Geospatial, racial, and educational variation in firearm mortality in the USA, Mexico, Brazil, and Colombia, 1990–2015

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Background

- Firearms have been a persistent cause of death in the Americas for the past 25 years

- Firearm mortality in the USA is much higher than in any other high-income country, and even higher in several Central and South American countries

- The epidemiological and demographic determinants, and subnational variations of firearm deaths in the Americas are poorly documented

- Identifying high-risk population groups and localities can lead to appropriate planning and targeting of interventions
Key messages

• There were **2.5 million firearm deaths** in the USA, Mexico, Brazil, and Colombia from 1990-2015, with **1.4 million** of the deaths in **men aged 15-34**

• Firearm *homicides* accounted for **73% of all firearm deaths**

• US black men aged 25-34 had the overall **highest risk of firearm homicide of any demographic group** in the study: with high school or less education, the risk was **14x higher** than for comparably educated US white men, and with post-secondary education, the risk was **30x higher**

• **1.8 million firearm deaths**, 1 million in men aged 15-34, **could have been avoided** if the 4 countries could achieve the same firearm mortality rates as their lowest-burden states
Choice of countries

- USA: 321.5 million
- Mexico: 120.8 million
- Colombia: 48.2 million
- Brazil: 201.2 million

2015 total population: 691.8 million
Mortality & population data sources

USA
Mortality: National Center for Health Statistics
Population: National Cancer Institute’s Surveillance, Epidemiology, and End Results database

Mexico
Mortality: Instituto Nacional de Estadística y Geografía
Population: Mexican Population Council

Brazil
Mortality: Sistema de Informação sobre Mortalidade
Population: Instituto Brasileiro de Geografia e Estatística

Colombia
Mortality & population: Departamento Administrativo Nacional de Estadística
<table>
<thead>
<tr>
<th>Country</th>
<th>Total Deaths</th>
<th>Suicide/Homicide Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>851,000</td>
<td>56% suicide</td>
</tr>
<tr>
<td>Mexico</td>
<td>272,000</td>
<td>83% homicide</td>
</tr>
<tr>
<td>Brazil</td>
<td>855,000</td>
<td>90% homicide</td>
</tr>
<tr>
<td>Colombia</td>
<td>494,000</td>
<td>94% homicide</td>
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</tbody>
</table>
In each country, there was substantial subnational variation in firearm mortality risk for men aged 15-34 years.
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In the US, black men aged 15-34 years had higher firearm mortality risks than Hispanic and white men of the same age.
In Brazil, brown* men aged 15-34 years had the highest firearm mortality risks compared to black and white men of the same age.

* Colour category as self-reported in Brazilian census data
For US black men aged 25-34 years with low education, the risk of firearm homicide was:

- 14x higher than for comparably educated US white men the same age
- 5x higher than for US black men the same age with high school or less education
- 1.5-4x higher than for comparably educated Mexican, Brazilian, or Colombian men the same age
For US black men aged 25-34 years with post-secondary education, the risk of firearm homicide was:

- **30x higher** than for comparably educated US white men the same age
- **7.5x higher** than for comparably educated US Hispanic men the same age
- **1.5-4x higher** than for comparably educated Brazilian or Mexican men the same age
• Between 1990-2015, firearm mortality risks **decreased in the USA and Colombia, and increased in Mexico and Brazil**.

• Firearm mortality accounted for **up to half of the overall risk of death** for men aged 15-34 years, ranging from **13%** in Mexico to **58%** in Colombia (both in 2000-04).
Conservatively, 1.8 million firearm deaths could have been avoided in the four countries

<table>
<thead>
<tr>
<th>Firearm deaths, 1990-2015, in thousands</th>
<th>USA</th>
<th>Mexico</th>
<th>Brazil</th>
<th>Colombia</th>
<th>All Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total firearm deaths</td>
<td>851</td>
<td>272</td>
<td>855</td>
<td>494</td>
<td>2472</td>
</tr>
<tr>
<td>Avoidable firearm deaths</td>
<td></td>
<td></td>
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<tr>
<td>Lowest local rates</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Both sexes, all ages</td>
<td>535</td>
<td>211</td>
<td>626</td>
<td>406</td>
<td>1778</td>
</tr>
<tr>
<td>Men aged 15-34 years</td>
<td>208</td>
<td>116</td>
<td>449</td>
<td>255</td>
<td>1028</td>
</tr>
<tr>
<td>Lowest female rates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both sexes, all ages</td>
<td>710</td>
<td>246</td>
<td>792</td>
<td>446</td>
<td>2194</td>
</tr>
<tr>
<td>Men aged 15-34 years</td>
<td>299</td>
<td>136</td>
<td>559</td>
<td>291</td>
<td>1285</td>
</tr>
</tbody>
</table>

- Using lowest local rates, **1.8 million** deaths could have been avoided, **1 million (58%)** in men aged 15-34 years

- Using lowest female rates, **2.2 million** deaths could have been avoided, **1.3 million (59%)** in men aged 15-34 years
Implications

• Subnational variation in firearm mortality in the four countries is often greater than cross-national variation, and represents a societal challenge.

• Education and race strongly affect an individual’s risk of firearm mortality, where that information was available.

• Most firearm deaths would be avoided if countries could achieve the firearm mortality rates of their lowest-burden states.

• A limitation of the data is that state-level data can mask variation in even smaller areas (e.g. specific cities, demographic groups).
Key messages

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• **1.8 million firearm deaths**, 1 million in men aged 15-34, **could have been avoided** if the 4 countries could achieve the same firearm mortality rates as their lowest-burden states
Collaborators

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For more information:
www.cghr.org/guns

Link to full paper and appendix (free)
Press release
PowerPoint presentation

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