

The Ripple Effect of Firearms

How Families, Communities,
and Society in the U.S.
Are Affected by Firearms



**United
Hospital Fund**

*Improving Health Care
for Every New Yorker*

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Acknowledgments

This chartbook was written by Giovanna Braganza, Alexandra Brandes, and Joan Guzik of United Hospital Fund (UHF). This analysis was produced as a collaboration between UHF and Boston Consulting Group (BCG) through a pro bono engagement. Special thanks to Caitlin Mullins, Daisy Bourne, and Michael Kahn, working under the direction of

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UHF works to build an effective and equitable health care system for every New Yorker. An independent, nonprofit organization, we are a force for improvement, analyzing public policy to inform decision-makers, finding common ground among diverse stakeholders, and developing and supporting innovative programs that improve health and health care. We work to dismantle barriers in health policy and health care delivery that prevent equitable opportunities for health. For more on our initiatives and programs, please visit our website at www.uhfnyc.org and follow us on Twitter.

Objectives

UHF partnered with the Boston Consulting Group (BCG) to analyze the impact of gun violence on people nationwide and in New York specifically. The working group's objectives were to: 1) develop a baseline analysis of how many people in the U.S., New York State, and New York City are affected by gun violence and who is disproportionately affected; and 2) to assess the direct and indirect impact of gun violence on society, personal life, and health care—and how they intersect.

A detailed methodology is available upon request. Please contact: info@uhfnyc.org.

Key findings



Firearms ranked as the leading cause of death for children in 2020, overtaking motor vehicle accidents.¹



The 85% death rate from firearm suicide attempts² drives 50+% of all firearm deaths.³



Nationally, annual lost wages due to fatal and non-fatal firearm injuries are estimated to be over \$1.5 billion. The annual direct medical costs of firearm injuries are approximately \$2.2 billion.

¹ Kaiser Family Foundation; KFF.org.

² Harvard Public Health Magazine, Guns & Suicide, August 16th, 2016.

³ CDC Provisional Mortality Statistics, 2021.

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Introduction: Gun violence as a public health problem

Gun violence has become so ubiquitous in the U.S. that, despite its uniqueness as a problem compared to other countries, it often appears to go without notice except by the victims, their families, and communities. Only mass casualty gun violence, typically a mass shooting or a surge in community shootings, consistently makes headlines. This normalization has desensitized us to the tremendous toll gun violence is exacting on our communities. As gun violence is a leading cause of death and significant cause of trauma and disability, across all age groups and communities, it is imperative to look at gun violence as a public health problem.

There were a record number of firearm deaths in 2021. It was more than any point since 1981, when the Centers for Disease Control and Prevention (CDC) started tracking firearm deaths. The rate of gun violence in 2021 was the highest it has been since it peaked in 1990. 2021 represented a historical peak in firearm death rates for some demographic groups, specifically Black men ages 20-24, white men ages 80-84, and Black and white women of all ages.

Using a public health framework and analytic approach, UHF partnered with the Boston Consulting Group to analyze the impact of gun violence on people nationwide and in New York specifically.

The devastating toll of gun violence on communities across the U.S. highlights the need to treat it as a public health problem at national, state, and community levels.

This report shows the compelling need to address gun violence, how it compares to other public health problems, and why more research is needed. The ban on federal funding for gun violence prevention research was recently lifted, presenting an opportunity to research gun violence prevention and treatment.

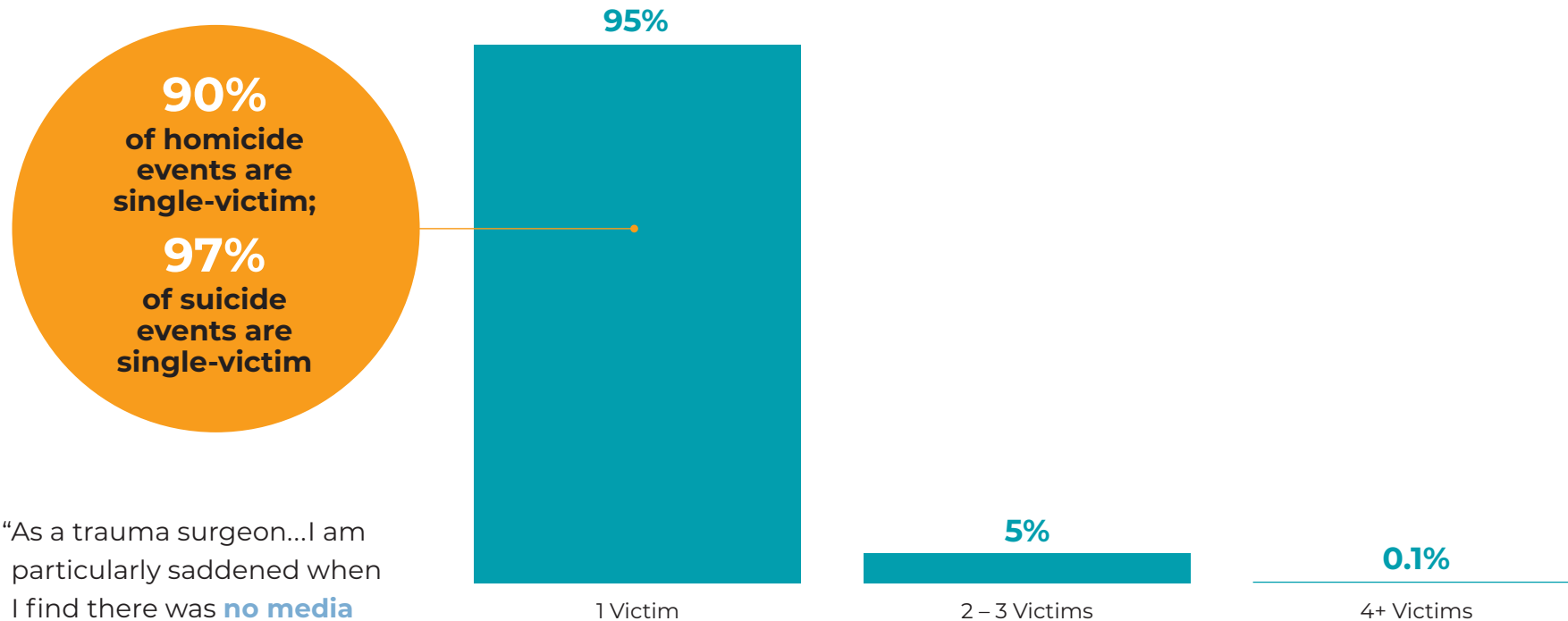
Following the increase in gun violence in New York during the COVID-19 pandemic, and the recent high-profile mass shooting in Buffalo, UHF will focus on gun violence as a public health problem with a series of commentaries expanding beyond the work in this joint UHF-BCG report.

