

Comparative Study of Deaths Related to COVID-19, Homicides, and Air Pollution in the Mexicali-Imperial County Cross-Border Region (2018–2020)

Estudio comparativo de muertes relacionadas con el COVID-19, homicidios y contaminación del aire en la región transfronteriza Mexicali-Imperial County (2018–2020)

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ABSTRACT

This comparative study analyzes the absolute numbers and death rates of air pollution-related fatal victims, intentional homicides, and COVID-19 losses from 2018 to 2020 in the Mexicali (Baja California, Mexico) and Imperial County (California, United States) cross-border region. The analysis is nourished with quantitative data from secondary sources, systematized by all three levels of government authorities in the case of Mexicali and federal authorities in the Imperial County case. Evidence reveals that air pollution, homicides, and COVID-19 have had a differential impact on both sides of the border. While the COVID-19 pandemic was devastating in multiple aspects, air pollution-related mortality rates in the Mexicali-Imperial County cross-border region were five times higher than those of COVID-19. Mexicali was the most distressed “side” of the border in absolute numbers. However, by population rate, Imperial County was the most disturbed. Therefore, this situation reflects a shared priority for state and municipal authorities on both sides of the border.

KEYWORDS: *bilateral study, cross-border, Mexicali-Imperial County, death rates, COVID-19.*

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RESUMEN

Este estudio comparativo analiza las cifras absolutas y las tasas de mortalidad de víctimas fatales por homicidios dolosos, COVID-19, y enfermedades relacionadas con la contaminación atmosférica, de 2018 a 2020, en la región transfronteriza de Mexicali (Baja California, México) y el Condado de Imperial (California, Estados Unidos). El análisis se nutre de datos cuantitativos de fuentes secundarias, sistematizados por autoridades de los tres niveles de gobierno para el caso de Mexicali, y federales para el caso del Condado de Imperial. La evidencia revela que la contaminación del aire, los homicidios dolosos y el COVID-19 han tenido un impacto diferencial en ambos lados de la frontera. Aunque la pandemia del COVID-19 fue devastadora en múltiples aspectos, la tasa de mortalidad relacionada con la contaminación atmosférica en la región transfronteriza Mexicali-Condado Imperial fue cinco veces superior a la del COVID-19. Mexicali fue el “lado” de la frontera más afectado en cifras absolutas. Sin embargo, por densidad poblacional, fue el condado de Imperial el más perturbado. Por lo tanto, esta situación refleja una prioridad compartida para las autoridades estatales y municipales de ambos lados de la frontera.

PALABRAS CLAVE: *estudio bilateral, transfronterizo, Mexicali-Imperial County, tasas de mortalidad, COVID-19.*

Introduction

In 2020, COVID-19 broke out in the world, paralyzing, among other things, the border between Mexico and the United States, starting in March. As a result, for the first time in the history of both nations, land ports of entry to the United States were partially¹ closed for over a year, offering a unique opportunity to understand border phenomena better (Diaz & Gonzalez, 2021). Through this manuscript, the author pretends to deliver a descriptive bilateral comparative analysis of intentional homicides, COVID-19, and air pollution-related fatal victims between 2018 and 2020. The border sister cities examined are Imperial County (California, United States) and Mexicali (Baja California, Mexico), before and during the SARS-CoV-2 global health crisis.

Intentional homicides, COVID-19, and air pollution-related fatal victims are social phenomena unconnected to each other but anchored in the microregion. In other words, both Mexicali and Imperial County have suffered fatalities related to air pollution and, more recently, to COVID-19. Of course, other border-crossing cities share this last event. Still, we thought it would be thought-provoking to take the pandemic and compare the seriousness of other local difficulties, such as air pollution and gun violence, that have skyrocketed death rates in recent years. This comparative research

¹ Only U.S. citizens and residents had access to the U.S. land ports of entry. In late 2021 Mexican border residents with visas were granted permission to cross.

aims to provide a panoramic analysis of deaths due to COVID-19, homicides, and diseases associated with air pollution. The article is structured into six sections: introduction, problematization, methodology, results, discussion, and final considerations.

