

# **The impact of rising violence against women on perceived vulnerability in Mexico, 2005-17**

## **Authors:**

Marcia Pescador Jiménez: Post-doctoral Research Fellow at Harvard T.H. Chan School of Public Health.

Artemisa Flores Martínez: Professor at Centro de Investigación y Docencia Económicas.

María Vignau-Loria: Doctoral fellow at University of Washington.

Tim Riffe: Research scientist at Max Planck Institute for Demographic Research.

Vladimir Canudas-Romo: Associate professor at the Department of Demography at the Australian National University.

José Manuel Aburto\*: Doctoral fellow at Center on Population Dynamic (CPop), University of Southern Denmark & Max Planck Institute for Demographic Research.

J.B. Winsløws Vej 9, DK-5000 Odense C

T: +45 65509416

jmaburto@health.sdu.dk

\*Corresponding author

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## **Extended abstract**

### **Introduction**

Homicide rates fell by 9.2% around the globe in the first decade of the 21<sup>st</sup> century, but only by 3.1% in developing countries.(1) Conversely, in some Latin American countries homicide rates increased disproportionately.(2) Particularly, in Mexico, male homicide rates more than doubled between 2007 and 2012.(3, 4) As a result, male national life expectancy stagnated in 2000-10, and the average lifespan was reduced in every Mexican state between 2005-10.(5, 6) Yet, little attention has been paid to the public health impact on women. In this study, we aim to examine the mortality and emotional health of women across Mexico, in association to the epidemic of violence.

Over 31 thousand females have been victims of homicide in Mexico in the new century.(3) Homicides are the ultimate form of violence, but they only represent a piece of the health and social burden, particularly for children and women.(7) For example, victims of violence are at risk of depression, alcohol abuse, suicidal behavior, psychological problems, among other detrimental consequences over their life course.(8-11) Even witnessing violence can affect the wellbeing of the population. Those who witness violence have higher rates of post-traumatic stress disorder, depression, and are more likely to externalize violent behaviors.(12, 13) In particular, women who witnessed violent acts are twice as likely to experience depressive and anxiety symptoms compared to those who did not witness violence.(14) This is important because Mexico has undergone a rise in violence related to specific policies trying to mitigate drug cartels operations with unprecedented consequences in the last ten years on population health.(15-18)

Previous evidence has documented the drug-war consequences on males' longevity and homicide rates after 2005.(4, 5, 19) However, little attempt has been made to investigate its consequences on women's emotional health and mortality from a public health perspective in Mexico, and it is of vital relevance under the recent increase of violence in the country.(3) Homicides, as the most comparable and accurate marker of violence,(7) have spread throughout the country unevenly(3, 20) and their share of overall mortality varies regionally.(21) Therefore, women homicide rates could have increased in tandem with an increase in emotional distress from those surviving after 2005, specially in historically states that have experienced the highest levels of violence in Mexico, such as Chihuahua (bordering the U.S. with Texas) and Guerrero (South).(22)

The aim of this study is to analyze the association between the increase of violence and its impact through homicides with emotional distress in women, as measured by perceived vulnerability across

states in Mexico. Given the importance of the effect of rising violence and its cost on the Mexican society and healthcare systems,(23, 24) understanding its consequences from a public health perspective is a step towards explaining the impact of Mexico's epidemic of violence on women's health.

### **Study Data And Methods [650 including limitations]**

We used data on homicides from publicly available files through the Mexican National Institute of Statistics.(3) These files include information on cause of death using the International Classification of Diseases 10<sup>th</sup> revision (ICD-10) by age, sex, state of residence in a given year. Population estimates come from the Mexican Population Council and were corrected for completeness, age misstatement, and international migration.(25)

The National Survey of Victimization and Perception on Public Security (ENVIPE) is an annual cross-sectional survey that includes respondents older than 18 years of age throughout Mexico. Face-to-face interviews are conducted in households sampled using a multistage area-probability sampling. The aim of the ENVIPE is to estimate the violence cases that affected the households during the previous year, measure the level of victimization, the perception of violence among participants and the level of trust in public authorities.(26) The National Survey of Security (ENSI) is a cross-sectional survey that interviews probabilistically selected respondents older than 18 years of age. Sampling was carried out using a multistage area-probability sampling design with stratification by city. The aim of the ENSI is to estimate the social violence in Mexico at a national level, the effect of violence on victims, as well as the collaboration with justice representatives.(27) In order to capture the impact of violence before and after the upsurge, we leverage data from ENSI 2005 (N=66,000 households) and from ENVIPE 2017 (N= 102,000 households).

**Methods.** We computed age-standardized homicide rates (ICD-10 codes X85-Y09) for women between ages 15 and 65 using the 2005 national female population as standard. In addition, we calculated the proportion of the population vulnerable of becoming a victim in 2005 and 2017.

