



**2022 NATIONAL
RESEARCH CONFERENCE**
FIREARM INJURY PREVENTION

***Washington, D.C.
November 29-December 1***

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26	Firearm injury surveillance discrepancies: A call for a national firearm injury registry	Fatima Elgammal	Rutgers, The State University of New Jersey
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52	The association between community violence exposure and parental firearm ownership	Karissa Pelletier	University of Michigan
53	Gun ownership, storage practices and suicide risk in U.S. Army active-duty servicemembers	Catherine Dempsey	Uniformed Services University of the Health Sciences; Henry Jackson Foundation for the Advancement of Military Medicine
54	Women veterans' perspectives, experiences, and preferences discussing firearms in the context of lethal means safety	Evan Polzer	University of Colorado Anschutz
55	Veterans' perspectives of firearm safety discussions in the VA Healthcare System	Megan Lafferty	VA Portland Healthcare System
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59	Evaluating firearm data collection improvement strategies of the South Carolina Violent Death Reporting System	Marlene Al-Barwani	South Carolina Department of Health and Environmental Control
60	Research-practitioner partnerships to develop data-informed approaches to CVIs	Angelica D'Souza	Northwestern University
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69	A systematic review of recurrent firearm injury rates in the United States	Kristen Mueller	Washington University in St. Louis
70	The importance of psychopathy in understanding risk of gun violence.	Nicholas Thomson	Virginia Commonwealth University
71	The economic value of research on gun policy: A model-assisted estimate	Stephen Newbold	University of Wyoming
72	Survey results from firearm business owners involved in the Colorado Gun Shop Project: Factors associated with denying firearm sales to individuals in crisis	Sabrina Arredondo Mattson	University of Colorado Boulder
73	Analysis of "Stand Your Ground" self-defense laws and state-wide rates of homicides and firearm homicides	Michelle Degli Esposti	University of Michigan
74	Viewing firearm danger through the lens of police officers	William Terrill	Arizona State University
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3	Where are the guns? Evaluating gun prevalence measures and their connection with homicides using gun sales data	David Johnson	University of Central Missouri
4	Gun violence and alcohol abuse in patients with serious mental illness	Ade Mason	Virginia Commonwealth University
5	Variance in state mental health firearm prohibition laws: A 50-state analysis	Deirdre Bowen	Seattle University
6	Risk for future suicide after surviving a medically serious self-inflicted gunshot wound	Andrew Schramm	Medical College of Wisconsin
7	Talking with patients about firearms: means safety and suicide prevention may offer important inroads	Anne Massey	University of Washington
8	Building a natural language processing pipeline to characterize female firearm suicides using National Violent Death Reporting System Data: Troubleshooting and lessons learned	Evan Goldstein	University of Utah
9	Does allowing firearms on college campuses increase the risk of student suicide?	Marjorie Sanfilippo	Eckerd College
10	Circumstances of firearm suicide among U.S. Black youth	Erin Kelly	University of Colorado Anschutz Medical Campus
11	A systematic review of lethal means counseling in clinical settings	Elizabeth Spitzer	VA Boston Healthcare System, Harvard Medical School
12	The Mass Attacks Defense Toolkit: Advancing efforts to prevent and mitigate mass shootings and other mass violence	John Hollywood	RAND Corporation
13	Law enforcement officer use-of-force, prevalence, trends, and correlates: National survey results	Bruce Taylor	University of Chicago
14	Fatal and nonfatal shootings by police in the United States, 2015-2020	Julie Ward	Johns Hopkins University
15	The effects of exposure to firearm violence on post-traumatic stress symptoms among adolescents: A scoping review	Esther Lee	University of Michigan
16	Provider documentation of trauma-informed care in hospitalized youth assault trauma patients in an Urban Academic Quaternary Care Center	Insia Zufer	Johns Hopkins University
17	Trends in youth risk behaviors and firearm injury in the U.S. over 20 years	Justin Hatchimonji	University of Pennsylvania
18	Examining the associations between proactive and reactive aggression with gun violence among youth with Conduct Disorder	Laura Hazlett	Virginia Commonwealth University
19	Baseline characteristics of adolescent youth seeking emergency department treatment for an assault injury	Laura Seewald	University of Michigan
20	Using a difference-in-differences approach to examine the impact of child access prevention laws on youth firearm suicides	Mark Gius	Quinnipiac University
21	Effects of gun safety videos and gun violence in movies on whether children handle real guns	Sophie Kjaervik	The Ohio State University
22	Extreme Risk Protection Orders issued against minors: Findings from six states	Veronica Pear	University of California, Davis

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24	Validation of the Gun Belief and Behavior Scale with a U.S. veteran sample	Joseph Constans	Tulane University
25	Differences in firearm storage practices among United States military service members who have and have not disclosed suicidal thoughts or attended behavioral health sessions	Michael Anestis	Rutgers, the State University of New Jersey
26	Application of a new conceptual model of help seeking for survivors of community gun violence	Caterina Roman	Temple University
27	Improving the capacity of hospital ED data systems to track firearm injuries	Catherine Barber	Harvard University
28	The effects of school shootings on firearm acquisition and carrying	Susan Parker	University of Michigan
29	Challenges and opportunities in police data measurement of nonfatal firearm injury	Susan Parker	University of Michigan
30	Methodological challenges and promising tools for research evaluating the impacts of social policies on firearm injury	Ellicott Matthay	New York University
31	The Harms and Benefits Inventory (HBI): Development of a validated survey-based measure to understand the impact of policy on gun users	Mitchell Doucette	Johns Hopkins University
32	Measuring firearm-related violent crime using Criminal Legal System records: Challenges and opportunities	Julia Schleimer	University of Washington
33	Rural-urban variation in youth violence and handgun carrying in the United States, 2002-2019	Julia Schleimer	University of Washington
34	Acute and recurrent firearm injury rates in an urban population (2010-2021): Using machine learning to improve classification	Kristen Mueller	Washington University in St. Louis
35	Identifying needs among victims of violence: Findings from 1-year hospital-based violence intervention program pilot	Ashley Raposo-Hadley	University of Nebraska Medical Center
36	The importance of accurate local surveillance for firearm injury prevention.	Cary Cain	Baylor University
37	Older adults and firearm safety: Factors associated with making plans to adopt new safety behaviors across transtheoretical model stages of change	Christopher Knoepke	University of Colorado Denver
38	Adaptation and evaluation of a lethal means safety suicide prevention module for concealed carry courses	Claire Houtsma	Southeast Louisiana Veterans Health Care System / Tulane University
39	Assessing feasibility and acceptability for implementing a hospital-based violence intervention program for Black men in Arkansas: Medical provider perspectives	Heather Horton	University of Arkansas for Medical Sciences
40	Equitable implementation of S.A.F.E. firearm	Katie Hoskins	University of Pennsylvania
41	Assessing the feasibility and impact of a firearm safety intervention in the retail and range environment: A qualitative study of employee perceptions	Mike Henson-Garcia	The University of Texas
42	Participatory action research with the firearms community: An evaluation of the Colorado Gun Shop Project	Stesha Peacock	University of Colorado Boulder
43	Measures of school connectedness and social support serve as protective factors against weapon violence and firearm carrying	Teja Pulavarthi	University of Pittsburgh
44	Emerging strategies to incorporate firearm injury prevention into healthcare: Results of qualitative interviews with providers and patients	Lauren Maxim	VA Portland Healthcare System
45	"A Good Way to Start a Dialogue" patient and provider perceptions of a standardized question about firearm access to support suicide prevention	Julie Richards	University of Washington
46	Positive education and positive youth development frameworks for gun violence prevention	Sarina Alavi	Columbia University
47	Analysis of rural and urban patients treated for firearm injuries in 131 U.S. Trauma Centers	Ashley Hink	Medical University of South Carolina

POSTER PRESENTATIONS

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49	The impact of structural racism on violent crime: A multi-city analysis	Christina Mehranbod	Columbia University
50	Drug/gang related pediatric firearm mortality in Milwaukee, Wisconsin 2010-2020	Erica Marion	Medical College of Wisconsin
51	The toll of nonfatal gunshot injuries	Erica Mullen	Everytown for Gun Safety Support Fund
52	Violent death rates: A comparison of the U.S. to the other high-income countries, 2018	Erin Grinshteyn	University of San Francisco
53	Violence still unrelenting: An analysis of two decades and 12,088 gunshot wounds at a Level I Trauma Center	Fatima Elgammal	Rutgers, The State University of New Jersey
54	The language of violence: Do words matter more than we think?	Leah Tatebe	Northwestern University
55	Accounting for socio-economic context in quantifying the attractive and repellent influence of built environment on firearms violence in multiple cities	Luke Muggy	RAND Corporation
56	Persistent, elevated, and increasing: gun violence in American "Micropolitan" cities, from 2015-2021	Magic Wade	University of Illinois Springfield
57	Social vulnerability and firearm violence in Chicago	Michael Poulson	Boston Medical Center / Boston University
58	Firearm death and injury in Canada and the USA: Implications for policy and practices	Wendy Cukier	Toronto Metropolitan University (formerly Ryerson University)
59	Social networks and experiences of firearm violence among Black youth	Alexander Riley	University of Pittsburgh; UPMC Children's Hospital of Pittsburgh
60	The impact of COVID-19 on gun violence	Ariel Wood	Virginia Commonwealth University Medical Center
61	Trends in firearm-related emergency department visits before and during the COVID-19 pandemic: Findings from NC-FASTER, 2019-2021	Lucas Neuroth	University of North Carolina at Chapel Hill
62	State gun policy and spikes in gun deaths in the COVID-19 pandemic	Wilson Hammett	University of California, Los Angeles
63	Examining characteristics and experiences of Black firearm owners	Allison Bond	Rutgers, The State University of New Jersey
64	What preferences for firearm locking devices exist among firearm owners? Findings from a systematic review and discussion of implications for research and practice	Jessica Buck-Atkinson	University of Colorado Anschutz Medical Campus
65	Personal preferences and experiences with out of home firearm storage in Colorado and Washington State	Megan McCarthy	University of Colorado Anschutz Medical Campus
66	Interactions at the point of firearm purchase and subsequent use of locking devices	Shelby Bandel	Rutgers, The State University of New Jersey
67	Gun ownership and suicide among Black Americans	David Hemenway	Harvard University
68	Perceived risk of household firearm ownership: Evidence for optimism bias and implications for intervention	Amanda Aubel	University of California, Davis
69	Effect of gun ownership on violence: A division-level longitudinal analysis in the USA	Jacob James Rich	Case Western Reserve University
70	Racial and ethnic disparities in firearm injury during COVID-19 in a Midwestern Metropolitan area	Constance Kostelac	Medical College of Wisconsin
71	Perception and application of spirituality among Black male survivors of firearm violence	Augustine Cassis O. Boateng	University of Pennsylvania
72	Not reporting gun victimization to the police: An analysis of crimes perpetrated against women by their intimate partners 1993-2021	Eugenio Weigend Vargas	University of Michigan
73	A critical appraisal of the evidence on the gender-based impacts and experiences of stand your ground laws	David Humphreys	University of Oxford

Session: Poster Session 1

Blue Pre-Function Room, November 30, 5:15-6:15 PM

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1. State regulation of public carry, 1980–2020: From bans to permitless carry and NYSRPA v. Bruen

Alexander D. McCourt JD PhD MPH¹

¹Center for Gun Violence Solutions, Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health

Statement of Purpose: This study maps and categorizes state concealed carry policies from 1980 to 2022 and describes the implications of the Supreme Court’s decision in *New York State Rifle and Pistol Association v. Bruen* (NYSRPA) on state regulation of public carry.

Methods/Approach: This study used public health law research methods to gather, categorize, and analyze concealed carry policies from 1980–2022 in all 50 states. Statutes, regulations, and legislative history documents were obtained from Thomson Reuters Westlaw, Nexis Uni, HeinOnline, and state government websites. Policies were categorized based on the overall permitting scheme and specific permitting requirements, including training courses and elements affording discretion to permitting agencies. Trends and common themes were identified from these longitudinal legal data. These elements were reassessed and analyzed in light of the Supreme Court’s opinion in NYSRPA.

Results/Conclusion: From the 1980 to 2022, concealed carry was deregulated considerably. This occurred in two phases, with many states starting to adopt so-called “Right-to-Carry” laws in the 1990s and states rapidly adopting permitless carry laws in the 2010s. Alongside the first phase, states added new provisions, including training requirements, that provided opportunities to shape gun carrying behavior. The second deregulation, however, removed requirements like training by repealing the overall permit requirement. NYSRPA added another wrinkle to this analysis, reshaping the law in the handful of states with discretionary policies and threatening the status of other permitting provisions.**

Innovation & Significance to the field: This study identifies themes and trends in the overall liberalization of concealed carry. Prior work has found associations between relaxed concealed carry policies and increases in violence. The specific findings in this study highlight the need for research into individual permitting requirements and for novel approaches to regulating carry and reducing gun violence, especially in light of the Supreme Court’s opinion in NYSRPA.

** At the time of submission, the NYSRPA decision has not been issued.

2. State by State Legislative Action to the Sandy Hook Mass Shooting and Analysis of Subsequent Legislative Reaction in the years from 2013-2020

Deirdre M. Bowen JD PhD^{1,2}, Frederick P. Rivara MD MPH^{3,4,5}, Alice Ellyson PhD^{3,5,6}, Ali Rowhani-Rahbar MD PhD MPH^{3,4,5}

¹Seattle University School of Law, ²Firearm Injury Prevention Research and Policy Program, ³Department of Pediatrics, University of Washington School of Medicine, ⁴Department of Epidemiology University of Washington School of Public Health, ⁵Firearm Injury and Policy Research Program, University of Washington, ⁶Center for Child Health, Behavior, and Development, Seattle Children’s Research Institute, ⁷Harborview Injury Prevention & Research Center, School of Medicine, University of Washington

Purpose: We developed a database of firearm-related laws enacted by states in the legislative session immediately after the Sandy Hook massacre and in the seven years that followed, analyzed subsequent state legislative reactions, and identified patterns in these reactions starting with the initial “Sandy Hook” laws through subsequent legislative activity in response to mass shootings through 2020.

Methods: Using Thomson Reuters Westlaw, we developed a database of gun laws enacted or amended beginning in 2013. We tracked legislative response through 2020. We coded legislative response identifying four patterns: legislative action leading to firearm restrictive laws, firearm expansive laws, a mixed response, or consistent legislative inaction.

Results/Conclusion: In the first legislative session after Sandy Hook, state responses varied. An almost equal number of states failed or chose not to pass legislation, passed a mix of legislation that both restricts and expands access or possession of firearms, or passed restrictive legislation only. Trends in the subsequent years revealed a continuity in heterogeneity with twenty-nine states passed a mix of firearm restrictive and expansive laws, ten states consistently enacted firearm restrictive legislation, nine states were mostly inactive, and two states consistently firearm expansive. Legislation that passed fell into two categories: 1)firearm restrictive laws that involved domestic violence or mental health, and 2)firearm expansive laws that expanded concealed carry options. We conclude that inconsistent state legislative action from one year to the next with contracting and expanding access to firearms may contribute to an overall weakening of firearm policy.

Innovation: This database and study provided two insights: it shows heterogeneity in longer term legislative response patterns to mass shootings beginning with Sandy Hook, and more broadly, it shows why state firearm policy might not be as effective even in states passing restrictive laws despite evidence that restrictive laws are associated with lower firearm deaths.

3. Improving causal inference in firearm policy research: A review of confounder selection

Julia Schleimer MPH¹, Camerin A. Rencken SCM¹, Matthew Miller MD ScD MPH², Soja A. Swanson ScD³, Ali Rowhani-Rahbar MD PhD, MPH¹

¹Department of Epidemiology, School of Public Health, University of Washington, ²Department of Health Sciences, Bouvé College of Health Sciences, Northeastern University, ³Department of Epidemiology, School of Public Health, University of Pittsburgh

Purpose: Estimating effects of firearm policies is an important research endeavor. Confounding is a pervasive threat to causal inference in these settings. To address this, most studies control for confounders in a multiple regression framework, making the choice of such variables an important consideration. This scoping review characterizes investigators' selection of confounders in non-randomized firearm policy research in the US.

Methods: We identified empirical research articles indexed in PubMed from 1/1/2000-9/1/2021 that examined any of 18 pre-specified firearm policies which regulate: 1) who may own, purchase, or possess firearms, 2) firearm sales and transfers, and 3) the use, storage, or carrying of firearms. For the same policy-outcome combinations examined in two or more studies, we identified confounders used across studies and the reported method of confounder selection.

Results: Of 7733 screened articles, 120 were included. We have extracted data from 33 articles thus far, 17 of which are pre-post studies, allowing comparison of change in the outcome with change in the policy. Although most studies reported selecting covariates based on prior evidence for their association with the policy and/or outcome, there was little overlap in covariates selected in studies of the same policy and outcome. For example, five pre-post studies examined the association between background check policies and firearm homicide. Of 22 total confounders included across these studies, only 9 were common to one or more studies. Four of these studies additionally controlled for other firearm policies (9 total policies included; 5 common to one or more studies). Across various policy-outcome combinations, common confounders included demographic and economic characteristics.

Innovation/Significance: Covariates selected for confounding control may reduce or induce bias. Wide variation in selected confounders might contribute to inconsistent results in firearm policy research. More rigorous and transparent confounder selection may improve the accuracy of evidence on firearm policy effectiveness.

4. The Effects of Firearm Concealed Carry Licensing Policies: Who do they affect and how?

Susan Parker MPP MS¹

¹Department of Health Management and Policy, School of Public Health, University of Michigan

Statement of Purpose: Firearm injury and mortality, excluding suicide, is most often caused by violent interpersonal assaults that occur in public spaces. While the majority of U.S. states have permitted gun owners to carry firearms in public for decades, in the last twenty years, the remaining states loosened restrictions on carrying concealed weapons

in public. The effects of regulating concealed weapons in public have for decades remained unresolved (Morral 2018), but recent advances find that permissive concealed carry licensing laws increase violent crime and homicide (Colmer and Doleac 2021; Donohue et al. 2019). Yet, less is known about the effects of concealed carry licensing on injury and death by victim race or the mechanisms that affect policy outcomes.

Methods/Approach: This study examines the staggered state-level rollout of permissive concealed carry licensing laws by combining state-level medical claims databases with detailed patient information to create a panel of firearm injuries treated in hospitals from 2000-2018 using a differences-in-differences framework to estimate the effects of concealed carry policy on firearm injuries. To assess whether policy effects are driven by changes in firearm prevalence among legal firearm possessors, demand for firearms measured by background check and concealed carry license volumes are assessed. Further, illegal firearm prevalence is assessed using data on stolen and recovered firearms.

Results/Conclusion: The effects of loosening restrictions on concealed carry licenses differ by victim race and county residence urbanicity. Overall changes in firearm injury and mortality may be driven less by changes to household prevalence than increases in public firearms carrying. Firearm theft increases significantly after policy implementation.

Innovation & Significance to the field: Identifying differential victim effects is important in understanding the burden of firearm injury and can inform targeted policy interventions to reduce harm.

5. The association of permit-to-purchase laws with intimate partner homicide

Stephen Oliphant MPP¹, April M. Zeoli PhD MPH², Mitchell Doucette PhD MS³, Cassandra K. Crifasi PhD³, Daniel W. Webster ScD MPH³

¹School of Criminal Justice, Michigan State University, ²Department of Health Management & Policy, School of Public Health, University of Michigan, ³Center for Gun Violence Solutions, Johns Hopkins Bloomberg School of Public Health

Statement of Purpose: Firearm intimate partner homicide rates have been rising since 2015. While research suggests that some firearm restriction laws are associated with population-level intimate partner homicide reduction, it is unknown if permit-to-purchase laws, which provide a strict mechanism for implementation of the firearm purchase restriction, are also associated with intimate partner homicide rates.

Methods/Approach: Data on intimate partner homicides come from the multiply-imputed and weighted Supplementary Homicide Reports, state-and-year indexed from 1990-2019. We utilized two methodological approaches to assess the association of permit-to-purchase laws with state-level intimate partner homicide rates. We will conduct a longitudinal panel analysis using generalized estimating equations, modeling homicide counts using a negative binomial distribution, robust standard errors, and controlling for additional firearm safety laws and state-level characteristics. Then, we will use the augmented synthetic control method with fixed effects to estimate the impact of single-state permit-to-purchase policy changes on intimate partner homicide. For both modeling approaches, outcomes will be stratified by race/ethnicity (Non-Hispanic, White vs. Non-Hispanic, Black) and weapons (firearm vs. non-firearm).

Results/Conclusion: The results of each approach will be presented and compared, drawing conclusions regarding the association of permit-to-purchase with intimate partner homicide and differences in results by model-type. Results from the stratified analyses will also be discussed.

Innovation and Significance to the Field: This is the first study to directly test permit-to-purchase laws on intimate partner homicide using two different statistical techniques. Our longitudinal panel analysis will provide the population average effect of permit-to-purchase laws on intimate partner homicides and our augmented synthetic control approach will provide the average treatment effect on the treated for law adopting states. Implications of these two approaches will be discussed.

6. Effect of Second Amendment Sanctuary Ordinances on Firearm Homicide and Suicide Rates

Alexandra Filindra¹, Burcu Kolcak²

¹University of Illinois Chicago, ²Rutgers University

Statement of Purpose: In recent years, local governments have begun adopting resolutions declaring themselves as “Second Amendment Sanctuaries”, or “gun sanctuaries” in their effort to defy statewide gun-control measures they deem unconstitutional (Field 2020; Su 2021). Based on our original data collection, in the past year, around 1,000 counties have adopted Second Amendment sanctuary ordinances, non-binding resolutions largely adopted by boards of county commissioners. In this paper, we examine whether the adoption of second amendment sanctuaries affects firearm homicide and suicide rates.

Methods/Approach: This paper uses a difference-in-differences design (DID) that looks at the effect of adoption of second amendment sanctuary ordinances on firearm suicide and homicide rates in order to minimize potential unobserved heterogeneity among counties in a certain time period, or among periods in a certain county. We compare differences in firearm suicide and homicide rates post-2018 period, the year marked by the adoption of Second Amendment sanctuary ordinances, relative to the pre-2018 period between Second Amendment sanctuary counties and non-Second Amendment sanctuary counties. We use an original dataset that identifies all counties based on their adoption of Second Amendment sanctuary ordinances across the United States. For our dependent variable, we use county-level rates of homicide and suicide from the US Centers for Disease Control and Prevention (CDC). Our analysis also includes a set of geographic and demographic control variables.

Results / Conclusion: We hypothesize that suicide and homicide rates will be higher after the adoption of sanctuary ordinances than before and also higher in counties that have adopted such ordinances than those that have not.

Innovation and Significance to the Field: This paper investigates the effect of a new policy that has spread quickly across many counties. We use an original dataset on county-level Second Amendment sanctuary ordinances combined with data on crime, and other secondary source data.

7. Examining sleep problems as a mediator between adolescent firearm violence and depression in adulthood

Esther Lee MPH¹

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Statement of Purpose: Firearm violence is the third leading cause of death for children and adolescents (ages 1-19). It is well-established that adolescents exposed to firearm violence have adverse mental health outcomes including depression and anxiety. Further, sleep plays a critical role in their well-being and mental health. Sleep loss and disruption are linked to multiple negative mental health outcomes (e.g., major depression, ADHD, anxiety) among adolescents. While there is prolific literature on the relationship between sleep and delinquency, fewer studies have examined the relationship among sleep problems, depression, and firearm victimization and perpetration. This research examined whether sleep problems (i.e., difficulty falling asleep and sleep duration) mediated the association between firearm-related victimization in adolescence and perpetration and depression in adulthood.

Methods: The data was derived from the National Longitudinal Study of Adolescent to Adult Health (Add Health), a nationally representative sample of adolescents and young adults. Waves 1, 2, 3, and 4 were utilized (N=1,449) to examine the association between weapon (firearm and knives)-related victimization and perpetration (Wave 1) and depression (Wave 4) as well as sleep problems (Waves 2 and 3), controlling for age, grade, sex, race/ethnicity, and median household income.

Results: Adolescents with exposure to firearm victimization and perpetration were more likely to have depression; sleep problems mediated this relationship (p-value= 0.01), even after controlling for age, grade, sex, race/ethnicity, and median household income. 12% of the total effect was mediated by insomnia. However, sleep length (number of hours) in Wave 3 not a significant mediator. The direct association between firearm victimization and perpetration and depression was statistically significant ($\beta = 0.35$, p-value=0.005).

Innovation & Significance: This study contributes to the literature elucidating the relationship among adolescent firearm victimization and perpetration, depression in adulthood, and sleep problems. Further, it provides a possible target for intervention among adolescents exposed to firearm violence.

8. Mental Health Comorbidities, Household Firearm Ownership, and Reported Firearm Access Among Children

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Statement of Purpose: To estimate how youth and their caregivers' mental health risk factors for suicide are associated with youth reported access to firearms inside and outside the home.

Methods/Approach: This cross-sectional study examined Adolescent Brain and Cognitive Development Social Development (ABCD-SD) data collected from 2016 to 2021. Participants included 2,277 children ages 10 to 15 years old from five study sites in the United States. We used generalized linear models to estimate household firearm ownership and child's reported firearm access. Child mental health risk factors for suicide included depression, anxiety, attention deficit hyperactivity disorder (ADHD), oppositional defiant disorder, externalizing problems, and lifetime suicidality. Caregiver mental health risk factors for suicide included depression, anxiety, ADHD, antisocial behavior, and lifetime mental health histories.

Results/Conclusion: Around 20% of children lived in a firearm-owning household, and 5% of children reported easy firearm access. Overall, children with mental health risk factors for suicide were just as likely or more likely to report firearm access as those without such risk factors. In firearm-owning households, children who indicated lifetime suicidality were 2.48 times more likely (95% CI = 1.50, 4.10) than their counterparts to report easy firearm access. In non-firearm households, children of caregivers who reported any mental health history or indicated externalizing problems were 1.67 times (95% CI = 1.10, 2.54) and 2.28 times (95% CI = 1.55, 3.37) more likely than their counterparts to report easy firearm access.

Innovation & Significance to the field: Our study is the first to examine how youth and their caregivers' mental health risk factors for suicide are linked to children's access to firearms inside and outside the home using a novel dataset from the ABCD study. In addition to promoting safe firearm storage and screening for child mental health, youth suicide prevention efforts should address youths' access to firearms not in their homes and the effects of caregiver mental health.

9. Exploring Personal Crises Observed in Mass Shooters for Third-Party Detection and Intervention Using Psychometric Network Analysis

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Purpose: Mass shootings in the United States have received significant attention from the media and scholars alike. Recent work indicates that mass shootings are becoming more deadly in the US, making the identification of critical warning signs among would-be mass shooters of paramount importance. In the present work we utilized a public database containing information on mass shooters to identify personal crisis indicators that may serve as critical warning signs to third parties prior to mass shooting events.

Methods: To this end we applied a regimen of psychometric network analyses to a dataset of crises observed among mass shooters from the US prior to their attacks. We also conducted a regression and subsequent dominance analysis using these crisis indicators as predictors of shooting severity to identify which accounted for the most variance of shooting severity.

Results: First, our exploratory graph analysis identified two specific groupings of crises: Distressed Isolation and Disturbed Affect. Next, our network analysis revealed that agitation was a highly important node due to the strong links it shared with mood instability and abusive behaviors. However, isolation yielded the greatest community cross-loading and the most edges in the network. We also found that depression and mood instability were the most important predictors of shooting severity, as they explained the greatest amount of variability.

Innovation & Significance: This work marks a novel application of psychometric network analysis to the study of mass shooters and the prevention of such events. Our findings are discussed within the framework of the path to intended violence model and in terms of practical implications for interventions. We ultimately argue that social isolation is an ideal candidate for the acquaintances and communities of would-be shooters to intervene on and that a community-based model of intervention may be an important future direction.

10. Trajectories of handgun carrying in rural communities from early adolescence to young adulthood and their association with bullying and physical violence

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Purpose: Most evidence on the patterns of handgun carrying and their overlap with interpersonal violence is based on findings from only urban communities. Characterizing patterns of handgun carrying among adolescents and young adults growing up in rural areas as well as their association with bullying and physical violence can inform prevention programs that reduce firearm-related harm.

Approach: We used a longitudinal cohort study of 2,002 public school students from 12 rural communities across 7 states from ages 12-26 (2005-2019). We determined specific points of intervention by identifying patterns of handgun carrying using latent class growth analysis and quantified how initiation age, duration, and frequency of carrying differ across identified patterns. After determining trajectories, we studied the association of handgun carrying trajectories with both the uses and experiences of bullying and physical violence during adolescence and young adulthood using logistic regression.

Results: Latent class growth analysis indicated six longitudinal trajectories: never/low probability carrying (n=1,590;79.4%), emerging adulthood carrying (n=166;8.3%), steadily increasing carrying (n=163;8.1%), adolescent carrying (n=53;2.6%), declining carrying (n=24;1.2%) and high probability and persistent carrying (n=6;0.3%). The earliest average age of initiation occurred in both the adolescent and declining carrying groups at age 12.5 and 12.6, respectively. Trajectories with a higher probability of handgun carrying also carried more frequently. Compared to youth with very low probabilities of carrying a handgun in adolescence and young adulthood, youth with high probabilities of handgun carrying during adolescence (declining carrying, adolescent carrying, steadily increasing carrying) had greater odds of bullying (OR=11.22, 95%CI=[2.63,47.89]; OR=3.89, 95%CI=[1.99,7.62]; OR=1.95;95%CI=[1.39,2.73], respectively) and of using physical violence (OR=15.85, 95%CI=[4.71,53.40]; OR=9.74;95%CI=[4.85,19.54]; OR=3.33, 95%CI=[2.39,4.63], respectively).

Innovation/Significance: Experiencing and using bullying and physical violence were associated with specific patterns of handgun carrying among youth growing up in rural areas. Handgun carrying could be an important focus of violence prevention programs among those youth.

11. Rates and factors associated with firearm carrying among young adults presenting to four urban emergency departments

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Statement of Purpose: The Screening to Predict Young Adults at Risk for Firearm Violence (SPARK) project is a multisite prospective longitudinal study proposing to use machine learning methods to predict future firearm violence risk. Here, we use partial baseline data from SPARK to study rates, and factors associated with, firearm carrying.

Methods/Approach: Research assistants in four emergency departments (EDs) in three cities (Flint, Seattle, Philadelphia) approached youth aged 18-24 to participate in SPARK. Consenting youth completed a baseline assessment including validated measurements of firearm-related behaviors (possession/carrying/use), violence

exposure (peer/partner; childhood violence exposure), peer behaviors, and neighborhood-level factors. We calculated rates of past-six-month firearm carrying and rates of carrying in several high-risk scenarios (e.g., while using drugs), and analyzed associations between covariates and firearm carrying using logistic regression.

Results: To date, 815 participants are enrolled in SPARK across four sites (36.3% male, 59.9% female, 3.8% non-conforming; 41.1% Black, 32.5% White, 9.6% Multi-racial, 14.6% Other race) and 94 (11.5%) reported firearm carrying outside the home. Among those, 44.1% report carrying in ≥ 1 high-risk scenario (e.g., while drinking/using drugs; while committing a crime) and 25.5% report firearm discharge in ≥ 1 high-risk scenario (e.g., to scare/threaten someone). Relative to the rest of the sample, those reporting firearm carrying had higher rates of peer (73.1%-vs-39.4%) and partner violence (35.1%-vs-18.5%), had higher rates of violence-related childhood experiences (57.6%-vs-30.4%), and reported higher scores on scales measuring community violence exposure, peer delinquency, and attitudes favoring retaliation (all $p < 0.001$). Logistic regression models, adjusted for site, race, age, and gender, were largely consistent with the unadjusted results.

Significance: Nearly 12% of youth presenting to urban EDs carry firearms, and almost half of those report carrying/discharging a firearm in high-risk scenarios. Firearm safety interventions should prioritize youth with several sources of violence exposure, exposure to delinquent peers, and attitudes favoring retaliation.