Problematization

Mexicali is the capital city of Baja California, Mexico, the border state adjacent to California, United States. In 2020, the municipality of Mexicali had 1,049,792 inhabitants (49.6% women), while its neighbor, Imperial County, had a population of 179,702 residents (INEGI, 2020; U.S. Census, 2020). Mexicali is a young metropolitan area (Ley, 2012); unlike Brawley, El Centro, and Calexico, all small towns embedded in Imperial County cannot be understood without each other due to the socioeconomic interaction of the area (Perry, 2009). It is key to clarify that both study zones have an important and productive agricultural area, generally called “the valley”.

Until recent years, Mexicali was known for having above-average human development (Orozco & Hernandez, 2023). For example, in 2014, the UNDP (2014, p. 28) assigned a .746 human development index (1 being the highest score), positioning the city back then just below the metropolitan areas of Mexico City, Queretaro, and Nuevo Leon. On the other hand, on a scale from 0 to 100 (100 being the maximum value), Mexicali registered 57.12 points on the City Prosperity Index (UN-HABITAT, 2018). Meanwhile, according to Coneval (Consejo Nacional de Evaluación de la Política de Desarrollo Social), in 2020, the degree of social lag in Mexicali was very low (Coneval, 2020).

Regarding Imperial County, official data shows that one out of every four inhabitants lives in poverty. Moreover, it has an unemployment rate of 16%, well above California’s 4% state average (Parvini, 2019; DataUSA, 2022). Furthermore, according to official data, most people living in poverty are Hispanic (47.6%), followed by Whites (34.9%). In Imperial County, poverty is feminized. Except for the 15–24 age group, where males outnumber females, women are the most troubled from birth to death (DataUSA, 2022).

On the other hand, according to the last controlled survey of drug consumers in Mexicali, from 2016 to 2017, most of them used tobacco, alcohol, and marijuana simultaneously. Similarly, of the total sample, one of each two consumed methamphetamines, while four in every ten consumed cocaine (CIJ, 2017). Unfortunately, there is no recent data, so it is impossible to elaborate on drug consumption rates in the capital city. However, authorities recently registered a seizure increase of psychotropic substances, which can be interpreted as a vaster product supply chain in the illicit market. On the other hand, in 2016, Imperial County registered a rate of opioid misuse of 6.5 per 100 people and an estimated 343 methadone patients per 100 thousand people (Clemans-Cope, Epstein & Wissoker, 2018).

There seems to be a correlation in this case – the more significant the increase in drug seizures, the greater the number of intentional homicides. Homicidal violence has escalated dramatically in Mexicali, once characterized as a peaceful and prosperous border city. In 2020, as the COVID-19 pandemic surged, gun deaths related to organized crime broke records. For example, in Mexicali, there was a 43% increase compared to the previous year, reflecting a rise in the homicide rate from 14.38 to 19.62 victims per 100,000 inhabitants (Table 1).

However, Imperial County is not far behind. Although the figures are not dramatic compared to other nearby cities (e.g., Los Angeles), the homicide rate is exceptionally high, similar to that of Central American countries back in 2011, such as Honduras (Table 2). Therefore, it can be stated that homicidal violence is a significant problem in the bilateral area.

Table 1.
 Intentional homicides in
 Mexicali, Baja California
 (2018–2020)

Year	2018	2019	2020
Intentional homicides	151	144	206
% Difference	N/A	-4.64%	43%
Rate	14.38	13.71	19.62

Source: Own elaboration with data of SSCBC

Table 2.
 Homicides in Imperial
 County, California
 (2018–2020)

Year	2018	2019	2020
Intentional homicides	121	108	126
% Difference	N/A	-10.75%	16.66%
Rate	67.33	60.09	70.11

Source: Own elaboration with data of CDC WONDER

Nevertheless, the problem which historically characterized the area on both sides of the border is high levels of air pollution. According to specialists, Mexicali is one of the most air-polluted cities in the country and even in the northern hemisphere (Quintero et al., 2010; Martinez, 2019). Among others, air pollution is caused by multiple factors such as car smog, factory emissions, sand, and dust due to the composition and nature of the soil in Mexicali and Imperial County (Quintero & Tovar, 2019, p. 251).