### **Study Preliminary results**

Exhibit 1 shows the change in age-standardized homicide rates (x-axis) between 2002-07 and 2011-16 for females, and the change in the vulnerability of becoming a victim between 2005 and 2017 by region and state.

Homicide rates increased in every Mexican state from 2002-07 to 2011-16. The largest increases occurred in the northern state of Chihuahua, bordering with Texas, USA, Guerrero in the South, and Colima in the central region. Over five more women were victims of homicides compared to the previous decade in these states. Paralleling the rise in homicide mortality, the proportion of population vulnerable of becoming a victim increased in 87.5% of the states. The largest increased happened in Colima, where 54.3% more people declared to feel unsafe in 2017 compared to 2005. Following Colima, in six states (Zacatecas, Veracruz, San Luis Potosí, Nayarit, Guanajuato and Tamaulipas) the increase of the population feeling vulnerable was over 30%. In four states, the proportion of vulnerable population decreased despite rising homicides: Yucatán in the South, Mexico City in the Center, and Sinaloa and Baja California in the North.

Table 1 shows the levels of age-standardized homicide rates in 2002-07 and 2011-16 for females, and the proportion of population vulnerable of becoming a victim in 2005 and 2017 by state and region.

Homicide rates vary from 0.5 to 3.0 per 100,000 population in 2002-07, and from 0.6 to 10.3 in 2011-16. The states presently with the highest female homicide rates are Chihuahua in the North (10.3), Guerrero in the South (10.2), and Colima in the Central region (6.3). In contrast the safest states are Yucatán in the South, and Aguascalientes and Querétaro in the Central region.

Similarly, the proportions of population vulnerable of becoming a victim vary from 20.1 to 88% in Mexico City, while in 2017 these vary from 27.2% in Yucatán to 90.7% in Mexico state.

