REDUCING FIREARM INJURIES... TO ZERO

CAPSULE SUMMARY

Firearm-related injuries are devastating, and often preventable. **Our Grand Challenge is to reduce the number of firearm injuries to zero.** Utilizing our team comprised of faculty from the College of Arts and Sciences, School of Medicine, and School of Public Health, we propose a program of work to 1) identify those at risk of firearm injuries; 2) design and implement an evidence-based, multidisciplinary firearm violence prevention program, and 3) conduct a rigorous, mixed-methods evaluation of the effectiveness and cost-effectiveness of such a program. The results will directly benefit the citizens of Birmingham and Alabama, and will also be highly applicable to the remainder of the United States and indeed international settings.

THE PROBLEM

Firearm injuries are devastating and common. Injuries and violence are the top three causes of death for people between the ages of 1 and 44 years in the United States.(1) Every year, approximately 35,000 people die and 65,000 people are injured by firearms.(2) Many view firearm-related violence as inevitable or unavoidable, but it is in fact predictable and probably preventable, in the same method that public health efforts have reduced workplace injuries and infectious diseases.(3) Violent injury – and firearm injury in particular – is rarely accidental and is often a recurrent problem (termed "injury recidivism").(4-8)

The United States is experiencing an upward trend in firearms violence.(9) This trend is not uniform, but is driven by increases in particular locations(10) and among certain demographic groups. Firearm injuries cared for at our Level I Trauma Center have doubled over the last four years, and we now see nearly 600 patients with firearm injuries per year.

CONCEPT

Hospital-based violence intervention programs. These multidisciplinary programs aim to reduce injury recidivism, defined as suffering a subsequent injury following an index injury. The approach is holistic, addressing the patient as a whole, and includes medical, cognitive, social, economic, and behavioral factors. The success of these programs require close collaboration between healthcare organizations, social workers, criminal justice, and other agencies.

Hospital-based violence intervention programs can be effective. A recent systematic review identified three studies showing reduced recidivism and several others showing positive intermediate outcomes. However, many of the studies were limited by poor methodological quality, and the authors commented that additional studies were needed to establish violence intervention programs as evidence-based practice. The authors also asserted that the optimal study would focus on high-risk populations, include an adequate sample size, an appropriate control group, utilize intensive participant tracking, and measure objective outcomes. (11)

High-risk populations. Some of these high-risk populations have already been identified. In particular, those who have already suffered a firearm injury, without being killed or severely disabled, are at high risk of further firearm injuries. (12) However, the limited inclusion of these individuals in the evaluation of a firearm violence reduction program is a somewhat narrow and reactionary approach. Ideally, those who might benefit from intervention (e.g., victims of other mechanisms of violence) should be identified earlier, prior to incurring their first firearm injury.

VISION

Aim. We propose to develop and evaluate an innovative firearm violence prevention program at University Hospital and UAB Highlands that applies novel strategies to advance the science and bring meaningful program gains in this area. Our approach takes advantage of a multidisciplinary team; a rich use of data culled from multiple sources; and in-depth formative research that will be essential for the design of more tailored efficacious programs than currently exist.

Objective 1: To identify those at risk. This phase will utilize a prospective case-control study design, with the objective of developing a state-of-the-art risk prediction model, for the prospective identification of individuals at high risk of suffering firearms violence. In addition to traditional data (such as age, gender, education level, and socioeconomic status), we will also incorporate novel sources, including social media data (Facebook and Twitter), criminal justice data, and behavioral data. We hypothesize that the inclusion of such data will result in a higher-fidelity risk prediction model that will have practical utility in informing which patients are at high risk of firearm injury and thus, might benefit from inclusion in a firearm intervention program.