According to Quintero and Tovar (2019, pp. 253–257), other causes of air pollution are agricultural burning, unpaved roads, electric power generation, and mixed human and animal wastes. Even more, two major factors should be added to the equation: 1) Mexicali has a dry and arid climate during most of the year, displaying urban heat islands throughout the city (García-Cueto, Jáuregui-Ostos & Toudert Tejeda-Martinez, 2007); and 2) Mexicali’s altitude ranges from ten meters above sea level (e.g., Islas Agrarias) to three meters below sea level (e.g., Santa Isabel), a geographic condition that possibly hinders particulate matter dispersal throughout the urban sprawl due to the

lack of fresh air flow in a dry and arid climate, that, on the contrary, delivers dry fugitive windblown dust (Alvarez, 2017; Gobierno de Mexicali, 2022).

To understand the size of the environmental problem, Quintero and Tovar (2019, p. 252) make a municipal comparison of Baja California’s emission percentage in the atmosphere during 2014, as seen below in Table 3. Indeed, according to the specialists, Mexicali produces over half of the state’s PM₁₀ and PM_{2.5} emissions, which profoundly damages people’s health (European Commission, 2014).

Municipality	Percentage						
	PM ₁₀	PM _{2.5}	SO ₂	NO ₂	ROG	CO ₂	NH ₃
Ensenada	29.1	27.6	41.3	28.3	23.2	16.8	17.1
Mexicali	55.0	52.9	20.9	32.7	35.8	34.6	48.8
Tecate	3.5	3.3	15.8	4.0	2.9	3.6	3.8
Tijuana	9.8	10.3	18.2	27.0	35.1	39.3	26.3
Rosarito	2.6	5.9	3.8	8.0	3.0	5.7	4.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 3. Percentage of emissions by the municipality in Baja California (2014)

Source: M. Quintero & A. Tovar (2019), Plan de contingencias ambientales atmosféricas urbanas at J. Ley & F. Denegri (Coord.), *Ciudad y sustentabilidad. Riesgos urbanos*. Mexico: UABC.

Regarding Imperial County, air pollution is measured by tons per day; therefore, a complete comparison with Mexicali is unavailable due to the lack of data (e.g., percentages in US-bound and tons per day in Mexican-bound). However, even with the previous mismatch, it is known that Imperial County authorities have reduced the PM₁₀ emission by over 50% (from 96 to 46 µg/m³) in recent years (Imperial County, 2018, p. 3). The PM₁₀ comprehends soil, dust, silica, salts, pollen, and tire rubber (Imperial County, 2018, p. 17).

Despite efforts, emissions are expected to increase slightly in the incoming years until 2030. Furthermore, unlike in Mexicali, in Imperial County, fugitive windblown dust is the leading air pollution agent of PM₁₀, as shown in Table 4. Other significant causes are unpaved roads, farming operations, and mineral processes. Unfortunately, official sources consulted do not refer to the outlook and possible decrease of PM_{2.5}, which is even more harmful to people’s health due to the fine size and the type of substance, such as sulfates, nitrates, ammonia, carbon, and organics (Imperial County, 2018, p. 17).

U.S. authorities and specialists say air pollution affects people’s health, particularly those with a vulnerable respiratory system, although not exclusively (NIH, 2022; Zhu et al., 2019). In addition, although air pollution is unconsidered a direct death cause, scientific studies reveal it as a critical factor that triggers a series of chronic degenerative diseases and comorbidities in the population, such as respiratory and cardiovascular diseases and cancer (Evelyn et al., 2021; NIH, 2022).