Key findings from New York City

- **NYC accounts for 33% of all firearm fatalities in New York State**
- **Black New Yorkers make up 24% of the NYC population but account for 71% of all NYC shooting victims**
- **50% of shootings occur in zip codes with a median household income below \$50,000, despite such zip codes comprising only 24% of the population**

Figure 1

Estimated fatal firearm incidents in U.S. by victim count, 2018-2019



“As a trauma surgeon...I am particularly saddened when I find there was **no media reporting on the shootings that have caused injury and death to my patients.**”⁴

—Elinore Kaufman, MD, assistant professor of Surgery in Traumatology in the Perelman School of Medicine at the University of Pennsylvania

Center for Disease Control & Prevention (CDC), National Violent Death Reporting System (NVDRS).

NOTES:

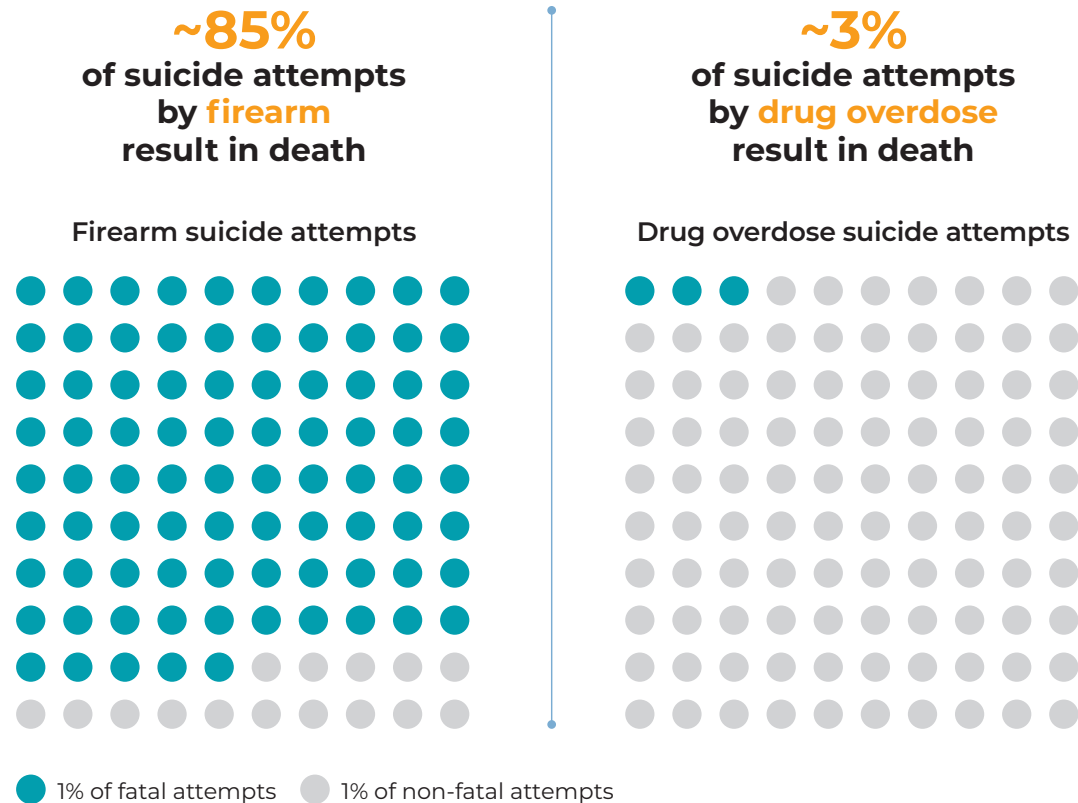
1. NVDRS.
2. CDC Underlying Cause of Death Data, 2018-2019, excluding states that do not report to NVDRS.
3. Everytown Mass Shooting Database, excluding states that do not report to NVDRS.
4. Otto, Frank, “Media’s reporting on gun violence does not reflect reality”, PennToday (2020).

Figure 2

Firearm suicide attempts versus drug-related suicide attempts

Firearm suicide attempts are significantly more lethal than drug-related suicide attempts

The stigma of suicide obscures its prevalence. More than half of firearm deaths are suicides, and more than half of people who died by suicide used a firearm. Even though most people who *attempt* suicide do so with drugs, most people who *die* by suicide do so with a firearm. The absolute lethality of firearms means people who attempt firearm suicide are very unlikely to survive, compared to other means of suicide.



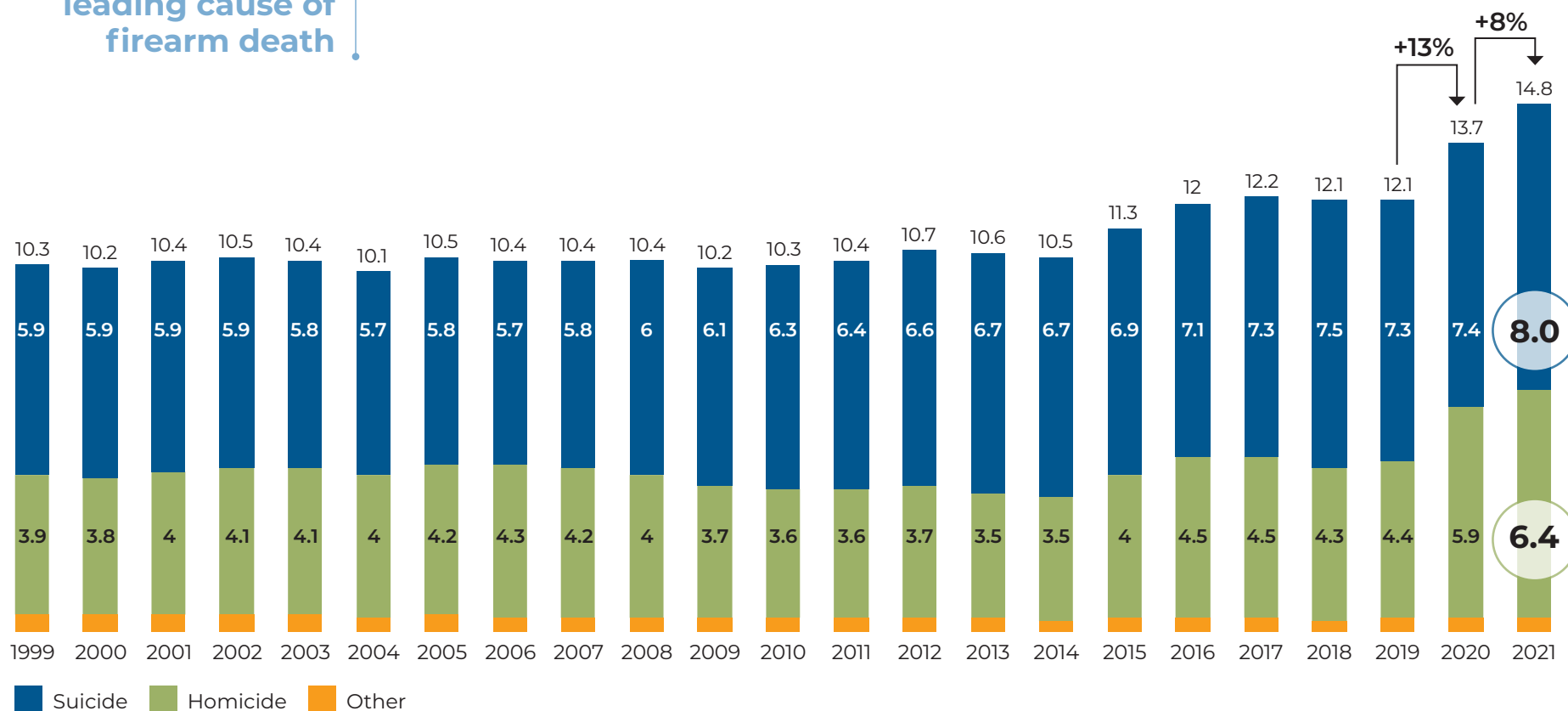
NOTES:

1. CDC Underlying Cause of Death, 2012-2020 & Provisional 2021 Data, 49k total firearm deaths, 26k firearm suicides.
2. Harvard Public Health Magazine, Guns & Suicide August 16th, 2016.
3. Brady United Against Gun Violence, The Truth about Suicide and Guns (2021), <https://brady-static.s3.amazonaws.com/Gun-Suicide-Prevention.pdf>.
4. Figures for 2021 use complete but provisional data from the CDC pulled in September, 2022. Precedent from past years indicates figures may change by ~1% once finalized.

Despite the increase
in homicides,
suicides are still the
leading cause of
firearm death

Figure 3

Estimated rate of firearm fatalities by injury intent in the U.S., 1999–2021 (per 100,000 residents)



Sources: CDC Underlying Cause of Death, 1999–2020; CDC Provisional Mortality Statistics, 2021.

NOTES:

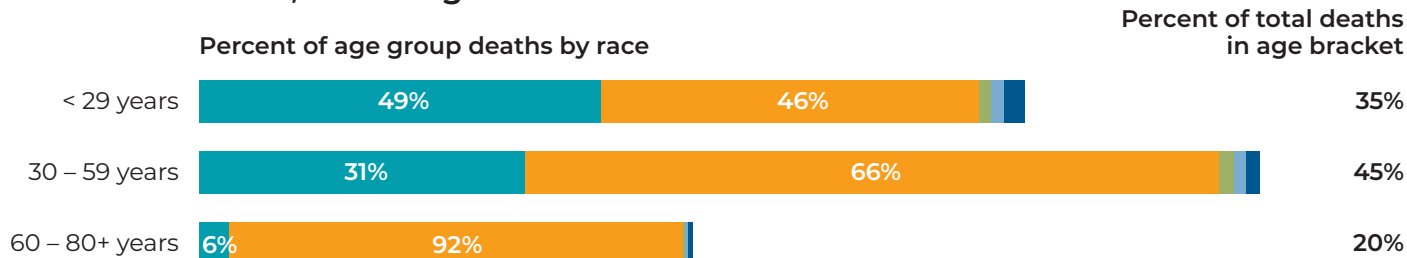
1. Per the CDC's figures and methodology, 2021 crude rate per 100,000 uses vintage 2020 population estimates from the U.S. Census.
2. Figures for 2021 use complete but provisional data from the CDC pulled in September, 2022. Precedent from past years indicates figures may change by ~1% once finalized.

Figure 4

Racial disparities in firearm fatalities

Your race, age, gender, and zip code determine how likely you are to die from gun violence. White men over 50 in rural areas are most likely to die of firearm suicide. The highest rate of firearm suicide is among white men aged 80-84. For Black men in their early 20s, gun homicide is the leading cause of death. Nationally, 32% of firearm fatality victims are Black, though Black people make up only 14% of the population. Black women had a maximum fatality rate for firearm homicide 9 times the rate of white women and 4.5 times the rate of Latina women.

Firearm fatalities, including suicides



Firearm fatalities, excluding suicides



NOTES:

1. CDC Provisional Mortality Statistics, 2021.
2. CDC Underlying Cause of Death Data, 2018-2020 & CDC Provisional Mortality Statistics, 2021.
3. Death certificates are compiled in CDC WONDER mortality data. Consistent with U.S. Office of Management and Budget standards, there are 4 race categories and a separate Hispanic origin category. Data limitations do not permit analysis of firearm deaths by cause, age, race, and Hispanic origin. As such, Hispanic origin is not distinguished in this data visualization.
4. Rees et al, "Trends and Disparities in Firearm Fatalities in the United States 1990-2021" (2022), JAMA, <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2799021>.
5. Figures for 2021 use complete but provisional data from the CDC pulled in September, 2022. Precedent from past years indicates figures may change by ~1% once finalized.

Figure 5

Firearms are the leading cause of death for children in the U.S.

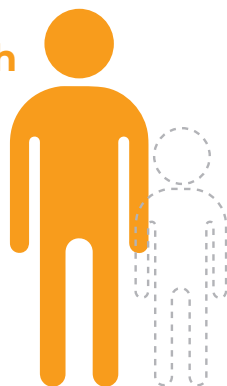
In 2020, approximately 7,000 parents lost a child to gun violence. In 2021, an estimated 4,000 children lost a sibling through gun violence. Many children are also unlikely to reach adulthood without exposure to gun violence.

In 2021...

13 children* were killed by guns **every day**



Firearms were the
#1 cause of death
for children in 2020



30,000 children
lost a parent
to gun violence in 2021



* Children defined as ages 0 – 19.

NOTES:

1. Kaiser Family Foundation (KFF); U.S. data from 2020.
2. An estimated 65% of the 4,357 firearm deaths were homicide, 30% were suicides, 3% accidental, 2% undetermined.
3. Figures for 2021 use complete but provisional data from the CDC pulled in September 2022. Precedent from past years indicates figures may change by ~1% once finalized.
4. Everytown, The Impact of Gun Violence on Children and Teens (2019), <https://everytownresearch.org/report/the-impact-of-gun-violence-on-children-and-teens/>.

A firearm makes domestic violence 5 times more likely to result in death

Despite data limitations, the available data demonstrate that firearms make gender-based violence more lethal. Women, particularly Black women and Black trans women, are significantly more likely to be killed by a firearm. For example, Black trans women accounted for 69% of all trans gun homicides in the U.S., even though they are only estimated to account for 13% of the trans community. Although men are more likely to die by firearm across all age groups, the intersection of gun violence and gender-based violence is undeniable in the data.

Figure 6

Contribution of firearms to gender-based violence

More than **half of all women** killed by a firearm were victims of intimate partner violence.



Women who are Black are **3 times more likely** to be killed by a firearm than women who are white, based on annual fatality rate.



Black trans women accounted for **69% of all trans gun homicides** in the U.S.



