. Retrieved from <https://www.delawareonline.com/story/news/crime/2018/09/06/dozens-arrests-do-little-stop-wilmingtons-cycle-gang-violence/851211002/>
30. Braga, A. A., Welsh, B. C., & Schnell, C. (2015). Can policing disorder reduce crime? A systematic review and meta-analysis. *Journal of Research in Crime and Delinquency*, 52(4), 567–588. <https://doi.org/10.1177/0022427815576576>
31. Braga, A. A., & Weisburd, D. L. (2015, March 18). Focused deterrence and the prevention of violent gun injuries: Practice, theoretical principles, and scientific evidence. *Ann Rev Public Health*, 36, 55–68. [PubMed](#)
32. Kennedy, D. M. (2006). Old wine in new bottles: policing and the lessons of pulling levers. In D. Weisburd & A. A. Braga (Eds.), *Cambridge Studies in Criminology: Police innovation: Contrasting perspectives* (pp. 155-170). Cambridge University Press.
33. Dicker, R., Gaines, B., Bonne, S., Duncan, T., Violano, P., Aboutanos, M., . . . Shapiro, D. (n.d.). Violence intervention programs: a primer for developing a comprehensive program within trauma centers. Retrieved from <https://www.facs.org/quality-programs/trauma/advocacy/ipc/firearm-injury/hvip-primer>
34. Purtle, J., Dicker, R., Cooper, C., Corbin, T., Greene, M. B., Marks, A., . . . Moreland, D. (2013, August). Hospital-based violence intervention programs save lives and money. *The Journal of Trauma and Acute Care Surgery*, 75(2), 331–333. [PubMed](#)
<https://doi.org/10.1097/TA.0b013e318294f518>
35. Chong, V. E., Smith, R., Garcia, A., Lee, W. S., Ashley, L., Marks, A., . . . Victorino, G. P. (2015, April). Hospital-centered violence intervention programs: A cost-effectiveness analysis. *American Journal of Surgery*, 209(4), 597–603. [PubMed](#)
<https://doi.org/10.1016/j.amjsurg.2014.11.003>
36. Becker, M. G., Hall, J. S., Ursic, C. M., Jain, S., & Calhoun, D. (2004, March). Caught in the Crossfire: The effects of a peer-based intervention program for violently injured youth. *J Adolesc Health*, 34(3), 177–183. [PubMed](#) [https://doi.org/10.1016/S1054-139X\(03\)00278-7](https://doi.org/10.1016/S1054-139X(03)00278-7)
37. Heinze, J. E., Reischl, T. M., Bai, M., Roche, J. S., Morrel-Samuels, S., Cunningham, R. M., & Zimmerman, M. A. (2016, February). A comprehensive prevention approach to reducing assault offenses and assault injuries among youth. *Prev Sci*, 17(2), 167–176. [PubMed](#)
<https://doi.org/10.1007/s11121-015-0616-1>
38. Cheng, T. L., Wright, J. L., Markakis, D., Copeland-Linder, N., & Menvielle, E. (2008, March). Randomized trial of a case management program for assault-injured youth: Impact on service utilization and risk for reinjury. *Pediatric Emergency Care*, 24(3), 130–136. [PubMed](#) <https://doi.org/10.1097/PEC.0b013e3181666f72>
39. Aboutanos, M. B., Jordan, A., Cohen, R., Foster, R. L., Goodman, K., Halfond, R. W., . . . Ivatury, R. R. (2011, July). Brief violence interventions with community case management

- services are effective for high-risk trauma patients. *The Journal of Trauma*, 71(1), 228–237. [PubMed https://doi.org/10.1097/TA.0b013e31821e0c86](https://doi.org/10.1097/TA.0b013e31821e0c86)
40. Butts, J. A., Roman, C. G., Bostwick, L., & Porter, J. R. (2015, March 18). Cure violence: A public health model to reduce gun violence. *Annual Review of Public Health*, 36(1), 39–53. [PubMed https://doi.org/10.1146/annurev-publhealth-031914-122509](https://doi.org/10.1146/annurev-publhealth-031914-122509)
 41. Finally, good news in Wilmington's fight against crime [Editorial]. (2018, May 9). The News Journal.
 42. Kingston, B., Bacallao, M., Smokowski, P., Sullivan, T., & Sutherland, K. (2016, April). Constructing “packages” of evidence-based programs to prevent youth violence: Processes and illustrative examples from the cdc’s youth violence prevention centers. *The Journal of Primary Prevention*, 37(2), 141–163. [PubMed https://doi.org/10.1007/s10935-016-0423-x](https://doi.org/10.1007/s10935-016-0423-x)
 43. Community, C. D. C. Council. (2017). Accelerating Youth Violence Prevention and Positive Development. Retrieved from <http://www.dhss.delaware.gov/dhss/communityadvisorycouncilfinalreport.pdf>

Copyright (c) 2018 Delaware Academy of Medicine / Delaware Public Health Association.

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<https://creativecommons.org/licenses/by-nc-nd/4.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.