Dear Colleagues on the Fund for a Safer Future Advisory Group:

I am pleased to offer this Letter of Intent in response to the recent Request for Proposals (RFP) to support research that will help answer the question: "What works to prevent firearm-related death, injury, harm, trauma, and to promote healing?" Our proposed project is entitled "The Causes and Consequences of Police Shootings." We have elected to structure this letter as responses to specific questions outlined in the RFP.

What question(s) will the project seek to answer? How will it build on and differ from existing knowledge on this topic? The goal of our mixed-method project is to advance knowledge on the complex interplay[1] of historical/contemporary racism, police shootings, and health. We propose to:

AIM 1. Examine the impact of historical redlining and racial covenants[2] on police shootings.
AIM 2. Examine the impact of police shootings on health.
AIM 3. Examine to what extent police shootings mediate the relationship between historical redlining and racial covenants and health.
AIM 4. Understand how police shootings affect health outcomes, and how strategies of resilience used by community members may shape these processes.

Since the beginning of 2023, 311 people have been fatally shot by police.[3] This averages out to approximately 2 deaths by police using firearms per day with many more gun shots not resulting in death. Our proposed project will link local historical indicators of structural racism to contemporary police shootings and health outcomes. Structural racism, in terms of health outcomes, is "the state-sanctioned or extralegal production and exploitation of group-differentiated vulnerability to premature death."[4] Racialized police shootings have been pervasive throughout United States history.[5] America's history of racial violence is reflected in the police shootings against Black people today.[6] A Black unarmed person is shot by police about 3.49 times more than a white unarmed person.[7,8] Both direct and indirect exposure to police violence increase individuals' reports of general anxiety, depression, suicide attempts, and anticipation of future police violence victimization.[9–11]

The burgeoning literature of structural racism in health has identified key aspects of the historical process by which historical racial violence translates into contemporary, amongst a broader matrix of racialized, structural violence in the United States.[12] Recent scholarship has operationalized historical forces of structural racism through the mid-20th century practice of "redlining which were highly racialized,[13] effectively conflating "race" with "financial risk" and defining, in part, a space's current and future value as a function of its racial composition. Scholars have tied HOLC grades to contemporary health outcomes[14-18], such as self-rated health,[14] and mental health.[15] Further, while scholarship has begun to identify the mediating mechanisms of the processes by which historical projects of racialized exclusion translate into contemporary health realities (e.g., crime, school segregation, etc),[19] existing research has not conceptualized contemporary racialized criminal legal practices as a fundamental mechanism in this historical process. Our theoretical model is depicted in

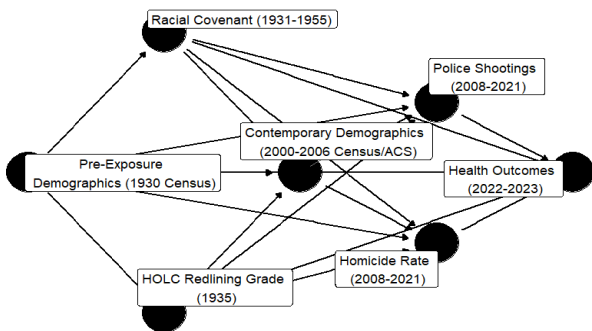Figure 1: Theoretical Model of Structural Racism, Police Shootings, and Health

Figure 1 below. **We conceptualize police shootings as an instance of the institutionalization of structural racism that links historical racial violence to contemporary health outcomes and disparities.**

We hope to advance not only our understanding of the causes of police violence and firearm use, but also seek to better understand what role police firearm violence plays in historical processes of structural racism and the (re)production of firearm injury and other contemporary health problems. Further, we will conduct interviews to understand and contextualize coping strategies and

resiliency in shaping the health effects of exposures to police shootings. This contribution is important because we know little about the specific individual-level mechanisms that connect police shootings and adverse health outcomes. Likewise, research has infrequently accounted for the routine nature of police violence on minoritized communities. Our interview study expands extant scholarship by drawing on resiliency and stress to understand how marginalized communities respond to and mitigate the deleterious health effects of repeated police shooting exposures.

What are the expected impacts for this project? The perceived threat of police violence is a prominent feature of being a minoritized person in the United States. However, despite this central feature, Black and other minoritized communities have learned to navigate these systems of historic and present day oppression. The ultimate goal of our project is to give voice to the traditionally marginalized and powerless. We intend to do this in three ways. First, our study hopes to elucidate the mechanism by which health disparities occur in our society, and to better understand the historical roots of these inequities. Second, the interviews we conduct in communities where police shootings occurred will help inform future interventions that build upon existing resilience in minoritized communities. Third, the analytical framework we will establish will allow for additional examinations of different health conditions such as birth outcomes.

