Firearm Purchasing and Firearm Violence in the First Months of the Coronavirus Pandemic in the United States

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JOYCE FOUNDATION
LUNCH & LEARN WEBINAR
AUGUST 10, 2020
Firearm violence in the U.S.
Background

Deaths from Firearms in the U.S., 2018

39,740 deaths

- Suicide, 61%
- Homicide, 35%
- Legal Intervention, 1%
- Unintentional, 1%
- Undetermined, 1%
- Public mass shooting, 0.2%

Data from CDC WISQARS and Mother Jones Mass Shooting Database, 1982-2019
Background

Homicide

- Firearm: 74.1%
- Cut/Pierce: 28.6%
- Suffocation: 50.5%
- Unspecified: 10.8%

Suicide

- Firearm: 50.5%
- Drug Poisoning: 28.6%
- Suffocation: 7.6%
- Fall: 2.6%

Data from CDC WISQARS, 2018
Firearm access and violence
Background

Homicide studies

<table>
<thead>
<tr>
<th>Study</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wiebe, 2003 (33)</td>
<td>1.41</td>
<td>1.20–1.65</td>
</tr>
<tr>
<td>Dahlberg et al, 2004 (23)</td>
<td>1.9</td>
<td>1.08–3.34</td>
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<tr>
<td>Cummings et al, 1997 (22)</td>
<td>2.2</td>
<td>1.30–3.71</td>
</tr>
<tr>
<td>Grassel et al, 2003 (24)</td>
<td>2.4</td>
<td>1.58–3.65</td>
</tr>
<tr>
<td>Kellermann et al, 1993 (9)</td>
<td>2.7</td>
<td>1.63–4.48</td>
</tr>
<tr>
<td>Branas et al, 2009 (48)</td>
<td>3.54</td>
<td>1.18–10.58</td>
</tr>
</tbody>
</table>

Pooled estimate               | 2.00 | 1.56–3.02  |

Anglemyer et al., 2014
Background

- Risk driven by firearm injury
  - Firearm owners had higher risk of firearm suicide compared with non-firearm owners (hazard ratio of 7.8 for men and 35.2 for women); no higher risk of non-firearm suicide (Studdert et al., 2020)
  - Handgun purchase associated with death from firearm homicide (odds ratio of 3.3), but not non-firearm homicide (Grassel et al., 2003)
Background

Miller et al., 2006
Surges in firearm purchasing
Background

- Surges in purchasing follow mass shootings and significant political events
- Associated with subsequent population-level increases in firearm violence

Studdert et al., 2017; Laqueur et al., 2019; Levine & McKnight, 2017
Coronavirus pandemic created widespread disruptions (more than 4.8 million cases and 150,000 deaths)
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Substantial surge in purchasing near onset of pandemic
Background

- Coronavirus pandemic created widespread disruptions (more than 4.8 million cases and 150,000 deaths)
- Substantial surge in purchasing near onset of pandemic
- Other effects of the pandemic
Objective: To estimate the association between changes in firearm purchasing and interpersonal firearm violence during the coronavirus pandemic.
Methods
Setting & Design

- Cross-sectional time series
- Monthly data for 48 contiguous states and the District of Columbia
- January 2018 – May 2020
Exposure

- Firearm purchasing
- FBI’s National Instant Criminal Background Check System (NICS) records specific to firearm purchase transactions
Exposure

- Firearm purchasing
  - FBI’s National Instant Criminal Background Check System (NICS) records specific to firearm purchase transactions

“excess” purchases observed purchasing rate minus expected purchasing rate
Exposure

- Firearm purchasing
- FBI’s National Instant Criminal Background Check System (NICS) records specific to firearm purchase transactions

"excess" purchases

observed purchasing rate minus expected purchasing rate

Expected purchasing rates estimated from historical state-specific purchasing patterns
Outcome

- Firearm violence
- Public reports of firearm violence collected by the Gun Violence Archive (GVA)
- Intentional, interpersonal firearm violence injuries (nonfatal + fatal)
Methods

Analysis

- Regression model links “excess” firearm purchases to changes in firearm violence within states
- Control for:
  - time-invariant characteristics of states (e.g., culture)
  - seasonal and secular trends
  - effects of the pandemic common to all states
  - COVID-19 cases and deaths
  - stay-at-home orders
  - social distancing
  - temperature
  - precipitation
Results
Excess firearm purchasing (national)
Excess firearm purchasing (national)

Results

![Chart showing excess firearm purchasing](chart.png)

- Actual purchases per 100k population
- Prediction
- Training fit – ARIMA(1,0,0)(2,1,0)[12]

March 2020
Excess firearm violence (national)
Excess firearm violence (national)
Results

States outlined in red were ordered, at some point during the study period, to close gun stores.
Association between changes in firearm purchasing and violence

1 “excess” purchase per 1,000

1.015 times the rate of firearm injury (95% CI: 1.005 to 1.025)
Association between changes in firearm purchasing and violence

1 “excess” purchase per 1,000

1.015 times the rate of firearm injury (95% CI: 1.005 to 1.025)

776 additional injuries (95% CI: 216 to 1,335) across all states March-May

8% increase over expected
Conclusion
Significant increase in firearm violence associated with the pandemic-related surge in firearm purchasing

Nationwide excess of 2.1 million firearm purchases March through May 2020

Increase in firearm purchasing associated with increase in firearm violence
Implications
Limiting surge in purchasing may limit surge in violence

Firearm violence prevention strategies & compounded risks associated with pandemic

Perceptions of risk and safety

Generalizability
Limitations
Limitations

- Observational design vulnerable to confounding
- Ecological design lacks specificity
- Measurement error
- Short-term impact of changes in purchasing
- Focus on interpersonal firearm violence
Future research
Future research

- Longer study period
- Other types of firearm violence
- What factors modify the association?
- Other geographic units
- Are trends in firearm violence different from trends in non-firearm violence?
- Who purchased firearms during the pandemic and why did they purchase them?
- Factors associated with magnitude of surge
- Other contributing causes?
Thank you
Thank you

Joyce Foundation (grant no. 42400)
Heising-Simons Foundation (grant no. 2019-1728)
University of California Firearm Violence Research Center
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The authors have no conflicts of interest to declare.
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