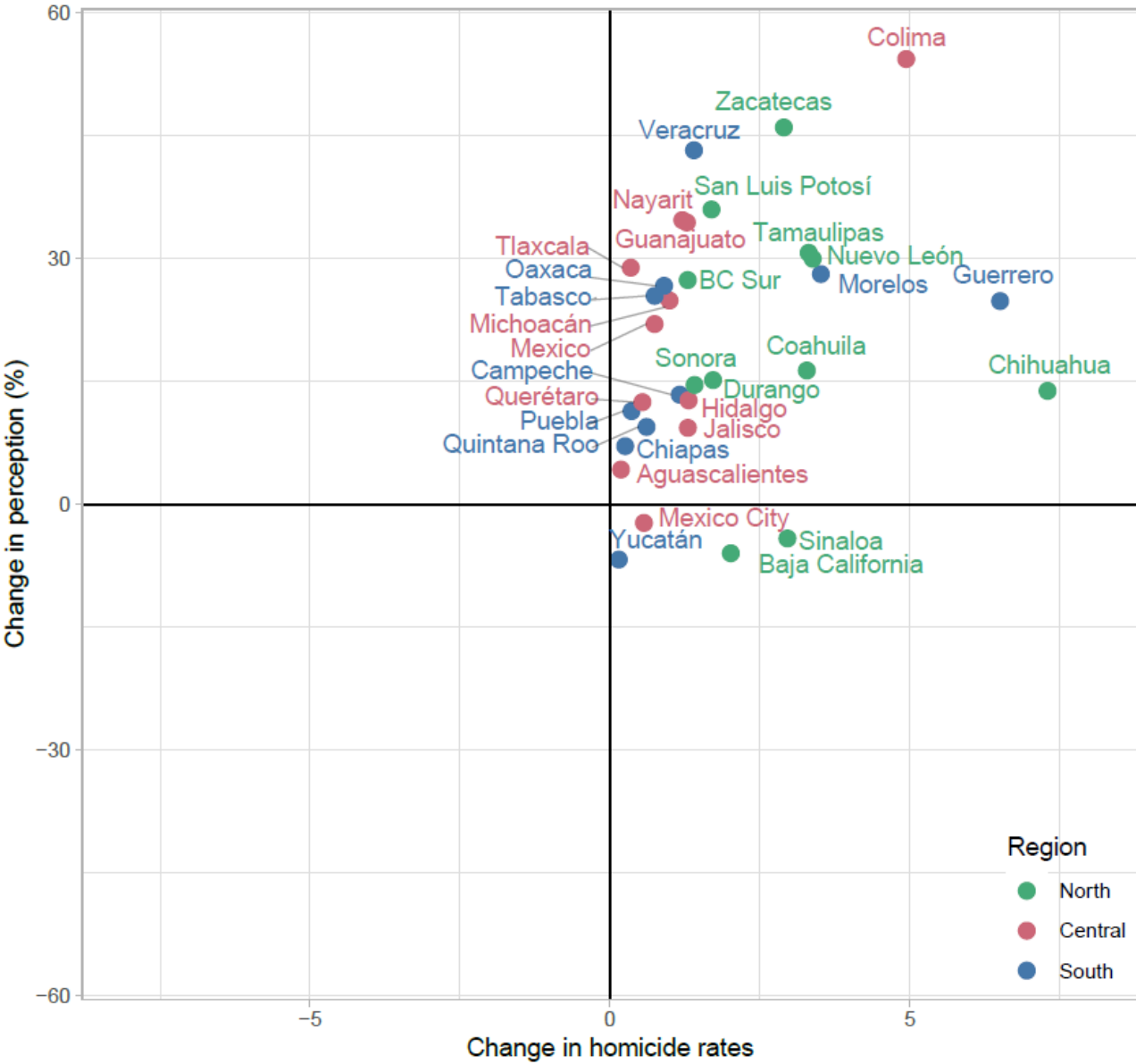
### **Next steps**

Our preliminary results provide clear evidence to suggest that the rise of violence and homicides in Mexico may have a severe impact on the well-being of Mexican women. Future research will examine the heterogeneity across states to uncover vulnerable populations and explore the association of the upsurge in violence with women's mortality.

**Table 1. Age standardized homicide rates for females and proportion of population vulnerable of becoming a victim by state.**

| Region         | State               | Age-standardized<br>homicide rate |           | Proportion of<br>population<br>with<br>vulnerability |      |
|----------------|---------------------|-----------------------------------|-----------|--|------|
|                |                     | 2002-2007                         | 2011-2016 | 2005   | 2017 |
| <b>North</b>   | Chihuahua           | 3.0                               | 10.3      | 60.4   | 74.2 |
|                | Tamaulipas          | 1.7                               | 5.0       | 54.5   | 85.2 |
|                | Sinaloa             | 1.7                               | 4.6       | 78.7   | 74.5 |
|                | Coahuila            | 1.3                               | 4.6       | 40.1   | 56.4 |
|                | Baja California     | 2.3                               | 4.3       | 64.0   | 58.0 |
|                | Nuevo Leon          | 0.7                               | 4.1       | 41.1   | 71.1 |
|                | Zacatecas           | 1.2                               | 4.1       | 38.4   | 84.4 |
|                | Durango             | 1.7                               | 3.4       | 42.2   | 57.4 |
|                | Sonora              | 1.6                               | 3.0       | 42.8   | 57.4 |
|                | Baja California Sur | 1.7                               | 3.0       | 33.5   | 60.9 |
|                | San Luis Potosi     | 0.9                               | 2.6       | 37.7   | 73.7 |
| <b>Central</b> | Colima              | 1.4                               | 6.3       | 20.1   | 74.5 |
|                | Mexico State        | 2.9                               | 3.6       | 68.7   | 90.7 |
|                | Nayarit             | 2.2                               | 3.4       | 23.9   | 58.6 |
|                | Michoacán           | 2.3                               | 3.3       | 52.7   | 77.6 |
|                | Jalisco             | 1.2                               | 2.5       | 56.4   | 65.7 |
|                | Mexico City         | 1.9                               | 2.4       | 88.0   | 85.7 |
|                | Guanajuato          | 0.8                               | 2.1       | 40.8   | 75.2 |
|                | Hidalgo             | 0.7                               | 2.0       | 42.4   | 55.1 |
|                | Tlaxcala            | 1.4                               | 1.8       | 30.2   | 59.1 |
|                | Queretaro           | 1.0                               | 1.6       | 41.9   | 54.4 |
|                | Aguascalientes      | 0.9                               | 1.0       | 39.5   | 43.7 |
| <b>South</b>   | Guerrero            | 3.7                               | 10.2      | 58.3   | 83.1 |
|                | Morelos             | 1.5                               | 5.0       | 58.2   | 86.3 |
|                | Oaxaca              | 2.9                               | 3.8       | 47.4   | 74.1 |
|                | Quintana Roo        | 2.1                               | 2.7       | 59.1   | 68.5 |
|                | Veracruz            | 1.0                               | 2.4       | 46.7   | 89.9 |
|                | Chiapas             | 1.7                               | 2.0       | 54.0   | 61.1 |
|                | Tabasco             | 1.2                               | 1.9       | 63.4   | 88.8 |
|                | Campeche            | 0.7                               | 1.9       | 44.2   | 57.6 |
|                | Puebla              | 1.5                               | 1.9       | 56.7   | 68.1 |
|                | Yucatan             | 0.5                               | 0.6       | 34.0   | 27.2 |

Exhibit 1. Change in female homicide rates by 100,000 population between 2002-07 and 2011-16, and change in the proportion of population vulnerable of becoming a victim between 2005 and 2017 by state.



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