Category	2018	2019	2020
Electric Utilities	.09	.09	.09
Manufacturing and Industrial	.03	.03	.03
Food and Agricultural Processing	.01	.00	.00
Service and Commercial	.07	.07	.08
Food and Agriculture	.31	.32	.32
Mineral Processes	3.95	4.08	4.22
Other (Industrial Processes)	.01	.01	.01
Residential Fuel Combustion	.05	.05	.05
Farming Operations	8.37	8.31	8.25
Construction and Demolition	3.29	3.40	3.51
Paved Road Dust	1.27	1.24	1.28
Unpaved Road Dust	51.85	51.84	51.83
Fugitive Windblown Dust	212.51	212.50	212.50
Managed Burning and Disposal	1.27	1.26	1.25
Cooking	.09	.09	.09
On-road Mobile	.44	.43	.44
Another mobile	1.05	1.05	1.04
Total	284.65	284.77	284.99

Table 4.
PM₁₀ future year inventory
for Imperial County
(tons per day)

Source: Imperial County (2018) The Imperial County Air Pollution Control District is requesting the Air Pollution Control District Board of Directors to hold a public hearing, <https://apcd.imperialcounty.org/wp-content/uploads/2020/01/2018PM10PlanBoardPacket.pdf>

It is worth mentioning that toxic substances such as SO₂, NO₂, PM₁₀, PM_{2.5}, and CO₂ – condensed in populated metropolitan areas, with motor vehicle traffic, industrial activity, stressful lifestyles, and smoking habit – are associated with obstructive pulmonary diseases, asthma, acute respiratory infections, pericardial venous insufficiency, cerebrovascular hemorrhages, ischemic heart disease, arterial hypertension, breast cancer, leukemia, non-Hodgkin's lymphoma, lung cancer, fetal death, and maternal mortality (Wang et al., 2019; Zhu et al., 2019; NIH, 2022). Indeed, there is no fatal disease produced by air pollution but rather comorbidities, typical of spaces polluted by SO₂, NO₂, PM₁₀, PM_{2.5}, and CO₂.

In this context of air pollution and homicidal violence, COVID-19 adds to the equation. SARS-CoV-2 is an infectious disease that spreads quickly among the population. It affects people differently, generating mild, moderate, and fatal symptoms. The signs are usually cough, fever, tiredness, and loss of taste or smell. The virus is harmful when it incubates in the lungs, inflaming the alveoli. The patient's health is compromised and put at risk when the virus decreases the lung function autonomy, resulting in death. In this sense, people

with a vulnerable respiratory system, among others, become targets of the virus (Zhou et al., 2021; Derwich and Orozco, 2021).

The research results analyze COVID-19, intentional homicides, and air pollution-related fatal victims in Mexicali (Baja California) and Imperial County (California) before and during the pandemic. The temporary closure of the land ports of entry to the United States was a unique opportunity to understand bilateral dynamics, especially during the voluntary lockdown to prevent the virus from spreading worldwide. In addition, this research aims to identify – out of the three variables – which phenomenon disturbs the population the most in the cross-border region.

Methodology

This research runs a descriptive binational population comparative analysis between homicides, air pollution, and COVID-19 fatalities between 2018 and 2020. The border sister cities studied were Imperial County (California, United States) and Mexicali (Baja California, Mexico) before and during the SARS-CoV-2 health crisis. The analysis was nourished with quantitative data from secondary sources systematized by all three levels of government authorities in the case of Mexicali and federal authorities in the case of Imperial County.

Analyzing quantitative information with a binational approach naturally implies a methodological challenge (Carrillo et al., 2017). Unfortunately, local authorities and their teams generally do not share methodologies when systematizing data, which can happen due to many legitimate factors, including language difficulties, an unregistered phenomenon in the locality, the lack of budget, and others. Therefore, in methodological terms, the starting premise is that quantitative information is systematized differently on both sides of the border. In this recognition of voids, the bilateral context can examine in detail.