12. Implementing community-based youth firearm prevention: The True Reason I Grabbed a Gun Evolved from Risks Project (TRIGGER)

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Statement of Purpose This paper describes an implementation study of the TRIGGER project in Washington DC that is part of the CDC-funded Michigan Youth Violence Prevention Center. The TRIGGER project includes a youth employment program that engages youth in building social-emotional skills, learning about root causes of gun violence, and planning gun violence prevention projects. The evaluation of TRIGGER involves two phases: implementation and outcome evaluation. This paper focuses on the implementation phase of our study to provide feedback to program leaders about program delivery and develop an implementation guide. Our project is a collaboration between academic researchers and a community-based organization.

Methods/Approach Our data include: 16 semi-structured interviews with key community- and youth stakeholders, focus group discussions with participants, and observations of program sessions. The interviews will address topics regarding program capacity and sustainability, reach, and barriers to delivery. Focus groups will address participant satisfaction, feedback, and suggestions for improvement. Session observations will include ratings by research assistants on youth engagement, facilitator behavior, and overall quality. Qualitative data from interviews and focus groups will be coded using a deductive/inductive approach to analyze patterns and identify themes. The observational data will be integrated with these qualitative data to inform program improvement and develop the implementation guide.

Results/Conclusion We do not have results to share because the deadline for abstracts was before commencement of data collection. We will have collected all data by August and will have analyzed it before the conference.

Innovation & Significance to the field Our study is novel because we have little systematic information about grassroots youth gun violence prevention program implementation. It is vital for community firearm violence prevention to involve local stakeholders in program development and evaluation to ensure programs are locally relevant, acceptable, and sustainable.

13. Comparison of Pediatric Firearm Related Fatalities in Intimate Partner Violence Related Homicides, Familial Homicides, and Other Child Homicides

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Statement of Purpose: Child homicide is the fourth leading cause of pediatric mortality in the US, yet is understudied. Prior research has identified that up to 20% of child homicides can be attributed to parental intimate partner violence (IPV). This study seeks to answer: What are the differences in firearm-related and non-firearm related fatalities among children killed in IPV-Related Homicide (IPVRH), familial (non IPV-related) homicides, and other child homicides?

Methods/Approach: We examined autopsy records and case narratives from medical examiner reports of all homicides in Harris County, Texas and Maricopa County, Arizona from 2016 to 2020. Based on the situational context provided in medical examiner case narratives, we classified child homicides as IPVRH, familial homicide, or other. We examined child homicides in Maricopa County (n=165 child homicides; n=22 IPVRH of children) and in Harris County, Texas (n=130 child homicides; n=11 IPVRH of children).

Results/Conclusion: Data analysis is underway. We will use multinomial regression to test the association of risk factors, and report chi-square and calculate relative risk. We hypothesize that children of IPVRH are more likely to be killed by a firearm, more likely to be part of a homicide-suicide, and have distinct risk factors. Analyses will examine individual and situational covariates of firearm and non-firearm homicides of children. In addition to demographic variables, we will also examine a number of situational variables including injury settings, cause of death, victim-offender relationship, perpetrator suicide, parental separation/divorce, number of victims, and witnesses.

Innovation & Significance to the field: This study adds to the evidence of firearm-related homicides of children and in identifying risk factors preceding murders of children. The results of this study will provide additional information about firearms and other situational risk factors for child homicides that can be used to guide future intervention and policy work.

14. Reducing Firearm Access for Youth At-Risk for Suicide in a Pediatric Emergency Department

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Statement of Purpose: To evaluate feasibility and acceptability of behavioral health (BH) specialists providing lethal means counseling (LMC) and firearm safe-storage devices to caregivers of youth presenting with BH complaints in the pediatric ED.

Methods: Prospective feasibility study of ED caregivers of youth presenting with BH complaints. Caregivers self-administered e-surveys on demographics and firearm safe-storage knowledge/practices. BH specialists provided LMC and gun-owners were offered free lockbox and/or trigger lock. 1-week follow-up e-surveys gathered self-reported data on gun-safety practices and intervention acceptability. Primary outcomes include proportion of gun-owning participants, follow-up response, and acceptability of LMC. Secondary outcomes include reported change in firearm-safety practices. Descriptive statistics used for univariate and paired data responses. Likert-scale acceptability responses dichotomized to strongly agree/agree vs. neutral/disagree/strongly disagree.

Results: 58 subjects were approached with 37 enrolling (97% female, 51% Black, mean age 40 years (SD± 8.8)). 57% had no prior gun-safety counseling/education; 46% with gun at home. Among gun-owners (n=17), 82% had handguns and 53% had shotguns. 71% always used safe-storage device. 41% used gun-safe, 29% used lock box, and 24% used trigger lock. 65% of gun-owners requested safe-storage devices. 70% (n=26/37) of participants completed follow-up where 77% of participants asked about household guns prior to child visiting other homes compared to 46% pre-intervention (+30.8%). 88% affirmed at intake and follow-up that ED gun-safety education was useful and 81% affirmed at intake and follow-up that ED is an appropriate place for gun safety discussions. Among gun-owners that completed follow-up (n=14): 100% stored all guns locked at 1-week compared to 71% pre-intervention (+28.6%).

Conclusions: Preliminary results show ED-based LMC via BH specialists as feasible. Caregivers report intervention useful, acceptable, and appropriate. LMC/device distribution led to reported changes in safe-storage practices.
Innovation/Significance to the field: ED-based approach for LMC provides timely resources that improve caregiver firearm-safety practices.

15. Provider Perspectives on Trauma Recovery & Violence Prevention Resources for Assault Injured Youth in an Urban Level 1 Trauma Center

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Statement of Purpose Firearm homicide is the leading cause of mortality for adolescents. Further, youth who have experienced assault injury (AI) are nearly twice as likely to be reinjured. Evidence-based trauma recovery and violence prevention (TRVP) services have been shown to decrease youth reinjury as well as violent act rate, but provider utilization and awareness of these resources is understudied.

Methods/Approach We surveyed 82 health providers working in a Level 1 pediatric emergency department (ED) over a 7-month period. All participants completed a 12-item Likert scale survey to measure awareness, usage, importance, and efficacy of TRVP resources. Qualitative free responses captured data on existing resources, resource barriers, and areas of improvement.

Results/Conclusion Participants included 54 physicians, 19 nurses, 4 ED technicians, and 5 other staff. Most providers (90%) agreed that TRVP resources should be incorporated into standard care for AI youth. However, providers had limited awareness of resources and low confidence in utilizing resources. Eighty percent of providers scored ≤ 3 of 5 on awareness of existing resources, and roughly 41% of participants reported feeling slightly to not at all confident in activating existing resources. These findings suggest the need to develop educational interventions to train providers on TRVP resource utilization. Providers also reported low efficacy rating for existing resource: over 88% of participants identified existing resources as moderately to not at all effective at preventing reinjury. In their qualitative responses, participants identified resource insufficiency, systemic issues, communication barriers, patient interest, and lack of provider knowledge as barriers to TRVP uptake. These findings suggest the need to strengthen TRVP programs to address identified resource insufficiencies, beyond just investments in patient and provider education.

Innovation and Significance to the Field With rising youth morbidity and mortality, pediatric EDs should consider improving TRVP resources to decrease firearm reinjury rate and decrease youth mortality.

16. Asking Saves Kids: a firearm injury prevention campaign in a suburban Cook County pediatric Emergency Department (ED)

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Statement of Purpose: In the United States, 87 children are injured or killed by guns daily. Firearms are the second leading cause of death for American children; gun violence is a public health epidemic. Campaigns such as ASK (Asking Saves Kids) promote gun safety education and encourage conversations around these topics as a potential to keep kids safe from unintentional firearm injury due to a loaded or unsecured gun in the home. Our study seeks to evaluate if educating child caregivers about gun safety and the ASK campaign, while in the ED, increases their confidence in discussing these topics with other child caregivers.

Methods/Approach: Caregivers of patients in Loyola University Medical Center's (LUMC) pediatric ED ("participants") completed a baseline questionnaire regarding familiarity with the ASK campaign, and their practice of discussing at-home gun safety. Participants then received educational material from the ASK campaign ("ASK education") about gun safety in homes with children. At two points after receiving ASK education, participants completed questionnaires regarding their familiarity with the ASK campaign and practice of asking about at-home gun safety.

Results/Conclusion: In this small sample, participants were significantly more likely to be familiar with the ASK campaign at the immediate follow-up assessment (OR = 6.29; p = .02) and at the final assessment (OR = 14.67; p = .001). We believe this increased familiarity with the ASK campaign correlates with participants being able to correctly describe its mission.

Innovation & Significance To The Field: Prior studies at LUMC have demonstrated that educating EM providers about ASK increased their comfort in discussing gun safety topics with patients. In this study, we sought to determine if teaching child caregivers' about ASK while in the ED would increase their comfort in and practice of discussing these topics with other caregivers.

17. Care Management Needs Among Assault-Injured Youth Enrolled in a Hospital-Based Violence Intervention

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Statement-of-Purpose: Hospital-based violence interventions are increasingly employing strengths-based care management approaches to link assault-injured youth with community services to reduce the risk of repeat violent injury. Understanding key resource needs among this population can inform future intervention efforts.

Methods/Approach: We present baseline data from 50 assault-injured youth (age-14-24) enrolled in an on-going multi-site randomized control trial (RCT) evaluating the efficacy of two versions of a hospital-based violence intervention that combines behavioral therapy with care management. Enrolled youth were asked at baseline about key service needs and barriers to accessing services prior to their condition assignment.

Results: Among assault-injured youth (age=19.6; 44.0%-male; 80.0%-Black; 68.0%-public assistance; 16.0% baseline firearm carriage; 80% non-partner (20% partner) violence; 28.0% firearm victimization), 86.0% self-identified one or more care management service needs (mean=4.64 requested services (SD=4.43)). Key areas identified by assault-injured youth included access to: (1) pro-social resources (58.0% requested positive free time activities; 30.0% positive peer/adult mentors); (2) mental health counseling/treatment (30.0%); (3) employment opportunities/training (28.0% requested access to job programs; 28.0% requested job training/skills); (4) school/GED resources (28.0%); and, (5) basic social service needs (44.0% financial assistance; 28.0% food assistance; 26.0% clothing/hygiene; 18.0% housing/shelter). Of note, while 18.0% reported alcohol and 60.0% reported marijuana misuse, only 2.0% of youth requested access to substance use services. Perceived barriers to accessing services among youth included: (1) not knowing what services were available or how/where to access services (32.0%); (2) potential cost of services (28.0%); (3) wait time to access services (28.0%); (4) belief that should be able to handle problems without help/assistance (20.0%); and, (5) distance to services (16.0%).

Innovation/Significance: Given the increasing use of care management wrap-around services within violence prevention programs, understanding key service needs for assault-injured youth, as well as barriers to accessing those resources is essential for future prevention programming.

18. Development of a Veteran Led Out-of-Home Firearm Storage Network: The Armory Project

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Statement of Purpose: Because of potential resistance to in-home storage devices, safety advocates and investigators have promoted voluntary out-of-home storage options as an additional safe storage offering. However, the acceptability and effectiveness of out-of-home storage programs have not been tested. **The purpose of this presentation is to describe our efforts to develop a regional, Veteran-led out-of-home firearm storage network and to present pilot data demonstrating its feasibility, acceptability, and effectiveness.**

Methods/Approach: The investigators developed an out-of-home storage program, known as The Armory Project (TAP), that consisted of a network of three Veteran-owned firearm retailers who agreed to provide temporary and free out-of-home storage for customers in need of this resource. The investigators provided support to the retailers in several ways including providing financial support for storage cabinets, developing educational booklets, banners, and adverts for TAP, assisting in development of transaction documents, providing staff training on suicide prevention, and leading monthly meetings to discuss success and barriers. A four-month pilot was conducted to assess retailer, staff, and customer acceptability, retailer compliance, and program effectiveness.

Results/Conclusion: Suicide and LMS knowledge. Training was provided to all retail staff and a pre/post assessment showed that the training increased knowledge about the relationship between firearms/suicide and increased staff confidence in ability to discuss out-of-home firearm storage options with customers.

Feasibility and Acceptability. Multiple process measures showed that the retailers were actively engaged in the program, collected requested information from customers/staff, actively promoted the program with our program/educational materials, and robustly disbursed promotional/educational materials. Program Effectiveness. A total of 10 weapons for 8 customers were stored during the pilot. Additionally, retailers reported having 28 out-of-home storage conversations with customers.

Innovation & Significance to the field. This study represents the first assessment of the feasibility and effectiveness of an out-of-home firearm storage program led by Veteran retailers.

19. The Firearm Implicit Association Test: A Validation Study

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Statement of Purpose: Currently, only self-report measures have been used to study firearm attitudes. Like all self-report measures, firearm questionnaires are susceptible to under- or over-reporting biases, particularly due to the emotional and controversial nature of the topic. Given research suggesting that firearm owners are generally unwilling to engage in open conversation about their firearms, measurement of firearm attitudes may be prone to such biases. To address limitations of self-report measures in other areas of study, investigators have employed the Implicit Association Tests (IAT) which utilizes reaction time data to assess the relative accessibility of certain attitudes and beliefs. **The purpose of this presentation is to describe the development and validation of a Firearm IAT.**

Methods/Approach: The IAT measures participant reaction times in associating target and attribute words/images to assess the strength of association under investigation. IAT procedures were adapted to examine the relationship between firearms and positively/negatively valenced words. Specifically, participants were exposed to neutral images (furniture) or target (firearm) images and words reflecting positive or negative valence (e.g., happy, awful). A total of 274 undergraduates completed the Firearm IAT, the Gun Behavior and Belief Scale, the Attitudes Toward Guns Scale (ATGS), and demographic questions.

Results/Conclusion: Results revealed that participants had a mean (*M*) *D* score of -0.31 that significantly differed from 0 [*t*(247) = -10.75; 95% CI (-0.36, -0.25); *p* < 0.0001; Cohen's *D* = 0.68], indicating that, on average, there was a slight association between firearm images and words reflecting negative valence among participants. To demonstrate construct validity, the relationship between IAT *D* scores and explicit measures of firearm beliefs were examined. As expected, there was a significant positive association between the Firearm IAT and both the GBBS and ATGS total score, as well as between the Firearm IAT and the ATG total score, indicating that the IAT can serve as an indirect measure of firearm attitudes.

Innovation & Significance to the field: This study shows that the IAT can be used as an indirect measure of firearm attitudes. This assessment strategy could be helpful in testing situations that might lead to deception on self-report measures.

20. Violent injury prevention across the lifespan: a single institution analysis of firearm related injuries in the elderly
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Statement of Purpose: Firearm related violence (FRV) is a public health crisis in the United States. While most research and outreach initiatives are focused on youth, this study sought to investigate patterns of injury and clinical outcomes of firearm related injury (FRI) in elderly patients.

Methods: A retrospective review of the institutional trauma registry at a large, academic Level I center was performed from 2016-2021. A descriptive analysis of patterns of penetrating injury was conducted and comparisons were made in a subgroup analysis between elderly (age > 65 years) and adult (age 18-65 years) victims using propensity score matching.

Results: There were 23,975 patients with admission for traumatic injury and 4,133 (5.8%) were elderly. Of these, 134 (3.0%) had penetrating injuries and 72 (54%) of those were FRI. The mean age of elderly patients with FRI was 70.6y and they were predominantly black (50%) males (85%). Their presence of pre-existing comorbidities was higher and 73.6% were on government insurance (vs 17.3% in adult cohort, $p < 0.001$). 42% of elderly FRIs were self-inflicted compared to only 3% in the adult cohort. Their overall mortality rate was 25% versus 15% in adults with FRI ($p < 0.001$). When controlling for gender, race, existing comorbidities and ISS in a propensity-matched model, the difference in mortality remained significant (OR = 3.89, CI [1.83,6.02] $p < 0.001$).

Conclusion, Innovation & Significance: While the target demographic of most violence prevention efforts is young people, it is important to recognize FRV affects individuals across a lifespan and culminates in significant healthcare and rehabilitation costs. This study further demonstrates an alarming rate of self-inflicted FRI in elderly patients, making this a crucial area for continued research and directed prevention efforts.

21. It Doesn't Add Up: Performance of the Adverse Childhood Experiences (ACEs) Questionnaire with Black Male Firearm Violence Survivors in a Hospital-based Violence Intervention Program
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Statement of Purpose: Black men experience worse health outcomes when compared to other race-gender groups because structural racism and negative social determinants. Improving the health of Black males will require a comprehensive approach, including the examination of how social experiences and institutional forces influence the health of Black boys. Despite higher rates of morbidity related to firearm injuries, Black men are disregarded when creating health disparity screening questionnaires.

Methods: A mixed methods study utilizing both in-depth interviews and Felitti's 1998 adverse childhood experiences tool.

Results: In the population of interest, the ACEs questionnaire is not performing as expected. Black male firearm violence survivors in this study report an average ACE score between three and four, yet their narratives describe severe child and early adulthood trauma that is not captured on the ACEs questionnaire.

Conclusion: This presentation will examine narratives of urban Black male firearm violence survivors who report significant trauma compared to trauma as described by the original ACEs questionnaire. Thus, exposing the incongruence and cultural ineptness of the ACEs questionnaire in communities of color, especially Black communities. I believe the ACEs questionnaire should be revised in order to address the lived experiences of the population of interest, in this case urban Black males specifically Black male firearm violence survivors.

22. An Evaluation of Community-Based Gun Buyback Programs: Informing Communities and Political Leadership about People's Reasons for Turning in Firearms

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Statement of Purpose Death by firearm is a serious public health concern backed by decades of evidence showing a direct and robust correlation between the rate of gun ownership and the rate of gun deaths in any given community. Over the last 30 years gun buyback (GBB) programs have steadily grown to gain the support of both community and government officials yet their efficacy varies widely from state to state making it difficult to assess outcomes on a nationwide basis.

Methods/Approach A 21-question self-administered voluntary and anonymous paper survey was administered to willing GBB participants in Connecticut, Massachusetts, and California from 2011-2020. The following information was elicited: Military or formal weapons training, Gun storage safety practices, Importance of healthcare provider asking families about gun safe storage practices, Types and quantity of firearms turned in, Firearms remaining in the home, Access to firearms with children <18 yr. living in the home, Veteran status, Home with history of mental illness & suicide, Home with history of domestic violence, home with history of dementia or Alzheimer's, Demographics- age, race, ethnicity, gender, and Distance traveled to turn in firearm.

Results/Conclusion A total of 711 people (280 from CT) completed the survey (N=711/768;92.5%) yielding 2,234 guns (1,400 from CT). Participants were predominantly male (73.5%), white (80.9%), and older than 55 years (59.0%). They lived an average of 19.0 miles from the event and had an average median household income of \$65,731. More than half (54.5%) did not purchase the firearm, acquiring it through inheritance, gift, or random find. CT GBB found a correlation between the demographics of people turning in firearms and those most likely to commit or attempt suicide by gun.

Innovation & Significance to the field Even though beliefs and attitudes towards firearms differ among communities, the reasoning behind turning in firearms may be very similar. Understanding why people participate in GBBs can provide useful insight to help advance public health initiatives in communities where the prevalence of undesired guns in the home is unknown and unsafe and/or further inform first responders and health providers who care for such populations.

23. Gun Violence in the US Territories

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Statement of Purpose: Two US territories, the US Virgin Islands (USVI) and Puerto Rico, see some of the highest rates of gun violence in the US. We describe the trends in gun violence and the driving factors behind the alarming rates.

Methods: We compiled publicly available data from a variety of federal and territorial sources to calculate the rates of gun violence and gun trafficking in the territories. We also conducted in-depth interviews with key stakeholders to better understand what factors contribute to the high rates of gun violence.

Results/Conclusion: Based on the latest available data, firearm homicide rates in the USVI and Puerto Rico are seven and four times higher, respectively, than the firearm homicide rate in the 50 states. Unlike in the states, firearm homicides comprised the vast majority of gun deaths in both territories. Most of the firearms trafficked into the USVI and Puerto Rico that were used in crimes and recovered by law enforcement were originally sold in southeastern states like Florida, Georgia, and Texas. In 2016, 85% of firearms recovered and traced by law enforcement in the USVI were sold outside the territory. Similarly in 2018, 76% of firearms recovered and traced were sold outside of Puerto Rico. Additionally in Puerto Rico, the lack of trust in law enforcement and problems with policing contributed to the high rates of gun violence. Issues of data availability and data quality limited our findings.

Innovation & Significance to the Field: Gun violence in the USVI and Puerto Rico has received little attention for policymakers, researchers, and advocates. This is the first consolidated report on gun violence in US territories and hopefully will inform how researchers and policymakers prevent gun violence in the future.

24. What to do when the person at risk is you: A qualitative study of firearm owning individuals

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Statement of Purpose: Suicide is a leading cause of death in the US; 53% of suicides are by firearm. Reducing firearm access for those at risk of suicide is recommended; what is not well known is how firearm owners perceive themselves – versus others – to be at risk. In this qualitative analysis, we sought to explore the views of individuals who live in homes with firearms and their perceived personal risk of suicide.

Methods/Approach: Semi-structured interviews were conducted with English-speaking adults who owned firearms or lived in homes with firearms in Colorado or Washington State. We recruited participants through email, telephone calls, social media, listserv, and snowball sampling. We used a mixed deductive and inductive approach in coding of transcripts to identify dominant themes.

Results/Conclusion: This analysis included all interviews conducted for the larger study (n=38). Half of the participants were male (53%) and aged 35-54 years (40%). Most identified as non-Hispanic (95%) and white (92%). Dominant themes were (1) perceived risk of suicide initially focused on other members of the household. (2) most participants utilized the characteristics of the perceived at-risk individuals to guide their decision-making process and involved limiting physical access to the firearm and temporary out-of-home storage, (3) participants found it difficult to assess their own risk of a mental health crisis and struggled to conceptualize mitigation strategies for themselves, and (4) individuals who had experience with personal risk were more comfortable in navigating potential options.

Innovation & Significance: Results show that firearm owners are generally able to conceptualize risk mitigation strategies to reduce potential harm for other household members. However, they struggle with personal risk assessment and mitigation strategies. Lethal means counseling should focus on developing strategies to reduce the risk of suicide for all members of the household.

25. Gun shows and universal background check laws across state lines

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Statement of purpose: States with more gun laws have fewer gun assaults, and associations are strongest for background check laws. However, sales between private buyers and sellers (i.e., gun shows) are exempt from some background check requirements according to federal and most state laws. The aim of this study was to determine whether gun shows are more likely to take place in counties that are near states with universal background check laws.

Methods: This cross-sectional study used gun show data from a 2018 public online listing aggregated within 3,107 counties in the contiguous 48 states. The main independent variable was the presence of a universal background check law in neighboring states. We controlled for potential drivers of demand for gun shows, including the total number of gun laws within-state and in neighboring states, local and in-flowing population size, and proportion of the local and in-flowing population who were gun owners. Bayesian conditional autoregressive Poisson models estimated

associations between neighboring-state universal background check law and the presence of a gun show in each county while accounting for spatial dependencies and nesting of counties within states.

Results: Of the 1,869 identified gun shows, nine of the states in which they occurred had a universal background check law. After controlling for confounders, a 1 SD increase in the gravity-weighted average of the presence of a universal background check law in neighboring states is associated with a 65% increase in the incidence rate of gun shows per county population in 2018 (OR: 1.65, 95% CI: 1.16, 2.35).

Conclusion: Gun shows may service demand from people seeking to circumvent prohibitions against gun purchases.

Innovation and significance to the field: These results lend further support to universal background check laws preventing the transfer of guns from private individuals into criminal networks supplying guns for crime.

26. Firearm Injury Surveillance Discrepancies: A Call For A National Firearm Injury Registry

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Statement of Purpose: The public health approach to gun violence prevention suffers from a lack of ability to accurately quantify nonfatal injury. The Centers for Disease Control and Prevention's (CDC) estimates of fatal and nonfatal firearm injury continue to be unacceptably unreliable as sampling methods and administrative data barriers for reform persist. The purpose of this study is to identify sources of inaccuracy in firearm injury surveillance.

Methods: For a single state, the firearm injury mortality data was queried from 2003-2017 from CDC WISQARS, the National Violent Death Reporting System (NVDRS), and the state head assessment dataset. To further identify discrepancies, queries of the state trauma databank (STDB), Discharge Data Collection System (DDCS), and VDRS were compared. Finally, individual chart review of the two highest volume state trauma centers was abstracted for circumstantial firearm data to compare with the listed external cause code (e-code).

Results: Data discrepancies in the surveillance of firearm death with the NVDRS undercount firearm death at an average error of 3.5% compared to WISQARS. 544 individual charts were reviewed. Narrative support of the e-codes in charts were deficient, with only 4.5% of cases reporting a weapon, and 22% reporting an activity code. 14.6% of firearm injuries had no assigned e-code for firearm injury and 48% of remaining cases had inaccurate e-codes assigned, with overrepresentation of assault and handgun injury without supporting documentation.

Significance to the field: In a single state, nearly 15% of the firearm injuries at the two highest volume centers are not reported to any public health system. Furthermore, death counts are even inaccurate up to 4%. On a national scale, that could account for up to 1,600 gun violence deaths unaccounted for annually. A national firearm injury registry is needed for accurate firearm injury surveillance.

27. Risk Factors Among Rising Trends in Firearm Violence Against Children and Adolescents

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Statement of Purpose: Firearm violence is now the leading cause of injury and injury-related deaths among children in the U.S. Younger children are more likely to be injured or killed by a firearm in the home as a result of intimate partner-related violence or being unintentionally shot by someone else. Existing research provides little information linking firearm violence against children with their mistreatment. The purpose of this study is to identify socio-environmental factors predisposing pediatric firearm injuries.

Methods: This retrospective review of pediatric gunshot wound (GSW) victims at a single Level I trauma center evaluates the demographics, environmental factors, and social context of children 0-21 years-old (2014-2020). We also examined intent, weapon, perpetrator, location GSW was sustained, mortality, and whether abuse or neglect was suspected. We examined trends using descriptive statistics on outcomes variables.

Results: Of the 348 patients, mean of 18 years (SD 2.6 years), of which 91% are male, 85% Black, and 89% non-Hispanic ethnicity. There was an 87% increase in pediatric GSWs between 2015 and 2016. GSW intent was classified as assault in about half of the cases (51%). Social workers identified child abuse in 1% (n=4) and neglect in 3% (n=9) of patients; however, of the 21 patients with multiple GSW encounters, three were evaluated by social work, and one presumed to experience neglect. Although abuse and neglect were identified in 4% of patients, only ⅓ of the patients had adequate nutrition.

Significance: Firearm injuries have increased amongst the urban pediatric population, comprising mostly of Black, non-Hispanic males. While most injuries were attributed to assault, this intent was identified in only 19% of firearm fatalities. There remains a paucity of assessment of environmental and social health, however early or outpatient evaluation for abuse and neglect in the home remains critical.

28. The Impact of Redlining on Modern-Day Firearm Injuries: A Nationwide Study of Federal Policy

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Statement of Purpose: Urban firearm violence is typically concentrated within specific neighborhoods, rather than randomly distributed. Redlining was a 1930s federal policy that graded select urban areas primarily on minority concentration, in turn influencing resident's capacity to obtain mortgages and insurance. We aimed to evaluate the impact of historic exposure to redlining on the incidence of modern-day firearm injury.

Methods: Using ArcGIS, we created a dataset using Gun Violence Archive, the American Community Survey for Zip Code Tabulation Areas (ZCTA), and original Redlining spatial data for the entire US for the years 2014-2018. We categorized each ZCTA as having been exposed to the negative effects of redlining if it contained firearm injuries within redlined Grade C ("Definitely Declining") or D ("Hazardous") regions. We used coarsened exact matching to match ZCTAs that were exposed to C/D redlining with those that were not. Matches were based on age, median income, income inequality, percentage Black population, and education. We then used a Zero Inflated Negative Binomial regression to assess the difference in the average number of firearm incidents per ZCTA of those C/D exposed and unexposed, controlling for population size.

Results/Conclusion: 148,022 ZCTAs were included, of which 4,717 experienced C/D Redlining. The average number of firearm incidents in C/D unexposed ZCTAs was 1.01, while in exposed ZCTAs was 10.9. The incidence of firearm injury was 12.8% higher ($p < 0.001$) in C/D-exposed neighborhoods. This suggests that Redlining has contributed significantly to the risk of modern-day firearm violence, and offers insight into policies to reverse this impact, such as federally subsidized healthcare and mortgage opportunities to long standing residents in these neighborhoods.

Innovation & Significance to the Field: This study demonstrates the impact historical federal policies have on national, modern-day risks of firearm injury and thus how we might reverse their damaging impact.

29. The Impact of Firearm Ownership and Conceal Carry Laws Over Time

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Statement of Purpose: Prior research has demonstrated a relationship between decreased barriers to civilian firearm concealed carry permits with gun-related injury and death. To further explore this relationship, we assessed whether

reducing barriers to civilian firearm concealed carry permits through state-level policy change was associated with changes in gun ownership at the state level.

Methods/Approach: We used several proxies for gun ownership: (1) the National Instant Criminal Background Check System (NICS); (2) the RAND Corporation Household Firearm Rate (HFR); and (3) the ratio of firearm suicide to all suicide using vital statistics data (suicide ratio). Their study period was 1980-2019. We conducted exploratory analyses and a staggered difference-in-difference model to assess the impact of changing concealed carry laws on gun ownership proxies, reporting average treatment effect on the treated (ATT). Our analyses also controlled for several state-level demographics.

Results/Conclusion: HFR, suicide ratio, male suicide ratio, and NICS all provided evidence of increased firearm ownership rates among states that enacted a right-to-carry law. However, each firearm ownership proxy failed to meet the parallel treatment assumption. Further, visual inspection of the difference-in-difference plots do not have noticeable increases in firearm ownership until 20 years after implementation of a right-to-carry law, suggesting other factors may be at work beyond the right-to-carry law.

Innovation & Significance to the Field: Our findings suggest modest increases in firearm ownership in states that made it easier for people to carry concealed firearms in public. However, the increases were not evidenced until years after the law changes. Taken together, passage of right-to-carry laws may be associated with increases in firearm ownership rates, but further research is needed to examine these trends.

30. Predicting firearm type in firearm suicide deaths: implications for policy evaluation

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Purpose: Accurate firearm suicide data are necessary for evaluating the effect of firearm policies on mortality. Several firearm laws, such as permit-to-purchase, are specific to either handguns or long guns. 62% of firearm suicides in the National Vital Statistics System (NVSS) (1980-2017) are recorded with an unspecified firearm type leading to imprecise outcome measurement which decreases the sensitivity of policy evaluation. Firearm type is rarely missing in the National Violent Death Reporting System (NVDRS) but only available in recent years. We sought to create a prediction model capable of imputing missing firearm type in NVSS for firearm suicide.

Methods: 2015-2018 NVDRS data from 40 reporting states and D.C. were fit to candidate models to predict long gun vs. handgun suicide use. Since states contributed varying years to NVDRS, the dataset was stratified by state and year prior to splitting into 80%-training and 20%-validation sets. Logistic regression, C5, and random forest models were fit to the training set, and their predictive accuracies compared using stratified 10-fold cross-validation. All variables common to NVDRS and NVSS were included as predictors, in addition to year, county urbanicity, and state fixed effects. The best fitting model was applied to the validation set to test overall validity.

Results: Long guns were used in 24.4% of NVDRS firearm suicides and fire type differed by gender, year, and urbanicity. The inclusion of county and state context improved accuracy, but all prediction methods performed poorly. The C5 model had the highest Kappa-14.5%(95%CI:13.9-15.1) and was used in validation. Accuracy in the validation set was inadequate: sensitivity-13.1%(95%CI:12.2-14.1), specificity-96.0%(95%CI:95.6-96.3).

Significance: The inability to accurately predict firearm type in firearm suicides limits capacity to evaluate firearm type-specific policies. Continued investment in firearm death and injury surveillance systems that collect firearm type, such as NVDRS, is crucial for future firearm policy evaluations.

31. Firearm and non-firearm self-defense homicides: National Violent Death Reporting System, 2003-2020

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Statement of Purpose: To examine characteristics of justifiable self-defense homicides, including the role of firearms.