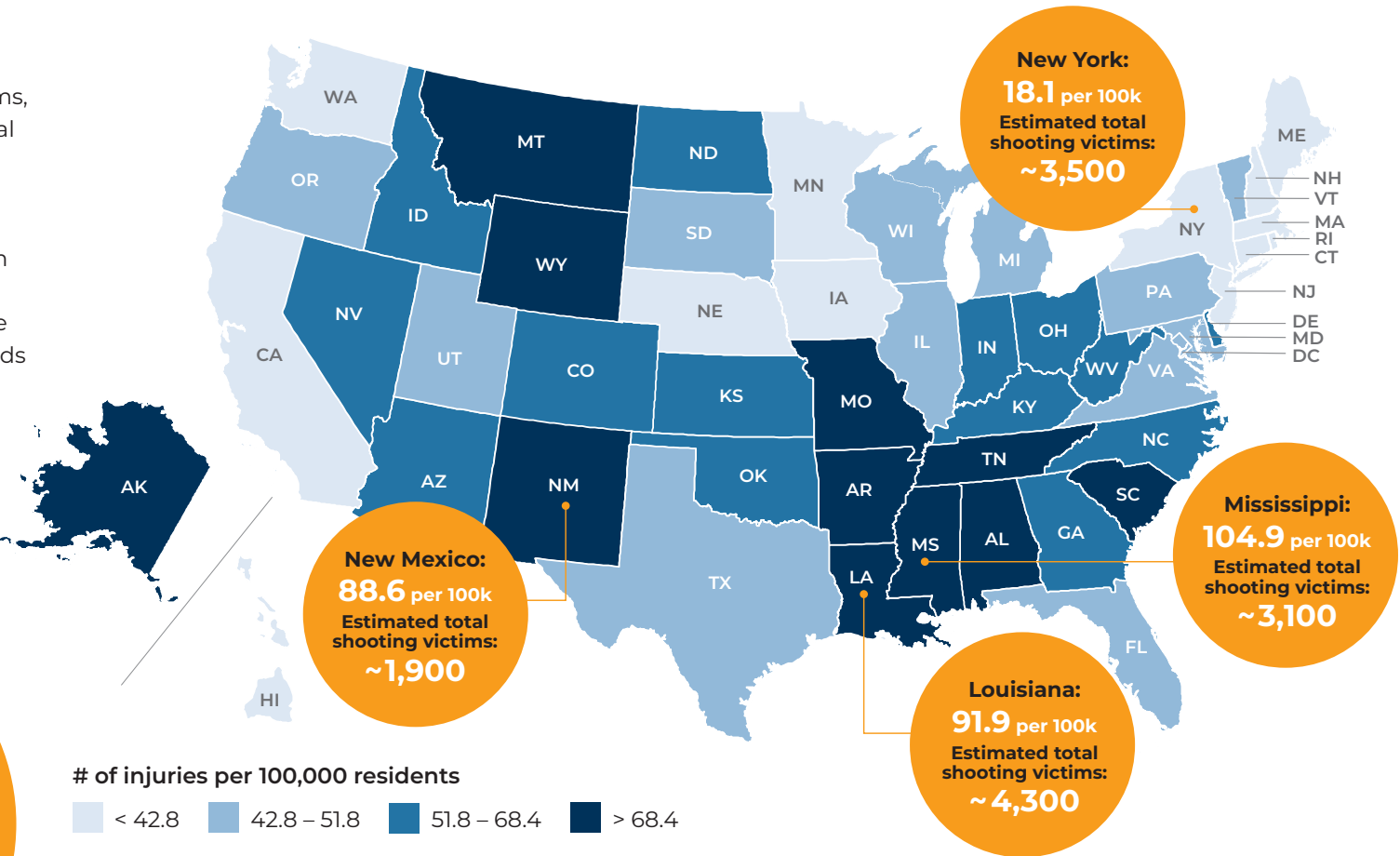
NOTES:

1. Petrosky et al., "Racial and Ethnic Differences in Homicides of Adult Women and the Role of Intimate Partner Violence—United States, 2003–2014" (2017).
2. Campbell et al., "Risk factors for femicide in abusive relationships: results from a multisite case control study" (2003).
3. Violence Policy Center, "When Men Murder Women: An Analysis of 2020 Homicide Data" (2022).
4. National Coalition Against Domestic Violence, "Domestic Violence and Firearms Homicides" (2022).
5. Everytown, Remembering and Honoring Pulse, Anti-LGBTQ+ Bias and Guns are Taking Lives of Countless LGBTQ+ People (2022), <https://everytownresearch.org/report/remembering-and-honoring-pulse/>.

Figure 7

Firearm injury rates by state, 2021

When looking at the impact of firearms, we considered both fatal and non-fatal injuries due to firearms; an estimated 160,000 individuals were injured by guns in 2021. Southern states have the highest per-capita rates of firearm fatalities, while New York ranks 48th. The overall rate of firearm injury in the U.S. is 48 per 100,000, which far exceeds that of other high-income countries. A concerted national approach focusing on reducing firearm homicides and suicides could lower the incidence of firearm injuries across the country.



Sources: CDC Provisional Mortality Statistics, 2021; Miller, Schnippel et al., "Nonfatal Firearm Injuries by Intent in the United States: 2016-2018 Hospital Discharge Records from the Healthcare Cost and Utilization Project", 2021; Kaufman et al., "Epidemiologic trends in fatal and nonfatal firearm injuries in the US, 2009-2017", 2020; Gani et al., "Emergency Department Visits For Firearm-Related Injuries In The United States, 2006-14", 2017.

NOTES:

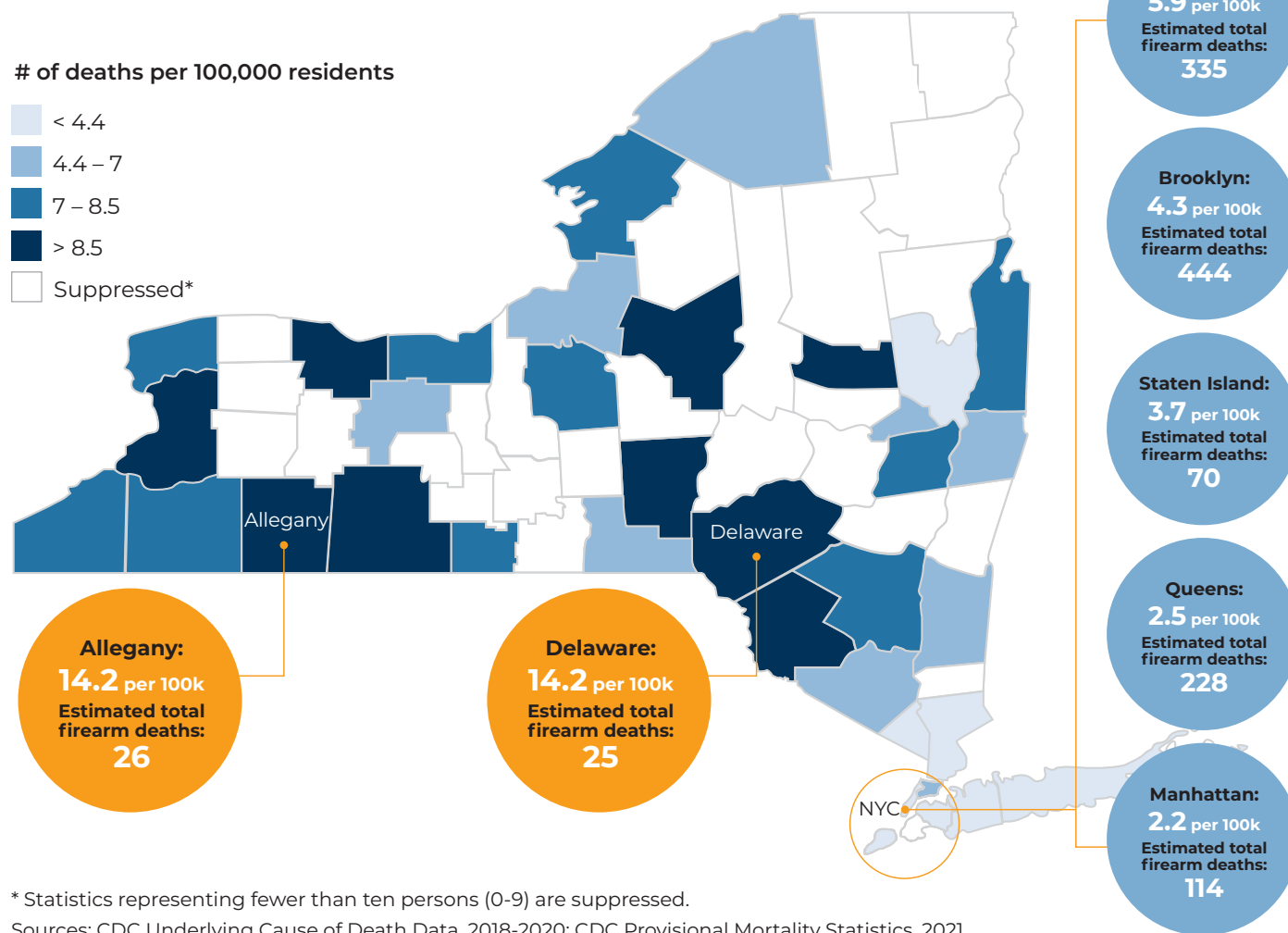
1. Per the CDC's figures and methodology, 2021 crude rate per 100,000 uses vintage 2020 population estimates from the U.S. Census.
2. Figures for 2021 use complete but provisional data from the CDC pulled in September 2022. Precedent from past years indicates figures may change by ~1% once finalized.