Even though obtaining public municipal-level segregated facts of COVID-19 fatalities on the Mexican side was challenging, the closest range data in the U. S.-bound was county-level. It should be clarified that multiple cities make a county; in this case, Imperial County is composed mainly of Brawley, Calexico, and El Centro, which, even joined together, are not as populated as their Mexican counterpart, Mexicali.²

COVID-19 fatalities data is recovered from the CDC WONDER database on the U.S. side. In contrast, there were two sources on the Mexican side: Conacyt (Consejo Nacional de Ciencia y Tecnología) and the Baja California

² It is important to note two issues: 1) Brawley, Calexico, and El Centro are interconnected on a daily basis and cannot be understood without each other due to their proximity; 2) they are small urban localities, which individually do not yield relevant information that contrasts with Mexicali. Because of this and because CDC information is disaggregated by county, the data on one side of the border is municipal level and, on the other, county level.

Health Office. The first source provided a municipal-level database specialized in daily cases divided into confirmed, suspected, negative, and deaths (Conacyt, 2020). From this categorization, the focus was on fatalities. However, when writing this article, since the database did not cover the 12 months of 2020, Baja California Health Office, the second source, provided the remaining information with the exact characterization of the latter (SSBC, 2020).

Regarding homicide deaths on the Mexican side, the leading source was the public database of Baja California's law enforcement agency that delivers detailed figures (SSCBC, 2022). On the other hand, locating updated municipal-level statistics on air pollution-related deaths on the Mexican side was the main challenge of this research. Unfortunately, the only source was the municipal archives updated in a rough format (COPLADEMM, 2022).

Unfortunately, neither INEGI nor any other federal agency has disaggregated public information on this matter, making it an opportunity for authorities to work in greater detail. As for the U.S. side, our primary data source for both homicides and pollution-related deaths was CDC WONDER (CDC, 2022). The National Institute of Environmental Health Science (NIH, 2022) also complemented the second.

Therefore, the information was organized into three tabs in an Excel file: a) Mexicali, b) Imperial County, and c) Both. An initial section contains a table titled "frequent respiratory illnesses", in the first (Mexicali) and second (Imperial County) tabs. As mentioned above, high levels of air pollution link with certain diseases, which are divided here into three main blocks: I) respiratory disease, II) cardiovascular disease, and III) cancer (Jiang, Mei & Feng, 2016; NIH, 2022).

The respiratory disease block comprehends data related to the subsequent death causes: obstructive pulmonary diseases, chronic bronchitis, emphysema, asthma, and acute respiratory infections (Kurt, Zhang & Pinkerton, 2016). Cardiovascular diseases related to high levels of air pollution include pericardial venous insufficiency, cerebrovascular hemorrhages, ischemic heart disease, arterial hypertension, maternal mortality, and fetal death (NTP, 2019; NIH, 2022). The third and last block addresses breast cancer, leukemia, non-Hodgkin's lymphoma, and people with fatal lung cancer (DeVries, Kriebel & Sama, 2016; Manisalidis et al., 2020; NIH, 2022).

Likewise, in the first and second tab, a table contains COVID-19 and homicide fatal victims, as well as those for cancer, respiratory and cardiovascular disease for Mexicali and Imperial County, respectively. Again, the information is disaggregated by category and not as a group up to this point. Finally, in the third section of both tabs, a table summarizes the data in the following variables: a) frequent respiratory illnesses, b) COVID-19, and c) homicide fatalities from 2018 until 2020.

The third tab (Both) summarizes the binational information, as shown in figures 1–4. In this sense, the data goes from general to particular. For example, the first figure addresses all three variables in the cross-border context from

2018 to 2020. On the other hand, the following figure focuses only on the first variable – diseases related to air pollution – while the third figure focuses on the third variable: homicides. Likewise, the latter has a binational approach from 2018 to 2020. Finally, Figure 4 summarizes a chaotic year: on the one hand, the pandemic, and on the other, Mexicali’s massive increase in homicides, parallel to the chronic air pollution on both sides of the border. As can be seen, Mexicali and Imperial County were affected in all three study categories. Still, Mexicali was undoubtedly the most distressed of the two cities in both rate and absolute numbers.

A contribution intended to achieve through this binational descriptive research is to contextualize the seriousness of air pollution and other extreme situations in the cross-border region. These include extraordinary crises, such as a pandemic, in which practically everything was unknown about the virus, except its high fatality risk. Also, within this context, the description allows us to identify the types of fatalities recorded on each side of the border for decision-makers to implement social policies and programs according to needs within a cross-border approach.