Methods/Approach: Data from all available years (2003-2019) and states/jurisdictions (42 states, District of Columbia, Puerto Rico) in CDC's National Violent Death Reporting System (NVDRS) were used. Justifiable self-defense homicides (JSDH) were defined as homicides committed by civilians (i.e., not law enforcement) in self-defense or defense of others. We examined victim and suspect demographics; victim-suspect relationship; injury location type; whether the incident had single or multiple victims; and weapon characteristics. Precipitating circumstances were also examined, including relationship problems, criminal activity, and other stressors. All preliminary results are descriptive; further analyses will compare characteristics of firearm vs. non-firearm JSDH using chi-square tests and add 2020 data.

Results/Conclusion: Preliminary results showed N=2,145 JSDH captured by NVDRS from 2003-2019. Ninety-four percent of JSDH were single homicides; 6% of victims were part of multiple homicide incidents. Ninety-seven percent of victims were male, and 60% were under age 35. Eighty-five percent of suspects were male, and 56% were under age 35. The two most common victim-suspect relationships were stranger (37%) or acquaintance (33%). Most (64%) JSDH occurred in a home; second most common was street/sidewalk/alley (12%). Firearms were used in 83% of JSDH (73% handguns). Sixty-eight percent of JSDH were precipitated by another crime, most commonly assault (38%), robbery (34%), and/or burglary (30%). Forty percent of JSDH were precipitated by arguments, and often occurred during the argument (64%). Seventeen percent were intimate partner violence related. In 20% of JSDH, the victim was noted to have a substance use problem.

Innovation & Significance to the field: This is the first known study to use NVDRS data to examine JSDH. The findings underscore the importance of strategies to reduce the occurrence and escalation of violence, including in intimate partner and other relationships.

32. Violent vs. non-violent traumatic injury patients' engagement in technology-assisted stepped care mental health service at a Level 1 trauma center

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Statement of purpose: Individuals who are violently injured (e.g., gunshot/stab wound) experience poorer mental health outcomes than non-violent injury patients. However, limited research has examined how injury type may affect engagement in interventions designed to promote individuals' emotional recovery post-injury. This study examined whether non-violent and violent injury patients differ in their demographic characteristics, mental health outcomes, and engagement in the Trauma Resilience and Recovery Program (TRRP).

Method/Approach: TRRP uses a stepped-care, technology-enhanced model to provide evidence-based screening and treatment services for individuals with traumatic injuries. The sample included 2,527 adults (65% male), including 16% violent injury patients and 84% non-violent injury patients. Most patients identified their race as African American (38%) or White (54%).

Results/Conclusion: Results indicated that violent injury victims had higher odds than non-violent injury victims of being male, African American, younger in age, and uninsured at the time of admission. Violent and non-violent injury victims' engagement in TRRP services were similar immediately following injury, however, patients with violent injuries were less likely to engage with follow-up services a month following injury. Patients with violent injuries reported higher levels of PTSD and depressive symptoms 30 days post-injury and thus were more likely to receive treatment referrals. After accounting for age, sex, race, and insurance status, the only significant relations were between injury type and 30-day screen status (i.e., completed, unable to contact), receipt of TRRP treatment services, and PTSD symptoms.

Innovation & Significance to the field: This study is the first to examine differences between violent and non-violent injury patients in their engagement each step of TRRP. Our findings underscore the importance of developing culturally relevant strategies to increase violent injury victims' engagement in intervention programming such as TRRP and promote their emotional recovery.

33. Infectious Complications of Pediatric Firearm Injury

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Purpose: Firearm-related injuries are the leading cause of death in children and adolescents, responsible for an increasing percent of pediatric deaths. The study of infectious complications following pediatric specific firearm injury has been scarce; our study describes infectious complications of firearm-related injuries at pediatric hospitals in the United States as described by the Pediatric Health Information System (PHIS) database.

Approach: Data from 44 hospitals was queried for firearm-related injury and infection between January 1, 2012 to December 31, 2021 identified by ICD-9/-10 codes. Codes for infectious conditions were used to estimate frequency. Logistic regression was used to examine association between infectious complication and age and race/ethnicity. We also compared the length of stay (LOS) and mortality between patients with and without infection using zero-inflated models.

Results: Over the ten-year period, we identified 2,940 patients with firearm injury of which 225 had an infectious complication (infection frequency 7.65%, 95% CI: 0.067-0.087). Multivariate logistic regression showed younger patients had a higher probability of infection compared to older children and adolescents ($p=0.0018$, Table 1). A logistic regression model revealed Black patients had lower probability of infection compared to White, Multi-ethnic, and Other ethnic groups. LOS was significantly greater for cohort with infection (mean LOS with infection of 23 days compared to 2.7 days if without infection, $p < 10^{-16}$). There was also no difference in mortality with infection, relative risk of death without infection compared to with infection was 2.30 (95% CI: 0.99 – 5.45).

Significance: Infectious complications following firearm related injury among children were more common in younger children and those identified as Multi-ethnic or Other races. We also found children with infection had longer hospitalizations than those without infection following firearm injury. Understanding the epidemiology and course for pediatric patients following firearm injury will prompt greater attention to prevent infectious complications.

34. Medical Visits Related to Firearm Injuries Increased During COVID-19

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Statement of Purpose: To investigate, using real-world clinical data, trends in medical visits related to firearm injuries both before and during the COVID-19 pandemic.

Methods/Approach: The TriNetX Research Network was used for this study. TriNetX provides continuously updated, de-identified EMR data on over 84 million patients, primarily in the U.S., including patient demographics and diagnoses. Using ICD-10 codes, we identified all patient visits for a new firearm injury between March 1, 2019, and November 30, 2021. We categorized firearm injuries by intent (assault, self-harm, unintentional and undetermined) and by twelve seasons during this timeframe.

Results/Conclusion: Overall, firearm injury visits were primarily unintentional (71.1%), with 21.0% due to assaults, 5.9% undetermined, and 1.9% self-inflicted. There was a notable spike in firearm injuries in the Spring and Summer of 2020, with a marked 28% increase in Summer 2020 relative to Summer 2019. The rise in cases was evident across age, sex, race/Hispanic ethnicity, and region, with cases being the highest for Black patients, males, patients aged 20-29, and individuals residing in the South.

Innovation & Significance to the Field: This study represents an innovative nationally comprehensive evaluation of firearm-related medical visits both before and during the COVID-19 pandemic. These results confirm previous reports that firearm injuries have increased since the pandemic began. This increase may be attributed to society's tumultuous time amidst a global pandemic and lockdown orders that prompted skyrocketing rates of gun sales and first-time gun ownership. Further understanding of the factors that led to this increase is needed to inform firearm policy and guide prevention efforts. In particular, the large percentage of unintentional cases, corresponding in time with a rise in first-

time gun owners, should be a call for increased education, training, and regulation over safe firearm access and storage.

35. Suicide risk after surviving a self-inflicted gunshot wound: Qualitative interviews with next of kin

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Purpose: Individuals who survive a medically serious suicide attempt are at heightened risk of dying from a future suicide attempt. Surprisingly little is known, however, about factors that impact the degree of that risk, especially when the attempt was via self-inflicted gunshot wound. This gap in research hinders development of suicide prevention strategies focused on survivors of a medically serious suicide attempt. We sought to advance this area of research and practice by conducting psychological autopsies with the next of kin of individuals who survived a life-threatening suicide attempt and went on to die from a subsequent attempt.

Methods: We gathered medical records of individuals treated from at a Level I Trauma Center for injuries sustained in a suicide attempt between 2004 and 2020. Through a collaboration with the county medical examiner, we then identified patients who survived the initial self-inflicted injury but went on to die from a subsequent suicide attempt. We are currently conducting Psychological Autopsy interviews with next of kin of the decedents. The Psychological Autopsy is a standardized qualitative interview developed by the American Association of Suicidology and is considered the gold standard for identification of distal and proximal factors that contributed to an individual's suicide in order to refine prevention efforts.

Innovation & Significance: This is the first ever study to examine factors that contribute to the suicide of individuals who survived a previous medically serious suicide attempt. Elucidating risk and protective factors in this unique population is critical to the development of evidence-based suicide prevention efforts. Given the high lethality of self-inflicted gunshot wounds, we plan specific stratification of risk among survivors of self-inflicted gunshot wound(s) in comparison to other mechanisms of injury.

36. Hospitalizations in the year prior to female firearm suicide: Linking Washington state Violent Death Reporting System to the Comprehensive Hospitalization Abstract Reporting System

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Statement of Purpose: Over half of suicide decedents have encounters with a health care professional within four weeks of their death, and 80% within the year prior. We sought to identify demographic and circumstantial characteristics associated with a history of hospitalization in the year prior to female firearm suicide death in the State of Washington.

Methods: Demographic and circumstantial variables for all female firearm suicides in Washington State between 2015 and 2019 were extracted from the Washington State Violent Death Reporting System (WA-VDRS). Data on the history of hospitalization in the year prior to death was extracted from the Washington State Comprehensive Hospital Abstract Reporting System (WA-CHARS) and were linked to WA-VDRS data. Descriptive statistics are presented, including a bivariate analysis (t-tests/chi-square, as appropriate) of demographics and preceding characteristics between those with and without hospitalization in the year prior to suicide.

Results/Conclusions: Between 2015 and 2019 in Washington State, 335 female firearm suicides were reported and of those, 64 (19%) had a hospitalization in the year prior to death. Of the 335 decedents, 299 (89%) were White, 319

(95%) were non-Hispanic; mean age was 49 years. Decedents with hospitalizations in the year prior to suicide were significantly older (54 vs. 48; $p<0.001$) and more likely to have a substance use disorder (20% vs. 11%; $p=0.047$), relative to those who were not hospitalized. Reported arguments (10.9% vs. 19.2%) and intimate partner problems (22% vs. 31%) were less common among those with a history of hospitalization, but these differences were too modest to rule out chance given the sample size.

Innovation/Significance: Hospital encounters involving substance use disorders may be an opportunity to intervene with firearm screening/counseling. Female firearm suicide decedents with challenging interpersonal circumstances, such as arguments/intimate partner problems preceding suicide, may infrequently present at hospitals, indicating a need for further inquiry.

37. How Firearm Access Impacts Suicide among Wisconsin Farmers

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Purpose: In 2020, the CDC released an important report highlighting disparities in suicide rates by industry and occupation. Among industries found to have significantly high rates of suicide, in comparison with other industries, was farming/fishing/forestry. While this report provided important information to draw attention to this disparity, it did not investigate factors that contribute to higher rates in these occupations. The purpose of this study is to investigate psychosocial correlates of farmer suicide in Wisconsin, including mechanism of injury used in farmer suicides, in order to determine how access to firearms as a “tool of the trade” in farming intersects with suicide death among farmers.

Methods: This is a retrospective, qualitative cohort study. Narrative information from the Wisconsin Violent Death Reporting System (WVDRS) was extracted and analyzed for farmers who died by suicide in Wisconsin between 2004 and 2018. Narratives were read and a codebook was developed, and then codes were applied to the data. The codebook was then revised, and the data were coded a second time. Themes were then determined based on the second round of coding. These themes qualitatively reflect the essence of the narrative information.

Results: A total of five unique themes were generated, and one theme specifically relates to access to firearms on farm settings. Additionally, approximately 70% of Wisconsin farmers who died by suicide used a firearm in their fatal suicide attempt. This is in contrast to the state’s firearm suicide rate of approximately 50%.

Innovation and Significance: This is the first study of its kind to qualitatively analyze WVDRS data to describe factors contributing to farmer suicide and is the first to qualitatively describe how firearms intersect with suicidal behavior among farmers. This information is critical for farmer suicide prevention activities, which must be culturally and occupationally based.

38. Legal Issues and Firearm Access as Risk Factors for Firearm Suicide in Wisconsin

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Purpose: As of 2019, Wisconsin had the 24th highest imprisonment rate in the country, and the U.S. has consistently displayed higher rates of suicide among inmates. Legal issues can be a major life stressor at any point in the criminal justice process, including before being convicted and after serving a sentence. It is important to assess when firearms are being used in suicides both before and after an individual is imprisoned, especially knowing that felons cannot legally own firearms.

Methods: Data on suicides from 2004-2018 was used from the Wisconsin Violent Death Reporting System. Analyses were performed on 3 different groups: those with a recent criminal legal issue, those with a recent civil legal issue, and those who had recently been released from jail or prison. The goal of these analyses was to search for trends and common risk factors within this population.

Results: Nearly half of all decedents with a criminal legal issue (43.2%) and with a civil legal issue (44.2%) died by suicide by means of firearm. Additionally, 37.6% of suicides of those recently released from a criminal institution killed

themselves using a firearm and 57.4% owned the gun used in their suicide. It was also found that all 3 groups were significantly more likely to die by suicide using a firearm when they did not have a history of or current mental health treatment.

Innovation and Significance: While studies exist on suicides of inmates, there is not much research focused on suicides at other points in the criminal justice process. Additionally, there is little to no research on firearm suicides among individuals facing legal issues. These findings have important implications for suicide prevention policies within the legal justice system.

39. Gun Technology Intervention in Mitigating Mass Shootings

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Mass shootings targeting schools have been prevalent over time in the United States. As a result, of the school tragedies related to gun violence, the Office of the President issued a Memorandum in 2016 on promoting Smart Gun Technology. This was following a 2013 report by the Department of Justice on developing technologies that can reduce accidental shootings caused using stolen guns. The 2016 Report carried out by the federal agencies, DOJ, DHS, and DOD issued baseline specifications on the Research and Development to mitigate mass shootings in America by using smart solutions that do not take away Gun ownership. This study proposes a school safety detection simulation, which is a multifaceted technology that detects unauthorized firearms in protected school spaces in real-time. If adopted, this technology ensures none of the 130,903 institutions in the United States encounters a mass shooting. In this study, we further investigate alternative policy measures and technical mechanisms to reduce mass shootings. According to a 2016 Survey by Johns Hopkins, despite 59% of American gun owners being willing to buy a smart gun, attempts to market Smart Gun technology have failed. We explore evidence-based interventions such as the attempted development of the Armatix iP1 and Biofire Technologies smart guns, why they failed, and their effect on the New Jersey mandate law. We further study the existing consumer market and policy gaps in the adoption of Gun Technology through survey data and sentimental analyses by American Gun Owners, Manufactures, and policymakers. Our hypothesis found the need for a multidisciplinary approach to policy and market-friendly technological interventions to end mass shootings in the United States with no mandate and policy disruptions.

40. Fatal Police Shootings and Community Health in the United States, 2014-2018

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Statement of Purpose: Police violence represents a major threat to public health in the United States. The current study aims to examine the association between exposure to fatal police shootings and community health in U.S. census tracts and to reveal disparities in exposure and susceptibility to the exposure across community contexts.

Methods/Approach: We validated and linked open-source fatal police shootings data between 2014 and 2018 (i.e., Fatal Encounters, the Washington Post's Police Shootings Database, and Mapping Police Violence) with the CDC's health estimates for U.S. census tracts (the PLACES 2020 release). Mixed-effects linear models estimated the association between exposure to fatal police shootings and community health in U.S. census tracts and explored whether the association varied by community contexts and characteristics of the involved victim.

Results/Conclusion: Experiencing a fatal police shooting in the census tract was associated with a higher level of poor general health and unhealthy behaviors, and a lower level of health preventive practices. The effect sizes were substantial after adjusting for confounders. The prevalence of exposure and the strengths of the associations were more evident in communities with a higher level of minority population, poverty rate, or income inequality. The type of an incident (based on victim characteristics) was not significantly associated with the three health measures.

Innovation & Significance to the field: Beyond mental health problems (on which previous research has focused), exposure to fatal police shootings is associated with poor general health outcomes and behaviors. Reducing fatal police

shootings and its adverse health impact requires comprehensive and coordinated efforts that dismantle structural racism embedded in law enforcement and mitigate differential access to socioeconomic resources.

41. Exploring the Precursors and Sequelae of Firearm Violence in Adolescence and Young Adulthood

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Statement of Purpose: Firearm violence is among the leading causes of death for adolescents and young adults. Consistent with the public health approach to violence prevention, identifying risk and protective factors of this public health crisis is a necessary step to develop effective interventions. One potential risk factor of gun violence is prior experience with and exposure to firearms. Indeed, survivors of previous firearm violence are substantially more likely to carry firearms and sustain future gun injury and death. Thus, we examine the physical, mental, behavioral, and social sequelae of surviving a gunshot wound (GSW), as well as the link between previous firearm exposure with future firearm carriage, use, and victimization.

Methods/Approach: We employ a qualitative, phenomenological research design to interview youth between the ages of 15 and 34 who sustained an intentional gunshot wound injury (not self-inflicted). Participants include patients recruited since 2019 who were treated at a Trauma 1 emergency room in southeast Texas. A semi-structured interview guide probes for experiences regarding past exposure to firearms, including firearm carriage and use, as well as post-injury sequelae (e.g., physical disability, depression, substance use, interpersonal conflict, academic/career success).

Results/Conclusion: Data are being collected, coded, and analyzed through September 2022. We realize this is an unconventional proposal, but are confident that the study will be finished in time for an informative poster presentation.

Innovation and Significance: In-depth, personal accounts of GSW injury, their meanings, and how they affect the individual moving forward will contribute to our knowledge and ability to intervene in young adulthood. A qualitative approach is particularly helpful in this arena to help explain existing trends in youth violence. Conclusions about young GSW patients will provide insight into opportunities for healthcare professionals to intervene and prevent the perpetuation of youth violence.

42. Rural and urban adolescents' conceptualization of common firearm-related terms

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Purpose: Firearm injury is the leading cause of death among American adolescents, and firearm access is a risk factor for injury. Compared to urban, rural adolescents are more likely to have a firearm in the household and earlier access to firearms in their environment. Despite expressed need to account for unique rural factors, few studies have investigated rural adolescents' firearm perceptions. Such perceptions are important for successful firearm injury prevention. We used qualitative data to understand and compare rural and urban adolescents' definition of firearm-related terms.

Approach: The sample included 4-H adolescents ($N=101$, $Mean_{age}=17$, 50% female, 35%=rural; National Center for Health Statistics classification) completing an online survey on firearm terms. Participants were given three open-ended prompts of "How do you define the word 'firearm'/'carrying'/'handling'?" Responses were thematically coded by two project staff and frequency of mentions were calculated by rural/urban.

Results: For 'firearm', *gun* was the most common theme (38% rural, 38% urban; frequency of mentions). Among rural adolescents, *weapon* (34%) was the second theme followed by *shoot/fire/eject* (19%). In comparison, *shoot/fire/eject* (34%) was the second theme followed by *weapon* (15%) for urban adolescents. For 'carrying', *on person* (42% rural, 61% urban) and *holding* (29% rural, 23% urban) and for 'handling', *use* (42% rural, 49% urban) and *in hands* (36% rural,

36% urban) emerged as the top two themes while (39% rural, 18% urban) was a third theme. Data collection is ongoing, and themes will be updated for presentation.

Rural and urban adolescent conceptualizations of firearm-related terms are generally similar. However, rural adolescents place more importance on a firearm as a weapon and safe use when handling. Study findings provide insight into the perceptions of firearm-related terms for adolescents, an often-neglected voice. Although preliminary, findings can inform policy and prevention efforts to address or correct perceptions.

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o h Youth exposure to community level firearm violence as witnesses or victims is a significant public health problem. The main objective of Project Resilience was to increase the protective factors that lessen the risk for and consequences of exposure to community-level violence.

U Project Resilience was a youth violence prevention program. Youth participants and their college mentors attended weekly workshops to develop resiliency and advocacy skills. Key elements of this project included the development of a citizens advisory committee, youth mentorship, youth photovoice project and advocacy showcase and program evaluation.

k # A total of 10 youth and 10 college student mentors participated in the program. After completing the Community Resiliency Model (CRM) learning activities and receiving training in photovoice, youth and their mentors completed a photovoice advocacy project. Key themes that emerged from the photovoice advocacy project included: resources, art & expression, knowledge of community history, investments vs divestments and togetherness. Results from the pre and post surveys indicated an increase in resiliency skills among college and youth participants. Additionally, youth and college participants reported higher levels of self-efficacy in their ability to participate in local firearm violence prevention advocacy efforts and expressed a desire to continue to lead efforts.

@ o Although the majority of research has focused on the risk factors for community violence a paucity of studies have explored the protective factors. Preliminary findings suggest that this program was successful in addressing protective factors for youth violence and community-level firearm violence. Additionally, CRM, a model that is typically used to train adults in resiliency skills, was modified for youth and young adults. The application of the CRM model is a novel approach to reducing the potential negative outcomes of exposure to community-level firearm violence among youth and young adults.

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o h Pediatric residents and clinicians don't consistently provide firearm safety counseling despite evidence and AAP recommendations. The Safer: Storing Firearms Prevents Harm training portal was developed with AAP support to provide data-informed, actionable tools focused on universal screening. This study presents preliminary, interim analyses of immediate change in perceived self-efficacy with comparisons by provider type.

U This is an ongoing pre-post study (2/1/2022 to 6/7/2022). Participation includes 3 brief surveys completed before, immediately after, and one-month after training. Perceived self-efficacy is a continuous variable from 0-100%, where higher scores indicate greater perceived self-efficacy. Descriptive statistics are reported using medians (IQR), or frequency (proportion). Study participation was compared between practicing and resident clinicians using Fisher's exact or Chi-squared, and ANOVA or rank-sum tests for categorical and continuous variables, respectively. Wilcoxon matched-pairs signed-rank tests were performed to determine the change in perceived self-efficacy in the immediate post period.

k # For these interim analyses, 210 participants completed baseline surveys, and 101 (48.1%) had sufficient follow-up data for inclusion. Among included participants, 75 (74.3%) were practicing clinicians and 26

(25.7%) were resident clinicians. Compared to practicing clinicians, residents were more likely to care for a higher proportion of Black children and treat/consult on a child with a firearm-related injury within the past 12 months. (Table 1) We also found statistically significantly different barriers and beliefs reported between practicing clinicians and residents. (Table 2) Compared to baseline, the follow-up self-efficacy distribution was significantly higher (median = 50 and 80, respectively; $p < 0.001$). Differences remained statistically significant when analyzing by provider type (practicing clinician median = 50 and 80, respectively; $p < 0.001$; resident median = 50 and 75, respectively; $p < 0.001$). **Innovation & Significance to the field:** Evaluating the dissemination of the Safer platform will best inform future implementation strategies of firearm safety programs to prevent childhood morbidity and mortality.

45. Changing Attitudes Toward Youth Violence: The Role of Hospital-Based Violence Interventions

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Statement of Purpose: The epidemic of youth violence is sweeping the nation, and has become a public health crisis. The effect of hospital-based interventions on risk factors (violent attitudes and behaviors) and protective factors (attitudes towards school and employment) still remains unknown. This study will assess changes in attitudes towards violence in response to a hospital-based brief violence intervention (BVI) and community case management services (CCMS).

Methods/Approach: Youths (10-24 years; $M_{age}=19$) who were intentionally injured (43% injured by gunshot wound) and admitted to a trauma center were prospectively randomized to BVI alone (Group 1) or in combination of BVI + CCMS (Group 2). Recidivism, attitudes toward violence (ATV), triggers for fighting (TFF), school attendance (ATS), employment (ATE), and future aspirations were assessed at baseline (BsL) during admission, 6-weeks (6W) and 6-monthspost-discharge.

Results/Conclusion: 75 injured patients were enrolled. The groups did not significantly differ on demographics or injuries. 21% of the participants reported having a history of violent recidivism. ATS improved from 64% BsL to 81% 6W ($p=0.14$), and 92% 6M ($p=0.07$). ATV improved from 68% BsL to 79 % at 6W ($p=0.0061$), and (78%) at 6M ($p=0.0199$). TFF were transiently decreased ($<50\%$) at 6W, returning back to BsL ($>50\%$) at 6M. ATE was high $>90\%$ at all levels. Hospital experience was associated with a positive change in future outlook and aspirations in 70 to 80% (GR1 75%, GR11 78%) at all time periods.

Innovation & Significance to the Field: Hospital BVI has a positive impact on youths' perception of and vulnerability to violence, while promoting protective factors.

46. Correlates of Student Expulsion for Firearm Possession in Michigan Public High Schools

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Statement of Purpose. Youth firearm possession at school is a key determinant of youth firearm injury, as 57% of all violent crimes committed by youth take place on school days, and 34% of youth victims are victimized on or near school grounds. Identifying school-level correlates of student expulsion for firearm possession may inform interventions for reducing youth firearm injury.

Methods. To identify correlates of student expulsion for firearm possession, we used publicly available data from the Center for Educational Performance and Information for the 2018-2019 school year for public high schools in Michigan ($n=640$). We estimated bivariate associations between school characteristics and whether the school had an expulsion for firearm possession. We then estimated a multivariate logistic regression to identify associations between school characteristics and expulsion for firearm possession.

Results and Conclusions. Of the 640 schools, 6% ($n=40$) had an expulsion for student firearm possession. In bivariate analyses, schools with an expulsion had more students, a higher percentage of Asian students, a higher percentage of

Hispanic students, and a lower percentage of White students compared to schools without an expulsion ($p < 0.05$). In the multivariable logistic regression, schools with more students and higher rates of economically disadvantaged students had higher odds of having an expulsion for student firearm possession (aOR 1.01 [1.01, 1.02] and 1.02 [1.01, 1.04], respectively) after controlling for school locale, percent of study body by race and sex, violence exposure, student engagement, and staffing.

Innovation and Significance. Although researchers have identified individual correlates of firearm carriage, this is among the first to investigate school correlates of student expulsion for firearm possession. We found a disparity exists between schools in expulsions as a function of a student body's overall socioeconomic status. Elevating a school community's collective economic well-being may reduce student expulsions for firearm possession, but future studies also should evaluate the role of racial and socioeconomic bias in surveillance and expulsions in this disparity.

47. Screening adolescent/young adult patients for gun violence risk at North Carolina primary care practices

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Statement of Purpose: This study piloted the use of the SaFETy score, a four-item tool for predicting gun violence exposure in adolescent and young adult patients, in primary care settings in North Carolina.

Methods/Approach: In this longitudinal quantitative study, patients ages 14-24 at four rural and suburban North Carolina primary care clinics were surveyed at baseline and six months post-baseline. Surveys included the SaFETy questions as well as demographics, peer and parental influences, community violence exposures, and gun violence exposure. Multivariate linear regression was completed with gun violence exposure as the dependent variable and SaFETy score, demographics, and other survey questions as independent variables.

Results/Conclusion: The majority of the patients were female (69%), non-Hispanic (73%), and had at least a high school diploma or GED (63%). 45% were White and 36% were Black or African-American. The majority of respondents had easy access to a gun (61%). 40% scored 1 or higher on the SaFETy questionnaire at baseline. An association was found between baseline SaFETy score and a variety of gun violence exposures during the following six months. In conclusion, the SaFETy Score may serve as an effective indicator of gun violence risk for adolescent/young adult patients at primary care practices.

Innovation & Significance: Primary care providers routinely screen young patients for health risks and counsel those at high risk. This preventive approach could be applied to gun violence, a leading cause of morbidity and mortality among adolescents/young adults in the United States. The current study piloted the use of the SaFETy score, a set of four questions known to predict gun violence in urban youth, in adolescents/young adult patients at suburban and rural primary care clinics. Future research can evaluate its efficacy in a larger sample size and develop interventions for high-scoring patients.

48. The Age-Graded Interaction between Individual Propensity and Situational Factors Associated with Urban Gun Violence Among a High-Risk Youth Sample

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Statement of Purpose: The current study used a longitudinal, within-individual design focusing on the age-graded nature of firearm offending with a high-risk youth sample. The current also assessed the moderation of situational factors on the association between individual risk factors and gun violence over time.

Methods/Approach: The current study used latent growth curve modeling with time-invariant covariates and time-varying individual and situational risk factors to assess how situational factors moderate the effect of propensity for violence on gun use over time in a high-risk youth sample.

Results/Conclusion: The results of the current study demonstrate how individual, situation, and interactive risk factors influence gun violence across an age range of heightened risk for gun violence.

Innovation & Significance to the field: The current study extends prior research by examining the age-graded nature of various risk factors for gun use during a critical developmental stage. Additionally, the current study examined how situational factors condition the association between individual propensity for gun use and actual gun violence. The results from this study inform policies aimed at addressing the crisis of gun violence by pinpointing age-graded risk factors to identify the most appropriate periods for intervention.

49. Firearm Related Experiences in an Ethnically Diverse Sample of Young Adults in the Southern United States

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Statement of Purpose: This study examined firearm-related experiences (access, carrying, being threatened) in an ethnically diverse sample of young adults in the Southern U.S.

Methods/Approach: Wave 10 data (2021) of an ongoing longitudinal study were examined. Participants included 755 young adults (average age=26 years, SD=.78; 62.4% female) who identified primarily as Hispanic (33.4%), White (28.5%), and Black (26.4%). Chi-square tests examined whether firearm-related experiences differed by gender, race, education, income, and financial difficulties.

Results/Conclusion: 52.9% of participants reported ready access to firearms, 22.1% had carried a firearm outside of their home (not for shooting/hunting), mainly (93.7%) for self-protection reasons, 4.9% had been threatened with a firearm by an intimate partner and 3.9% by a non-partner. Firearm access was more likely in males (vs. females, 61.4%vs.41.8%, $\chi^2=12.74$, $p<.001$), White participants ($\chi^2=22.86$, $p<.001$), those with higher annual incomes ($\chi^2=21.58$, $p<.001$), and those who reported no past year financial difficulties (vs. with difficulties, 60.5%vs.50.5%, $\chi^2=5.67$, $p<.05$). Firearm carrying was more likely in males (32.1%vs.16.2%, $\chi^2=25.66$, $p<.001$), White participants ($\chi^2=15.08$, $p<.01$), those without a college degree (vs. college graduates, 15.2%vs.24.6%, $\chi^2=8.13$, $p<.01$), and those with higher annual income ($\chi^2=11.57$, $p<.01$). Females (7.1%) were more likely than males (1.1%) to have been threatened with a firearm by a partner, $\chi^2=13.68$, $p<.001$, but males (5.8%) more likely than females (2.8%) to have been threatened with a firearm by a non-partner, $\chi^2=4.08$, $p<.05$. Being threatened with a firearm by a partner or non-partner was more likely in those without a college degree (vs. college graduates, 6.5%vs.2.5%, $\chi^2=4.87$, $p<.05$; 5.2%vs.0.4%, $\chi^2=10.50$, $p<.01$) or who reported past year financial difficulties (vs. without difficulties, 5.9%vs.1.6%, $\chi^2=5.55$, $p<.05$; 4.9%vs.1.1%, $\chi^2=5.28$, $p<.05$).

Innovation & Significance to the Field: Findings highlight the role of demographic factors and financial difficulties in access to and experiences with firearms; results will inform prevention and intervention programs.

50. Understanding Illicit Firearm Ownership among Black Individuals

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Introduction: New Jersey is ranked as having some of the most restrictive gun laws in the country (Wood 2019). Despite these efforts, the illicit firearm market contributes to significant gun violence experienced in communities of color. Illicit guns are trafficked through the Iron Pipeline via I-95 from lesser regulated states into more regulated states in the Northeast (Braga et al., 2020). With this in mind, there has been growing attention to better understand the illicit firearm market in the US. Yet, in depth research into the illicit firearm market is lacking for most US states.

Purpose: To address this gap, the New Jersey Gun Violence Research Center has partnered with the Newark Community Street Team to launch a community based participatory research (CBPR) study focused on examining the lived experiences of illicit firearm owners in New Jersey.

Method: The Newark Community Street Team is currently assisting the New Jersey Gun Violence Research Center with recruiting a purposive sample of 25 illicit firearm owners residing in New Jersey. Eligible participants will self-identify as having owned an illicit firearm in the past 5 years. In this qualitative study, we are conducting semi-structured interviews with participants to better understand their lived experiences owning an illicit firearm.

Preliminary Results: In our preliminary analysis, we are noticing that safety and protection drives individuals to possess illicit firearms. Participants expressed needing a firearm to guard against potential threats and disagreements and to protect their families from danger. This presentation will provide insights that will help attendees better understand illicit firearm ownership in Black communities.

Significance to the field: Through a series of qualitative interviews with community members, we aim to develop preliminary understandings about illicitly acquired firearms, thereby providing an opportunity to develop data-driven solutions.