Allegany and Delaware counties have the highest per-capita rate of firearm fatalities in New York

Given its large population, more New Yorkers die by firearm than residents of most other states—even though New York has one of the *lowest* per-capita firearm death rates in the country. Over a thousand New Yorkers died by firearm in 2021. It is a common misconception that gun violence is mostly an urban problem; across the nation, as in New York, gun violence has significant impacts on rural areas as well. Only 33% of the firearm deaths were in NYC, despite it being home to 43% of New Yorkers. Upstate counties have the highest rates of firearm deaths in the state; over 84% of firearm fatalities in Allegany and Delaware counties were the result of suicides.

Figure 8

Firearm death rates by county, 2018-2021



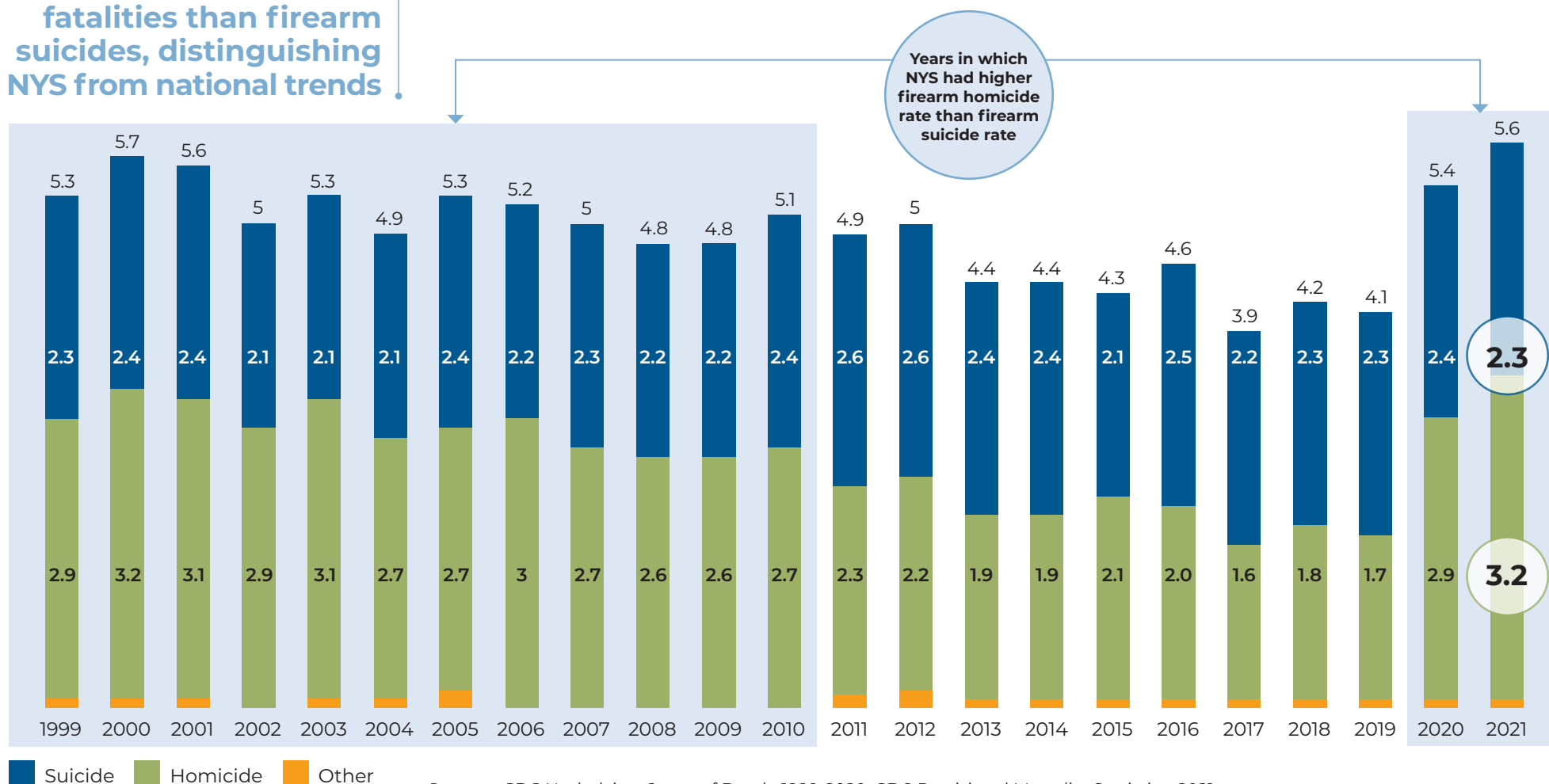
NOTES:

1. Per the CDC's figures and methodology, 2021 crude rate per 100,000 uses vintage 2020 population estimates from the U.S. Census; over 84% of firearm fatalities in Allegany and Delaware counties are the result of suicides.
2. Figures for 2021 use complete but provisional data from the CDC pulled in September 2022. Precedent from past years indicates figures may change by ~1% once finalized.

For the first time in over a decade, in 2020 and 2021, firearm homicides accounted for more fatalities than firearm suicides, distinguishing NYS from national trends.