Objective 2: To design and implement a firearms violence reduction program at UAB. Phase 2a will comprise an ethnographic evaluation of existing hospital-based violence intervention programs. Phase 2b will use a convergent parallel design and community engaged research principles to identify perceived needs of stakeholders, including former patients, healthcare workers, social workers, psychologists, psychiatrists, addiction specialists, police, educators, probation officers, local business leaders, charities, and others. Using a novel intergroup dialogue model shown to reduce distrust and other barriers will help us better understand the needs of our population, and gain the collaboration of local organizations and facilities. This phase will build shared community commitment and uncover most salient intervention targets for phase 2c, where we will design and implement this program. While based in the UAB healthcare setting, it will be inclusive and interdisciplinary, reaching out to and interfacing with other agencies and organizations.

Objective 3: To evaluate the firearms violence prevention program at UAB. We will conduct a randomized evaluation of the firearms violence prevention program. This will take the form of a "Registry Randomized Clinical Trial (RRCT)," whereby individuals meeting the inclusion criteria are automatically identified from the trauma registry or electronic health record. The registry will also be used to assess the primary outcome, which will be (re-) presentation with a firearm injury. In tandem with the evaluation of clinical effectiveness, we will also evaluate the cost-effectiveness of the program and conduct further qualitative evaluations.

INNOVATION

Novel approaches. The proposed program will have a number of innovative features, including 1) a rigorously developed multi-level intervention; 2) the inclusion of at-risk individuals; 3) the use of social media and criminal justice data to inform risk prediction; 4) a registry-randomized clinical trial design; and 5) a focus on mixed methods (quantitative and qualitative) evaluation.

Benefits. The results will directly benefit the citizens of Birmingham and Alabama, but will also be highly applicable to the remainder of the United States, and indeed in international settings; and position UAB at the forefront of firearms and violence prevention research.

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REFERENCES

1.   Centers for Disease Control and Prevention. CDC Injury Center Research Priorities. Available from: https://www.cdc.gov/injury/researchpriorities/index.html. Accessed March 14, 2018.

2.   Centers for Disease Control and Prevention. Firearm Mortality by State 2018. Available from: https://www.cdc.gov/nchs/pressroom/sosmap/firearm_mortality/firearm.htm. Accessed March 14, 2018.

3.   Krug EG, Dahlberg LL, Mercy JA, Zwi AB, Lozano R. World report on violence and health. Geneva: World Health Organization; 2002.

4.   Centers for Disease Control and Prevention. Repeat injuries in an inner city population-- Philadelphia, 1987-1988. *MMWR Morb Mortal Wkly Rep*. 1990;39(1):1-3.

5.   Goins WA, Thompson J, Simpkins C. Recurrent intentional injury. J Natl Med Assoc. 1992;84(5):431-5.

6.   Sims DW, Bivins BA, Obeid FN, Horst HM, Sorensen VJ, Fath JJ. Urban trauma: a chronic recurrent disease. *J Trauma.* 1989;29(7):940-6.

7.   Cooper C, Eslinger D, Nash D, Al Zawahri J, Stolley P. Repeat Victims of Violence. *Arch Surg.* 2000;135:837-43.

8.   Papachristos AV, Wildeman C, Roberto E. Tragic, but not random: the social contagion of nonfatal gunshot injuries. *Soc Sci Med.* 2015;125:139-50.

9.   FBI. Crime in the U.S. 2016. Available from: https://ucr.fbi.gov/crime-in-the-u.s/2016/crime-in-the-u.s.-2016/cius-2016. Accessed March 14, 2018.

10.   Rosenfeld R. Documenting and explaining the 2015 homicide rise: Research directions. Washington, D.C.: U.S. DOJ/OJP/National Institute of Justice. 2018 [4/2/18]. Available from: https://www.ncjrs.gov/pdffiles1/nij/249895.pdf. Accessed March 14, 2018.

11.   Strong BL, Shipper AG, Downton KD, Lane WG. The effects of health care-based violence intervention programs on injury recidivism and costs: A systematic review. *J Trauma Acute Care Surg.* 2016;81(5):961-70.

12.   Brooke BS, Efron DT, Chang DC, Haut ER, Cornwell EE, 3rd. Patterns and outcomes among penetrating trauma recidivists: it only gets worse. *J Trauma.* 2006;61(1):16-9.