What is the proposed research methodology/ies? If engaging communities or groups directly affected by this gun violence, what is your approach to centering their perspectives in your methodology? Our research methodology to investigate the impact of historical structural racism on contemporary police violence and health outcomes is a mixed method design in Minneapolis and St. Paul, Minnesota. Each of the authors has been embedded in Minneapolis and St. Paul with deep connections to the community, conducting listening sessions as, e.g., board members and researchers for the Minnesota Justice Research Center, the University Urban Research and Outreach-Engagement Center, the Restore the Vote Coalition, and the Minneapolis Mayor's Public Safety Task Force. These experiences, particularly the community listening sessions and our continuing engagement with community partners, has helped shape the proposed project. We propose a quantitative historical and administrative data analysis to assess Research Aims 1-3, and a qualitative interview design to assess Aim 4.

Quantitative Historical and Administrative Data Analysis (Aims 1-3). We first propose a data analysis of several secondary data sources in Minneapolis and St. Paul, Minnesota. To build the structure of our theorized historical process (see Figure 1), we will construct a unique longitudinal dataset situated at the Zip Code Tabulation Area (ZCTA) level drawing on data from the sources described below. Minneapolis and St. Paul, colloquially known as the "Twin Cities", are selected on the basis of rich, detailed historical and contemporary administrative data that exist, can be spatially situated, and are available for use in each municipality.

Our key exposures of interest are the spatial presence of redlining and racial covenants in each city. Historical spatial data on HOLC redlining grades are obtained from the Minnesota Natural Resource Atlas[21] for both Minneapolis and St. Paul. Shapefiles of racial covenants - clauses inserted in property deeds to prevent non-white individuals from owning or renting space - are obtained from the Mapping Prejudice Project at the University of Minnesota.[22] We will then construct indicators of the proportion of each ZCTA polygon that *overlaps* with different HOLC graded spaces and racial covenants, effectively constructing proportional measures of each ZCTA polygon that was historically subject to these racialized exclusionary projects.

The distal outcomes of interest are rates of health outcomes in Minneapolis and St. Paul. We leverage administrative hospital claims data obtained through the Minnesota Hospital Association from 2022-2023.[23] With each database, we spatially locate each diagnosis by ZCTA, the lowest level of geography available in the hospital claims data. We will then construct ZCTA-specific measures of rates of various health outcomes, including firearm assault injury and mental health. Each outcome will be expressed as a rate per 1,000. Further, we will also create racially stratified measures, effectively making race-specific incidence measures of the health outcomes. This will allow us to investigate effect heterogeneity with respect to racial subgroups in Minneapolis and St. Paul. We will obtain administrative data on police officer involved shootings and crime as reported by the Minneapolis and St. Paul police departments and validate these data using publicly available

repositories. These data are publicly available via each municipality's open data portal.[24,25] We will spatially locate each police shooting by ZCTA, and will create both dichotomous indicators of the presence of a police shooting in each ZCTA, as well as a rate per 1,000 residents using the 2018-2021 5-year American Community Survey. These measures represent our focal mediating variables of interest in our theoretical model (Figure 1).

Finally, we obtain spatial demographic data from the Decennial Census[26] and American Community Survey[27] (ACS) from the United States Census Bureau. These data serve as our key pre-exposure controls (1930 Census), as well as key control measures of contemporary demographics (2000-2006 Census/ACS) that may confound the relationship between police shootings and health. At each time point, we construct a bevy of racial, economic, educational, age, and gender demographics for use in our statistical modeling strategies.

In Aim 1, we will model the relationship between our historical exposure measures of HOLC grades and racial covenants and police shootings using spatial lag autocorrelation models, statistically adjusting for the spatial autocorrelation of health outcomes between neighboring ZCTAs as well as a suite of pre-exposure variables from the 1930 Census. We will also estimate models with and without contemporary measures of demographics, concentrated disadvantage, and homicide to isolate the direct effect of structural racialized exclusion, and examine the indirect effects that operate via contemporary social structure. In Aim 2, we model the relationship between police shootings and crime using two-way fixed-effect panel models for each health outcome, which control for time-constant heterogeneity between ZCTAs, and ZCTA-constant heterogeneity between years. Because we have a longer series of temporal data in the contemporary period (2008-2023), this allows for the use of a panel dataset comprising each ZCTA from 2008-2021. This two-way fixed effects model effectively models within-unit time variation that is not shared across all years, and the causal identification of our estimated police shooting effect (presence or the rate) on each health outcome relies upon the assumption that the remaining time variance is independent of unobserved variables. To strengthen our causal inference, we include a bevy of time-varying controls including the homicide rate, demographic and economic changes, and other measures of police behavior (e.g., stops, other uses of force). In Aim 3, we quantitatively assess the extent to which police shootings mediate the relationship between historical structural racism and contemporary health outcomes. Therefore, we use a counterfactual mediation approach[28] to trace connections between historical legacies of racial exclusion and the contemporary distributions of health outcomes and disparities as shown in Figure 1. Conventional regression mediation estimators on longitudinal data assume that there is no exposure-induced mediator outcome confounding. In other words, conventional mediation approaches estimate the marginal change in exposure status when *nothing else* changes (also known as the cross-world independence assumption). In this complex social process of racism, policing, and health, this is an untenable assumption. It is hard to imagine a counterfactual world in which historical exclusionary processes change, impact police shootings, and are *completely alike in all other respects*.