Figure 9

Estimated rate of firearm fatalities by injury intent in New York State, 1999–2021 (per 100,000 residents)



Sources: CDC Underlying Cause of Death, 1999–2020; CDC Provisional Mortality Statistics, 2021.

NOTE:

Per the CDC's figures and methodology, 2021 crude rate per 100,000 uses vintage 2020 population estimates from the U.S. Census.

50% of all firearm fatalities in NYC take place in zip codes with a median income below \$50,000

The geographic, racial, and socio-economic disparities that exist in NYC are further magnified when looking at firearm fatalities. Half of all firearm fatalities occur in zip codes where the median household income was less than \$50,000, though these are home to only 24% of the NYC population. Black people are overrepresented in these low-income neighborhoods. Only 24% of NYC residents are Black, but they account for 71% of firearm fatality victims in the city.

Generations of systemic disinvestment in Black communities have created neighborhoods with high rates of firearm death. The neighborhoods with the highest rates of gun violence today reflect the redlining maps dating back to the 1930s. Surges in gun violence in these zip codes further perpetuate poverty and chronic disinvestment by reducing local business and by slowing the growth of home values.

Figure 10

Estimated rate of firearm fatalities in NYC by zip code, 2018–2021

of firearm fatalities per 100,000 residents*

< 1.65

1.65 – 6.86

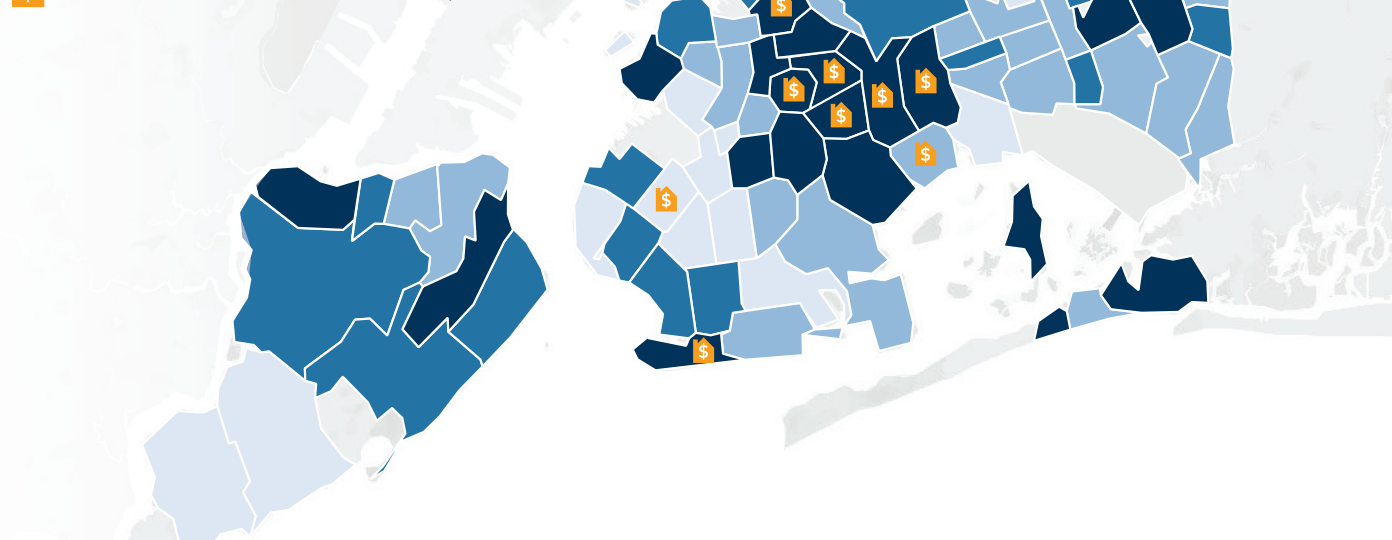
6.86 – 19.55

> 19.55

Data unavailable

* Exclusive of upper limit

\$ Median household income < \$50,000



Sources: NYPD Shooting Data; US Census 2020 ACS 5-year Estimates; Urban Institute: Economic Impacts of Gun Violence; US Bureau of Labor Statistics.

NOTES:

1. NYPD data deduplicated on incident key for incident-level analyses and deduplicated on victim for victim-level analyses.
2. Uzzi M, et al. An Intersectional Analysis of Historical and Contemporary Structural Racism on Non-Fatal Shootings in Baltimore, Maryland, *Inj Prev* (2022) doi:10.1136/ip-2022-044700.

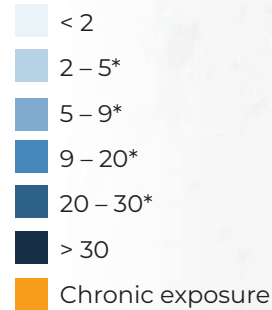
The trauma of gun violence, whether through the loss of a family member or witnessing a shooting—consistent with other adverse childhood experiences (ACEs)—increases the likelihood for chronic health problems, severe mental illness, and substance use disorders later in life. Children in zip codes with a higher prevalence of gun violence are likely to be chronically exposed, compounding the effects and likelihood of additional ACEs.

