school shooting incidences per 10 million population increased from 1.45 to 3.12 in Everytown data and from 1.04 to 2.96 in K12 data. The zip code areas with higher poverty rate (Incidence ratio, IRR=1.37 [95% CI, 1.09–1.73], larger black population [IRR=1.24, 95% CI 1.13–1.37], higher homicide rate [IRR=1.08, 95% CI 1.04–1.12] and larger population size [IRR=2.34, 95% CI 2.00–2.75] had an increased incidence of school shooting. Increasing public interest or Google trends for school-shooting was independently associated only with the death of victims.

Conclusion/Significance Although school shootings are more likely in large neighborhoods with high homicide and a larger proportion of the black population, public interest in school shootings depended only on whether the death occurred during school-shooting.

Social determinants of health and injury

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A COMPARATIVE CASE STUDY OF CHANGES IN CRIME SURROUNDING A HOME RENOVATION/REBUILD PROGRAM OF THE NATIONWIDE CHILDREN'S HOSPITAL IN COLUMBUS, OH

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Neighborhood environments are a known social determinant of health. Vacant and abandoned buildings and lots, poor or hazardous housing conditions, combined with crime and violence can affect residents' health and well-being. Nationwide Children's Hospital launched its Healthy Neighborhoods Healthy Families initiative in 2008 which sought to improve residents' health by rejuvenating vacant and abandoned properties and increasing homeownership in the South Side neighborhood of Columbus, Ohio. Between 2008 and 2019 the program funded 309 repairs or renovations in this neighborhood. We conducted a ZIP code-level comparative case study of HNHF program housing interventions using a synthetic control methodology to evaluate changes in crime in the program area compared to those in a synthetic control area. We found evidence of relative reduction in total crimes in the HNHF program area, relative to its synthetic control, after the intervention. This decrease can largely be accounted for by a decline in thefts. Some evidence of additional decline in drug possession is seen. This program to repair, rebuild, and increase ownership of housing has shown social benefit for neighbors of the Nationwide Children's Hospital.

Domestic and sexual violence

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THE IMPACT OF INTIMATE PARTNER VIOLENCE ON BREAST AND CERVICAL CANCER TREATMENT AMONG PATIENTS IN AN INTEGRATED, SAFETY-NET SETTING

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Statement of Purpose Examine the impact of intimate partner violence (IPV) on receipt of cancer treatment and surveillance.

Methods Longitudinal data were collected for breast and cervical cancer survivors from 2009–2017 at Parkland Health and Hospital System. Data were extracted and merged from two sources. First, electronic health records were used to assess survivors' cancer treatment modalities (i.e. surgery, chemotherapy, radiation, hormone replacement therapy) and concordance with National Comprehensive Cancer Network (NCCN) surveillance guidelines. Second, survivors were invited to participate in a phone survey that included 9-item validated screened for IPV. Regression models were used to evaluate the impact of IPV history on cancer treatment and NCCN guidelines.

Results/Findings 54% of survivors were a victim of IPV in their lifetime and 10% of victims experienced victimization during active cancer treatment. IPV victims were more likely to get a single agent chemotherapy compared to non-victims ($x^2=6.68$, $p\text{-value}<0.02$) and less likely get hormone replacement therapy ($x^2=12.55$; $p\text{-value}<0.001$). There was no significant relationship between IPV history and concordance with NCCN guidelines. After adjusting for key confounders, the odds of hormone replacement therapy was 0.34 times less likely among patients with a history of IPV compared to patients without a history of victimization (OR=0.34; 95% CI: 0.19, 0.60).

Conclusion Largely, cancer treatment and surveillance do not differ for women with a history of IPV. This suggests that, for this limited time of active treatment, access to the healthcare system is not restricted by abusive partners. Healthcare systems can leverage this valuable window to help the victim access social services.

Significance IPV screening is recommended as standard practice in healthcare because it improves patient health and safety. New evidence suggests screening is especially important in oncology clinics, where victims are more likely to be diagnosed with cancer and less likely to survive from cancer.

Firearm violence

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INTERSTATE FIREARM TRANSFERS AND STATE FIREARM LAWS: A STUDY OF GEOGRAPHIC NETWORKS

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Statement of Purpose Firearms ended the lives of almost 40,000 people in the United States in 2017, including over 14,000 by homicide. Stronger state firearm laws are associated with fewer firearm homicides and are an essential element of a comprehensive approach to preventing firearm homicide. However, flow of firearm across state lines can undermine prevention efforts in states with strong firearm laws. The purpose of this study was to assess the flow of firearms across US states relative to state firearm laws.

Methods The Bureau of Alcohol, Tobacco, Firearms and Explosives provided data for all firearms that were used in crimes for 2015–2017 and could be traced to a retail purchase location. We created a 48x48 matrix of the contiguous US states for counts of firearm transfers for origin states (where firearms were first purchased) and destination states (where crimes were committed). We linked these data to 2015 firearm laws for origin and destination states, and assessed

associations between laws and transfers using Exponential Random Graph Models applied to this valued directed geographic network.