Before concluding this section, it is essential to point out that official sources reviewed for both case studies deliberately presented missing data. Both CDC and Mexicali local archives reported sensitive information; therefore, the institutions marked with an asterisk the number of fatal victims due to maternal mortality, fetal death, leukemia, and non-Hodgkin’s lymphoma patients on both sides of the border. Again, it avoids stigmatization and victimizing the patient and their families. Therefore, the absolute number of fatalities related to diseases in the context of high levels of air pollution is most likely to be higher than those shown in figures 1, 2, and 4 for both sides of the border.

Also, it is important to state that this research does not calculate the risk or mortality associated with long-term exposure to high levels of air pollution through mathematical models. However, we recognize that multiple models bring researchers closer to a range of estimates per disease, encompassing mortality correlated to $PM_{2.5}$ long-term exposures (Burnnet et al., 2014; Cohen, 2018; OECD, 2021).

However, for this research, it was impossible to carry out the mortality formula $D_t^r = AF \cdot BD_t^r$ with $AF = \left(1 - \frac{1}{RE}\right)$. The main reason for that was the lack of official information – on both sides of the border – regarding $PM_{2.5}$ daily concentrations.

Nonetheless, even in the best-case scenario, considering the data availability, the model has several methodological flaws that would not fully explain the problem but rather a portion of it. Indeed, such a mathematical model considers only outdoor exposure, excluding indoor exposure, where $PM_{10-2.5}$ will also be filtered daily. According to specialists, indoor PM_{10} concentrations range from 63.5 ± 27.4 and 90.1 ± 33.5 $\mu\text{g}/\text{m}^3$, while indoor $PM_{2.5}$ concentrations range from 39.4 ± 18.1 and 49.5 ± 18.2 $\mu\text{g}/\text{m}^3$ (Azam, Asadgol & Fahiminia, 2020).

This data is also estimated since the research was conducted in Tehran (Iran) between March and July 2016 (Azam, Asadgol & Fahiminia, 2020, p. 48).

Another methodological flaw of the model is that it does not include PM₁₀, which makes over half of the Mexicali-Imperial County annual emissions. In addition, the mortality calculated with this model excludes the soil, dust, silica, salts, pollen, and tire rubber, which is unfeasible given that, according to U.S. official data, 90% of PM₁₀ in Imperial County is related to unpaved road dust and fugitive windblown dust.

Although relevant, the scientific efforts are still estimates since data cannot be comprehensively applied locally or continuously during the year. For example, in 2015, the closest assessment of daily exposure to PM_{2.5} at a regional level (e.g., Latin America) was 17.5 µg/m³.

Last but not least, secondhand smoke should not be set aside as an important health hazard. According to Cohen et al. (2018, p. 9593): “the total particle dose from smoking a single cigarette is assumed equivalent to breathing an ambient atmosphere of 667 µg/m³ for 24 h”. According to an official survey of 2,324 Mexicali inhabitants, around 10% of respondents (6% male – 4% female) smoked tobacco (Observatorio Estatal de las Adicciones, 2017). For our bilateral case study, it is unknown whether air pollution-related fatalities were cigarette smokers or not. Therefore, this research addresses absolute numbers as a first approach to the cross-border problem, hoping future research can more accurately delimit the direct fraction of fatalities due to this situation.

Results

Figure 1 provides an overview of homicide in absolute numbers, COVID-19, and air pollution-related fatalities in the Mexicali-Imperial County cross-border region from 2018 to 2020. Both sides of the border saw an increase in the number of intentional homicide victims, although it grew by 143% in the Mexicali case. On the other hand, air pollution-related fatal victims in Imperial County remained similar. For example, in 2018, Mexicali registered a significant decrease, in 2020 – 23% less than the previous year – but not as much as in 2018. As can be seen, there is a higher fatal risk on the Mexican side for any of the three variables, but especially for air pollution, followed by COVID-19.