**Approximately
66,000
children in NYC live
in a zip code with
chronic gun violence
exposure**

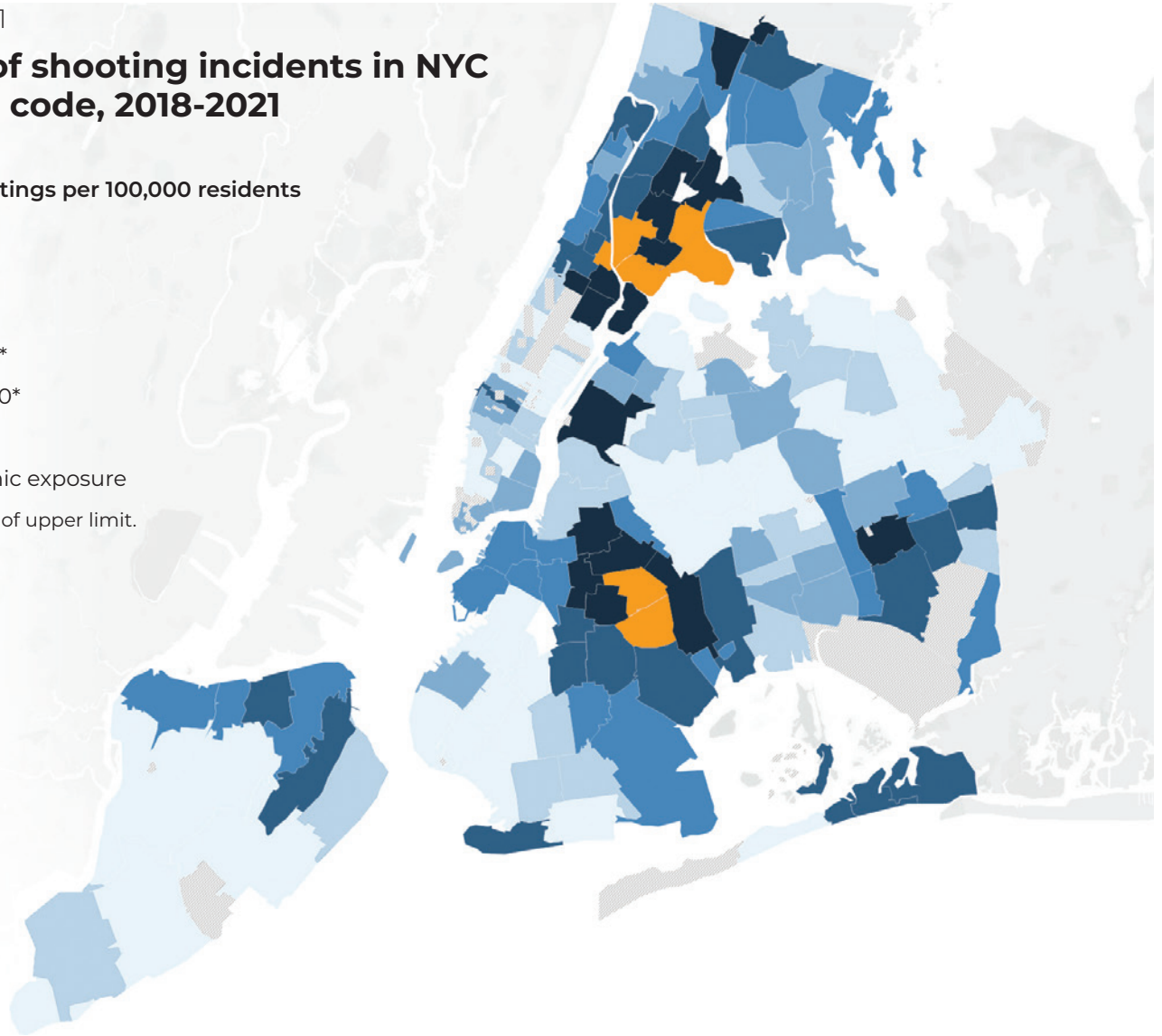
Figure 11

Rate of shooting incidents in NYC by zip code, 2018-2021

of shootings per 100,000 residents



* Exclusive of upper limit.



Sources: NYPD Shooting Data; US Census 2020 ACS 5-year Estimates.

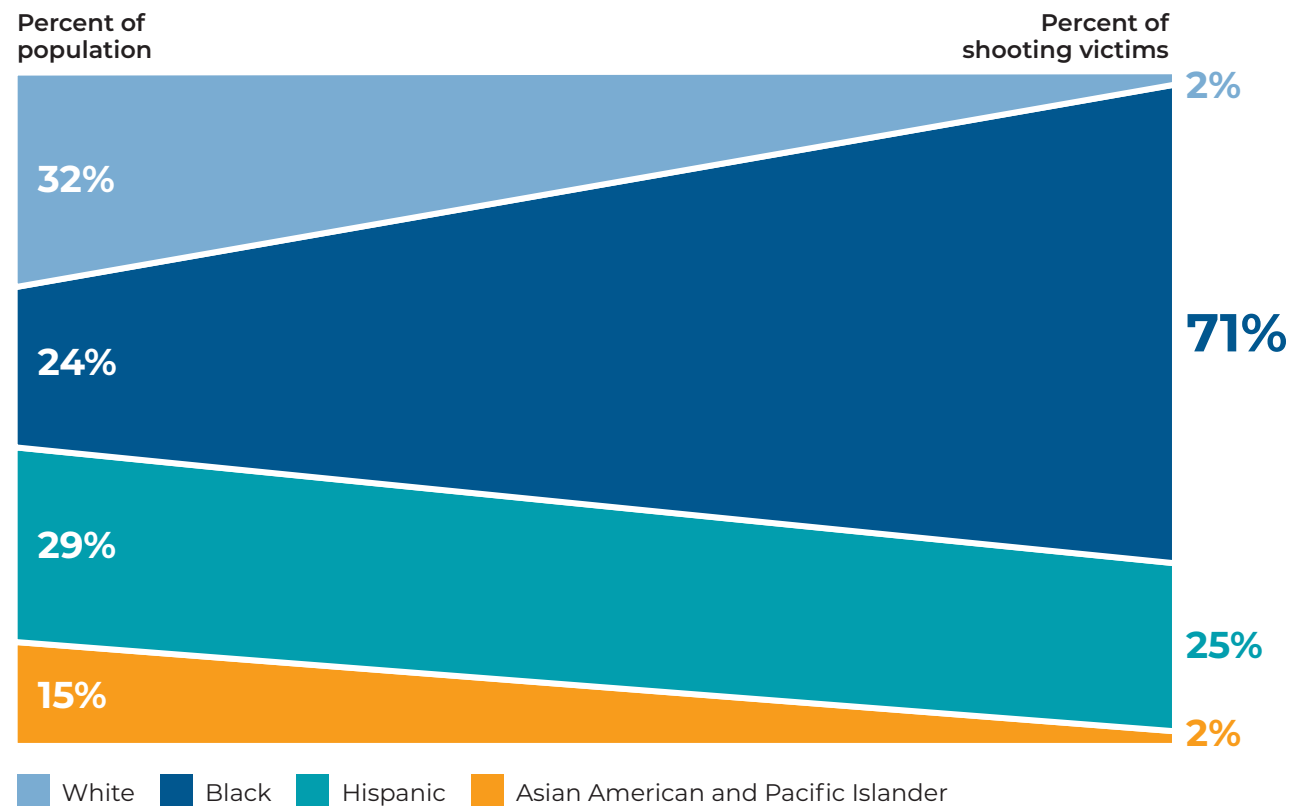
NOTES:

1. NYPD data deduplicated on incident key for incident-level analyses and deduplicated on victim for victim-level analyses.
2. Chronic exposure defined by working group as an average per capita rate > 40, highest 10 zip codes, 2 out of 4 years or more, and a per capita rate > 36 in at least 2 out of 4 years, 2018-2021.

**In New York City,
Black people make
up 24% of the
population but
account for 71% of all
shooting victims**

Figure 12

Racial disparities in shooting victims in New York City, 2018-2021



Sources: NYPD Shooting Incident Data, 2018-2020; U.S. Census QuickFacts, New York City, New York; Urban Institute: Economic Impacts of Gun Violence; US Bureau of Labor Statistics.

NOTE:

Potential duplicate victims in NYPD data removed based on unique incident ID and victim characteristics.

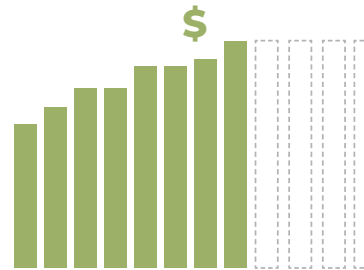
Figure 13

Long-term economic and societal costs

The most horrific aspect of gun violence is the lives lost and the lives forever traumatized because of it. In addition to the human toll, gun violence has a significant economic toll. The annual lost wages due to fatal and non-fatal firearm injuries top \$1.5 billion. The annual direct medical costs of firearm injuries are \$2.2 billion. Preventing gun violence has both immediate and long-term implications to society, and it will require cross-sector interventions and approaches.