51. Gender differences in weapon types used in fatal interpersonal violence-related homicides in Chicago, IL from 2015 to 2020

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Purpose: More than 25% of women and 14% of men in the US experienced intimate partner violence, with more than half of all intimate partner violence (IPV)-associated homicides involving a firearm. Further characterization of gender differences remains sparse.

Methods: The CDC's National Violent Death Reporting System (NVDRS) links data from death certificates, and coroner/medical examiner and law enforcement reports. We examined Illinois 2015-2019 NVDRS data for deaths of Chicago residents where IPV was endorsed and/or Jealousy contributed to death. We selected firearm cases and examined the distribution of these cases by sex, weapon type, and whether the incident was a homicide-suicide.

Results: During 2015-2019 there were 329 deaths among 318 unique incidents; 139(42.2%) with fatal injuries caused by a firearm. Of the firearm deaths, most were suicides 56.1% (78); 42.4% (59) homicides. 71.2% (99) deaths were among males; 28.8% (40) were female. 30%(12) of firearm IPV-associated deaths among women were in the context of a homicide-suicide event, only 15%(15) of male FA IPV associated deaths were in the context of a homicide-suicide event.

Conclusion: Firearms were the predominant weapon used in IPV-associated deaths in Chicago from 2015- -2019 with men more likely to die by suicide and women more likely to die by homicide.

Significance: The high portion of males represented among firearm IPV-associated deaths may be due to a high percentage of suicides among these IPV-associated cases as males have higher suicide rates compared to females. The large proportion of IPV-associated firearm deaths among males suggests a role for IPV prevention in suicide in addition to other violence prevention initiatives.

52. The Association Between Community Violence Exposure and Parental Firearm Ownership

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Statement of Purpose: The purpose of this study is to determine the association between community violence exposure and parental firearm ownership. In order to examine this association, the research question examined in this study is: *What role does exposure to community violence play on parental firearm ownership?* We hypothesize that *the greater the exposure to community violence, the greater the likelihood of parental firearm ownership.*

Methods/Approach: Nationally representative data from the Firearm Safety Among Children and Teens Consortium's National Survey (6/24/2020-7/24/2020) was examined. Parents (n=2,380) of high-school age teens (age 14-18) were asked a series of validated measures assessing firearm ownership, community violence exposure, as well as socio-demographic characteristics. We constructed a stepwise logistic regression model examining the association of community violence exposure and parental firearm ownership. This modeling was chosen as we seek to understand what factors are driving parental firearm ownership.

Results/Conclusion: The stepwise logistic regression models demonstrate that exposure to certain kinds of violence that are associated with an increased likelihood of firearm ownership among parents. The results of the models suggested that both partner and non-partner victimization for parents does not affect their likelihood of owning firearms, but their community violence exposure does increase the likelihood of firearm ownership (OR=1.08, $p < 0.05$). Other significant predictors of firearm ownership among parents sampled includes sex, age, marital status, and education. Sensitivity analyses also suggest that overall parental community violence exposure was more predictive of firearm ownership than their child's exposure to community violence and victimization.

Innovation & Significance to the Field: This analysis adds new insight for the field surrounding the importance of community violence exposure and the likelihood of parental firearm ownership. This study contributes to our understanding of what drives parents to own firearms and can guide prevention strategies about the importance of reducing community violence.

53. Gun Ownership, Storage Practices and Suicide Risk in U.S. Army Active-Duty Servicemembers

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Statement of Purpose: Firearm-related suicides are the 10th leading cause of death in the U.S. reaching epidemic proportions in the last decade. Unsafe storage practices are associated with increased suicide risk. Our objective is to improve our understanding of motivations for gun ownership, storage practices and identify actionable targets for suicide prevention and intervention among service members.

Methods/Approach: We examined a subset of gun owners ($n = 31$ cases and $n = 92$ controls) from the Army STARRS Health Outcomes Study (SHOS-B) using a mixed methods approach consisting of qualitative and quantitative analyses. We used a conventional content analytic approach to analyze the text responses. We coded 123 responses; built a codebook and generated descriptive statistics. Subsequent quantitative analyses of text responses consisted of logistic regression analyses to examine predictors of safe storage practices. Coefficients were exponentiated in logistic models to create ORs with 95% CIs.

Results/Conclusion: Safety and protection was the primary reason for gun ownership as reported by family members of suicide descendants ($n = 18$, 57.77%); followed by sports and recreation ($n = 11$, 36.31%), familiarity (military or family) ($n = 4$, 16.35 %), for work ($n = 3$, 8.88 %), collector/memento ($n = 2$, 5.92 %), laws/rights ($n = 1$, 2.96 %), and other ($n = 2$, 5.92 %). Soldiers who reported to own guns for safety/protection were more likely to store their guns unsafely (OR = 3.8, 95% CI, 1.7-8.8, $P=0.0017$).

Innovation & Significance to the Field: To our knowledge, this is the first time primary reasons for ownership is reported by third parties of soldiers who died by suicide. Safety and protection is the principal reason for ownership and an actionable target for intervention. Future research is needed to further understand the motivations for gun ownership and the perceptions of safe storage.

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54. Women Veterans' Perspectives, Experiences, and Preferences Discussing Firearms in the Context of Lethal Means Safety

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Statement of Purpose: Firearm suicide represents a critical issue among women Veterans, among whom firearms represent the leading method of suicide. Lethal means safety (LMS) is recommended to prevent suicide; however, there are specific considerations for its use among women Veterans. A broader understanding of women Veterans' preferences and needs is necessary for its optimized use in this understudied, at-risk population.

Methods/Approach: In 2021-2022, we conducted qualitative interviews with 40 women Veterans with a lifetime history of suicidal ideation or attempt to understand their perspectives, experiences, and preferences regarding firearm discussions. Participants were recruited nationally from a database of Veterans enrolled in VHA care, as well as through a local research recruitment repository and word-of-mouth. Purposeful sampling was used to obtain a sample that was diverse with respect to race, ethnicity, age, and region. Data were transcribed and coded in ATLAS.ti using an inductive thematic analysis.

Results/Conclusions: Women Veterans described specific preferences for firearm LMS, including when, where, how, why, and by whom. Findings showcased the influence of women Veterans' partners on use, access, and storage of household firearms, which was further complicated by intimate partner violence. Further, women Veterans' personal histories (e.g., military service, military sexual trauma, suicidal ideation and attempt) appeared to be important factors that influenced their willingness to discuss firearms with healthcare providers.

Innovation and Significance to the Field: This study is the first to explore women Veterans' perspectives and experiences regarding firearm LMS, a unique and important focus as women Veterans have historically been overlooked in prior research on firearms and suicide prevention. Our findings suggest the need for a more holistic appraisal of firearm access among women Veteran patients, as well as understanding of interpersonal dynamics when considering strategies to change firearm access in households with firearm owners that are not the women Veteran.

55. Veterans' Perspectives of Firearm Safety Discussions in the VA Healthcare System

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Statement of Purpose: The Veterans Health Administration (VA) serves >9 million Veterans each year, many of whom own firearms. Despite the patient population being at high risk for firearm injuries and death, policy makers have been concerned that standardized firearm safety discussions, or lethal means counseling, within the VA could deter Veterans from seeking care. This study examines Veterans' perceptions about firearm safety discussions to help inform healthcare-based harm reduction efforts.

Methods/Approach: We conducted semi-structured interviews with 40 Veterans from four VA facilities that treat a high rate of patients with firearm-related injuries. Interviews were audio-recorded and transcribed. We used a rapid analysis approach to understand patient perspectives and to identify themes.

Results/Conclusion: Participants had various experiences with firearms, shaped by cultural and physical environments as well as military service. We found most Veterans were agreeable to universal discussions of firearm safety. However, some voiced concerns, deeming it outside the scope of a provider's role ('who are you to ask?') and saying it could raise suspicions if intention is unclear and Veterans are worried about losing access to firearms ('raises red liberal flag'). They pointed out they and other Veterans might not answer honestly; however, no participants said they would be concerned enough to stop engaging with VA care. All participants thought lethal means counseling and safe

storage were appropriate and necessary topics for providers to discuss in specific at-risk situations, such as suicidal ideation/mental health or dementia. Preferences around the method of such discussions varied, but many Veterans emphasized that the timing of delivery, and provider trust and training, are key.

Innovation & Significance to the Field: Our findings suggest that universal discussion of firearm safety will not turn Veterans away from care and could be incorporated into standard practice as part of a comprehensive, firearm-focused harm reduction program.

56. Determining who military service members deem credible to discuss firearm safety for suicide prevention Allison E. Bond MA^{1,2}, Craig J. Bryan PsyD ABPP³, Daniel W. Capron PhD⁴, Annabelle O. Bryan MA³, Michael D. Anestis PhD^{1,2}

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Statement of Purpose: Suicide is the leading cause of death in the United States (US) military (Armed Forces Health Surveillance Center, 2014). Firearms account for 51% of all suicide deaths in the US (CDC, 2021). Safe storage (e.g., unloaded, locked) can reduce risk for suicide (Grossman, 2005). Determining ways to increase safe firearm storage is important for reducing suicide rates. The present study seeks to determine who firearm owning military members deem credible to discuss firearm safety for suicide prevention. Additionally, we explore if the ranking of credible sources differs among those of different races, age groups, sociopolitical beliefs, and military branch.

Methods/Approach: A sample of 719 firearm owning US active-duty military members were recruited via IPSOS using the KnowledgePanel calibration approach to optimize representativeness. Descriptive statistics were run to determine the ranking of credible sources.

Results/Conclusion: Military members, law enforcement, and military veterans were ranked highly credible to discuss firearm safety for suicide prevention; while faith leaders, casual acquaintances, and celebrities were the least credible sources. Multiple, notable differences were found among subgroups. These differences will be further discussed during the presentation.

Innovation & Significance to the field: Research has yet to examine who firearm owning military members deem credible to discuss firearm safety for suicide prevention. Findings of highly credible sources are consistent with previous research. However, this study is novel in that we included unique sources (e.g., faith leaders, created a name of a mock suicide prevention organization), which provide additional information on prior findings. Findings from this study can increase the effectiveness of means safety/safe storage messages. Creating more effective means safety messages may increase safe storage behavior among military members, and in turn can reduce suicide risk among this population at increased risk for dying by suicide.

57. Predicting Violent Crime Among Handgun Purchasers in California Using Handgun Purchase Trends and Criminal Histories

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Statement of purpose: Firearm purchasing records are a potentially critical and unexplored resource for the development of risk prediction tools to identify individuals at high risk for violence. In this study, we use machine learning methods to develop models to predict firearm violence among legal purchasers of handguns.

Methods: Our data consists of all individuals with records of transaction in California's Dealer Record of Sale (DROS) database, from 1996 through 2020. We extract features to describe purchase history including age at first purchase, temporal purchase patterns, firearm caliber and price, and others. Purchaser information is linked to criminal records to identify firearm-related major violent crime, our primary outcome, as well as criminal history predictors. Using gradient boosted models with Cox Proportional Hazards loss functions, we fit a validated predictive model of individual

risk of violence. Handgun purchasing and criminal history features are included in the model as time-varying covariates summarizing the previous year and lifetime of the purchaser. We also include time-invariant community characteristics of the purchasers as additional predictors. The gradient boosted model is ideal for this application as it can efficiently identify the most important features, and interactions of features, for prediction.

Results: Results are forthcoming. Our data consists of 3,521,963 legal handgun purchasers in California. Among those purchasers, 913,094 (25.9%) had a criminal history.

Innovation and significance: We demonstrate the utility of gun sale records in identifying higher risk handgun purchasers and relevant risk factors. Effective utilization of these data may help aid efforts to reduce firearm related death and injury.

58. What lessons can we learn on how to improve evaluations from the evaluations of Australia's National Firearms Agreement?

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Purpose: To examine the collective evaluations of Australia's National Firearms Agreement (NFA) to look for lessons on how to improve the evaluation literature on firearm interventions generally.

Approach: We read all the NFA evaluations, along with critiques of these evaluations. We examined the strengths and limitations of each particular evaluation and then of the entire assembly of evaluations. The goal was to look for lessons and insights about how evaluations in the entire firearm field might be improved.

Results: Almost all of the NFA evaluations used the same small dataset of annual national rates of aggregate firearm and non-firearm homicide and suicide. There was virtually no theory presented about who, and how, and when the effects should be felt—e.g., a larger effect on some people or places, or whether effects should have been immediate, lasting, and/or increasing over time. Counterfactuals (what would have happened had there not been an NFA) were sometimes constructed so that, logically, no benefit could possibly be found. Trends were often used in the counterfactuals, but there was no explanation for the trends seen before or after the NFA. There was rarely any alternative theory presented for the outcomes seen after the NFA.

Significance: It is important to determine how to improve not only each singular firearm evaluation, but also how to improve the collection of evaluations about any policy. One lesson from the NFA is the importance of theory, particularly theory about disaggregate effects (e.g., a bigger effect on some groups) and to have collected disaggregate data to test those theories. Similarly, it is important to examine intermediate effects along the causal chain as well as the final outcome. For convincing evaluations, as a field we need to ensure that disaggregate data have been collected and then to theorize before we begin our analyses.

59. Evaluating Firearm Data Collection Improvement Strategies of the South Carolina Violent Death Reporting System

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Statement of Purpose: As part of the Centers for Disease Control and Prevention (CDC) National Violent Death Reporting System (NVDRS), the South Carolina Violent Death Reporting System (SCVDRS) collects and abstracts data from death certificates, coroner, and law enforcement reports to characterize suicides, homicides, legal intervention deaths, and deaths due to accidental firearm injury or undetermined intent. Nearly, 67% of deaths from 2018 through 2019 were firearm-facilitated compared to 64% from 2003 through 2017. Increases are expected for 2020 deaths. Data on whether the firearm was stolen, owner-shooter relationship, and firearm storage were low ranging from 2% to 6% completeness. Upon receipt of CDC National Center for Injury Prevention and Control supplemental funding in September 2020, the SCVDRS team initiated a pilot to improve collection of firearm-related data within NVDRS.

Methods/Approach: Multimodal approaches to implementation and evaluation of these interventions included surveys and interviews with data providers and abstractors; structured abstractors training on firearms and law enforcement firearm coding; and modification of the data request template to request supplemental firearm-related

reports for additional details about firearm type, storage, access, and scene recovery. A quality assurance analyst was hired to assist with evaluation of these interventions.

Results/Conclusion: Despite the impact of COVID-19 shutdowns on coroner and law enforcement report availability for abstraction, completeness for owner-shooter relationship increased from 5.53% to 18.7%; firearm stolen increased from 6.12% to 16.6%; and firearm stored locked increased from 1.83% to 3.05%. Declines were noted in firearm type and make. Evaluation is ongoing.

Innovation & Significance to the field: Firearm deaths are rising in South Carolina and represent over two-thirds of deaths reported by SCVDRS. Availability of high-quality data about firearm access and usage in fatal violent or accidental injury incidents is historically low. Evaluation of successful strategies for increasing data collection and abstraction is imperative.

60. Research-Practitioner partnerships to develop data-informed approaches to CVIs

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Statement of Purpose: The expansion of street outreach efforts in many cities creates opportunities to cultivate new techniques and approaches for CVI efforts. N3 has partnered with outreach organizations in Chicago in the development of two innovative gun violence prevention strategies: **FLIP (Flatlining Violence Inspires Peace)** and **SOAR (Street Outreach Analytics Response)**. This paper reviews these innovations, with a focus on implementation, evaluation and research design, and preliminary findings.

Methods/Approach: FLIP is a multi-pronged gun violence intervention strategy designed to buttress existing outreach infrastructure. In partnership with outreach organizations, FLIP deploys over 400 Peacekeepers during the summer months throughout violence hotspots. SOAR is a data-informed approach that integrates network science to assist outreach organizational partners with their rapid, coordinated response to gun violence.

Results/Conclusion: Analyses of FLIP data suggest that the program may be associated with reductions in gun violence in hotspots. In 2021, 84% of FLIP hotspots experienced zero shootings and FLIP Peacekeepers completed 639 mediations and established 47 non-aggression agreements. SOAR, currently in its startup phase, has developed a process of data review and deployment that will be undergoing evaluation in the summer or 2022. Both engaged research efforts have been successful in increasing partner capacity for data informed practice.

Innovation & Significance to the field: FLIP and SOAR represent innovations in outreach that begin from a engaged research partnership that fosters trust and builds capacity in outreach organizations. FLIP serves as both a violence prevention strategy as well as a training group for future outreach staff. SOAR provides an innovative approach to network science that has the potential to amplify the reach and impact of outreach. Such innovations might increase the efficacy of violence reduction strategies as well as provide a model for more collaborative and equitable approach to research and community partnership.

61. Nothing About Us Without Us: A Community-Focused Study of Gun Violence Prevention Work in New Haven, CT

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Research has consistently shown that a small percentage of individuals account for a disproportionately large amount of gun violence. When combined with the ineffectiveness of traditional law enforcement approaches, this finding led to developments of alternative models of violence prevention such as Cure Violence and Group Violence Intervention (GVI) in cities with disparate rates of gun violence such as New Haven, CT. Cure Violence is a public health approach to address violence as a disease to be treated by violence interrupters in the community that mediate conflicts. The Group Violence Intervention model reduces gun violence with focused deterrence facilitated through the collaborative efforts of law enforcement and community members. Several evaluations highlight the success of Cure Violence and GVI programs nationwide, however, assessments from the perspective of individuals at the center of

violence are largely missing from existing evaluations. Therefore, this study aims to explore how gun violence prevention work impacts individuals centering on their own accounts. To this end, we use a Participatory Action Research (PAR) model in which community members with lived experience of gun violence join the research project as community co-researchers. Our community co-researchers are contributing to the design of an interview instrument and leading interviews with participants in gun violence prevention programs in New Haven. Interviews focus on how individuals and communities perceive the messages underlying gun violence prevention initiatives and the services provided by them. Results will be forthcoming, following the completion of interviewing and data analysis. Our PAR approach is much about process as it is about results: we seek to change the traditional power dynamics of research projects to include individuals most impacted by gun violence, not only as research subjects, but as active research partners involved in the design and development of a research study.

62. Target practice: firearm injury prevention skill development using standardized patient encounters

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Firearm safety is an enormous public health issue that requires a multi-pronged, comprehensive approach. One important component is for healthcare providers to discuss with patients the risks associated with a firearm in the home and collaborate on ways to reduce them. Professional organizations recommend that trainings/CME programs incorporate firearm injury prevention into their curricula. However, surveys find that the majority of providers lack a routine system to identify patients who are firearm owners and that low confidence and low expertise are barriers to asking about firearms and addressing safety. When providers receive education on gun safety, they are more likely to conduct firearm safety counseling. Most educational programs, however, are lecture-based and result in changes in knowledge and attitudes but not in skills. Simulation is an ideal methodology to address an educational gap for gun safety skills because it allows for practice, feedback and skill ratings. We will describe a pilot project examining the use of standardized patients for psychologists-in-training to practice and obtain feedback about their firearm injury prevention skills. Fourteen psychology doctoral interns and fellows viewed a 1-hour didactic and then completed two different standardized patient practice encounters over the course of one month. Participants completed measures assessing pre- and post-didactic knowledge and attitudes and self-efficacy, use of skills and provided feedback about the didactic and standardized patient components of the training. An observational coding tool was also developed and used to code firearm injury prevention competencies demonstrated during the standardized patient practices. This project is unique in its use of videotaped standardized patient encounters and feedback to increase mental health provider confidence and competence in conducting firearm injury prevention with patients and/or their caregivers. Qualitative and quantitative data will be presented along with next steps for expansion to other sites and disciplines.

63. Firearm Injury Risk Screening and Treatment (FIRST) Pilot Study: Results of a Counseling based Intervention for Emergency Department Patients

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Statement of Purpose: Healthcare-based interventions provide a promising opportunity to access and intervene with high risk firearm owning patient groups. Previous research has not evaluated the nuanced effects of different intervention types (counseling only, device handout, etc). We examine the efficacy of an Emergency Department (ED)

based counseling only intervention on patient firearm storage habits. We also assess patient willingness to discuss firearm safety with providers and the plausibility of connecting them to relevant resources.

Methods: Patients were recruited by culturally competent trained physician researchers from four EDs and randomized to a counseling based intervention group (IG) or control group (CG). Both groups completed a baseline survey and received an information packet on firearm safety, and the intervention group received an interactive firearm safety counseling session. Both groups were contacted at one month and completed a follow-up survey.

Results: There was no significant difference in self-reported changes to firearm storage habits between IG and CG at one month (adjusted OR 1.66, 95% CI 0.69 – 3.97). Patients were comfortable discussing firearm safety with providers, with at least 60% agreeing or strongly agreeing and less than 20% disagreeing or strongly disagreeing for each medical professional listed on the survey. Participants were able to follow up with the resources provided, with >30% of those who had screened positive for alcohol/drug use or for children in the home reporting following up with the appropriate resource.

Conclusion, Innovation & Significance: Counseling interventions alone did not appear to change firearm storage behaviors within the parameters of our study. However, patients felt comfortable discussing gun safety with medical providers, and some were able to follow up with appropriate resources. Future research should explore more nuanced approaches to firearm counseling-based intervention strategies, narrow the focus to a single risk population, or consider providing monetary or physical means to help patients to store firearms more safely.

64. Successes, challenges, and solutions to creating firearm storage maps for voluntary, temporary out-of-home firearm storage: Results from a qualitative study

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Statement of Purpose: Based on principles of lethal means safety, reducing access to lethal means can help prevent suicide; this can include temporarily, voluntarily storing firearms away from home. In 2019, Colorado created a state-wide online map that displays organizations willing to consider requests for firearm storage. Since then, at least 10 states have created or considered creating similar maps. We sought to understand how public health practitioners in various states who have developed or are developing maps have approached creating such maps, including challenges encountered and desired support or resources.

Methods/Approach: We interviewed English-speaking adults who had thought about, began to, or created state firearm storage maps in the United States. We recruited participants through email invitations, telephone calls, and snowball sampling. Semi-structured interviews were conducted and recorded via web conference (March to April 2022). We used a mixed deductive and inductive approach to coding transcripts to identify dominant themes.

Results/Conclusion: We conducted 14 interviews with 19 individuals from 10 states. Half of all interviewees were from academic institutions (50%), followed by nonprofit organizations (22%), Veterans Affairs (22%), or state health departments (6%). Findings fell into broad themes about creating maps for voluntary, temporary firearm storage: 1) identifying storage partners, 2) liability associated with hosting the map (rather than liability for businesses who participate), and 3) practical resources.

Innovation/Significance: While lethal means safety is a recommended approach for suicide prevention, knowledge of large-scale availability of storage locations is necessary for this approach to be successful. Understanding views of public health practitioners in developing these resources for firearm owners is necessary to design feasible programs for both firearm owners and those hoping to connect them to resources. This study showed the need for toolkits, legal, and technical support for those hoping to create firearm storage map programs.

65. Innovative Initiative as a Model for Universities to Increase Interest in and Activity Around Preventing Firearm Injuries Research

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Statement Of Purpose: Historically limited federal funding for firearm-related research represents a challenge for researchers beginning or sustaining work in this field. The School of Public Health (SPH) launched a new initiative in 2021 called Public Health IDEAS (Interdisciplinary Discovery, Engagement + Actions for Society) for Preventing Firearm Injuries (IDEAS-PFI). This approach to building support for firearm injury prevention research, started with a small amount of seed funding and utilizes internal faculty and school structures to gather momentum through interdepartmental collaborations. We describe the first steps of the IDEAS-PFI initiative to facilitate researchers' engagement in the field of firearm injury prevention.

Methods/Approach: The objectives of the two-year seed period are 1) establish an interdisciplinary, collaborative research program within SPH; 2) facilitate a pipeline of undergraduate students through postdoctoral-level researchers in the field of firearm injury prevention; 3) disseminate IDEAS-PFI research activities, findings, and products to relevant stakeholder groups; and 4) build capacity among SPH faculty and staff to sustain the IDEAS-PFI initiative.

Results/Conclusion: In the first five months of the initiative we: convened a whole-school meeting to introduce the initiative; used general and targeted messaging and an online interest form to develop a list of interested researchers; had participation from five of six SPH departments and four research centers; approved funding for two pilot studies, and supported two cross-department grant proposals with SPH faculty and community organizations. Initial perceived barriers to engagement include: limited time; lack of knowledge of the field; and desire to identify partners/co-authors with complementary skills/interests.

Innovation & Significance To The Field: Although a nascent effort, we will build on internal collaborations and engagement by connecting with external stakeholder groups, participate in policy development and information dissemination at the state and federal level, and apply for funding to sustain the initiative beyond its seed period, building on the foundation of research conducted and networks of faculty, staff, and students created during that time.

66. Responsible Firearm Storage: Firearm Lethal Access Matters Evaluation (FLAME) Program Feasibility & Validation study

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Purpose: In 2020, there were 24,292 suicides from a firearm and 535 cases of death from the unintentional discharge of a firearm in the United States. It is well established that firearms in the home are a higher risk of death or injury to people due to the unintentional or intentional discharge. The safe storage of firearms has been applied to suicide prevention activities, as there is clear evidence that when access to lethal means is restricted, delayed, or not available, individuals planning to kill themselves are less likely to follow through with a suicide attempt.

Method: This study proposes the development of the Firearm Lethal Access Matters Evaluation (FLAME) Tool which will include: 1) a FLAME Storage Score, a score on how safely firearms are stored, (e.g., 0 firearms are not in the home to 10 loaded, unlocked), 2) a FLAME Environment Score, a recommended FLAME Storage score based upon the home environment (e.g., children, someone in crisis) and 3) Responsible Storage Recommendations (RSR). The FLAME tool will be given to firearm owners as a method for them to rate their storage levels and be provided recommended storage methods based upon their environment.

Results/Conclusions: The FLAME Tool is underdevelopment and has been submitted as a VA HSR&D grant proposal. This novel approach to firearm safety is open to discussion and refinement as an option to assist people to responsibly store their firearms.

Innovation & Impact: The FLAME Storage Score may be a useful tool in subsequent studies measuring firearm storage levels. Additionally, if the FLAME Tool is found to be effective it could be used in subsequent studies as an intervention to improve the storage of firearms, potentially resulting in less access to lethal means (firearms) and lower suicide rates in Veteran and non-Veteran populations.

67. Stakeholders' Perspectives on Improving the Acceptability of Lethal Means Counseling

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Statement of Purpose: Lethal means counseling (LMC) is an evidence-based intervention that is underutilized in clinical practice. We conducted a systematic review of all qualitative studies examining stakeholder perceptions of LMC and its implementation.

Methods: Pubmed and PsycInfo were searched using terms related to: (1) Lethal means counseling, firearms, or medications; (2) suicide, safety, or injury; and (3) qualitative methodology, resulting in 6,127 unique records. Two coders developed a coding manual and double-coded 20% of manuscripts (reliability $k > .70$). We used thematic synthesis with an inductive and iterative approach to analyze the findings of included papers.

Results/Conclusion: Eighteen studies explored perspectives on LMC for firearms among various stakeholders (providers, patients, members of the firearms community, healthcare leaders, and community and family members) across a variety of settings (emergency departments, pediatric and adult primary care, and outpatient mental health). Seven overarching themes were identified, including the value of firearms to owners' identities, their views of firearm ownership as a right, and the intersection of these views with perceived cultural tensions between patients and providers. Stakeholder recommendations for providers administering LMC included remaining nonjudgmental, respectful, and aware of their own firearm-related biases; showing cultural competency regarding firearms (e.g., appropriate terminology, appealing to a culture of responsibility); adapting counseling to patients' background and preferences; framing counseling as part of discussions about home safety or other lethal means (e.g., medications); providing a rationale for counseling; deciding whether to directly ask about firearm access based on the context and patient; and tailoring storage recommendations to patients' reasons for owning firearms.

Innovation & Significance: This is the first systematic review of qualitative studies exploring perspectives on LMC, and provides key insights that may inform development of interventions and help increase their acceptability and feasibility.

68. Acceptability of a Newly Implemented Suicide Prevention Module Among Concealed Firearm Permit Instructors

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Statement of Purpose: Suicide accounts for 60% of firearm deaths, but firearm classes infrequently cover the topic. In 2017, Utah added a suicide prevention module to its curriculum for Concealed Firearm Permit (CFP) classes. We assessed acceptability of the curriculum to instructors and attitudes and behaviors about lethal means safety.

Methods: Instructors who teach CFP classes were surveyed via Qualtrics in 2016 (n=999) and again in 2019 (n=498) after the module was added to their curriculum. We analyzed the coded and free-text responses from 2019.

Results: A significantly higher proportion of instructors in 2019 (vs. 2016) supported covering suicide (81% vs. 66%) and were "very likely" to offer to hold a potentially suicidal friend's guns (62% vs. 48%). In 2019, those who had (vs. hadn't yet) taught the module were more likely to believe a suicidal person is safer without their guns (62% vs. 42%) and to have actually held onto an at-risk person's firearms (24% vs. 16%). Of the minority who were opposed to (7%)

or unsure about (12%) the module, 67% provided a reason why. The most common reasons were: module irrelevant to the overall course, not their job to address mental health, suicide not preventable, and doubted module efficacy. The majority of the 67% who provided a reason for supporting the module indicated that spreading awareness promotes prevention.

Innovation & Significance to the Field: Teaching suicide prevention was widely supported by firearm instructors and associated with increases in the proportion whose attitudes and behaviors supported keeping guns from loved ones at risk of suicide. Very few perceived the module as anti-gun. Because the Utah CFP is recognized in 37 states, two-thirds of instructors teach outside of Utah, thus widely spreading the concept of covering suicide in firearm classes throughout the country.

69. A Systematic Review of Recurrent Firearm Injury Rates in the United States

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Statement of Purpose: Firearm injuries are a significant cause of morbid and mortality in the United States (US). The objective of this systematic review is to review methodologies and data sources used to identify best practices in identification and calculation of recurrent firearm injury rates.

Methods/Approach: We conducted a systematic review of recurrent firearm injuries in the US in accordance with PRISMA guidelines. We searched seven electronic databases on December 16, 2021 for inclusion criteria of English language, peer-reviewed journal articles that calculated recurrent firearm injury in the general population or in generalizable subgroups, like pediatric patients. Two reviewers independently screened the studies, and a third reviewer resolved conflicts. Two reviewers assessed the risk of bias and extracted data.

Results/Conclusions: Of 918 unique articles identified, 14 met our inclusion criteria. Recurrent firearm rates varied from 1% to 9.5%. We observed heterogeneity in data sources utilized, identification of subsequent injury, follow-up times post index injury, and the types of firearm injuries studied. Data sources ranged from single-site hospital medical records to comprehensive statewide records comprising medical, law enforcement, and social security death index data. Several studies applied machine learning algorithms to electronic health records to differentiate subsequent new firearm injuries from the index injury. Four studies conducted survival analyses, though the specific methodology varied across these studies.

We found wide variability both in the data sources and methods used to define and evaluate recurrent firearm injury and in the reported recurrent injury rates. This limits individual study generalizability of individual and societal factors that may inform violence prevention interventions.

Innovation and Significance: There is a need to develop best practices for reporting recurrent firearm reinjury rates, as well as the development, dissemination and implementation of standard practices for calculating recurrent firearm injury.

70. The importance of psychopathy in understanding risk of gun violence.

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Statement of Purpose: Psychopathy is one of the most reliable risk factors for violence across various populations. Yet, the association between psychopathy and gun violence remains poorly understood due to a lack of research. The present study aims to test if psychopathy is related to gun violence and how psychopathy mediates the link between well-known gun violence risk factors (i.e., risky firearm behaviors and beliefs, neurocognitive deficits) and gun violence in a large sample of violently injured adults and a female offender sample.

Methods/Approach: Correlations were conducted to test the association between psychopathy and gun violence across violently injured adults ($N=120$; $M_{\text{age}}=32$; 70% male) and female offenders ($N=204$; $M_{\text{age}}=37$). Gun violence was measured using both self-report and official reports from criminal convictions. Psychopathy was measured using self-report surveys. Mediation analyses were conducted using risk factors for gun violence (i.e., risky gun behaviors and attitudes) and neurocognitive function (i.e., impulsivity).