Figure 2 demonstrates that air pollution-related deaths are significantly higher on the Mexican side than on the U.S. side. For example, the death rate in Mexicali in 2018 was 1,052 victims per 100,000 inhabitants. One year later, in 2019, the rate increased to 1,443, and in 2020, the year of the pandemic, when the population was locked indoors to avoid the contagious virus, the rate decreased to 1,116 victims per 100,000 inhabitants. On the contrary, in Imperial County, the rate was significantly lower. In 2018, the death rate



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Figure 1. Homicide, COVID-19, and pollution deaths in Mexicali (Baja California) and Imperial County (2018–2020)

Source: Own elaboration with DATA of SSCBC, Conacyt, Baja California Health Office, COPLADEMM, NIH, and CDC WONDER

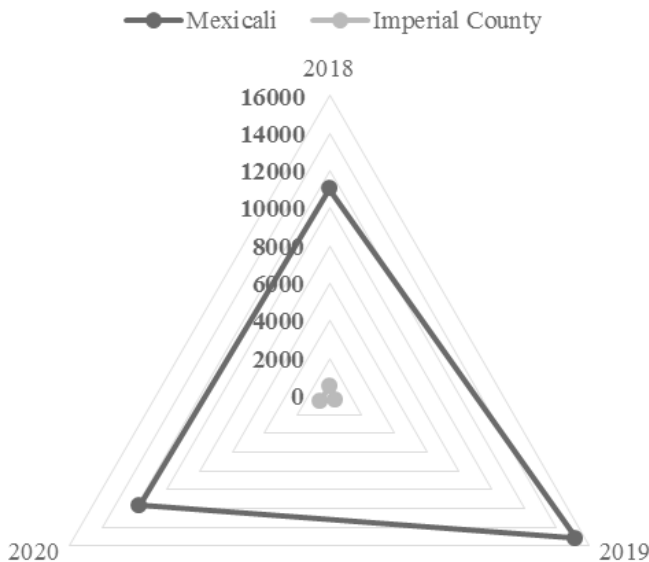


Figure 2. Air pollution deaths in Mexicali (Baja California) and Imperial County (California) 2018–2020

Source: Own elaboration with data of COPLADEMM, NIH, and CDC WONDER

related to high levels of air pollution was 291 per 100,000 inhabitants. In 2019 it was 227; in 2020, it was 295 per 100,000 inhabitants. Indeed, that is three times less than their southern neighbors.

In Figure 3, we find that, during 2020, there was an upward trend in homicides in Mexicali in absolute numbers. While the trend in Imperial County remains stable, on the Mexican side, the homicide rate related to organized crime has increased, since 2018, from 15.43 to 19.62 fatalities per 100,000 inhabitants by 2020. However, Imperial County’s homicide trend rate is very high. In 2018, the homicide rate was 67 for every 100,000 inhabitants, while two years later, in 2020, the rate increased to 70 victims. This ranks the county with one of the highest homicide rates in California and the United States (Gramlich, 2021; Montenegro, 2021). This point is interesting because although media outlets’ messages indicate that the Mexican side has the highest number of violent deaths, the insecurity crisis is on the U.S. side.