Results A total of 178,712 interstate firearms were transferred between the 48 contiguous US states for 2015 to 2017. After accounting for network structure and population characteristics, additional firearm laws in origin states were associated with 12% fewer traced firearm transfers (IRR=0.88; 95%CI: 0.83, 0.93, $p<0.001$), whereas additional firearm laws in destination states was associated with 10% more traced firearm transfers (IRR=1.10; 95%CI: 1.06, 1.15, $p<0.001$).

Conclusion Weak firearm laws affect firearm availability in states with strong firearm laws due to illegal flow across state lines.

Significance/contribution to Injury and Violence Prevention Science Firearm homicide disproportionately affects minority and otherwise disadvantaged individuals, groups, and neighborhoods. Preventive intervention to reduce health disparities related to firearm homicide must consider human mobility.

Motor vehicle crashes: epidemiology and interventions

62 SOBRIETY CHECKPOINTS REDUCE ALCOHOL-INVOLVED MOTOR VEHICLE CRASHES; DO CHECKPOINT SIZE AND DURATION MATTER?

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Statement of Purpose Sobriety checkpoints have strong empirical support as an intervention to reduce alcohol-related motor vehicle crashes. This study examined whether checkpoint size (number of police officers) and checkpoint duration (amount of time in operation) affect associations with alcohol-related crashes.

Methods Queensland Police Service provided latitude-longitude coordinates and date and time data for all breath tests and alcohol-related motor vehicle crashes in the Australian city of Brisbane from January 2012 to June 2018. Hierarchical cluster analysis identified checkpoints as clusters of ≥ 25 breath tests conducted by ≥ 3 breath testing devices over a duration of 3 to 8 hours. Checkpoints and alcohol-related crashes were aggregated as counts per week. Generalized linear autoregressive moving average models related crashes to the number of checkpoints conducted within each week, as well as 1 week prior and 2 weeks prior. Models controlled for seasonality and other theoretically relevant covariates (e.g. precipitation, public holidays).

Results A total of 3,420 alcohol-related crashes occurred and 2,069 checkpoints were conducted in Brisbane over the 6.5-year (339-week) study period. Checkpoints included a mean of 266.2 breath tests (SD=216.3), 16.4 devices (SD=13.7), and were 286.3 minutes duration (SD=104.2). Each 10 additional checkpoints were associated with a 5% decrease in crash incidence at a lag of 1 week (IRR= 0.95; 95%CI: 0.91, 1.00). We detected no differential effects according to checkpoint size or duration.

Conclusions Sobriety checkpoints are associated with fewer alcohol-related motor vehicle crashes for around 1 week. Checkpoint size and duration do not appear to affect this association.

Contribution to Injury and Violence Prevention Science Disadvantaged populations have greater incidence of alcohol-related motor vehicle crashes. Police departments can use the results of this study to maximize injury prevention and reduce health disparities while minimizing operational costs by conducting shorter checkpoints with fewer officers.

Motor vehicle injuries and policy

65 EXAMINING IMPACTS OF CONGESTION PRICING POLICIES ON ROAD SAFETY OUTCOMES USING A SYSTEM DYNAMICS APPROACH

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Purpose Congestion pricing policies (CPPs) are a travel demand management strategy designed to reduce peak-period traffic volumes by financially encouraging road users to use alternate transport modes, eliminate trips, or travel at different times. Several U.S. cities are considering CPPs, and New York City (NYC) plans to implement a CPP in 2021. While researchers have explored traffic flow and air pollution impacts of these policies, little is known about road safety impacts. We examined potential pedestrian safety impacts of NYC's proposed CPP.

Methods Integrating data from 1) multidisciplinary group model building sessions focused on pedestrian fatality trends, 2) a robust review of the CPP literature, and 3) NYC-specific data from the Metropolitan Transportation Authority, Department of Transportation, and American Community Survey, among others, we built a system dynamics simulation model with a time horizon of 2005–2035. The model structure represents alternate dynamic hypotheses about interrelated mechanisms underlying the impact of CPP on NYC mode-specific travel and pedestrian safety trends.

Results Key dynamic feedback mechanisms contributing to safety trends included demand for and, ultimately, use of specific travel modes (e.g., personal vehicle, metro, walking), which affected overall attractiveness of a given mode (e.g., due to congestion, crowding, perceived safety), and then further affected demand for corresponding modes. CPP revenue allocation to support use of specific modes by increasing numbers of metro cars and pedestrian/cyclist infrastructure may improve long-term safety trends, but delays in purchasing and improving infrastructure could negatively impact short-term safety trends.

Conclusions CPPs affect several, interrelated transportation and injury outcomes. Cities considering these policies should assess the status of and need for critical injury prevention strategies, such as safe and equitable infrastructure for all travelers, prior to implementation.

Contribution System dynamics models are an important tool for exploring the interrelated factors and ripple effects that determine transportation policy impacts.