Results/Conclusion: Psychopathy was positively related to gun violence in violently injured adults ($r=.44$; $p<.011$) and female offenders ($r=.27$; $p<.001$). These associations remained significant when accounting for sociodemographic factors. In the female offender sample, psychopathy mediated the relation between impulsivity and gun violent crime ($b=.06$, $SE=.02$, 95% CI [.03,.11]). In the violently injured patient sample, psychopathy fully mediated the link between risky gun behaviors ($b=.29$, $SE=.14$, 95% CI [.08,.60]) and impulsivity ($b=.66$, $SE=.39$, 95% CI [.05,1.58]) with gun violence. These preliminary results highlight the importance of psychopathy when understanding gun violence risk.

Innovation and Significance: The present study found psychopathy, across measurement and sample type, is positively related to gun violence. Further, psychopathy seems to play an integral role in linking behavioral and neurocognitive risk factors with gun violence. From a violence prevention standpoint, a focus on psychopathy treatment is essential to effectively address the gun violence epidemic.

71. The economic value of research on gun policy: a model-assisted estimate

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Statement of Purpose: The volume of scholarly research on firearms has been far below that on other public policy issues of comparable importance. Motivated by this observation, we address two closely related questions: 1) Based on the existing empirical literature, what is the credible range of net benefits from either increasing or decreasing the current prevalence of guns in the United States?; and 2) What is the economic value of additional research that would reduce uncertainties surrounding key aspects of gun policy?

Methods/Approach: We develop and analyze a game-theoretic model of firearm casualties in which decisions by law-abiding citizens to acquire a gun are driven by their perceived private benefits and costs, which in turn depend on the overall prevalence of gun ownership. We calibrate our model parameters using a range of published results from a targeted review of the empirical literature, and we use the calibrated model to compare the current prevalence of guns in the U.S. to the level predicted to maximize net social benefits.

Results/Conclusion: Due to both positive and negative external effects of lawful gun ownership, our model implies that the equilibrium un-regulated prevalence of guns could be lower or higher than the socially optimal level, depending on the relative strengths of the deterrence effect of gun ownership on criminals and the increased risks of deaths by homicide, suicide, or accidents involving guns. We identify several key parameters in our model that strongly influence the wedge between the social optimum and the equilibrium, but are currently highly uncertain.

Innovation & Significance to the field: By calculating the difference between the expected maximized net benefits under current information and under improved information about these key parameters, we are able to estimate the economic value that additional research on specific aspects of gun policy can provide.

72. Survey Results from Firearm Business Owners involved in the Colorado Gun Shop Project: Factors Associated with Denying Firearm Sales to Individuals in Crisis

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Purpose: Gun Shop Projects (GSPs) are community-driven suicide prevention partnerships between the firearms community (e.g., firearm retailers and ranges) and local public or community health agencies. GSPs use trusted

messengers in the firearms community to educate firearm businesses on the increased risk of suicide for firearm owners. While GSPs are being implemented in 21 states in the U.S., studies evaluating GSP implementation are limited. Research is needed on the practices firearm businesses might undertake to prevent suicides, such as denying a sale of a firearm to a person suspected of being in crisis.

Methods: We administered a cross-sectional survey to owners or managers of firearm businesses who participated in Colorado's GSP between 2015 and 2020 (n=196). The survey included measures to understand GSP implementation, business characteristics, and business practices (including denying sales), and individuals' demographics. Due to the small sample size, we examined bivariate associations using relative risk ratios, and chi-square tests for significance.

Results: Overall, 54 owners or managers participated in the survey (response rate=28%). Twenty-six percent reported having denied a sale. Relative risk analyses showed the following factors were significantly associated with denying a sale: businesses who included suicide prevention as part of safety instruction offered to customers, (2.95, $p<.10$); businesses who reported high motivation to get involved in suicide prevention (7.58, $p<.05$); if the establishment was previously impacted by suicide (4.20, $p<.05$); if the establishment was in an urban county (6.80, $p<.05$); and if the owner/manager was a Veteran (2.84, $p<.10$).

Significance to the Field: The initial findings are promising for determining which factors of GSP implementation may contribute to changing behaviors and practices among the firearm business community to prevent suicide. Conducting process and outcome evaluations of GSPs on suicides involving firearms can help to identify practices firearm businesses can undertake to prevent suicides.

73. Analysis of "Stand your ground" self-defense laws and state-wide rates of homicides and firearm homicides

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Statement Of Purpose: Lethal violence is a leading cause of death among US adolescents and adults and is on the rise. Homicide and firearm homicide rates are over 8 to 12 times higher in the US compared to other high-income countries, suggesting that current policy is playing a critical role. This study aimed to evaluate the impact of Stand Your Ground (SYG) laws on homicide and firearm homicide, nationally and by state, while considering variation by victim's race, age, and sex.

Methods: We used restricted-access CDC mortality data from January 1, 1999, to December 31, 2017, to conduct a controlled multiple baseline and location interrupted time series design and estimate the impact of SYG laws at the state and national level. Changes in homicide and firearm homicide rates (per 100,000 persons) were modelled using Poisson regression analyses within a generalized additive model framework. We further examined changes in homicide and firearm homicide rates by victim characteristics (race, age, sex).

Results: During the study period, 23 states enacted SYG laws, and 18 states did not have SYG laws enacted. SYG laws were associated with an average national increase of 7.8% in monthly homicide rates (IRR=1.08; 95%CI:1.04-1.12; $p=0.0001$) and 8.0% in monthly firearm homicide rates (IRR=1.08; 95%CI:1.03-1.13; $p=0.0019$). SYG laws were not associated with changes in the negative controls suicide or firearm suicide ($p>0.5$). Increases in violent deaths varied markedly across states, with the largest increases (16.2%-33.5%) clustering in the South (Alabama, Florida, Georgia, Louisiana). There was no evidence of differential associations of SYG laws by demographic group.

Innovation & Significance To The Field: Adoption of SYG laws across the US is associated with a robust 8%-10% increase in homicide and 8-11% increase in firearm homicide – equivalent of around 700 additional violent deaths every year that could have been avoided.

74. Viewing Firearm Danger Through the Lens of Police Officers

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Despite danger being an integral part of officer decision-making during potentially lethal encounters (see Graham v. Connor, 1989), the study of officers' perceptions of danger is scarce. Using a survey of over 800 police officers located in a large metropolitan police department, this study assesses officers' perceptions of danger in different types of armed citizen situations involving various levels of citizen resistance. It also identifies various contextual factors and officer characteristics in relation to danger. The findings are used to inform future research, departmental policy, officer training, and the "objective reasonableness" standard put in place by the Supreme Court.

75. Developing a Community-Academic Partnership to Address Gun Violence

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Universities in the US are often seen as ivory towers often working on communities instead of working with communities. Research shows that intentionally collaborating with communities aid in bridging the division between community partners and universities which then fosters better community engagement (Calleson, Jordan, & Seifer, 2005; Saltmarsh, Giles, Ward, & Buglione, 2009). Ultimately, such a process leads to projects that are more in alignment with and beneficial to community needs. Through these collaborations, a mutually beneficial relationship is established in which academics and community partners create a shared learning environment where ideas and resources are exchanged. Essentially, when academic and community members form partnerships, they are able to achieve more than if they worked in silos.

Purpose: The New Jersey Gun Violence Research Center (NJGVRC) has partnered with Newark Community Street team (NCST) to conduct a community based participatory research (CBPR) study focused on illicit firearm ownership among Black individuals living in New Jersey.

Method: Before launching the research, the NJGVRC organized several team meetings with NCST to discuss the partnership. Such a partnership brought NCST members to the table as equal partners in conducting research to examine a pivotal gap in the gun violence research literature.

Results: This collaboration resulted in building NCST's organizational capacity by training NCST team members to engage in research and equipping the NCST team with research skills applicable to future research projects. This presentation will inform participants about the ways in which the New Jersey Gun Violence Research Center fostered a strong partnership with the Newark Community Street Team to conduct gun violence research.

Significance to the field: This presentation will demonstrate that it is possible to build community-academic partnerships focused on shared priorities that meet community needs.

Session: Poster Session 2

Hampton Ballroom, December 1, 12:15-1:15 PM

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1. Impact of state-level preemption of local firearm ordinances on firearm mortality rates in five Pennsylvania counties

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Statement of Purpose: Government regulation of firearms has been shown to be associated with lower levels of firearm mortality. Yet many local governments are expressly prohibited by the state from enacting firearm regulations, referred to as preemption. This modeling study estimated what mortality rates (2001-2021) could have been in five Pennsylvania counties if local firearm ordinances had not been preempted by the state.

Methods: First, we trained a multilevel model of firearm mortality (source: CDC) on data from 50 states over the past 20 years (2001-2021). The independent variable was the number of firearm regulations (Boston University's Firearm State Laws database) and we controlled for various demographic characteristics (US Census Bureau). Next, we developed a database of municipal ordinances (Legistar, government websites) regulating firearms in five Pennsylvania municipalities: Philadelphia, Pittsburgh, Allentown, Erie, and York. This database established the number of firearm regulations that would be in effect in each municipality in the absence of preemption. Finally, we used this model to simulate what mortality rates for the five municipality's counties (Philadelphia, Allegheny (Pittsburgh), Lehigh (Allentown), Erie, and York) might have been if the municipal ordinances in our database had been able to be enforced in the absence of preemption.

Results/Conclusion: Preliminary results suggest that firearm death rates for these five counties would have been lower from 2001 to 2021 if not for the state's preemption of firearm regulations. The magnitude of this effect varied by model specification; we are currently assessing model quality and fit to obtain the best estimate.

Innovation & Significance to the field: State-level preemption of firearm legislation has the potential to increase firearm mortality. When evaluating state-level policy, it is important to consider the effects of local laws that were rendered ineffective because of preemption. Interdisciplinary legal epidemiology methods have potential to improve our understanding of the health impacts of public policy.

2. Effects of the Pelotas Pact for Peace on violence and crime in southern Brazil: a synthetic control analysis

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Purpose: Violence is the leading cause of mortality among young people in Latin America, and firearms are the main method of homicide. Several local governments have invested in public health approaches to prevent violence. However, the impacts of these programs are unclear. We evaluated whether a flagship violence prevention program, combining primary, secondary and tertiary prevention projects, called "Pelotas Pact for Peace" ("PPP"), has been effective in reducing violence and crime in Pelotas, Rio Grande do Sul, Brazil.

Methods: We used synthetic control methodology, alongside stakeholder interviews, to examine the effects of PPP on violence and crime, implemented since August 2017. Outcomes included monthly rates of homicide, property crimes (theft, robberies, vehicle thefts and robberies), and yearly rates of assaults against women and school drop-out from January 2012 to December 2021. We examined the effects of the initiative before and during the COVID-19

pandemic period. We constructed synthetic controls (counterfactuals) based on weighted averages from a pool of municipalities in Rio Grande do Sul, matching on pre-intervention trends and controlling for: population sociodemographics, and indicators of the economy, education, health and development, and drug trafficking.

Findings: We found limited evidence of an effect of the overall PPP initiative on violence (e.g., homicide), property crime (e.g., robbery, theft), and risk factors (e.g., school dropout). However, there was some evidence to indicate that a criminal justice focused deterrence strategy within PPP significantly reduced homicide. Also, during the COVID-19 pandemic, PPP may have served as a protective factor leading to larger-than-expected reductions in homicide and property crime.

Innovation and significance: Few municipal-level initiatives have successfully integrated primary, secondary, and tertiary violence prevention programs across multiple sectors (e.g., health, education, criminal justice). The evaluation of the Pacto, using advanced evaluation methods, represents important rare evidence of the effects of such an initiative in a high-violence context.

3. Where are the Guns? Evaluating Gun Prevalence Measures and Their Connection with Homicides using Gun Sales Data

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A controversial element of gun violence research is the debate surrounding which proxy for gun prevalence best captures the variation in gun availability. We test the effectiveness of common gun prevalence proxy variables against what is arguably the best measure of gun availability: firearm sales.

Using data from multiple sources, we create a balanced panel (03 - 19). Variables of interest are county homicide counts, handgun and long-gun sales, recovered firearms, and federal firearm licenses (FFLs). Homicide counts come from the CDC. Gun sales data comes from the PA State Police – Firearms Annual Reports (03 - 19). Recovered firearms are from the PA Attorney General’s Office. FFLs are from ATF.

First, we show gun sales are positively correlated with FFLs per mile – though this changes some when county-fixed effects are included. Second, gun sales are negatively correlated with FFLs per capita, and the proportion of gun suicides to total suicides. We first replicate the Johnson and Robinson (2021) result (increases in FFLs per mile are associated with more gun homicides). Next, using several fixed-effects Poisson regressions, we show increases in handgun (long-gun) sales are positively (negatively) correlated with gun homicides (homicides). The proportion of gun suicides has no relationship with homicides. With the recovered gun database, we show gun sales are a flawed measure. Roughly half of the crime guns successfully traced to a dealer in PA are found to have been recovered in a county different than the one they were originally sold. Consistent with Johnson and Robinson (2021), roughly half of these guns were traced to an adjacent county.

We advise researchers to use gun dealers as a measure of gun prevalence and in a way that considers markets bleeding over arbitrary lines. Using an accurate measure of gun prevalence is paramount when assessing the efficacy of policy.

4. Gun violence and alcohol abuse in patients with serious mental illness

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Statement of Purpose: Our understanding of risk factors for gun violence among people with serious mental illness is lacking. One of the most well-studied risk factors for violence is alcohol use, yet the association with gun violence is unclear. The present study aims to test the relation between alcohol use and gun violence, and the occurrence of alcohol use during the commission of a violent crime in a sample of forensic inpatient with serious mental illness.

Methods/Approach: In a sample of 82 forensic inpatients with serious mental illness, we assessed the relation between alcohol abuse risk using the Personality Assessment Inventory (Morey, 2007) and gun-related violent crime using official records. We assessed if alcohol use during the commission of a violent crime increased the odds of a patient having committed a violent crime with or without a firearm.

Results/Conclusion: Logistic regressions showed that alcohol abuse increased the likelihood of patients belonging to the violent crime group when compared to the gun-related violent crime group (OR=4.18, $p=.041$). Alcohol use during a violent crime did not increase the likelihood of participants belonging to the gun-related violent crime group when compared to the violent crime group (OR=.37, $p=.541$).

Innovation and Significance: Gun violence among people with serious mental illness remains poorly understood, which may limit treatment approaches in preventing gun violence in this underserved population. In the present sample, it was found that alcohol abuse and use during the commission of a crime did not increase the odds of patients belonging to the gun-related violent crime group. Consistent with prior research, alcohol use did increase the odds of patients engaging in violent crime. However, this was when compared to patients who had engaged in gun-related violence. Thus, alcohol abuse seems unrelated to gun-related violence in patients with serious mental illness.

5. Variance in State Mental Health Firearm Prohibition Laws: a 50-state Analysis

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Purpose: We developed a database of firearm-related laws enacted by states in the legislative session immediately after the Sandy Hook massacre and in the seven years that followed, analyzed subsequent state legislative reactions, and identified patterns in these reactions starting with the initial “Sandy Hook” laws through subsequent legislative activity in response to mass shootings through 2020.

Methods: Using Thomson Reuters Westlaw, we developed a database of gun laws enacted or amended beginning in 2013. We tracked legislative response through 2020. We coded legislative response identifying four patterns: legislative action leading to firearm restrictive laws, firearm expansive laws, a mixed response, or consistent legislative inaction.

Results/Conclusion: In the first legislative session after Sandy Hook, state responses varied. An almost equal number of states failed or chose not to pass legislation, passed a mix of legislation that both restricts and expands access or possession of firearms, or passed restrictive legislation only. Trends in the subsequent years revealed a continuity in heterogeneity with twenty-nine states passed a mix of firearm restrictive and expansive laws, ten states consistently enacted firearm restrictive legislation, nine states were mostly inactive, and two states consistently firearm expansive. Legislation that passed fell into two categories: 1)firearm restrictive laws that involved domestic violence or mental health, and 2)firearm expansive laws that expanded concealed carry options. We conclude that inconsistent state legislative action from one year to the next with contracting and expanding access to firearms may contribute to an overall weakening of firearm policy.

Innovation: This database and study provided two insights: it shows heterogeneity in longer term legislative response patterns to mass shootings beginning with Sandy Hook, and more broadly, it shows why state firearm policy might not be as effective even in states passing restrictive laws despite evidence that restrictive laws are associated with lower firearm deaths.

6. Risk for future suicide after surviving a medically serious self-inflicted gunshot wound

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Purpose: Individuals who survive a medically serious suicide attempt are at heightened risk of dying from a future suicide attempt. Surprisingly little is known, however, about factors that impact the degree of that risk, especially when the attempt was via self-inflicted gunshot wound. This gap in research hinders development of suicide prevention strategies focused on survivors of a medically serious suicide attempt. We sought to advance this area of research and practice by conducting psychological autopsies with the next of kin of individuals who survived a life-threatening suicide attempt and went on to die from a subsequent attempt.

Methods: We gathered medical records of individuals treated from at a Level I Trauma Center for injuries sustained in a suicide attempt between 2004 and 2020. Through a collaboration with the county medical examiner, we then identified patients who survived the initial self-inflicted injury but went on to die from a subsequent suicide attempt. We are currently conducting Psychological Autopsy interviews with next of kin of the decedents. The Psychological Autopsy is a standardized qualitative interview developed by the American Association of Suicidology and is considered the gold standard for identification of distal and proximal factors that contributed to an individual's suicide in order to refine prevention efforts.

Innovation & Significance: This is the first ever study to examine factors that contribute to the suicide of individuals who survived a previous medically serious suicide attempt. Elucidating risk and protective factors in this unique population is critical to the development of evidence-based suicide prevention efforts. Given the high lethality of self-inflicted gunshot wounds, we plan specific stratification of risk among survivors of self-inflicted gunshot wound(s) in comparison to other mechanisms of injury.

7. Talking with Patients About Firearms: Means Safety and Suicide Prevention May Offer Important Inroads

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Statement of Purpose: Healthcare professionals can play a critical role in preventing firearm injury given their frequent contact with the public and strong credibility as messengers; however, few of them report routinely discussing firearm safety with patients. Common barriers cited include lack of training and confidence. Recognizing that these discussions are also important for suicide prevention, we assessed providers' knowledge, beliefs, and confidence regarding firearm conversations before and after they completed a suicide prevention training with specific content on means safety.

Methods/Approach: From November 2018 through June 2022, 4,457 healthcare professionals completed a six-hour, web-based suicide prevention training. The course emphasized means safety and included a specific focus on firearms and medication. All participants completed the pre-training assessment and 2,701 (61% of all participants) also completed the post-training assessment. We used the McNemar-Bowker test to compare responses, pre- versus post-training, on: 1) knowledge regarding the burden of firearm suicide, 2) perceived patient acceptability regarding firearm and medication safety conversations, and 3) confidence in one's own ability to deliver simple messages about firearm and medication safety.

Results/Conclusion: Over 90% (n=2,432) believed that their patients were either interested (41.8%, n=1,125) or neutral (48.6%, n=1,307) in discussing locking and limiting access to firearms (93.6%, n=2,504 for medications). At post-assessment, 92.3% (n=2,446) were confident in their ability to deliver a simple message to all patients about locking and limiting access to firearms (93.5%, n=2,492 for medications).

Innovation & Significance to the field: Firearm safety is crucial in preventing firearm injury of all intent, including self-harm. Framing firearms discussions around self-harm and means safety may provide a more approachable path for clinicians—and more acceptable format for patients—than discussing firearms without any additional context. Increasing the frequency in which providers engage patients in these conversations is vitally important for both patient and community safety.

8. Building a Natural Language Processing Pipeline to Characterize Female Firearm Suicides using National Violent Death Reporting System Data: Troubleshooting and Lessons Learned

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Statement of Purpose: Little is understood about the circumstances preceding female firearm suicide death. Our objective was to develop, troubleshoot, and share a practical natural language processing (NLP) pipeline that could be helpful to National Violent Death Reporting System (NVDRS) users, including researchers and state health departments. We also aimed to use our NLP results to address the gap in understanding the circumstances preceding female firearm suicide.

Methods/Approach: We used records from the NVDRS Restricted Access Database. We coded a train/test dataset of unstructured Coroner/Medical Examiner and Law Enforcement reports for 1,462 randomly-selected suicide deaths. Our NLP preprocessing procedure included tokenization, stemming, Term Frequency Inverse Document Frequency weighting, and other steps. Using our train/test dataset, we tuned Naïve Bayes, Random Forest (RF), and Support Vector Machine (SVM) classifier models using 5-fold cross-validation (CV).

Results/Conclusion: Our NLP pipeline performed well for 5 labels, including recent interpersonal disputes, problems with intimate partners, and acute/chronic pain. Following 5-fold CV, the SVM and RF models performed best. For example, our SVM model had 98.2% specificity and 92.4% precision in classifying a recent interpersonal dispute before suicide. However, the models performed poorly for 14 preceding circumstance labels with rarer positive classes (typically <5% of cases). Attempts to correct for highly-imbalanced classes, including stratified K-fold cross-validation, did not improve model performance.

Innovation & Significance to the Field: We will discuss the tension between developing a general-purpose NLP tool and developing a sub-population-specific tool. To have an NLP pipeline that performs generally well for common circumstances across all sub-populations may require substantial investment in time and expertise. Assuming these resources are uncommonly available to health department colleagues and researchers who wish to apply NLP algorithms to NVDRS, a key decision would need to be made about whether using text mining with manual review would be more efficient.

9. Does Allowing Firearms on College Campuses Increase the Risk of Student Suicide?

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It is estimated that approximately 1,100 college students in the United States commit suicide each year and another 1.5% attempt unsuccessfully (<http://www.collegedegreesearch.net/student-suicides/>), rates that are likely to increase as students struggle with depression, anxiety, and uncertainty in this post-pandemic world. Data on suicidal thought and behavior among college students come from a variety of sources and are well-documented. What is less well-studied is the means of suicide. According to one survey, 27% of college students who committed suicide used a firearm. By comparison, 52% of suicides among the same age cohort in the general population are committed with firearms. What accounts for this difference? Could it be that allowing students to carry firearms on college campuses would increase the risk of suicide? Certainly, in the general population, access to a firearm increases the risk of

completed suicide. Moreover, 90% of people who attempt suicide with a firearm are “successful,” whereas the mortality rate for suicide attempts using substances is only 3%. To better understand the link between firearms and suicide among college students, this study explored the rates of suicide on campuses that allow and do not allow concealed carry. A survey sent to directors of university counseling centers ($N = 22$) revealed alarming trends. On the campuses allowing concealed carry ($n = 7$), 42.9% of directors reported student suicides involving firearms; on those campuses not permitting concealed carry ($n = 15$) the rate was only 13.3%. Attempted suicide rates by firearm were 42.9% compared to 6.7%. As more states relax gun laws and schools are pressured by the states to allow firearms on college campuses, will we see an increase in firearm suicides? Can we keep students safer by prohibiting guns on campuses? This paper offers an initial look at this complex situation.

10. Circumstances of Firearm Suicide among U.S. Black Youth

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Purpose. There has been a significant increase in the rate of suicide deaths among U.S. Black youth over the past two decades. While access to firearms is a risk factor for suicide, there is limited research that examines risk factors for suicide involving firearms specifically among Black youth.

Methods. We analyzed National Violent Death Reporting System data from 42 participating U.S. states from 2014 to 2018. We used logistic regression to compare demographic characteristics and precipitating circumstances of firearm suicide among Black and White youth ages 10-24.

Results. There were 17,341 suicides among youth ages 10-14 during the five-year period. Of these, 53% of Black male suicides involved firearms, 53% of White male suicides involved firearms, 28% of White female suicides involved firearms, and 22% of Black female suicides involved firearms. Compared to White youth who died by firearm suicide, Black youth (regardless of sex) were significantly less likely to have had mental health or interpersonal problems or a history of suicide and were significantly more likely to be in a relationship at the time of death. Additionally, Black male youth were significantly more likely to be involved in criminal activity before their death compared to White male youth, and Black female youth were significantly more likely to identify as LGBTQ+ and have experienced homelessness compared to White female youth.

Significance. This study identifies risk factors associated with firearm suicide among Black youth in the U.S. as compared to White youth and has implications for successful prevention of firearm suicide among Black youth. These implications include access to and cultural relevance of mental health services for Black youth, differential criminal justice responses to Black male youth, and the need for using an intersectional framework for prevention among Black female youth.

11. A Systematic Review of Lethal Means Counseling in Clinical Settings

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Statement of Purpose: Lethal means counseling (LMC) involves assessing an individual's access to specific lethal means (e.g., firearms) for intentional and unintentional injury, and promotes reducing access to those means. The aim

of this systematic review was to describe the settings and populations in which LMC interventions have been tested, including their effectiveness and the outcomes measures employed across studies.

Methods: Seven databases were searched using terms related to: (1) suicide, injury, violence; (2) counseling, education; (3) lethal means, firearms, medications, poison; and (4) access, restriction, storage. This resulted in 16,523 unique records. Authors followed PRISMA guidelines for selection and coding of articles. We assessed the variability of settings, patient populations, intervention components, and outcome measures used across studies, as well as intervention effectiveness.

Results/Conclusion: Of 15 studies identified, 14 assessed changes in storage behaviors and 9 demonstrated statistically significant improvements in storage behavior following the intervention. Of two non-controlled interventions assessing impacts on suicide behaviors (e.g., suicide attempt), both reported no effect. Studies were conducted in inpatient settings and emergency departments (n=9), pediatric clinics (n=4), and primary care/family practices (n=2). Eleven were tested among populations identified as having elevated injury risk and four were tested as primary prevention strategies. Firearm behavior outcomes included removal of household firearms, use of external locking devices or locked containers (e.g., cable lock, firearm safe), storing firearms unloaded, and storing ammunition locked and/or separate from firearms.

Innovation & Significance: Across pediatric and adult primary care settings, emergency departments, and mental health clinics, LMC appears to be effective in increasing safe firearm behaviors. Although this review highlights the potential effectiveness of LMC, more research needs to examine the mechanisms of change for LMC (e.g., providing gun locks versus information only), for how long behavior changes are sustained, and differences across settings and patient characteristics.

12. The Mass Attacks Defense Toolkit – Advancing Efforts to Prevent and Mitigate Mass Shootings and Other Mass Violence

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¹RAND Corporation

Statement of Purpose: We present the Mass Attacks Defense Toolkit, an online educational resource to advance efforts to prevent and reduce intentional, interpersonal firearm violence and public mass attacks in the United States.

Methods/Approach: Our team analyzed over 600 cases related to mass attacks, including over 300 that were stopped in advance. We reviewed hundreds of reports and resources related to these events, and interviewed dozens of subject matter experts to learn more about effective (and ineffective) prevention and response strategies. From all of this, we developed an online educational toolkit, funded by the National Institute of Justice, to provide practical strategies and guidance on deterring, mitigating, and responding to mass attacks.

Results/Conclusion: The resulting toolkit provides both top-level and lengthy guidance on attack prevention and response, as well as links to hundreds of additional resources. The tool is organized by the three phases of the Mass Attack Defense Chain: (1) prevent the attack, (2) mitigate the attack, and (3) follow up after the attack. The toolkit highlights three top ways we can mitigate and/or respond to mass attacks right now: through proactive prevention, especially encouraging public reporting of warning signs of serious intentions and preparatory actions for attacks; relentless follow-up, ensuring that all reported cases are assessed and actioned; and diligent preparation and training, with all partners involved in response participating in advanced planning and training. Response preparation further needs to include longer-term support services to victims, families, responders, and the larger community.

Innovation & Significance to the field: The toolkit goes beyond traditional reports and journal articles, to provide practical strategies and guidance on deterring, mitigating, and responding to mass attacks tailored to a variety of audiences, including public safety experts, practitioners, policymakers, community groups, and the general public

13. Law Enforcement Officer Use-of-Force, Prevalence, Trends, and Correlates: National Survey Results

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Purpose: Disparities in police use-of-force (UOF) garnered widespread attention following the death of George Floyd, but data on UOF and officer-involved shootings (OIS) remains scarce and often relies on news reports and undercounts non-fatal shootings. Our study is the first nationally representative survey of law enforcement agencies (LEAs) to collect recent incidents of UOF and OIS, as well as situational, agency, and community factors.

Methods/Approach: About 4,000 LEAs were randomly sampled, stratified by agency type, size, and region to complete an online survey (n=800 completed surveys between January 2021-February 2022). Aggregate counts of UOF and OIS incidents, including breakdowns by situational, subject, and officer characteristics (2015-2019) were collected, in addition to information on UOF policies and training. Descriptive analyses and multivariate Poisson regression models were performed to describe 5-year incidents and rates of UOF/OIS, and the effect of agency characteristics (size, region, type, training) on UOF/OIS rates.

Results/Conclusion: An average of 50.2 UOF and 0.25 OIS incidents occurred annually per agency between 2015-2019. Over 75% of LEAs did not report any OIS between 2015-2019. UOF and OIS incidents were stable across the five years, although UOF significantly increased from 2018-2019. Controlling for other agency factors, Midwestern and Western agencies had a significantly higher average UOF rate, and Southern and Western agencies had significantly higher OIS rates than Northeastern agencies. Larger agencies were associated with both higher UOF and OIS rates. Crime was positively associated with OIS but not UOF. Training was not significantly associated with UOF/OIS rates.

Innovation/Significance: Despite increased public scrutiny regarding UOF, we observed no significant increases in OIS incidents between 2015-2019, and a slight increase in UOF incidents. Several agency characteristics were associated with higher UOF and OIS rates, including larger LEAs. Agencies can use this dataset as a benchmark tool to inform their UOF policies.

14. Fatal and Nonfatal Shootings by Police in the United States, 2015-2020

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Statement of Purpose: Recent analysis of four states with histories of reporting fatal and nonfatal shootings by police suggests that nearly half (45%) of these shootings are nonfatal. Little is known about the circumstances surrounding shootings by police, inclusive of nonfatal outcomes, nationally. The purpose of this study is to describe fatal and nonfatal shootings by police in the United States, 2015-2020.

Methods/Approach: Data on fatal and nonfatal shootings by police were abstracted from the Gun Violence Archive and related publicly available sources. We excluded unintentional shootings, shootings without injury, shootings by off-duty police not acting in an on-duty capacity, and law enforcement occupational injuries. Fatal and nonfatal shootings were compared over time, geography, and by situation-, agency-, and victim-related characteristics.

Results/Conclusions: A total of 10,320 shootings, involving 10,626 victims, were identified. 55% of shootings were entirely fatal; 43% were entirely nonfatal. Proportionate fatality varied by state, ranging from 30-75%. Relative to unarmed incidents, odds of fatality were higher when a gun or knife was involved (OR: Gun: 1.1-1.4; Knife: 1.5-2.1). Alleged vehicular assault was associated with lower odds of a fatal event (OR: .39-.58). Weapon involvement did not fully explain state variation in proportionate fatality. Among victims, odds of death were significantly lower for Black than white individuals. Indications for police involvement prior to a shooting, associations with social needs (such as suicidal ideation or housing insecurity), agency characteristics, and other victim characteristics will be discussed.

Innovations/Significance: This research was the first to examine situational characteristics of shootings by police using a multi-year, nationwide sample of fatal and nonfatal shootings. Consistent with prior research, findings suggest that racial disparities are underestimated when examining fatal shootings alone. Persistent state differences suggest that state-level policing and other social policies may be opportunities for the prevention of deaths by law enforcement intervention.

15. The effects of exposure to firearm violence on post-traumatic stress symptoms among adolescents: A Scoping Review

Esther Lee MPH¹

Statement of Purpose: An emerging body of literature demonstrates the deleterious psychological effects of exposure to firearm violence among children and adolescents, including trauma and symptoms of posttraumatic stress disorder. This scoping review aimed to synthesize and evaluate the evidence on direct and indirect exposures to community gun violence and its impacts on post-traumatic stress symptoms (PTSS).

Methods: Articles were searched in eight databases (EMBASE, PubMed/Ovid MEDLINE, CINAHL Complete Plus (EBSCO), PsycINFO (EBSCO), Web of Science, Scopus, Criminal Justice Abstracts, and Google Scholar). Articles (n=4,450) were screened based on the following inclusion eligibility: English language, published in peer-reviewed journals (1980-2022), USA-based sample, exposure, and outcomes of interest. For each eligible article, the information extracted included study design, sample size, participant characteristics, exposure and outcome measures, statistical analysis, results, conclusions, methodological limitations, and risk of bias.