\$563 billion
in lifetime quality-
adjusted **life-years** lost



\$47 billion
in lifetime
income lost



\$4 billion
in lifetime **Adverse**
Childhood Experiences

**A single
firearm fatality
can cost a
neighborhood up
to an estimated
\$3.3 million
from closed
businesses and
lost economic
opportunities**



550,000
children lose a **parent**
every generation



125,000
parents lose a **child**
every generation

NOTE:

Years of potential life lost, or premature death, are calculated by subtracting the age at death from 75 and summing across all deaths. This provides a measure of the productive years that would have been lived, worked, and spent with family without premature death.

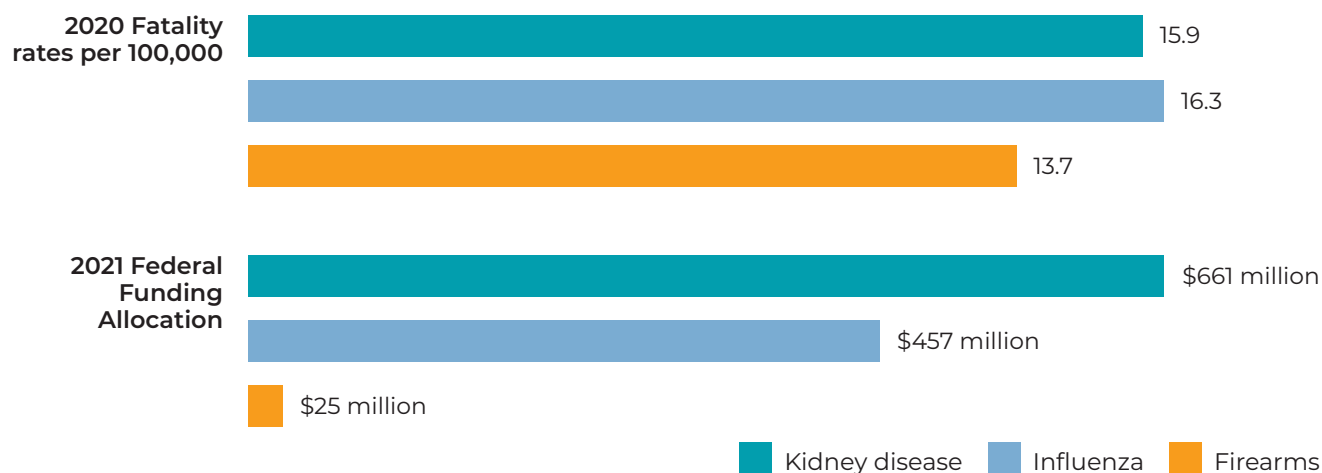
Firearm research is chronically underfunded, leading to a lack of robust data to fully catalog and track the impact of gun violence

Disparities in federal research funding make gun violence the second-most neglected leading cause of death. From 1997 – 2018, the Centers for Disease Control and Prevention and the National Institutes of Health were under a federal freeze that halted funding for gun violence research. Twenty years of underfunding has led to major gaps in research. Despite the tremendous toll of firearm injury and death, gun violence research only receives 2% of the funding expected based on the scope of the problem. The first \$25 million in federal funding dedicated to gun violence research was allocated in 2021. Gun violence is funded at about \$63 per life lost versus the median funding for leading causes of death, which is \$4,852 per life lost.

Figure 14

Firearm research is chronically underfunded

Gun violence receives <2% of funding expected based on the toll of the problem



Granular data would bolster future research

- Comprehensive, annual state-by-state information on shootings (e.g., # of shootings, severity, fatalities)
- Medical & mental health costs of shooting fatalities and injuries, by short- and long-term
- Effects of neighborhood gun violence (distinct from community violence) on community outcomes (e.g., childhood development)
- QALYs associated with fatal and non-fatal firearm injury, by severity

NOTES:

- Weir, Kirsten, "A thaw in the freeze on federal funding for gun violence and injury prevention research", APA (2021).
- Drane, Kelly "Here Are the Gun Violence Projects the CDC is Funding", giffords.org.
- CDC Underlying Cause of Death Data, 2020.
- NIH, "Estimates of Funding for Various Research, Condition, and Disease Categories" (2022).
- QALY stands for quality-adjusted life year.
- Fatality causes are not comprehensive, showcasing conditions with comparable rates to firearms.

Conclusion

The numbers presented in this report detail the unbearable human toll of gun violence. They also highlight the significant financial toll of gun violence as a key cause of death, injury, and trauma. Gun violence is a major and intersectional public health issue, disproportionately harming the most underserved communities. As more children and adults are killed, injured, and traumatized by gun violence, we must focus on prevention and treatment. Below is a list of priorities:

- Fund poverty reduction programs to reduce the disproportionate incidence of gun violence in low-income communities.
- Address structural, racial, socioeconomic, and geographic inequities in access to services and gun violence prevention programs.

- Reduce stigma of mental illness and suicide.
- Invest in research and evidenced-based prevention strategies.
- Coordinate across health care, law enforcement, child welfare agencies, domestic violence programs, schools, and community-based organizations so there is a “no wrong door” approach to receiving evidence-based prevention and post-gun violence episode services.

There is a great need for research, awareness, and investment from all levels of government. In the coming months, UHF will produce commentaries and other work related to gun violence to lend its expertise in research and policy to this critical issue for New Yorkers.

Key Definitions

Adverse Childhood Experiences (ACEs) are instances of childhood exposure to traumatic events that lead to poorer physical and mental health as well as other long-term consequences. ACEs are compounding in nature and children who experience multiple ACEs have more long-term effects than those who experience only one ACE.

Average Fatality Rate is a calculation that uses the average rate over the designated period of time (e.g., a quarter, a year, a decade, etc.) for every 100,000 people.

Gun Violence encompasses the use of a firearm to threaten or physically harm oneself or others. Community gun violence describes intentional acts of interpersonal gun violence committed in public places by individuals who are not intimately related to each other.

Harm reduction is a public health approach to managing high-risk behaviors which focuses on reducing the negative outcomes of the behavior.

Intimate Partner Violence describes violence between boyfriends, girlfriends, spouses, ex-spouses, heterosexual or same-sex partners, or ex-partners, whether the victim and offender lived together at the time of the incident or previously.

Maximum Fatality Rate is a calculation that uses the highest rate for any group within a specific demographic criterion (e.g., the age range of Black men with the highest fatality rate) for every 100,000 people.

Redlining maps are maps from the 1930s, showing neighborhoods where Black people and immigrants were allowed to live. Predominantly Black neighborhoods were deemed “undesirable” by the federal Home Owner’s Loan Corporation and, as such, were ineligible for federal loans and federal insurance for mortgages. The lack of access to mortgages prevented Black people from attaining home ownership and generational wealth accumulation. Even though the practice was made illegal in 1968, many studies have found that mortgage lending continues to be greater in neighborhoods with large white populations and that redlining persists in most metro areas across the U.S. This chronic disinvestment has perpetuated poverty in Black communities.

Trans is used as an umbrella term to describe someone whose gender identity differs from the gender they were assigned at birth. It also includes people who are gender non-conforming, non-binary, two-spirit, and other identities.