Qualitative Interview Design (Aim 4). We propose to conduct 40 semi-structured interviews to understand how police shootings affect health outcomes, and how strategies of resilience used by community members may shape these processes (Aim 4). We will interview residents of Twin City-area ZTCAs that have experienced a recent (2015-present) police shootings. Interviews allow our analysis to identify potential mechanisms, including police shooting-induced stress perceptions, coping behaviors, and resiliency, that link exposure to police shootings to residents' health outcomes. We will recruit participants by working with local health organizations (i.e., community health clinics) to reach adult clients who live in an eligible ZTCA. We will also recruit prospective participants by mailing study invitations to eligible ZTCA addresses and screen responding individuals for eligibility. The interviews will focus on a discussion of residents' perceptions of their general health and health behaviors, well-being and stress, their attitudes towards community and police gun violence, and their perceived stress and emotional and problem-solving coping strategies following a police shooting.

What are the qualifications and experience of the proposed research team? Our interdisciplinary research team is well-positioned for this research, having produced several manuscripts on police violence,[29,30] firearm assault injury,[29] and related phenomena.[31] N. Jeanie Santaularia PhD MPH (MPI) is an Assistant Professor at the University of Washington School of Public Health. She is a trained social epidemiologist with substantive

and methodological expertise in violence prevention.[32,33] Her current research examines how social and institutional determinants cumulatively influence violence over the life course and the role of community, psychosocial and family protective factors in offsetting negative outcomes due to violence.[34,35] Ryan Larson(MPI) is an Assistant Professor of Criminology at Hamline University. He is a sociologist and criminologist whose research broadly examines the social consequences of punishment and policing on crime, stratification, and other aspects of social life. His recent research has focused on tracing the spatially-variant health consequences of police violence, investigating the criminogenic effects of punishment on violence via the augmentation of community disadvantage.[29,31] Christopher Robertson(Co-investigator) is a Ph.D. candidate in Sociology at the University of Minnesota and a Robert Wood Johnson Foundation Health Policy Research Scholar. His research examines how criminal justice contact, especially policing and probation, perpetuate influence population health and how individuals make sense of policing, police violence and community safety.[36,37]Christopher Uggen(Co-investigator) is Regents Professor and Martindale Chair at the University of Minnesota with longstanding interest in violence, health, and population dynamics, including his most recent book, *Prison and Health in the Age of Mass Incarceration* (2022, Oxford). His research has focused on estimating the effects of punishment on violence, employment and crime, the rate and number of people convicted of felonies in each U.S. state over the past 40 years, and the health effects of incarceration.

What is the expected completion date?This will be a 2-year study: January 1, 2024 to December 30, 2025.

What is the budget for the project? This will be a 2-year study from January 1, 2024 through December 31, 2025. Our proposed budget for the full project is $250,000 in total costs. This will support efforts by the investigation team, a graduate research assistant, incentives for aim 4, as well as processes for accessing the data and dissemination of the study findings.

Total Salary and Fringe	79,231
Total Other Services	150,846
Travel	6,000
Total Direct Cost	236,077
Indirect Cost Base	139,031
Total Indirect Cost	13,904
Total Cost	249,981

How will you disseminate the results and to whom? Who will be responsible for this dissemination?
Given the strength of this interdisciplinary team, we will prepare several peer reviewed papers at high impact factor (American Journal of Epidemiology and American Journal of Sociology); several public-facing research briefs, and several press releases. In addition, all of our manuscripts, reports, analytic code, and data (when ethically allowable) will be made publicly available for an added layer of transparency and accountability. We will present our findings at national academic meetings, such as the American Society of Criminology, Society for Epidemiologic Research, and Society for Advancement of Violence and Injury Research. We will promote our findings using our own academic social media accounts as well as our Universities' websites.

Are there other funders for this project? Do you have any proposals pending or do you plan to submit other proposals to support all or a portion of the project? No.

How will the project incorporate an equity lens into the analysis? Our project is rooted in equity. We seek to understand the modern-day mechanism, police shootings, role in the historical processes of structural racism, and the (re)production of firearm injury and other contemporary health problems. Our qualitative aim will enhance understanding of the impact of police violence on population health by identifying potential mechanisms, such as resiliency, that shape the health consequences of police shooting exposure.

How will the project diversify the pool of researchers working in the field of gun violence prevention?
Dr. Santaularia and Christopher Robertson are both scholars from historically-excluded racial/ethnic groups who are new to firearm violence prevention research. In addition, Dr. Larson is relatively new to firearm violence prevention. This project will provide the collective opportunity to become more familiar with the field of firearm violence prevention, to gain policy-oriented training, and to gain training in epidemiological methods.

Please do not hesitate to contact me if I can provide additional information. Thank you for your consideration.,

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