Results: Preliminary findings suggest a robust relationship between adolescent exposure to community firearm violence and PTSS among adolescents. Polyvictimization increases the risk of PTSS among those exposed to firearm violence. Findings include a summary of the articles' study design and population, survey method, participant characteristics, study period, exposure/outcome, covariates, and ROBINS-I risk of bias assessment score. Thematic analysis is conducted with qualitative data analysis.

Innovation & Significance: The results identify potential targets for mental health intervention and prevention efforts for adolescents exposed to community firearm violence.

16. Provider Documentation of Trauma-Informed Care in Hospitalized Youth Assault Trauma Patients in an Urban Academic Quaternary Care Center

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Statement of Purpose: Exposure to violence, including firearm injury, is a traumatic event that can adversely impact individual and community health. Trauma-informed care can cultivate resilience and prevent future violence in patients who have experienced trauma. Yet, there are often no protocols to facilitate clinician implementation of a trauma-informed approach when caring for patients on pediatric or adult trauma services. This study aims to characterize trauma-informed care practices and identify opportunities for trauma-informed violence prevention interventions in a single academic quaternary care center in Baltimore, MD.

Methods/Approach: This study is a retrospective chart review analyzing the documentation of trauma-informed elements in the electronic medical record of youth patients (ages 12-24) admitted for assault trauma between 2016 and mid-2021. Descriptive statistics were used to summarize patient demographics, hospitalization characteristics, and documentation of trauma-informed elements. Chi-square analyses were performed to compare charts from the pediatric and adult trauma services.

Results/Conclusion: Out of 50 pediatric and 200 adult assault trauma patients, 36.0% and 80.5% were hospitalized for firearm injury, respectively. Adult patients had hospitalization characteristics suggesting higher injury severity. More patients admitted to the pediatric trauma service (96.0%) had at least one trauma-informed element documented than patients admitted to the adult service (82.5%). Social workers were the most likely provider to have documented a trauma-informed element, followed by physical therapists, occupational therapists, and physicians. Pain assessment (98.8%), social support (77.2%), and strengths/coping skills (66.8%) were most frequently documented. Safety assessments for suicidal ideation (6.4%), access to a weapon/firearm (0.8%), and retaliatory violence (2%) were rarely documented.

Innovation & Significance to the Field: There are opportunities to develop trauma-informed interventions for youth admitted for assault trauma. Standardized trauma-informed care documentation could be used to assess risk for future gun violence, ensure equitable access to services, and mitigate sequelae of trauma.

17. Trends in Youth Risk Behaviors and Firearm Injury in the US Over 20 Years

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Statement of Purpose: For the first time in the US, firearm injuries are the leading cause of death in children and adolescents. Little is known about the correlation between youth risk behaviors and firearm injury. We hypothesized that high rates of risky behavior in high school students are associated with higher rates of firearm injury in this population.

Methods: We obtained data from the Youth Behavior Risk Survey (YRBS) of the Centers for Disease Control and Prevention (CDC) and combined it with data from the CDC Web-based Injury Statistics Query and Reporting System (WISQARS) and CDC Wide-ranging Online Data for Epidemiologic Research (WONDER) databases. Population and demographic data were obtained from the American Community Survey (ACS), 2001-2020. We examined trends over time using a nonparametric test for trend and assessed correlation between behaviors and injuries using linear regression.

Results: The percentage of high school aged youth carrying a weapon in the preceding 30 days ranged from 13.2% in 2019 to 18.5% in 2005, without a statistically significant trend over time ($p=0.051$). Those carrying a weapon to school peaked at 6.5% in 2005 and steadily down-trended to 2.8% in 2019 ($p=0.004$). Fighting and the presence of drugs on school grounds also decreased over time. Conversely, firearm deaths among adolescents 14-18 years old showed no significant change, ranging from 4.0 per 100k in 2013 to 8.3 per 100k in 2020. Non-fatal shootings (26.0-47.1/100k) and total shootings (31.3-53.7/100k) also showed no change. There was no correlation between risky behaviors and these outcomes.

Conclusion/Significance: Self-reported firearm carriage, school fighting and the presence of drugs on high school grounds in the US have steadily down-trended over time. However, shooting injuries and deaths have not. While the former suggests progress, the latter remains concerning. Further work to investigate the relationship between behavior and injury is needed.

18. Examining the Associations Between Proactive and Reactive Aggression with Gun Violence Among Youth with Conduct Disorder.

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Statement of Purpose: It is well established that youth with conduct disorder (CD) engage in aggressive behavior. However, there is a lack of research exploring correlates of gun violence in this high-risk population, which may limit the effectiveness of gun violence intervention. Thus, the aim of this study is to explore the relation between two well-studied aggression subtypes, reactive and proactive aggression, and their relation with gun violence. Understanding how gun violence correlates with aggression subtypes may help direct intervention approaches (e.g., a focus on emotion regulation vs criminal thinking styles).

Methods: Participants included 28 youth ($M_{age}=14.88$; $SD = 1.48$) diagnosed with conduct disorder by a licensed psychologist and/or psychiatrist. Participants were mostly male (68.80%) and 44.10% identified as Black or African American, 45.20% White, 10.70% other. Participants completed the Reactive and Proactive Aggression Questionnaire (Raine, 2003) and the Gun Violence Questionnaire (Thomson, 2021). Univariate outliers among our three variables (i.e., ± 3 SD from the mean) were Winsorized.

Results/Conclusion: Bivariate correlations revealed significant positive correlations among all three variables. The partial correlation analyses showed that proactive aggression remained a positive correlate of gun violence after

controlling for reactive aggression, $r_{\text{partial}}(25) = 0.47, p = .013$. In contrast, the association between reactive aggression and gun violence was not significant after controlling for proactive aggression, $r_{\text{partial}}(25) = .08, p = .709$.

Innovation and Significance: These preliminary findings demonstrate that gun violence association with reactive aggression can be explained by the variance reactive aggression shares with proactive aggression, while the same was not found for proactive aggression. Thus, gun violence is more closely related to proactive aggression, which may suggest that targeting risk factors for proactive aggression could also have an impact on gun violence.

19. Baseline Characteristics of Adolescent Youth Seeking Emergency Department Treatment for an Assault Injury

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Statement of Purpose: Youth seeking Emergency Department (ED) treatment for an assault injury have elevated rates (36.7%) of repeat violent injury. Understanding characteristics of the assault and co-morbid risk factors can inform hospital-based violence interventions designed to reduce future violent injury risk.

Methods/Approach: We present baseline data from 50 youth (ages 14-24yo) enrolled in an ongoing multi-site randomized control trial evaluating the efficacy of two versions of a hospital-based violence intervention for assault-injured youth. Enrolled youth were asked validated measures prior to condition assignment.

Results: Among assault-injured youth (mean age=19.6; 44%-male; 80%-Black; 68%-public assistance), 80% reported that the altercation precipitating the injury was with a non-partner (e.g., peer). The majority involved severe violence behaviors, with 28.0% involving firearm threats/discharge. Violence leading to an ED visit commonly occurred at someone else's home/property (28.0%), their home/property (28.0%) or on/near school grounds (14.0%), with 18.0% reporting alcohol use and 28.0% reporting marijuana use prior to the altercation. Violence was most commonly motivated by retaliation (26.0%) and/or attempts to establish power/respect (22.0%), with a third (32.0%) of youth indicating they did not believe the altercation was over. Assault-injured youth reported a variety of risk factors, including substance misuse (18.0% alcohol misuse; 60.0% marijuana misuse), positive screens for mental health issues (28.0% anxiety; 40.0% depression; 10.0% PTSD), firearm carriage (16.0%), prior violence involvement (54% firearm victimization; 10.0% firearm aggression, 52% prior visit for a violent injury) and prior criminal justice involvement (44.0% prior arrest).

Innovation/Significance to the Field: Data from this ongoing ED study highlight violent injury characteristics and rates of co-morbid risk factors related to the cycle of violence. Addressing key assault-injury factors (i.e., violence motivations), as well as co-occurring risk factors (e.g., substance use, mental health, firearm behaviors) within hospital-based interventions is critical to reducing repeat violence risk.

20. Using a Difference-in-Differences Approach to Examine the Impact of Child Access Prevention Laws on Youth Firearm Suicides

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The aim of the present study is to determine the relationship between Child Access Prevention (CAP) laws and state-level youth firearm suicide rates. This paper differs from prior research in several ways. First, this is one of the few studies to focus exclusively on youth firearm suicide rates. Second, this study uses one of the largest and most recent

data sets of any study on this topic. Third, this study uses a difference-in-differences approach allowing for variations in treatment timing. Results suggest that CAP laws reduced firearm related suicides by 15.2%. It is important to note, however, that the parallel trends assumption was violated and that the average treatment effect for the treated group was statistically insignificant.

21. Effects of gun safety videos and gun violence in movies on whether children handle real guns.

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Statement of purpose: Previous research in our lab has shown that children are more likely to handle guns (e.g., pull trigger) after exposure to movie or video game characters who use guns. In the video game study, we found that children who had taken a gun safety course were less likely to handle guns. Unfortunately, causal inferences are not possible we measured rather than manipulated whether children took a gun safety course.

Methods: This study manipulates whether children watch a 1-minute gun vs. car safety video a week before they came to the lab. Participants ages 8-12 were tested in pairs. In the lab, participants first watched a 20-minute clip of a PG-rated movie with vs. without guns. Next, participants were placed in a room containing several games (e.g., checkers) and toys (e.g., Legos). The room also contained a file cabinet, with two real but disabled 9-mm handguns in the bottom drawer. A hidden camera recorded the behavior of children (e.g., whether they found and/or handled the guns).

Results: Data are still being collected. We predict a main effect for type of safety video (i.e., children who see the gun safety video will be less likely to use real guns themselves), a main effect for type of movie (i.e., children who see movie characters use guns will be more likely to use real guns themselves), and an interaction between type of safety video and type of movie (i.e., children who see movie characters use guns will be less likely to use real guns themselves if they previously saw a gun safety video than if they saw a car safety video).

Innovation and significance to the field: This research will provide important information about whether teaching children about gun safety can reduce their dangerous behavior around firearms

22. Extreme Risk Protection Orders Issued Against Minors: Findings from Six States

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Statement of Purpose: Extreme risk protection orders (ERPOs) temporarily prohibit the purchase and possession of firearms by individuals at high risk of harming themselves or others. Descriptive studies have revealed that ERPOs have been issued against respondents under the age of 18. Given that minors typically cannot legally purchase firearms, these cases may at first appear unwarranted. Cases involving this particularly vulnerable subpopulation of respondents have not previously been characterized. We aim to describe the case circumstances and violence-related outcomes among minor respondents to ERPOs in order to illuminate a use of the law that deserves special consideration.

Methods/Approach: We drew on data from abstracted ERPO court records from the start of implementation through June 2020 in California, Colorado, Connecticut, Florida, Maryland, and Washington. Cases were double coded until coders reached an interrater reliability threshold ≥ 0.8 . Respondent and case details were abstracted for each case. Post-ERPO suicide and mass shootings by respondents were investigated via linked mortality records and internet searches, respectively.

Results/Conclusions: Preliminary data suggest that using ERPOs against minors was rare. Colorado and Washington issued no such orders. We found 5 cases in Connecticut (0.4% of cases), 25 in Maryland (1.9%), 23 in California (2.2%), and 304 in Florida (6.5%). In California (other states still need to be analyzed), 43.5% of these were for threatened mass shootings and 17.4% were for suicide threats. Results for violent outcomes are forthcoming.

Innovation & Significance to the field: We drew on a novel dataset combining information from several states to more fully characterize ERPO implementation vis-à-vis minors. Nineteen states and Washington D.C. have ERPO laws and the bipartisan Senate framework on firearm legislation includes state incentives for implementation. Understanding the full range of uses, particularly against vulnerable respondents, will be important to holistically evaluating the laws' potential costs and benefits.

23. Community-Engagement and Coalition-Building to Promote Lethal Means Safety and Prevent Veteran Firearm Suicide

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Statement of Purpose: The President's Roadmap to Empower Veterans and End a National Tragedy of Suicide (PREVENTS) highlighted community-engagement and community-based interventions as key to improving lethal means safety (LMS) messaging and increasing uptake of evidence-based practices. The current project leveraged a public health approach through collaboration with community stakeholders in SE Louisiana, a region with higher rates of Veteran firearm injuries and deaths, to (1) develop culturally-acceptable LMS messaging and (2) build capacity for implementing and measuring impact of LMS interventions in community-based settings.

Methods/Approach: We followed principles of participatory action research (PAR) to build trust and proactively address barriers to coalition-building. Veteran 'peer champions' and involved in all stages of the research. We conducted field observations at events such as gun shows, met with stakeholders individually, and conducted 6 deliberative discussion forums to develop a coalition of community members from a range of perspectives and identify acceptable strategies to increase uptake of LMS.

Results/Conclusions: We built a coalition of over 200 Veterans, firearm retailers and instructors, and other community stakeholders. Coalition members identified elements of acceptable LMS messaging, including the need to address common misconceptions about firearm suicide and to tailor messages based on factors such as reasons for owning a firearm. They critiqued the emphasis on distributing cable and trigger locks in LMS efforts and identified a need to make more acceptable options, such as biometric cases, affordable and accessible. They endorsed the option of temporary, voluntary storage of firearms outside of the home, preferably with a firearm retailer, but identified significant barriers that would need to be addressed.

Innovation and Significance: Our project is the first to use PAR methods to establish a community-academic partnership to promote LMS. Through engagement with opinion leaders and organizations in firearm and Veteran communities, this work laid the foundation to support implementation and evaluation of several LMS-focused pilot projects.

24. Validation of the Gun Belief and Behavior Scale with a US Veteran Sample

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Statement of Purpose: Understanding how firearm attitudes may influence unsafe firearm behaviors are important for developing interventions and messaging to promote safe firearm storage and handling. Understanding attitudes and motivations for firearm ownership is particularly germane to suicide prevention efforts involving US Veterans as Veterans have higher rates of firearm ownership and higher rates of suicide with firearm. Nonetheless, existing tools to assess gun attitudes are limited in scope as they do not account for some of the perceived advantages of gun-

carrying and the perceived normativity of guns in an individual's social network. Given the limitations of the existing gun attitude scales, the aim of the study was to further develop and psychometrically evaluate a new tool to assess both gun behaviors and gun perceptions, the Gun Behaviors and Beliefs Scale (GBBS), in a sample of US Veterans.

Methods/Approach: Approximately 300 Veterans at a VA Medical Center were/are being recruited to participate in the current study. To date, 250 Veterans have completed study procedures, and we anticipate completing enrollment in September 2022. Veterans will be considered eligible if they present for outpatient mental health (MH) services. All enrolled participants complete the following measures: GBBS, Acquired Capability for Suicide Scale-Fearless About Death, Depression Symptom Inventory – Suicide Subscale, Distress Tolerance Scale, Posttraumatic Checklist for DSM-5, and the Posttraumatic Cognitions Inventory.

Results/Conclusion: Through Exploratory and Confirmatory Factor Analyses (EFA/CFA) with college student samples, the GBBS scale developers found the GBBS was composed of five theoretically distinct subscales. In the current study we will use CFA to assess the validity of the 5-factor structure in accounting for the motivations for pro-firearm attitudes in a US Veteran sample. In a separate, exploratory analyses, we intend to examine the relationship among firearm attitudes, suicidality, PTSD, and depression using correlation, multiple regression, and asymmetric bootstrapping mediation approaches.

Innovation & Significance to the field: Any change in unsafe firearm storage or handling practice needs to be informed through a better understanding of motivations to own and carry firearms. The current study will lead to improved understanding of US Veterans' attitudes to firearms.

25. Differences in firearm storage practices among United States military service members who have and have not disclosed Suicidal thoughts or attended behavioral health sessions

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Statement of Purpose: In the United States military, two-thirds of suicides are by firearm. Unsafe firearm storage increases risk for death by suicide and servicemembers with recent suicidal thoughts tend to store firearms less safely. This risk is compounded by a tendency for servicemembers to hide suicidal thoughts and avoid behavioral healthcare.

Methods/Approach: Participants were recruited via two methods, KnowledgePanel (KP; n = 45) and opt-in panels (n = 674), via the KnowledgePanel Calibration approach. Inclusion criteria included current US military service and firearm ownership. Data were collected between December 3, 2021 and January 4, 2022.

Our analyses focused on participants who endorsed past year (n = 180) or past month suicidal thoughts (n = 85). Those with past year ideation (M_{age} = 32.20) were predominantly male (75.1%) and White (77.0%). Those with past month suicidal ideation (M_{age} = 32.25) were predominantly male (71.2%) and White (69.1%).

Results/Conclusion: Servicemembers with past year ideation who had not disclosed their thoughts stored firearms at home more often and with a locking device less often. Servicemembers with past year ideation and had not attended behavioral health sessions in the past three months stored firearms with a locking device less often and loaded less often. Servicemembers who had past month suicidal ideation and had not disclosed their thoughts stored firearms with a locking device less often. Servicemembers with past month ideation who had not attended behavioral health sessions in the past three months stored firearms with a locking device and loaded less often.

Innovation & Significance to the Field: These findings, based on a nationally representative sample, highlight that suicidal servicemembers unlikely to be identified as high risk are vulnerable to unsafe firearm storage. This demonstrates the need to push firearm suicide prevention upstream and promote safe firearm storage regardless of known suicide risk.

26. Application of a New Conceptual Model of Help Seeking for Survivors of Community Gun Violence

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Statement of Purpose: Many inequities exist in supporting survivors of community gun violence. A key question in reducing inequities in care after victimization is whether police first responders and other formal system providers identify the victim as an “offender” and/or someone who is “undeserving” of supports. These labels and associated biases can directly reduce access to supports for gun violence survivors through a variety of mechanisms that include police withholding information about victim rights, among other direct and indirect barriers to social and health services. Unaddressed financial, mental and physical health consequences of victimization contribute to poorer health outcomes later in life.

Methods/Approach: This presentation brings together the extant research on help seeking, discrimination in criminal legal system functioning, and barriers to victim services by synthesizing these discrete threads into a theoretically-and empirically-informed conceptual model that captures the range of factors that shape gunshot survivors’ decision to report their victimization to the police and subsequent help seeking. Qualitative and quantitative data from a purposive sample of 103 victims of community violence, which include 14 survivors of gun violence, are used to ground the developing model. The presentation will focus on the qualitative analysis, conducted in ATLAS.ti, which elucidated barriers to help-seeking at different socio-ecological levels.

Results/Conclusion: The final conceptual model has five levels of influence, each with their own factors, as well as three phases of help seeking. The heuristic model facilitates the testing of specific pathways and interactions that facilitate or impede help seeking.

Significance: The conceptual model can help lay the foundation for research that seeks to remedy the marked mismatch between the prevalence of violent victimization and help seeking among survivors of community gun violence. Research findings can be applied to guide policies and programming to reduce inequities in care for survivors.

27. Improving the Capacity of Hospital ED Data Systems to Track Firearm Injuries

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Purpose: Taken together, three hospital data systems could—with improvements achievable within three years—provide access to reliable and timely local, state, and national data on firearm injuries.

Approach: We identify the extent to which gunshot wound (GSW) data are accurately classified by intent type (assault, accident, etc.), available as a census or stable estimate, timely, available at the local and state level, and publicly accessible. We point out sand traps for firearm researchers and recommend fixes to each system being advanced by a national effort led by Arnold Ventures.

Results: HCUP’s National Emergency Department Sample (NEDS) and the statewide hospital databases from which it draws are a rich data source. NEDS’ national estimates are stable (CV 8%), and statewide databases provide a census of cases at the county and often zip code level. However, currently far too many GSWs—mostly assaults—are miscoded as accidents, distorting the epidemiologic picture. One reason is the Alphabetic Index of the ICD coding system used by hospital coders and coding software programs. Since at least 1994, it lists the default code for GSWs as “accident by unspecified firearm.” The National Electronic Injury Surveillance System (NEISS) accurately records injury intent but because of sample problems, it yields imprecise estimates (CV>30%). Both systems have data lags of 1-3 years. The National Syndromic Surveillance Program (NSSP) collects data in near real-time on over 70% of ED visits nationally. NSSP is a yet unproved source of GSW data, with a pilot program (FASTER) currently in its second year.

Significance: Recommendations for change: NEDS - Support a proposal submitted to the ICD committee to default to assault for GSWs, not accident, unless case information indicates otherwise. NEISS – Provide federal funding to continue the data sample expansion and improvement currently underway. NSSP – If the pilot proves successful, expand FASTER nationwide.

28. Challenges and Opportunities in Police Data Measurement of Nonfatal Firearm Injury

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Purpose: The majority of nonfatal gunshot injuries stem from an assault. Police data has the potential to provide accurate and timely nonfatal gunshot assault injury surveillance, including valuable perpetrator and circumstance information when known.

Approach: This presentation will assess three primary concerns in using police data to measure nonfatal firearm injury: (1) Ensuring that police departments are aware of and record assaults in which someone is shot; (2) implementing a system that identifies victims of gun violence; and (3) assessing the barriers to comprehensive state and national crime data reporting to provide reliable estimates of firearm assaults.

Results: Many police agencies already gather the requisite nonfatal gunshot injury data; many make it readily available. However, local definitions and systems recording nonfatal shootings vary. Two recent coding reforms to the definition of a nonfatal shooting in federal data sources will improve the precision of police data if adopted by agencies starting in 2023.

However, critical problems undermine the nation's crime reporting system. In 2021, the Federal Bureau of Investigation (FBI) retired its long-standing crime reporting system for the National Incident Based Reporting System (NIBRS). While NIBRS makes some crime data improvements, fewer than 60% of law enforcement agencies reported data to NIBRS in the first quarter of 2022; New York, Los Angeles and Chicago did not. Alarming low law enforcement agency participation renders crime data virtually unusable for national and state level trends. Efforts to increase NIBRS participation are essential. Additional changes may be required to improve federal efforts to collect comprehensive crime data.

Significance: The effective loss of the nation's official crime data system—at a time when homicides had the biggest one-year increase in US history—is an urgent barrier to gun violence reduction efforts.

29. The Effects of School Shootings on Firearm Acquisition and Carrying

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Statement of Purpose: School shootings negatively affect exposed students in the short, medium, and long term. In the short and medium term, these effects are mainly through academic and psychological channels. Exposed students have poorer educational outcomes such as reduced test scores, chronic absenteeism, and higher likelihood of grade repetition relative to their unexposed peers (Beland and Kim, 2016; Levine and McKnight, 2021). In the long term, school shootings continue to affect exposed students into adulthood with evidence suggesting that as adults they experience declines in health and well-being, worse health-related behaviors and worse education and labor market outcomes (Deb and Gangaram, 2021).

School shootings may also have consequences beyond those experienced by exposed students. Concerns about safety may also affect parental behaviors, specifically attitudes towards firearm acquisition and carrying behavior. However, little is known about how experiencing violence affects firearm acquisition and carrying behavior. Whether school shootings affect firearm carrying behavior is an important behavioral science question as increases in firearm carrying are associated with gun injury (DeSimone et al., 2013; Donohue, 2017).

Methods: We conduct a difference-in-differences study of the effects of school shootings on several outcomes: 1) firearm background checks and 2) concealed carry license acquisition using newly available data.

Results: Preliminary results suggest that school shootings may increase firearm acquisition behaviors, with some heterogeneity driven by the level of media coverage and injury.

Innovation & Significance to the field: Identifying effects of school shootings can help inform policy aimed at reducing the harms for exposed students and parents.

30. Methodological challenges and promising tools for research evaluating the impacts of social policies on firearm injury

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Purpose: Research evaluating the impacts of social policies on firearm injuries is growing because of its potential for large impacts on population health and health equity. Yet this work faces critical methodological challenges that must be overcome to deliver rigorous evidence on what works and for whom.

Approach: This presentation will summarize key methodological challenges in research evaluating the impacts of social policies on firearm injury and promising tools to enhance the validity of future studies. I will survey major threats to internal and external validity, measurement, and statistical power, with an emphasis on disentangling the effects of co-occurring policies and quantifying how policy effects differ across population subgroups. Using a contemporary sample of 55 high-impact studies on the health effects of social policies and 13 social policy databases covering 502 unique policies, I will illustrate how these challenges manifest and can be resolved.

Results: Researchers face challenges measuring relevant policy constructs and enforcement gaps; addressing strong confounding by co-occurring policies and phenomena; deriving precise effect estimates; accounting for interference; and identifying heterogeneity in effects by population subgroup. Policy co-occurrence was substantial for 65% of the policies studied, but appropriately controlling for co-occurring policies can lead to extreme imprecision in estimates. Only 44% of studies evaluated heterogeneity in social policy effects by population subgroup. Studies that did evaluate heterogeneity did so in inconsistent ways, but generally identified differences that were substantial enough to alter policy recommendations. Promising tools to address these challenges include revising the way that policies are measured and summarized, randomizing policy implementation, standardizing evaluations of heterogeneity, new statistical estimators, and harmonizing multiple large datasets.

Significance: Ongoing methodological advances offer opportunities to enhance the rigor of research on the impacts of social policies on firearm injuries. Such research will be better-positioned to inform decision-making.

31. The Harms and Benefits Inventory (HBI): Development of a validated survey-based measure to understand the impact of policy on gun users

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Statement of Purpose. Gun policy presents unique implementation challenges due to the disproportionate impact on citizen stakeholder groups (i.e., gun owners and non-owners). Moreover, gun policies' effectiveness relies on citizen/intervention uptake (e.g. complying with license or storage requirements). Therefore, there is great need to consider citizens' perceptions of the potential harms and benefits of gun policies when developing and implementing gun policies. In the absence of an existing instrument to address this information gap, the current project describes the development and validation of a novel, policy-neutral, assessment instrument, the Harms and Benefits Inventory (HBI).

Methods/Approach. The authors developed 31 candidate HBI items on an 11-point scale. Items were further revised using data from cognitive interviews. Candidate HBI items and other relevant questions were then administered in a nationally representative survey of gun owners and non-gun owners (n = 2,007). Using a classic test theory approach, a series of exploratory and confirmatory factor analyses will be conducted to examine construct validity and internal consistency of retained items within identified subscales. Additional analyses will establish preliminary evidence of concurrent validity.

Results/Conclusion: The planned analyses will provide initial validation of the HBI using nationally representative data. The publicly accessible HBI will enable public policy makers, researchers, and advocates a standardized and non-policy specific means to assess perceived harms and benefits of gun policy.

Innovation & Significance to the field: To our knowledge, the HBI is the first validated instrument designed to assess perceived harms and benefits of gun policy. Applications of the HBI include to provide a tool for policy makers, researchers, and nonprofits developing a gun violence prevention intervention or policy to assess potential barriers and facilitators to citizen stakeholder willingness to uptake. Further, data from the HBI will eventually be made publicly available to inform policy development and implementation.

32. Measuring firearm-related violent crime using Criminal Legal System records: Challenges and opportunities

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Purpose: Accurate measurement of firearm-related violent crimes is critical to preventing them. In Washington (WA) and many other states, criminal codes are insufficient for complete ascertainment of firearm-related crime, and violent misdemeanor crimes are not well-defined in statute. To assess the degree of measurement error, we compared firearm-related violent crime defined in WA criminal codes with that determined by manual case review among individuals with misdemeanor convictions.

Methods: Using a sample of adults convicted of misdemeanors in WA superior courts from 1/1/2015-12/31/2019, we classified cases (considering both charges and convictions) as violent and firearm-related, each with two definitions. Violence was defined per 1) the Federal Bureau of Investigation's Uniform Crime Reporting system (a narrow classification including homicide, aggravated assault, rape, and robbery), and 2) the World Health Organization (a broader classification involving intentional use of force or power). Firearm-related was defined per 1) criminal codes, and 2) manual court record review (indicating firearm presence, use [including threats], or violations). We compared the frequencies and percentages of cases.

Results: We have thus far manually reviewed 1927 of 4797 cases. Of these, 28 (1.4%) and 188 (9.8%) were firearm-related per criminal codes and manual review, respectively, and 351 (18.2%) and 1164 (60.4%) were violent using narrow and broad definitions, respectively. Under the narrow definition of violence, 18% (7/38) of the firearm-related crimes identified via manual review were identified as such using criminal codes. Under the broader definition of violence, this percentage was 13% (20/153). Firearm-related offenses not captured by criminal codes included threats to kill with a firearm, domestic violence incidents, and firearm brandishing.

Significance: The percentage of firearm-related violent crimes in our sample ranged from 0.4% to 7.9% depending on sources and definitions used. State criminal codes could substantially undercount firearm-related crime and should be revised to allow large-scale rigorous analyses.

33. Rural-urban variation in youth violence and handgun carrying in the United States, 2002-2019

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Purpose: Youth handgun carrying is associated with increased risk of firearm-related injury. Most evidence on adolescent handgun carrying is from urban areas, but the behavior is more common in rural areas. We examined differences in the association of handgun carrying and violence across the rural-urban continuum.

Approach: We used nationally-representative cross-sectional survey data from the National Survey on Drug Use and Health (2002-2019) among adolescents aged 12-17 in the US to examine relative (prevalence ratios [PR]) and absolute

(prevalence differences [PD]) time-varying associations between use of interpersonal violence and handgun carrying across the rural-urban continuum. Within 6 county rural-urban strata, we estimated the associations of past-year handgun carrying and three forms of interpersonal violence: serious fighting, group fighting, and attacking with intent to harm.

Results: Handgun carrying was more common among those who used interpersonal violence within each county type. The association was stronger in more urban counties. For example, in the most urban counties in 2018-2019, those involved in a group fight had 3.7 times the prevalence of handgun carrying compared with those not involved in a group fight (95% CI=2.8-5.0); this PR was 3.1 in the most rural counties (95% CI=1.6-5.7). The association in absolute terms was similar and for some outcomes larger in rural areas. For example, in the most urban counties in 2018-2019, handgun carrying prevalence was 7.5 percentage points higher among those who were involved in a group fight compared to those who were not (95% CI=5.6-9.7); this PD was 21.8 percentage points in the most rural counties (95% CI=8.0-38.0), where handgun carrying was substantially more common.

Innovation/Significance: The association of handgun carrying and interpersonal violence is stronger in urban areas, but a higher proportion of rural youth carry, suggesting the opportunities for preventing handgun carrying and its potential harms may differ by urbanicity/rurality.

34. Acute and Recurrent Firearm Injury Rates in an Urban Population (2010-2021): Using Machine Learning to Improve Classification

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Statement of Purpose: The St. Louis Hospital-based Violence Intervention Program Data Repository (STL-HVIP-DR) shares data on all traumatically injured patients who received care across the four adult and pediatric level-I trauma hospitals. These hospitals care for most firearm injured patients in St. Louis. Our primary objective is to apply a machine learning classification model to estimate the rate of acute and recurrent firearm injuries in an urban population.

Methods/Approach: This was a retrospective cohort study of STL-HVIP-DR firearm injured patients from 01/01/2010–12/31/2020. We included all patients with an ICD code for firearm injury. We built and internally validated a machine learning classification model to predict whether a firearm injury encounter was an acute injury or follow-up visit associated with a prior injury. Our model was generated using least absolute shrinkage and selection operator (LASSO) regression. We evaluated model performance with area under the curve (AUC) and its 95% confidence interval (CI). We applied the model to all firearm injury visits in the STL-HVIP-DR linked with the National Death Index to estimate acute and recurrent firearm injury rates.

Results/Conclusion: There were 135,301 encounters among 99,456 unique patients in the STL-HVIP-DR; 22,584 visits had at least one firearm injury diagnosis among 13,442 unique patients. The classification model had high accuracy with AUC = 0.91 (95% CI 0.86-0.95). When applied to all 22,584 firearm injury visits 13,606 (60.2%) visits were classified as acute firearm injury. Of the 13,442 unique patients, 1,413 (10.5%) had a recurrent firearm injury. The classification model presented herein is a viable methodology to identify acute firearm injuries.

Innovation and Significance: There is a need to accurately identify acute firearm injuries to facilitate robust evaluation of HVIPs. This model improves on our team's prior efforts to accurately identify acute and recurrent firearm injuries from firearm-associated ICD codes alone.

