

Concept Proposal – Add Health Ancillary Studies

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Firearm violence is a significant public health issue in the United States that resulted in 48,830 deaths in 2021, including 20,958 fatalities from homicide. Beyond the toll of fatal shootings, thousands of individuals experience nonfatal gunshot victimization or are vicariously exposed to firearm violence in their local community each year. Consequently, personal or vicarious exposure to fatal or nonfatal firearm violence can significantly impact physical and psychological well-being. However, research on exposure to firearm violence and health has been severely restricted due to limitations with existing data sources. First, many studies rely on ecological data, linking aggregate levels of firearm violence to population health. However, these data cannot measure individual-level health responses to firearm violence. Second, existing individual-level data relies on self-reported personal or vicarious exposure to firearm violence but lacks information on objective gun violence measures in one's community. Third, research studies often cannot disentangle the impacts of fatal and nonfatal firearm shootings on health.

To overcome these limitations, we propose to link novel data from americanviolence.org. American Violence gathers shooting data from the [Gun Violence Archive](http://GunViolenceArchive.org), which uses over 7,500 sources to collect shooting data, including the data of the event and geocoded location of the shooting. Using these data, we will link the total number of fatal and nonfatal shooting events at the census tract level from 99 cities for 2014-2018 to Wave V of Add Health study. This data linkage will create the first dataset with both fatal and nonfatal shootings at the census tract level and rich individual-level data capturing health among adults in the United States. We will use this novel dataset to assess the impacts of community firearm violence on mental and physical health, and health behaviors of adults in the United States. While we focus on linking existing firearm violence data to Wave V, a benefit of this proposal is that because both Add Health and American Violence data collection are ongoing, additional linkage can be performed at the release of the Wave VI Add Health data, enabling a novel assessment of the long-term impacts of firearm violence exposure over time.

For this ancillary study, we propose the linkage of **10 total variables** at the census tract level, which measure fatal and nonfatal firearm shootings ($n = 2$) for years 2014-2018 ($t = 5$; $n * t = 10$) listed in the table below which describe the variable, source, unit of analysis, number of census tracts of availability, and years of availability. Data will be used to address the following questions:

Q1: What is the relationship between fatal and non-fatal firearm violence events at the census tract level and individuals' mental health (depressive symptoms; perceived stress) and physical health (general self-rated health; functional limitations)?

Q2: What is the relationship between fatal and non-fatal firearm violence events at the census tract level and individuals' health behaviors (sleep; substance use; dietary patterns)?

Q3: What is the relationship between fatal and non-fatal firearm violence events at the census tract level and individuals' health measured by biomarkers (i.e., c-reactive protein; blood pressure)?

Variable	Source	Definition	Unit of Analysis	Number of Census Tracts	Years of Availability
Fatal Firearm Shootings	americanviolence.org	Number of victims killed in shooting incidents involving multiple individuals	Census Tract	15,882	2014-2018
Nonfatal Firearm Shootings	americanviolence.org	Number of victims injured in shooting incidents involving multiple individuals	Census Tract	15,882	2014-2018

Gentrification, Retail Environments, and Chronic Disease Risk

Add Health Ancillary Study Concept Proposal

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Background and Study Overview

Evidence is emerging about associations between gentrification and health, but this research is limited by lack of longitudinal data. Studies to date mainly use a cross-sectional or repeated cross-sectional design, leading to selection bias because 1) new residents (i.e., gentrifiers) are included in analyses and 2) original residents who stay in a neighborhood that gentrifies may have more health-enhancing resources than those who move.^{1,2} Longitudinal research following original residents who move *from* a gentrified neighborhood is needed to understand potential impacts on health and health equity.¹ To address this important gap, we propose leveraging the nationally representative, longitudinal design of Add Health to examine differences in individuals' neighborhood environments, behaviors, and health outcomes among low-income residents of low-income neighborhoods who experienced gentrification from Wave 3 to Wave 4 vs. those who did not.

Specifically, we propose linking measures of gentrification and neighborhood food and tobacco retail environments to Add Health participants using census tracts previously identified using geocoded residential addresses. We then plan to analyze associations between gentrification and:

- 1) Changes in access to food and tobacco retail from Wave 3 to 4,
- 2) Metabolic syndrome at Wave 4, as mediated through health of the food environment, fast food consumption, food insecurity, housing insecurity, and stress, and
- 3) Smoking at Wave 4, as mediated through access to tobacco retail.

Future research could use linked data to examine associations between gentrification and additional social, behavioral, and health outcomes, as well as between retail access and these outcomes.

Linked Variables: Gentrification

In keeping with previous research,³⁻⁵ we propose measuring gentrification by comparing census tract level changes in housing prices (median rent, median home value) and neighborhood socioeconomic status (SES) (proportion of residents aged 25+ with a bachelor's degree) to changes in the corresponding metropolitan statistical area (MSA). Following a definition proposed for use in national, longitudinal health studies,³ if neighborhood SES and housing prices increase at a faster rate in the census tract than in the MSA, the census tract will be marked as gentrified, with a 50-75th percentile increase in housing prices indicating "gentrification" and an above-75th percentile increase in housing prices indicating "intense gentrification." For tracts outside of urban areas, census tract level changes will be compared with the corresponding state.

Linked Variables: Food and Tobacco Retail

Access to food and tobacco retail have been identified as important contextual determinants of health. Initial evidence suggests that tobacco retail density is associated with smoking⁶ and related health outcomes.⁷⁻⁹ Evidence on the impact of food retail access on dietary behavior and related health outcomes is mixed,¹⁰⁻¹³ nonetheless access to food retail has been identified as an important component of nutrition equity.^{14,15} There are currently no measures of tobacco retail linked to Add Health. Although some food retail measures are currently available at Waves 3 and 4, these measures are not comparable across waves. Wave 3 measures from the Obesity and Neighborhood Environment study include Euclidian and network distance between residential addresses and the closest store for a variety of store types and food outlets, as well as counts of these store types and food outlets within specified Euclidian and network buffers.¹⁶ Meanwhile, Wave 4 includes a census tract level measure of the Modified Retail Food Environment Index (mRFEI), a ratio of healthy food outlets to all food outlets.¹⁷ Because the measures are different across waves, longitudinal analyses involving change in individual exposure to food retail are not possible.

To consistently measure retail access across waves, we propose linking census tract level counts of distinct store types derived from National Establishment Time-Series data in Waves 3 and 4. In addition to the analyses described above, longitudinally consistent measures of food and tobacco retail environments will allow for research on associations between retail environment change, behavior change, and change in health risk biomarkers such as BMI, providing more robust evidence than is possible with the currently available data.

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