35. Identifying needs among victims of violence: Findings from 1-year hospital-based violence intervention program pilot

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Statement of Purpose: The objectives of the present study were to measure and describe the baseline participant needs of a hospital-based violence intervention 1-year pilot program (HBVIP), assess differences in expected hospital revenue based on changes in health insurance coverage resulting from program implementation, and discuss the program's limitations.

Methods/Approach: Between September 2020 and September 2021 Encompass Omaha enrolled 36 participants. During this period, 36 victims of violence enrolled, 34 (94.44%) of participants were admitted due to gunshot injuries and two (5.56%) for stabbings. A content analysis of 1199 progress notes detailing points of contact with participants was performed to determine goal status. Goals were categorized and goal status was defined as met, in process, dropped, or participant refusal.

Results/Conclusion: The most frequently identified needs were help obtaining short-term disability assistance or completing FMLA paperwork (86.11%), immediate financial aid (86.11%), legal aid (83.33%), access to food (83.3%), and navigating medical issues other than the primary reason for hospitalization (83.33%). Meeting the participants' short-term needs is critical for maintaining their engagement in the long-term. Further, differences in expected hospital revenue for pilot participants compared with a control group were examined, and this analysis found a reduction in medical and facility costs for program participants.

Innovation & Significance to the field: The pilot stage highlighted the complexity in needs and treatment victims of violence experience. As the HBVIP program grows and its staff become more knowledgeable about social work, treatment, and resource access processes, we anticipate continued improvement in the ability of the program to meet the needs of participants. These findings can also help inform violence intervention efforts in the community and more broadly.

36. The importance of accurate local surveillance for firearm injury prevention.

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Purpose: To explain the value of accurate local surveillance for injury prevention. National surveillance systems are broad in scope and designed to provide national or broad regional estimates. However, they are limited in that they do not provide data on non-fatal firearm injury in children, offer little information about the social factors, context, or shooting types, and local data cannot be determined. Additionally, some national databases are based on weighted estimates and thus may not accurately reflect local conditions; thus, region-specific data is not possible to determine. In order to plan local targeted firearm injury prevention efforts, an accurate local estimate of firearm injury and understanding social determinants and risk factors ("defining the problem") is essential.

Methods/Approach: Our team identified the knowledge gaps and utilized a framework (the Socio-ecological model) that has been successfully used for the prevention of injuries to build a local surveillance system for firearm injuries. This model identifies contributing factors across individual, relationship, community and societal levels to assist in targeting interventions for prevention.

Results/Conclusion: Examples will be provided of how injury surveillance has decreased deaths from motor vehicle crashes (based on Haddon's matrix, another injury prevention framework), and similarities between firearm injury prevention will be drawn. Accurate injury surveillance is important to inform injury prevention, and injury prevention frameworks can guide data components necessary to build a surveillance system.

Innovation/ Significance to the field: This is a novel model for local firearm injury surveillance that can be duplicated in other cities, counties and regions. Effective firearm injury prevention programs nationwide are needed to decrease or prevent firearm injury and death.

37. Older adults and firearm safety: Factors associated with making plans to adopt new safety behaviors across Transtheoretical Model stages of change

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Purpose/Background: The Transtheoretical Model (TTM: i.e., Stages of Change) is used to describe health behavior change processes. Despite this, and the prevalence of firearm injury among older adults, we know little about decision making processes regarding firearm safety. We sought to explore factors associated with TTM-related stages of change pertaining to older adults' firearm access and/or dispossession.

Methods: 1:1 interviews and focus groups with older adult firearm owners and family members as part of a larger project (developing the Firearm Life Plan). We analyzed transcripts using an inductive/deductive approach, first applying deductive codes aligned with TTM stages, then inductive analysis of each stage's excerpts, identifying themes within each.

Results/conclusion: 81 participants, including 60 older adult firearm owners and 21 family members. Participants in pre-contemplative phases were either absolute in never changing firearm access or viewed it as best addressed after the onset of health concerns or near death and relied on others to "tell them when it's time." Those contemplating plans were more concrete about the eventual need to alter firearm access, noting the role of family members, but described difficulty in knowing when to act. Those preparing to change often referenced a precipitating event (e.g., health scare). Those establishing plans (i.e., action stage) did so by providing "permission" for family members to change firearms access and were motivated by prior experiences with suicide or end-of-life discussions. Those in maintenance described plans that had been settled upon, communicated to others, or implemented due to recognized risk (e.g., PTSD, substance abuse).

Innovation/significance: What to do with firearms as changes in physical/cognitive functioning and mental health occur is an overlooked area of advanced planning. A stage-based understanding of how experiences, health conditions, and social dynamics affect engaging in planning for firearms access/dispossession can inform tailoring safety counseling for older adult firearms owners.

38. Adaptation and Evaluation of a Lethal Means Safety Suicide Prevention Module for Concealed Carry Courses

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Statement of Purpose: Aim one was to collaborate with relevant stakeholders to adapt and refine a suicide prevention module for concealed carry (CC) courses. Aim two was to evaluate the feasibility, acceptability, and effectiveness of this module among CC students and instructors.

Methods/Approach: Local firearm owners and instructors were engaged through qualitative interviews and iterative focus groups to assist in the adaptation and refinement of a suicide prevention module, consisting of a brief video and PowerPoint slides, which sought to raise awareness about firearm suicide, warning signs of a suicidal crisis, and lethal means safety (LMS; firearm suicide prevention through safer in-home storage practices and/or temporary out-of-home storage). Feedback was analyzed using rapid qualitative analysis and an adapted module was developed. Next,

firearm instructors ($n = 6$) were recruited to participate in a pilot implementation trial. Instructors incorporated the suicide prevention module in CC courses and collected pre-post data on acceptability and effectiveness (e.g., openness to safer storage practices). Data were analyzed using paired samples t -tests. Finally, individual qualitative interviews with students and instructors were conducted to evaluate acceptability of the module and recall of module learning objectives.

Results/Conclusion: Feedback from stakeholders highlighted key themes that were important to the development of a suicide prevention module for CC courses, including that the messenger needs to be relatable and the message needs to align with firearm owner values. Data collection for the evaluation phase of this project is expected to conclude by August of 2022. To date, we have obtained 26 pre-post course student survey responses and have conducted 8 student interviews.

Innovation and Significance: This is the first study to measure acceptability and impact of LMS suicide prevention messaging delivered in community CC courses. Results may support and inform future implementation efforts across the United States.

39. Assessing Feasibility and Acceptability for Implementing a Hospital-Based Violence Intervention Program for Black Men in Arkansas: Medical Provider Perspectives

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Statement of Purpose: Due to structural and environmental factors, young African American men face disproportionate impacts of gun violence and homicide. Arkansas experiences gross racial disparities in gun homicides, with the rate eleven times greater for African American men than for white men. Even nonfatal rates are higher for this population, and previous research emphasized the need for multi-level interventions to address mental injury and the many social factors that influence the risk of gun assault and recovery. Hospital-Based Violence Intervention Programs (HVIPS) show promise by linking patients to necessary mental, behavioral, and social services centered around a peer support model. However, the dearth of HVIPs in the South warrants research to assess the acceptability and feasibility among the key implementers, including Emergency Department (ED) medical providers, prior to implementation of the first HVIP in Arkansas.

Methods/ Approach: Semi-structured interviews were conducted with ED medical providers ($N=12$). Interview topics included acceptability of an HVIP, anticipated barriers to uptake, and potential strategies to mitigate these barriers. Two primary analysts conducted Framework Analysis, a rapid analysis approach involving framework development, code application, impactful statement identification, and content analysis.

Results/Conclusion: Medical Providers emphasized the potential positive impact for patients and importance of the peer support component. Anticipated barriers included concerns about the complexity of issue, difficulty reaching the population, discomfort approaching patients with the topic, limited connections with social service organizations and resources, and rural adaptations for victims in neighboring counties. Strategies identified for mitigating barriers included process development, dedicated HVIP staff, and adequate training to increase provider confidence and build rapport with both patients and community.

Innovation & Significance to the field: This research adds to our understanding of the anticipated barriers and facilitators perceived by ED providers about the implementation of an HVIP in the predominantly rural, southern state of Arkansas.

40. Equitable Implementation of S.A.F.E. Firearm

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Statement of Purpose: We present a case exemplar of our team's operationalization of equity-oriented recommendations in preparation for launch of an implementation trial focused on firearm safety promotion in pediatric primary care as a universal suicide prevention strategy.

Methods/Approach: In Step 1 of our process, pre-trial engagement with stakeholders and a review of the literature alerted us that delivery of an evidence-based firearm safety program may vary by patients' medical complexity and race and ethnicity. In Step 2, we selected the Health Equity Implementation Framework to inform our understanding of local context. In Step 3, a multi-method pilot study across 5 clinics in 2 health system sites was deployed to examine signals of inequities. We analyzed EHR data with GEE logistic regression models and clinician interview data with rapid qualitative techniques. In Step 4, we interrogated equity considerations. In Step 5, we will develop a plan to monitor and mitigate potential inequities related to race and ethnicity and sex over the trial.

Results/Conclusion: 694 eligible well-child visit observations and 47 clinicians comprised the pilot dataset. Our results suggested that medical complexity was not associated with program delivery. We did find potential inequities by race and ethnicity but must interpret with caution given the effective sample size. Though we did not initially plan to examine differences by sex, we discovered that clinicians may be more likely to deliver the program to parents of males than females. Seven qualitative interviews with pilot clinicians provided additional context.

Innovation & Significance to the Field: Our innovative process demonstrates that prospective, rigorous, exploratory work is vital for equity-informed implementation trials. Measuring implementation outcomes, such as reach, through an equity lens is key. Moreover, our work highlights the potential for health systems to engage in data-driven monitoring for inequities to ensure that implementation of firearm violence prevention programs translates into meaningful impact for all families.

41. Assessing the Feasibility and Impact of a Firearm Safety Intervention in the Retail and Range Environment: A Qualitative Study of Employee Perceptions

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Statement of Purpose: The purpose of this qualitative study is to explore if, and how, firearm retailers can be engaged in promoting firearm safety at point-of-sale.

Methods: Employees at one gun shop in Houston, Texas were invited to participate in virtual, semi-structured interviews. During the interview, a proposed intervention delivered during point-of-sale transactions to promote firearm safety was described. The proposal would require employees to provide firearm safety information and counsel patrons on proper firearm storage and strategies for keeping firearms from children and individuals experiencing suicidal ideation. Employees' reactions and perceptions about the acceptability, feasibility, and adoption were analyzed. Interview guides were informed by the RE-AIM framework – an implementation and evaluation framework commonly used in health promotion research. All interviews (n=19) were recorded and transcribed. Immersive crystallization was used to analyze inductive and deductive themes.

Results: Overall, employees reported the program concept was innovative, feasible, and would result in meaningful impact for their customers. Employees believed the program would be attractive to customers and represented a

unique marketing advantage. Participants mention the intervention would be more suited for first-time firearm owners and discussed tailoring of information by level of experience. Perspectives about providing suicide prevention information at the point-of-sale were mixed with some advancing that suicide is off-putting and outside the scope of business operations whereas others believe it is an appropriate and important effort to be conducted by shops. Rich information regarding language considerations emerged including (1) a preference for the term firearm and gun over weapon, (2) a recommendation to avoid demonizing language about firearms, and (3) a need for nuanced messaging surrounding suicide prevention in this context.

Innovation and Significance: This is the first study to describe employee perceptions on the acceptability, feasibility and potential adoption of a firearm safety communication intervention in the retail environment.

42. Participatory Action Research with the Firearms Community: An Evaluation of the Colorado Gun Shop Project

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Statement of Purpose: Engaging the firearm community to conduct research on firearm injury prevention can be challenging given sensitivities between academia and the community. Participation Action Research (PAR) approaches can help bridge this divide. This CDC funded evaluation took a PAR approach to conducting research on Gun Shop Projects (GSPs) in Colorado and nationally. GSPs are community-driven suicide prevention partnerships between the firearms community (e.g., firearm retailers and ranges) and local public or community health agencies. GSPs use trusted messengers in the firearms community to educate firearm businesses on the increased risk of suicide for firearm owners.

Approach: We used a PAR approach across all aspects of the evaluation. Our approach included: engaging advisors from the firearm community to review study methods, instruments, and language; training the research team on firearm cultural competency; working in tandem with established and trusted community partners for recruitment of firearm businesses; using relatable/appealing branding for our materials; hiring research assistants with a firearm background to recruit sites and individuals; and pilot testing methods with firearm retailers to ensure our approach was sensitive and appropriate.

Conclusion: Using a Participatory Action Research approach that is tailored to the firearm community enhanced our ability to engage and build trust with the firearm community to research and address firearm suicide prevention, recruit GSPs for the evaluation, gather appropriate data, and use the data to improve implementation of GSPs.

Innovation & Significance to the field: This tailored PAR approach can be helpful to other firearm researchers that may be struggling to conduct research on firearms or with the firearm community. Input from the firearm community at every phase of the evaluation helped to build trust with community partners and firearm community participants to actively engage in research.

43. Measures of School Connectedness and Social Support Serve as Protective Factors Against Weapon Violence and Firearm Carrying

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Purpose: Firearms have consistently been a concern for adolescent health and are a leading cause of pediatric deaths nationwide. Few studies have identified protective factors that reduce the risk of firearm violence. Therefore, this study examines the interpersonal protective factors school connectedness and social support.

Methods: Data were gathered through an anonymous survey conducted within an urban school district across 13 high schools in 2018 (n=2,604) modeled on the CDC Youth Risk Behavior Surveillance Survey. School connectedness and

social support were the exposures of interest. The primary outcomes were firearm carrying and engaging in violence with a weapon on school property in the past 12 months. Separate logistic models were built for each of the protective factors to identify associations with the primary outcomes. Models were adjusted for age, race, and covariates representing basic needs, education, and mental health.

Results/Conclusion: Mean age was 15.7 years, and 57.5% (n=1477) of youth were female. Majority of the students were white (57.6% (n=1485)) and 36.6% (n=944) were Black. 5.8% (n=141) of youth had carried firearms and 5.5% (n=142) engaged in violence with a weapon on school property in the past 12 months. In the adjusted regression models, school connectedness was significantly inversely associated with engaging in violence with a weapon on school property (Odds Ratio (OR) 0.230, 95% Confidence Interval (CI): 0.081-0.648) and social support was significantly inversely associated with firearm carrying (OR 0.444, 95% CI: 0.262-0.752). School connectedness and social support may be important in protecting youth from firearm and weapon-related violence. Interventions that strengthen safe and supportive interpersonal relationships within school environments and support systems may help reduce youth violence involvement.

Significance: Caring and supportive school environments and social supports for youth are modifiable protective factors to reduce youth violence, emphasizing the need to further evaluate the social networks of youth.

44. **Emerging Strategies to Incorporate Firearm Injury Prevention into Healthcare: Results of Qualitative Interviews with Providers and Patients**

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Statement of Purpose: Injuries and suicide from firearms occur at a higher rate among Veterans than non-Veterans. Firearm owners vary widely in their reasons for and behaviors around firearm ownership, use, and storage. Within Veterans Affairs (VA) healthcare environments, providers and patients have opportunities to reduce risk. Based on input from VA providers and Veterans who own firearms, this study identified emerging strategies for a comprehensive, healthcare-based firearm injury prevention program.

Methods/Approach: We identified VA healthcare facilities nationally that treated a relatively high rate of patients with firearm-related injuries between 2010 and 2019. We identified Veterans with a recent VA healthcare visit to these facilities and mailed recruitment letters. Veterans were eligible to participate in interviews if they owned, recently owned, or lived with someone who owned a firearm. Professional contacts at each VA facility suggested providers who then received a recruitment email to participate in individual interviews. Forty Veterans and 20 VA providers participated. Interviews were audio-recorded, transcribed, and analyzed using rapid analysis.

Results/Conclusion: Initial Veteran interviews generated ideas that were then incorporated into subsequent Veteran and provider interviews to elicit reactions and additional suggestions. Emerging ideas endorsed by both patients and providers revolved around: 1) provision of firearm safe storage devices in real time and at reduced cost; 2) identification of “credible messengers” to develop and disseminate firearm injury prevention messaging; 3) environmental changes that normalize education and discussion about firearm safety; and 4) incorporation of social opportunities with firearm safety training.

Innovation & Significance to the Field: Firearm injury prevention strategies are more likely to be effective when informed by the communities experiencing those injuries and deaths. As part of a comprehensive firearm injury prevention program, hearing from providers and patients who own firearms led to identification of emerging strategies to reduce risk in a healthcare environment.

45. **“A Good Way to Start a Dialogue” Patient and Provider Perceptions of a Standardized Question about Firearm Access to Support Suicide Prevention**

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Purpose: The use of standardized questions about firearm access during routine healthcare encounters is uncommon despite potential benefits for engaging patients at risk of suicide in collaborative safety planning. This project explored patient and clinician experience with a standard question (*Do you have access to guns? Yes/No*) to inform considerations for using and improving this clinical practice.

Methods: Electronic health records data was used to sample and recruit adult patients at Kaiser Permanente Washington who had received the firearm access question in the prior two weeks. Healthcare system leaders identified clinicians responsible for suicide care to recruit. Semi-structured phone interviews elicited experiences and suggestions for practice improvement and participants received a \$50 incentive. Interview transcripts were double-coded and analyzed using a combination of inductive and deductive thematic analysis to organize key content. Triangulation was used to describe the intersections between patient and clinician perspectives.

Results: Thirty-six patients and 30 clinicians were interviewed between 11/18/2019-10/8/2020.

Organizing themes included: 1) Reasons for using a standardized question about firearm access, 2) Challenges with standard firearm questions, and 3) Suggestions for practice improvement.

Patients and clinicians considered firearm access information relevant to health and safety. Patients also described fears of disclosing access based on anticipated stigma and negative consequences. Suggestions for patient-centered practice improvement included non-judgement, dialogue, and acknowledgment of varied reasons for firearm access.

Conclusion: A standard question about firearm access normalized and supported dialogue about firearm access. Understanding the function(s) firearms serve may be particularly valuable when clinicians counsel patients about risk mitigation.

Innovation/Significance: Future work improving patient-reported firearm practices should include transparency about the purpose and use of firearm access information, acknowledgement of patients' reasons for firearm access, and trauma-informed approaches to providing information about the limitations of human decision-making that increase risk of firearm suicide.

46. Positive Education and Positive Youth Development Frameworks for Gun Violence Prevention

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Statement of Purpose: In more than half of recorded K-12 shootings in the United States, the perpetrator was younger than 21, and, since 1970, 17-year-olds have perpetrated the highest number of school shootings. In light of this, it is critical to question the developmental trajectory to gun violence in schools and how it can be prevented. Positive education and positive youth development frameworks have largely been underrepresented in gun violence prevention research and dialogue, despite evidence supporting their use in preventing maladaptive developmental trajectories. This study sought to highlight the potential that strength-oriented frameworks have for preventing gun violence, by revealing themes within accounts of the developmental experiences of young perpetrators of school shootings.

Methods/Approach: NVivo 12 was used to organize and analyze recurring, developmental themes within familial, peer, and law enforcement accounts of the preceding experiences of young perpetrators of school shootings with the highest casualties in the United States. The accounts of nine perpetrators between the ages of 16 to 25 were analyzed.

Results/Conclusions: Twelve themes were identified. 100% of the perpetrators were reported to have felt contempt for life and hopelessness as well as poor school connectedness. 77.78% were reported to have experienced bullying, social isolation, and suicidal ideation. 55.56% were described as having poor parent-child relationship quality and having been radicalized. Poor school readiness, known mental health challenges, externalizing issues, antisocial behaviors, and adverse childhood experiences were other themes. Positive education and positive youth development

frameworks have been found to be effective in preventing and mitigating each of these risk factors through fostering competencies conducive to individual flourishing.

Innovation & Significance to the Field: This study highlights the potential of strength-oriented frameworks, which are largely underrepresented in gun violence prevention research and dialogue, for preventing gun violence. A greater emphasis should be placed on studying the development, implementation, and effectiveness of strength-oriented frameworks for gun violence prevention.

47. Analysis of Rural and Urban Patients Treated for Firearm Injuries in 131 U.S. Trauma Centers

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Statement of Purpose: Population-based studies of firearm injuries that include non-fatal injuries are limited. We identified differences in firearm injury risk factors and circumstances between patients in urban and rural communities.

Methods/Approach: Data were prospectively collected on patients injured by firearms from 131 trauma centers across the U.S. that participate in the Trauma Quality Improvement Program (TQIP), including personal and community risk factors (Distressed Communities Index (DCI)) and injury circumstances. Rural-Urban Commuting Area Codes were used to stratify patients. Differences were compared using Chi Square and two-sample t-test analyses.

Results/Conclusion: 8,178 patients were included: 7,273 residing in urban and 905 in rural communities; over 90% survived to discharge. Urban patients were younger (29.8 vs 33.3), more likely to be Black (68% vs 34%), and unemployed (42% vs 35.7%). There was no difference in testing positive for alcohol, but urban patients were more likely to test positive for other substances (67% vs 61.7%). Assaults comprised 73.2% of injuries in urban patients compared to 52.4% in rural patients; suicide attempts, unintentional discharges, shotgun, and rifle injuries were higher in rural patients. Handgun injuries were higher in urban patients (92% vs 80%). Urban patients were more likely to be injured by strangers in a street, car, or public setting. Rural patients were more likely to be injured by non-intimate family members or acquaintances in residential spaces. Approximately 1% of injuries were from law enforcement. There was no difference in the DCI; 66.4% of rural and 68.1% of urban patients reside in at-risk or distressed communities.

Innovation & Significance to Field: These data provide insight into risks and circumstances among patients injured by firearms in rural and urban communities and highlight the value of utilizing trauma center data infrastructure to improve the characterization of firearm injuries to inform prevention, intervention, and recovery strategies.

48. Fatalities and Nonfatal Emergency Department Visits for Firearm-Related Injury in North Carolina from 2010-2017

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Statement of Purpose: Rates of firearm-related injury vary between demographic groups, and patterns of intent may differ between fatal and nonfatal firearm-related injury. Moreover, nonfatal firearm injury incidence is less often described, despite its enormous burden. The purpose of this analysis is to provide a detailed understanding of specific

patterns of fatal and nonfatal firearm-related injury in one state (NC) to inform prevention efforts and other states' firearm-related injury surveillance and analyses.

Methods/Approach: We used 2010-2017 data from the North Carolina Violent Death Reporting System (NC-VDRS) and the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT) to identify fatal injuries and nonfatal injury emergency department (ED) visits, respectively, in which firearms were involved.

Results/Conclusion: From 2010-2017 there were 9,783 fatal firearm-related injuries and 30,545 nonfatal firearm-related injury ED visits in NC, an average of 1,223 deaths (rate=1.5/100,000 person-years) and 3,818 nonfatal injury visits (rate=4.8) per annum in a population of ~10 million. Unintentional injuries were the most common nonfatal injuries (N=13,667, rate=17.3), followed by undetermined intent (N=8,610, rate=10.9), assault (N=7,443, rate=9.4), and self-harm (N=825, rate=1.0). Most fatal injuries were from self-harm (N=6,173, rate=7.8), followed by assault injuries (N=3,424, rate=4.3). Black males had the highest rates of fatal and nonfatal assault and unintentional injuries, while White males had the highest rates of fatal self-harm injuries. The greatest difference by sex/race category was nonfatal assault injuries, where the Black male rate was 64.8x the White female rate. Fatal self-harm injury rates increased with age, but the majority of both fatal (58.9%) and nonfatal (83.0%) injuries happened in those younger than 45 years.

Innovation and Significance: This analysis describes a complete census of firearm-related injury resulting in death or ED treatment in NC. Trends varied dramatically by demographic group, intent, and between fatal and nonfatal injuries. These findings are important for informing priorities for prevention and further investigation.

49. The Impact of Structural Racism on Violent Crime: A Multi-City Analysis

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Statement of Purpose: Firearm violence is a major cause of death in the United States; it is also a contributor to racial health disparities in the United States. Previous studies have identified positive associations between depression-era racist housing policies ("redlining") and present-day firearm violence; however, these studies generally examine the relationship within single cities. The aim of this study is to examine whether associations between redlining and firearm violence are stable across US cities.

Methods/Approach: We conducted multilevel Bayesian conditional autoregressive Poisson models relating 1937 Home Owners' Loan Corporation (HOLC) discriminatory lending maps with 2017 violent deaths. The units were 948 ZIP codes nested within 23 cities, outcomes were counts of violent deaths, and exposures were the proportion of land area coded for ordinal HOLC grades (red, yellow, blue, green).

Results/Conclusion: After adjusting for socio-demographic factors and spatial data structures, associations between HOLC grades and violent death incidence were dose-responsive when pooled across all included cities. Compared to ZIP codes with 100% of land area zoned green, those with 100% of land area zoned red had 8 times greater incidence of violent death (IRR = 8.3; 95%CrI: 2.2, 32.1). Association did not differ significantly across cities.

Innovation & Significance to the field: Relationships between redlining and violent death are essentially stable across US cities. This research allows us to emphasize findings of previous studies examining the impacts of redlining on violent death across the extent of the entire country and emphasize the impact of structural racism, as captured through the proxy of redlining, on violent death, demonstrating the historical legacy of disinvestment and discriminatory practices.

50. Drug/Gang Related Pediatric Firearm Mortality in Milwaukee, Wisconsin 2010-2020

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Introduction: There is limited literature evaluating the association between pediatric firearm homicides and drug activity.¹ Firearm mortality is one of the leading causes of death in youth the United States and in Milwaukee more than 10% of homicide and nonfatal shooting victims from 2019-2021 were under the age of 18.^{2,3} Milwaukee has a high prevalence of drug-related crimes associated with drug trafficking from local gangs.⁴ The purpose of this study was to analyze the association between shootings that had a drug or gang nexus and pediatric firearm mortality in the City of Milwaukee.

Methods: Milwaukee Police Department data were retrospectively reviewed for fatal and nonfatal shooting victims under age 21 between 2010-2020. Demographic characteristics of the victims were summarized using percentages and central tendency measures. An adjusted logistic regression analysis was used to analyze the relationship between drug/gang-related shootings and pediatric firearm mortality. All statistical analyses were conducted using STATA v.15.1.

Results: The study identified 1,581 nonfatal firearm injuries and 187 fatal firearm injuries between 2010-2020 for those under age 21. Most nonfatal and fatal shooting victims were between the ages of 16-20 (85% for both), Non-Hispanic Black (88% and 82% respectively), and male (82% and 83%). Approximately 12% of the shootings were indicated to have a primary factor related to drugs or gangs, and at the bivariate level these shootings were more likely to result in mortality compared to other shootings, although this result becomes non-significant in the adjusted model.

Innovation: Identifying the impact of drug/gang related firearm shootings on pediatric firearm injuries can contribute to prevention through gun control policy and police efforts to combat drug and gang activity. Future research can focus on the role of youth in drug/gang activity and the prevalence of drug/gang related shootings in Milwaukee neighborhoods to target high-risk areas.

51. The Toll of Nonfatal Gunshot Injuries

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Statement of Purpose: Less attention has been paid to nonfatal gunshot wounds than gun fatalities in the conversation around America's gun violence epidemic. We analyze firearm injury disparities and argue that comprehensive and timely firearm injury data must be made publicly available to understand who is most impacted. With the CDC having removed their nonfatal firearms analysis and RAND's estimates excluding ED visits, which constitute 60% of nonfatal firearm injuries, this analysis fills a gap in gun safety research.

Methods/Approach: We analyzed two Healthcare Cost and Utilization Project datasets for 2019, the most recent year available: the Nationwide Emergency Department Sample and the National Inpatient Sample, to calculate nonfatal firearm injuries for different intents (assault, self-harm, shootings by police, and unintended or undetermined) by age, sex, race/ethnicity, income quartile, region, and urbanicity.

Results/Conclusion: The daily impact of firearms is enormous when focused on injuries: More than 200 people sustain a nonfatal gun injury every day in America, on top of the over 110 who die each day. Nearly 9 in 10 people who visit a hospital for a nonfatal gunshot wound are men or boys; most are teens and young adults. Though making up a small slice of the population, 15- to 24-year-olds comprise 37% of all hospital-treated gunshot wound victims. Black Americans have a nonfatal firearm injury rate 10 times higher than white Americans. The rate is 60 percent higher for Latinx Americans compared to white Americans. The American South has an injury rate three times the Northeast and twice as high as the West.

Innovation & Significance to the Field: We urgently need to count all nonfatal firearm injuries—where they are happening, who is impacted, how often, and why—and use this information to shape programs and policies that will stop violence and build safer communities.

52. Violent death rates: A Comparison of the US to the other high-income countries, 2018

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Note: We are completing the analyses but given that this is about guns, we want to triple check all numbers before making them public. We use xx until we are certain that every number is correct

Background: Lethal violence is a serious public health problem for the U.S. Most US violent deaths are gun deaths. The US has long been an outlier in gun deaths compared with other high-income countries. This study updates previous research given the age of previous studies.

Methods: We compare the US to the other high-income countries on homicide, suicide, and unintentional gun deaths. Data from the WHO for populous, high-income countries and from CDC's WISQARS and WONDER systems are used to assess mortality overall and among US white and non-white populations and in low-, medium-, and high-gun states in 2018. Death rates per 100,000 are calculated overall, and by age and sex. Significance is tested using Poisson and negative binomial regression.

Results: The homicide rate in the US was xx times higher than the homicide rate in the other high-income countries combined largely attributable to a firearm homicide rate that was xx times higher. The overall firearm death rate was xx times higher in the US than other high-income countries. xx% of all firearm deaths, xx% of women killed by guns, and xx% of all children aged 0–4 years killed by guns were from the US. Firearm homicide rates were xx times higher in high-gun US states and xx times higher in low-gun US states than in the other high-income countries. The firearm homicide rate among the US white population was xx times higher than other high-income countries. The US firearm death rate increased between 2003 and 2018.

Conclusion: The US continues to be an outlier among high-income countries with respect to firearm deaths.

53. Violence still unrelenting: An analysis of two decades and 12,088 gunshot wounds at a Level 1 trauma center

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Background: Ten years ago, our center published an analysis of a decade of gunshot wounds (GSWs). We hypothesized an additional ten years of data, with more sophisticated geospatial analysis, would show unfortunately similar patterns of firearm injury, demonstrating the lack of progress in combating this tenacious social epidemic.

Methods: All firearm injuries were queried from the trauma registry at an urban Level 1 trauma center from 01/2000-10/2021. Injury severity score (ISS), mortality, number of GSWs, scene location, and home address were collected. Cluster GSW (within 15 minutes) and re-injury rate (two discrete GSW incidents or one GSW and subsequent death) were calculated. Risk terrain modeling (RTM), an advanced three-dimensional geospatial technique, was used to identify place-based factors of scene location and home address of the victim. Police provided prehospital firearm homicide data; RTM was applied.

Results: There were 10,321 GSWs and 1,767 prehospital deaths identified. Most GSWs took place in 2006 at 625, with a slight decrease over time. Victim age, mortality, prehospital deaths, and clusters of more than one patient arriving at a time have increased over time, but ISS has decreased. Re-injury rate was 7.4%; half of deaths were in ED. The neighborhoods affected over time remained unchanged. RTM has a positive and negative predictive value of 55% and 99%, respectively, to predict neighborhoods at risk. Spatial factors include public housing, bodegas, and abandoned properties. Victim address is related to similar factors, as are homeless shelters, recreation centers, and liquor stores. The prevalence of gun violence survivorship in our community is 2.3%.

Significance: These data demonstrate how little progress has been made across the span of two decades to address root causes of firearm injury in at-risk neighborhoods. RTM provides an excellent tool to identify geospatial risk factors, representing social and structural determinants of health.

54. The Language of Violence: Do Words Matter More Than We Think?

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Statement of Purpose: Firearm violence is a leading cause of morbidity and mortality among young adults. Identification of risk factors is important to developing and implementing effective prevention efforts. Violence Intervention Programs (VIPs) have used a multi-prong social care approach to mediate the cycle of interpersonal violence. One struggle we continue to encounter is how to change the conversation around the future. Speech patterns have been associated with health outcomes and overall behavior modification. During our attempts at violence prevention, we hear young victims of violence say things such as, “I’m living on borrowed time” and “why should I worry about getting an education when I’ll likely die soon anyway.” We suspect that such speech patterns contribute to the cycle of violence and increase likelihood of reinjury.

Approach: The biopsychosocial model of health posits that a person’s health is dictated by a combination of biological, psychological, and social factors. By understanding that language which exists in the personal context can serve as both an indicator and a tool for targeted interventions. Cognitive behavioral therapy (CBT) works by retraining thought and speech patterns to affect change in behavior. This method can be utilized in the VIPs case management model through trained Violence Prevention Professionals.

Conclusion: We propose that we can measure the degree of hopelessness within current speech patterns of victims of violence, provide focused CBT specifically on instilling a sense of future, then measure if the degree of hopelessness and risky behaviors can be reduced.

Innovation: Language is an important indicator of a patient’s psychological state and approach to life-changing decisions. As such, language medication through CBT could potentially be used as a novel method of injury prevention. This concept that has not before been explored in this setting and may be an effective supplement to VIPs’ success.

55. Accounting for Socio-economic Context in Quantifying the Attractive and Repellent Influence of Built Environment on Firearms Violence in Multiple Cities

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Statement of Purpose: The objective of this research is to improve understanding of the spatial relationship of the built environment (BE) with urban gun crime and how the influence of environmental features varies across geographic location and socioeconomic context. Specifically, we analyze associations between incidents of reported firearms violence and distance to built environment features.

Methods/Approach: This study uses street networks to compare observed, reported crime data with the outputs from a Monte Carlo Simulation using the *Network Cross-K Function for Stochastic Spatial Events*. Where data is available, we examine ten features – transit stations, universities/colleges, convenience stores, gas stations, liquor licenses, alcohol outlets, tobacco retailers, lodging, restaurants, and schools – across four diverse metropolitan areas to uncover features that exert “attractive” or “repellent” influence. We present results from four U.S. cities and further investigate how results vary according to the socio-economic status of the surrounding census tract.

Conclusion: Attractive features include tobacco retailers in Pittsburgh, hotels/motels, alcohol outlets, and restaurants in New Orleans, and rail transit stations in Los Angeles. We find that attractors vary by city and socio-economic status, indicating that the unique underlying environmental context of each city facilitates firearms crime differently. We uncover localized attractive and repellent relationships within the lowest and highest socio-economic areas and identify several firearms crime detractors, including universities/colleges and public/private schools.

Innovation & Significance to the field: This paper makes three contributions. First, this study examines four cities that vary in geographic region, total area, population density, and demographic characterization. Second, we improve a metric of risk called Firearms Incident Density, which enables us to make comparisons across features. Third, we introduce a method for examining the influence of socio-economic status on the proximity of built environment features to firearms violence.

56. Persistent, Elevated, and Increasing: Gun Violence in American “Micropolitan” Cities, from 2015-2021

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Purpose: This poster/presentation highlights gun violence patterns in cities with populations of 5,000-50,000 and compares these to gun violence trends in larger American cities. My research complicates depictions of gun violence as either episodic (mass shootings) or “urban” (Chicago and Baltimore) phenomena by illustrating its persistence and worsening severity in many of the smallest US cities.

Methodology: 544 principal cities of micropolitical statistical areas were identified. Data from the Gun Violence Archive (gunviolencearchive.org) was used to calculate city gun homicide and injury rates per 100,000 from 2015-2021.

Results: From 2015-2021, over 40% of cities with populations of 5,000-50,000 had gun homicide rates that exceeded the US’s national rate. Moreover, several small cities recently have higher gun homicide rates than El Salvador, which has had the world’s highest murder rate of 52-62 per 100,000 since 2018. The average gun homicide rate in Selma, Alabama (population: 17,762) was 59 per 100,000 from 2015-2019, spiking to 87 in 2020-2021. In Natchez, Mississippi (population: 14,854) rates of 55 and 57, respectively, were observed, and in Greenwood, Mississippi (population: 13,826) the homicide rate increased over 200% in the Covid-19 era from roughly 46 deaths in 2015-2019 to a stunning 98 homicides per 100,000 by 2020-2021.

Innovation & Significance: Historic increases in gun homicides in major American cities in 2020 and 2021 are currently an important focus of research, media coverage, and policy debates. Attracting less attention are the hundreds of small cities whose gun violence rates were both alarmingly high prior to 2020 and have continued to worsen since the Covid-19 pandemic. My research shows that major metropolitan areas are not the only places confronting alarming increases in gun violence. Greater research and resources must be directed toward understanding and addressing the escalating problem of gun violence in America’s smallest cities.

57. Social Vulnerability and Firearm Violence in Chicago

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Purpose: Urban firearm violence is associated with inequities rooted in structural racism and socioeconomic disparities. We sought to understand the role of social vulnerability on the incidence of firearm violence in the racially and socioeconomically segregated city of Chicago.

Methods: Firearm assaults in Chicago between 2001 and 2019 were obtained from The Trace database. The Trace reports publicly available firearm data for a multitude of cities. Locations of incidents were geocoded using ArcGIS and overlaid with census tract vector files. These data were linked to social vulnerability (SV) measures obtained from the CDC. The SV index is made up of 4 categories: socioeconomic status, household composition, minority status, and housing and transportation. It is reported in 4 levels: Very Low, Low, Moderate, and High SV. Shooting rates were calculated by tabulating the total number of shootings per capita per census tract. We used Poisson regression with robust error variance to estimate the incident rate of firearm violence in different levels of social vulnerability.

Results: In total, 642 census tracts were analyzed. The median shooting rate was 2.6 shootings per 1,000 people (IQR 0.77,7.0). When compared to those census tracts with very low SV, census tracts with low SV had a 1.7 time increased incident rate of shooting (IRR 1.74, 95%CI 1.08,2.81). Tracts with moderate SV had a 3.1 time increased incident rate

of shooting (IRR 3.07, 95%CI 2.31,4.10). Tracts with high SV had a 7 time increased incident rate of shooting (IRR 7.03, 95%CI 5.45,9.07).

Conclusion: We show that in Chicago, social vulnerability has a large impact on the rates of firearm violence, providing a point for policy intervention to address high rates of interpersonal violence in the city and in other segregated cities like it.

Significance: This analysis provides a geographically nuanced study of social vulnerability on firearm violence.

58. Firearm death and injury in Canada and the USA: implications for policy and practices

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Purpose: To compare the rates of firearm death, injury and crime in Canada and the US with a focus on factors shaping the patterns of firearm violence, while examining similarities and differences including history and culture, political structures, policies, processes, and implementation issues.

Approach: Using an interdisciplinary approach, this work is informed by public health models which consider social determinants of health, policies, and implementation issues at the societal, community and individual level with some focus on gender and race. It will update work from Cukier and Sidel, *The Global Gun Epidemic* (Praeger, 2005) which compared firearm death and injury across jurisdictions, then discuss recent research on firearm death and injury including gang violence, domestic violence, unintentional injury, and suicide, along with the rare, but devastating cases of mass shootings and hate related violence.

Results: In Canada and the US both similarities and differences are evident in history and culture, legislative frameworks, demographics, interest groups and advocacy. Currently the rate of homicide without a firearm in the US is about twice the rate in Canada (2.0 versus 1.0 per 100,000). This is comparable to other industrialized countries such as the United Kingdom and Australia. However, the rate of homicide with a firearm in Canada is ten times that in the UK (0.4 versus 0.04 per 100,000) and yet substantially lower than in the USA (3.5 per 100,000). While there are significant differences in social determinants (education, income disparity, inequality, access to health care, etc.), the availability and use of firearms, history, culture, legislative frameworks, advocacy, and other processes also affect access, use and misuse.

Significance: Canada and the US are similar in many respects but have dramatically different rates of firearm death and injury. Understanding the reasons for this may help inform policy and practice.

59. Social Networks and Experiences of Firearm Violence among Black Youth

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Purpose: Among youth recently exposed to community violence, social networks may serve as a powerful influence on repeated exposure. This study describes experiences of firearm-related violence and examines the relationship between social network characteristics and experiences of firearm violence among Black youth.

Methods: Through existing community-based violence prevention programming and partnerships, we recruited Black youth, ages 14-19, who had witnessed community violence in the past 3 months in Pittsburgh, PA. Youth completed baseline and 2-week follow-up surveys. Baseline survey captured youth's egocentric social network, wherein youth enumerated peer and adult supports. Validated measures captured past-30-day (baseline) and past-2-week (follow-up) experiences of witnessing firearm violence and firearm-related violence victimization. Logistic regression examined associations between social network size and firearm violence.

Results: Twenty-five youth (60% female, $M_{age}=16.4$ years) completed baseline surveys and 21 (84%) completed follow-up surveys. At baseline, 20% of youth reported seeing someone get shot in the past 30 days; 24% reported witnessing

a shooting at 2-week follow-up. Additionally, 16% reported that someone tried to hurt them with a weapon (e.g., bat, knife, or gun) at baseline and 19% at follow-up. The average ego network size was 6.5 (range: 2-12) and, on average, 57.9% of network members were immediate family, while 20.7% were from their community. Ego network size was not significantly associated with seeing someone get shot (OR 0.69, 95%CI:0.45-1.06) or attempted victimization by someone with a weapon (OR 0.92, 95%CI:0.60-1.40) at baseline. Youth's ego network size was significantly associated with attempted victimization by someone with a weapon (OR 1.70, 95%CI:1.03-2.81) at follow-up but not significantly associated with seeing someone get shot (OR 1.11, 95%CI: 0.80-1.53).

Significance: Experiences of repeat violence were common and reflect the safety challenges youth face in the aftermath of community violence exposure. Understanding unique influences from youth's social networks can inform violence prevention interventions.

60. The Impact of COVID-19 on Gun Violence

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Statement of Purpose: Gun violence is a serious public health problem and can have profound lifelong impact on an individual's health, opportunities, and well-being (CDC 2021). Majority of individuals' outcomes are influenced by the conditions in which they live, play, and learn which is also understood as social determinants of health. The COVID-19 pandemic had many people isolated which may have exacerbated social pressures that may have led to an increase in violence.

Methods/Approach: To examine the impact of the COVID-19 pandemic on the types of violent injuries observed, we used data from the emergency department of VCU Health, a Level 1 Trauma Center ($N = 1,863$). Patients were 35.58 years old on average ($SD = 14.63$), 82.60% were male, and 68.90% identified as Black or African American. We coded variables representing the proportion of all injuries for each injury type (i.e., gunshot wounds, stabbings, and assaults) and whether each injury occurred before or during the pandemic.

Results/Conclusion: The proportion of violent injuries accounted for by gunshot wounds was significantly greater during the pandemic than before ($t(1824.94) = 4.77, p < .001, d = 0.22, 95\% CI: 0.13, 0.31$). In contrast, assaults and stabbings were less common on during the pandemic. In keeping with a rise in gunshot-related injuries and a decrease in less lethal forms (i.e., assault), violence injuries were significantly more severe during the pandemic.

Innovation and Significance to the Field: As reported in across the US, the pandemic has resulted in an increase in violence and violence-related injury. However, teasing apart the injury mechanism highlights that this increase seems most related to gunshot wounds, and not violence more generally (e.g., assault, stabbings). Therefore, the pandemic has resulted in more severe forms of violence (GSW), which has contributed to patient injury severity.

61. Trends in firearm-related emergency department visits before and during the COVID-19 pandemic: Findings from NC-FASTER, 2019-2021

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Statement of purpose: Firearm-related emergency department (ED) visits in North Carolina occurred at a rate of 51.4 per 100,000 residents/year from 2019-2021. Throughout 2020 and the first half of 2021, firearm-related ED visits were more frequent than 2019 levels, making firearm-related injuries one of the few injury mechanisms to increase in frequency among ED visits during the COVID-19 pandemic despite decreases in overall ED utilization. To understand

the potential impacts of the COVID-19 pandemic on firearm-related ED visits, this study (1) compares patient demographics during the years 2019-2021 and (2) estimates trends in monthly ED visits by patient disposition.

Methods/approach: NC DETECT, North Carolina's syndromic surveillance system, was queried for all firearm-related ED visits from January 1st, 2019 through December 31st, 2021. Firearm-related visits were identified using CDC's "Firearm Injury – All Intent V2" case definition. Patients were aggregated by visit year and demographic comparisons were made using chi-square tests (categorical) or one-way ANOVA (continuous). Trend analyses were conducted by aggregating visits by month of the study period (overall and by discharge disposition) and fitting LOWESS smoothed curves.

Results/conclusion: Over the study period, 15,952 ED visits for firearm-related injury were identified. Firearm-related ED visits rose in March, 2020, and remained elevated above 2019 levels throughout 2021. Differences in patient demographics across years were observed for race/ethnicity, disposition, and injury intent. Over the study period, hospital admissions from the ED trended downward after rising early in the pandemic, while transfers to other hospitals and deaths in the ED trended upward.

Innovation & significance to the field: This study highlights disparities in firearm-related injuries among North Carolinians during the pandemic. Firearm-related ED visits remain elevated relative to 2019, while hospital admissions from the ED are decreasing. Further research should be undertaken to characterize how injuries sustained may be changing.

62. State gun policy and spikes in gun deaths in the COVID-19 pandemic

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Statement of Purpose: To better understand the relationship between state policy and the increase in gun deaths seen in 2020, I sought to determine whether the biggest spikes in gun deaths in the pandemic occurred in states with the least restrictive gun policy environments.

Methods: Using a 2020 RAND systematic review of studies measuring effectiveness of specific state-level gun policies at reducing gun deaths, a framework for "scoring" state gun policy environments was developed and used to assign each state a score based on which policies with moderate or supportive evidence of an effect on identified gun violence outcomes were in place 2018-2021. To illustrate change in state firearm mortality rates, the National Violent Death Reporting System (NVDRS) was used. Once each state was "scored", the highest and lowest quartiles were determined based on state scores. The change in age-adjusted firearm mortality rates was then compared for each group over the study period.

Results: While there was a slight increase from 2018-2019 in the mean firearm mortality among both the lowest (0.38) and the highest quartile (0.15), both groups saw mean increases from 2019-2020, 2018-2020, and 2018-2021. The mean change in firearm mortality rate amongst the lowest scored states for 2018-2021 (4.36) was over twice the mean of the highest scored states (1.95).

Conclusion: While the present analysis was descriptive, further analyses should seek to determine if the presence of certain gun safety policies may have been protective. More research is also needed to determine any association between COVID-19 social restrictions and elevated rates of gun injury and death in the pandemic years.

Significance: An understanding of which laws may be protective in times of national-level surges may also inform state and federal policy as we move forward in the COVID-19 pandemic and prepare for future large-scale societal stressors.

63. Examining characteristics and experiences of black firearm owners

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Statement of Purpose: In the first 6 months of 2020, there was a 58.2% increase in firearm purchases among Black individuals relative to the same period in 2019. This increase is notable from a suicide risk perspective, as firearm access is associated with an increased likelihood of death by suicide (Anestis & Houtsma, 2018). Little is known about firearm ownership among those who identify as Black. The present study seeks to fill this gap by examining the characteristics (e.g., gender, reason for ownership) of firearm owners, and examining how Black firearm owners differed from Black non-firearm owners on variables related to threat concerns and suicide.

Methods/Approach: The study is comprised of two samples, sample 1 (National: N = 3,500) and sample 2 (NJ, MS, MN: N = 6,412). We examined data from those who identified as Black (n = 502; n = 1,086). Data were collected from Qualtrics Panels and matched to the 2010 US census data for age, race, sex, income, and education level.

Results/Conclusion: There were multiple differences between Black firearm owners and non-firearm owners. For example, a higher percentage of women were firearm owners compared to non-firearm owners; and firearm owners were more likely to have grown up with a firearm in their home. Handguns were the most commonly owned firearm in both samples. Higher levels of capability, experiences of discrimination, crime experiences, and threat sensitivity each predicted greater odds of being a firearm owner. Additional differences will be discussed.

Innovation & Significance to the field: This study fills an important gap by increasing our understanding of firearm ownership among Black individuals. Understanding reason for ownership, types of firearms owned, storage habits, and the experiences of Black firearm owners is important for increasing firearm means safety, a strategy which may reduce risk for suicide, among this population.

64. What preferences for firearm locking devices exist among firearm owners? Findings from a systematic review and discussion of implications for research and practice

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Purpose: Research on lethal means safety interventions suggests that the provision of firearm locking devices (e.g., cable locks) may increase secure storage behaviors among firearm owners. Efforts across the U.S. have incorporated this evidence and now commonly include device distribution. Despite the promising research supporting provision, there is little research on which devices firearm owners would prefer (and be more likely to use). This systematic review was conducted with the purpose of examining the research base regarding locking device preference among U.S. firearm owners to identify practical implications and areas for future research.

Methods/Approach: Using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines, the systematic review was conducted between February-June 2022. Searches were conducted in 7 multi-disciplinary databases. A grey literature search was also completed. No limitations on publication date or methodology were set, but included studies were required to report on utilization of or preference for specific devices among firearm owners in the U.S.

Results/Conclusion: Less than 40 peer-reviewed publications, dissertations, organizational reports, and other “grey literature” met inclusion criteria. Cable and trigger locks were commonly provided but were less often preferred when compared to larger devices (e.g., lockboxes). While the price of a device was an important consideration impacting utilization, the ability to quickly access a weapon for protection was the most discussed consideration impacting preference and utilization across studies. These findings are vital given the frequency in which current efforts may be providing devices not aligned to firearm owners’ preferences, and therefore not maximizing behavior change.

Innovation & Significance to the Field: This review emphasizes the need for expanded research on device preferences and the factors surrounding provision that may increase the effectiveness of interventions. These findings provide actionable recommendations for practitioners and researchers and furthers understanding of foundational best practices for firearm-injury prevention.

65. Personal preferences and experiences with out of home firearm storage in Colorado and Washington State

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Purpose: New public-facing, online state maps in Colorado and Washington state display various business and agencies willing to consider temporary, voluntary firearm storage. Little is known about how these programs might be utilized or the desirability of these programs by those with access to firearms. We surveyed adult firearm owners and those living in firearm-owning homes in Washington and Colorado to examine previous and future out-of-home firearm storage use, perceived barriers, and facilitators

Methods/Approach: An online survey was administered by Qualtrics through sampling of existing managed panels to reach a diverse sample. The survey instrument was pre-tested with individuals knowledgeable about firearms and survey research. Participants were English-speaking adults (18 or older) in either Colorado or Washington living in a home with a firearm (either as the firearm owner or not) in 2021. To test for differences between subgroups (owners vs non owners), we used two-sample t tests for continuous variables and Fisher's exact tests for categorical variables. An alpha level of 0.05 was used for significance testing.

Results/Conclusion: Among respondents (n=1,022), 696 (68.1%) were firearm owners and 326 (31.9%) non-owners living in a home with a firearm. Overall, 27.3% of respondents said that someone in their home had stored a firearm away from their home/car/garage in the last five years. Out of the 279 who had stored away from home, the most common locations were with a family member (39.1%) and in a self-storage facility (35.5%). When asked about concerns related to out of home storage, 73.3% were concerned with privacy, 71.5% concerned with protecting gun owners' rights, and 66.9% concerned with logistics of retrieving firearms.

Innovation/Significance to field: Due to the relatively common practice of storing firearms outside the home promoting temporary out of home storage could be a good way to help decrease firearm injuries.

66. Interactions at the point of firearm purchase and subsequent use of locking devices

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Statement of purpose: Firearms account for over 45,000 deaths in the U.S. each year in addition to thousands of nonfatal injuries. One notable prevention strategy is safe storage. Locking devices are one safe storage option that is easy to access and typically free, as they are included in many firearms sales. The present study examined the extent to which firearms retailers notifying purchasers about the included locking devices was associated with subsequent locking device use in two large samples and three subsamples. Exploratory analyses then examined demographic factors associated with frequency of seller notification of locks.

Methods: Sample 1 included 1203 firearm owners and sample 2 included 1556 firearm owners. Subsamples were drawn from sample 2 to and consisted of firearm owners from Minnesota (n=515), Mississippi (535), and New Jersey (506). Logistic regressions were used to examine the association between frequency of sellers notifying buyers of locks and subsequent locking device use. Linear regressions were used to examine what demographic factors were associated with greater frequency of seller notification of locking devices.

Results: Results indicated a general trend such that more frequent notification of locking devices at the point of purchase was associated with greater likelihood of using locking devices to secure firearms. At the subsample level, these findings were most consistent for Mississippi relative to Minnesota and New Jersey. Exploratory analyses generally indicated those who were younger and those living in more densely populated areas were more likely to be notified about locking devices at the point of purchase.

Significance to the field: These findings suggest that interactions about locking devices at the point of purchase may have an impact on firearm storage behaviors. Encouraging firearm retailers to have these discussions with those purchasing firearms might be an important strategy for preventing firearm related fatalities and nonfatal injuries.

67. Gun Ownership and Suicide among Black Americans

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Purpose: Little is known about the patterns of Black household gun ownership, or the relationship with Black suicide. We compare the patterns of Black vs White household gun ownership. Then, across states, we determine what is a good proxy for Black household gun ownership levels and examine the relationship between Black gun ownership patterns and rates of Black suicide.

Methods/Approach: We use the Behavioral Risk Factor Surveillance System which asked questions about gun ownership in all 50 states in 2001, 2002, and 2004. The BRFSS is the gold standard for state firearm ownership patterns.

Results: Patterns of Black and White household gun ownership levels are quite similar: age (higher rates among older adults), region (highest rates in the South, lowest in the Northeast), urbanization (higher rates in non-metropolitan areas), education (lower rates among the less educated), married (higher rates among the married), smoking and binge drinking (no differences between gun owning and non-gun owning households). But while White gun ownership and White firearm suicide follow similar patterns, among Blacks, firearm suicide rates are higher among young adults, and similar between urban and rural areas.

Across states, for both Blacks and Whites, the percentage of suicides that are gun suicides is an excellent proxy for household gun ownership levels. For Whites, their levels of household gun ownership are highly correlated with their firearm suicide rates per population and their overall suicide rates. But for Blacks, while their levels of household gun ownership are correlated with their firearm suicide rates, they are hardly related to their overall suicide rates.

Significance: Black firearm ownership patterns are extremely similar to White patterns, but while White suicide patterns follow their gun ownership patterns, Black suicide patterns do NOT follow their gun ownership patterns. To understand Black suicide, this fact requires explanation.

68. Perceived Risk of Household Firearm Ownership: Evidence for Optimism Bias and Implications for Intervention

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Statement of Purpose: Decisions to own firearms, engage in protective behaviors, and support policy interventions to mitigate injury risk may be shaped by beliefs about vulnerability to harm. Misperceptions about the risks of household firearm ownership are well-documented, but little is known about whether risk perceptions vary depending on whether risk is assessed with regard to oneself or others in one's neighborhood.

Methods/Approach: We surveyed California adults (n=2558) from the Ipsos KnowledgePanel in 2018. Respondents were asked if firearms in their own homes and firearms in all homes in their neighborhoods, respectively, made them safer, more dangerous, or it depends/don't know. First, we compared the perceived risk of household firearms for oneself and for others in their neighborhood, overall and by firearm ownership status. Then, we examined policy support and characteristics (e.g., reasons for ownership, length of ownership, storage practices) among gun owners with varying patterns of risk perceptions. Descriptive analyses were weighted to represent the adult population of California.

Results/Conclusion: Overall, respondents perceived greater risk associated with guns in all homes in their neighborhoods than guns in their own homes, regardless of firearm ownership status. One-quarter of respondents (26.2% gun owners; 41.2% non-owners living with gun owners; 25.7% non-owners) underrated their own vulnerability to firearm-related risk while perceiving others in their neighborhood to be more susceptible. Compared with gun owners overall, those with such "optimism bias" more often owned guns for protection (49.1% vs 62.0%), owned

handguns (80.9% vs 85.5%), and were new owners (8.8% vs 13.2%). However, compared with the subset of gun owners who unequivocally believed firearms increased safety in their own and others' homes (40.9%), those with "optimism bias" less often stored a firearm loaded and not locked up (24.0% vs 19.5%), had less often carried a loaded handgun in the past 30 days (26.9% vs 16.3%), and more often supported four policies/interventions for preventing firearm injuries (7 to 25 percentage point difference, depending on the intervention).

Innovation & Significance: Given evidence that household firearms increase risk for firearm injury and that optimism bias may impact whether individuals engage in precautionary practices, addressing optimism bias may be important for reducing risk, especially among new gun owners. However, perceiving the risks associated with firearms at least in others' homes (vs the unconditional belief that household firearms increase safety) may lead to increased support for firearm injury prevention strategies.

69. Effect of gun ownership on violence: a division-level longitudinal analysis in the USA

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Statement of Purpose Firearm-related mortality has increased in the USA since 2014, jumping 13.2% in 2020. For the first time in modern American history, firearms have surpassed cars as the leading cause of death among young adults. Firearms cause most suicides and homicides in the USA, both of which are near their highest rates in two decades. After a gradual decrease in gun ownership between 1973 and 2016, it has rapidly increased towards its highest rate in the past 50 years. Although much research has described how gun ownership increases an individual's risk for violence, a lack of data has prevented public health researchers from investigating the population-level effects of gun ownership rates on homicide and suicide.

Methods/Approach Employing weighted ordinary least squares for three different specifications with various combinations of control variables as a sensitivity analysis, this division-level longitudinal (panel) analysis estimates the effect of gun ownership for various types of firearms (General Social Survey) has on suicide and homicide mortality rates (National Center for Health Statistics) for the period 1973 to 2021. Results are then stratified by race and ethnicity.

Results/Conclusion All types of gun ownership (pistol, handgun, and rifle) increase suicides and homicides due to those types of firearms. Overall, a 1% increase in firearm ownership is associated with a 0.9% increase (95% CI, 0.21% to 1.60%; $P = 0.017$) in the all-cause homicide rate, but does not have a significant effect on the all-cause suicide rate. Recent increases in homicides and suicides were concentrated among communities of color, which for suicide departs from recent trends.

Innovation & Significance to the field This is the first longitudinal analysis of directly-measured gun ownership rates at the population level. Previous geographical-level research employed gun-ownership proxies, such as the proportion of suicides committed by firearms or the new RAND data.

70. Racial and Ethnic Disparities in Firearm Injury during COVID-19 in a Midwestern Metropolitan Area

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Purpose: Firearm violence is a public health crisis and particularly since the start of the COVID-19 pandemic there has been a significant rise in homicides and nonfatal shootings in cities across the US. Milwaukee, Wisconsin is no exception, with more than a 90% increase in victims of firearm violence between 2019 and 2021. Milwaukee is also a highly diverse but segregated urban center and disparities in the rates of interpersonal firearm violence across racial and ethnic groups reflect this segregation.

Methods/Approach: This project utilizes two data sources including firearm injuries from the trauma registry based on mechanism of injury (MOI) from the only adult Level 1 trauma center in Milwaukee and fatal and nonfatal shooting incidents reported to the Milwaukee Police Department from 2015-2021. Data will be aggregated monthly by race

and ethnicity. Given the seasonality of firearm violence in Milwaukee, seasonal autoregressive integrated moving average (SARIMA) models will be fit to monthly firearm violence counts in both sources to develop a baseline. Then firearm violence counts by race and ethnicity will be forecasted for the peri-COVID period to compare to actual injury rates. All statistical analyses will be conducted in R.

Results/Conclusion: Preliminary analyses of the trauma data indicate that counts for firearm injuries during the pandemic were significantly higher than forecasted for Black and Hispanic or Latinx patients, while there was no difference in firearm-related injuries for White patients. We anticipate that the fatal and nonfatal shooting rates will mirror the trauma registry findings.

Innovation/Significance: Understanding disparities in firearm-related injury across racial and ethnic groups and changes during COVID-19 has important implications for a public health response. Examining potential contributing factors such as the surge of firearm ownership and structural racism can provide insight into potential approaches to prevention and intervention of firearm injury across groups.

71. Perception and Application of Spirituality among Black Male Survivors of Firearm Violence

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Statement of Purpose: Black male survivors of firearm injuries often return to their communities after acute treatment with limited physical, psychological and emotional support. Black males are 50% less likely to seek professional mental health services compared to their White counterparts. In the absence of services to aid their recovery, Black men may draw upon their spirituality for emotional support. We sought to explore the perception and application of spirituality among Black male survivors of firearm violence to inform prevention, treatment and recovery modalities.

Methods/Approach: Using the Spiritual Framework of Coping, this pilot and qualitative study enrolled a subset of participants from the Emotional Response and Recovery from Injury (ERRI) in Urban Black Men study who agreed to be recontacted for future studies. Informed consent was obtained, semi-structured interviews were conducted via phone and were audiotaped, transcribed, and de-identified. Thematic content analysis was used to identify themes regarding how Black male survivors of firearm violence perceive and use spirituality in their recovery process. Preliminary analysis of 10 participants who were recovering 6-10 years after their firearm injury is presented.

Results/Conclusion: Preliminary findings shows that Black male survivors of firearm injury either concurrently use the services of spiritual leaders and professional mental health service or only use spiritual leaders when faced with mental health challenges. They express mistrust towards professional mental health providers. Offering spiritual resources to Black male survivors of firearm violence post-discharge may provide an additional approach to improve the recovery trajectory.

Innovation & Significance to the field: The perception of Black male survivors of firearm injury on spirituality and its application in their recovery process is a novel concept that is understudied. This study may help characterize pathways in assessing and providing culturally sensitive spiritual care to Black male survivors of firearm injury who underutilize professional mental health services.

72. Not reporting gun victimization to the police: an analysis of crimes perpetrated against women by their intimate partners, 1993-2021

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Women are more likely than men to suffer crime victimization at the hands of intimate partners and firearms play an important role in crime outcomes. At the same time, numerous crimes perpetrated by intimate partners against women go unreported to the police. The objective of this study is twofold. First, to analyze the effect of gun victimization on the likelihood that crimes perpetrated by intimate partners are reported to police. Second, to analyze

the link between gun victimization and common reasons why women do not report crimes perpetrated by their intimate partners. Data came from the National Crime Victimization Surveys (NCVS) from 1993 to 2021. To conduct the analyses, we ran a series of binary logistic regression models. For outcome measures we used dichotomous variables, including whether crimes were not reported to the police and a dichotomous variable for each of the top five reasons why women do not report these crimes. These were: personal matters, fear of reprisal, other reasons not included in the NCVS, to protect the perpetrator, and issues related to the police (perceived police as uninterested, biased, or inefficient). The main independent variable was the type of weapon used by offenders: firearms, other weapons, and no weapons. Our results show that women are more likely to report crimes to the police if intimate partners use firearms. However, when looking at the most common reasons, women were significantly more likely to abstain from reporting a crime due to fear of reprisal. This finding contributes to understanding the impact of gun violence beyond injuries (fatal and non-fatal) while also supporting the need for safer protocols to ensure women are not retaliated against with violence, particularly gun violence, after they report a crime.

73. A critical appraisal of the evidence on the gender-based impacts and experiences of stand your ground laws

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Statement Of Purpose: Castle Doctrine laws empower the so-called ‘True Man’ to use lethal force in self-defense. This is in contrast, for instance, with the Battered Women Syndrome defense, which requires expert testimony to evidence abused women’s psychological condition of learned helplessness. Extending the tradition of Castle Doctrine, most Stand Your Ground statutes do not mention domestic violence or only remove the duty to retreat if there is an active protection order (for which there are important structural barriers, including racism and class inequality). We aimed to critically appraise the extent to which existing evidence on the impacts and experiences of stand your ground laws has accounted for gender, sexual and domestic violence, the most common forms of violence against women.

Methods: We systematically identified qualitative and quantitative studies through electronic searches, reference harvesting, and expert consultation up until April 2020.

Results: There has been little examination of gender in quantitative or qualitative analyses of stand your ground laws and only three studies have considered race and gender intersectionally. The small sample of empirical studies that have focused on the gender-based outcomes of stand your ground laws indicate that these laws are applied differently or women versus men within the context of domestic violence in the justice system; however, the pattern of results observed is not consistent across available studies.

Innovation & Significance To The Field: The available evidence suggests that there are important differences in the application of stand your ground laws based on gender or race. However, further research is needed to clarify these differences using more robust national datasets on domestic violence, justice outcomes, and homicide rates that can support an intersectional analysis between race and gender. This research should also be developed with stronger theoretical considerations of the historical context of the weaponization of self-defense in the United States.