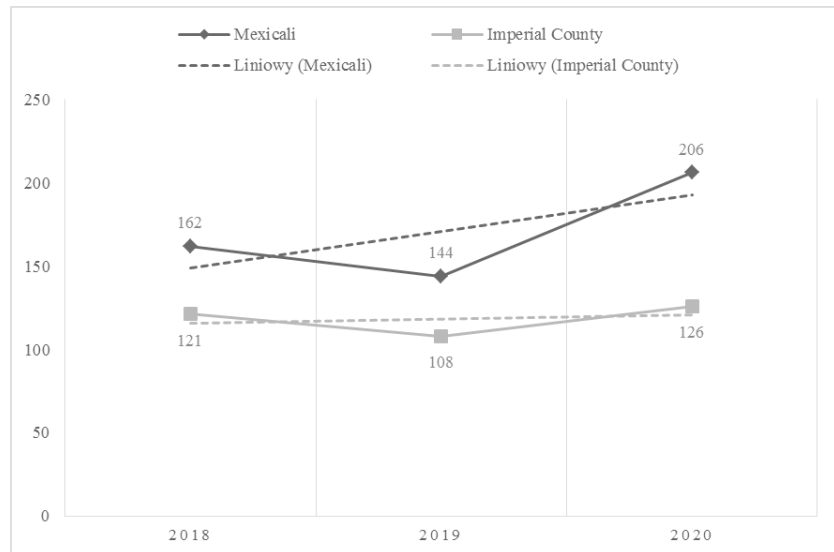


Figure 3.
Homicide deaths in Mexicali
and Imperial County
(2018–2020)

Source: Own elaboration with data of SSCBC and CDC WONDER

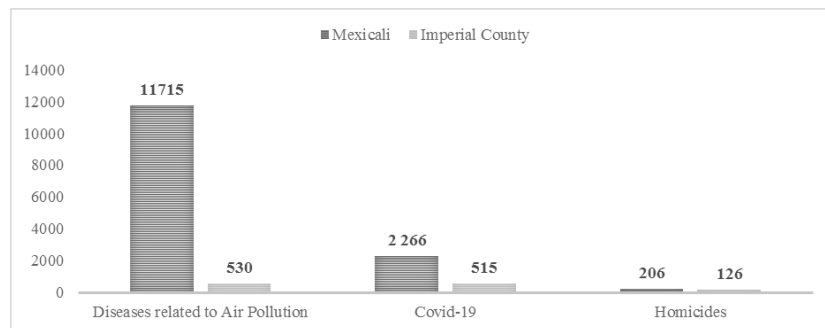


Figure 4.
Pollution, COVID-19, and
homicide deaths in absolute
numbers (2020)

Finally, Figure 4 summarizes the complexity of three cross-border phenomena that inequitably distress the Mexicali-Imperial County microregion. Indeed, authorities on both sides of the border have an unresolved multilevel shared responsibility for public security, health, and environmental matters. Official information shows that, back in 2020, the issue that distressed the population the most was air pollution-related deaths. The second place was for COVID-19, the lethal virus with no vaccine available to ease and contain the harm to public health. Lastly, homicide deaths are positioned in third place in the cross-border region as factors that alarm the community. Likewise, it is also important to emphasize that because Imperial County is less populated, the rates are higher than Mexicali, which has over a million inhabitants.

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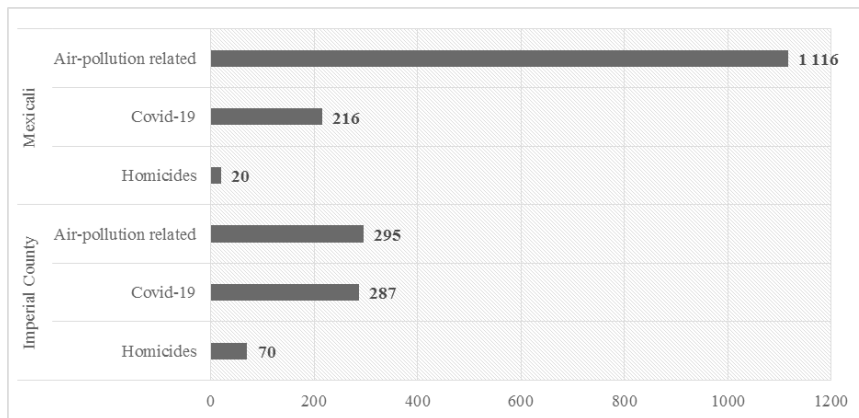


Figure 5. Pollution, COVID-19, and homicide death rate per 100,000 (2020)

Source: Own elaboration with data of SSCBC, Conacyt, Baja California Health Office, COPLADEMM, NIH, and CDC WONDER

Discussion

In Baja California, security has crushingly become a political priority over the past two decades, embodied through the *Plan Estatal de Desarrollo* (PED for its Spanish acronym), which is the main instrument guiding the state political agenda (Hernández et al., 2020, pp. 107–111; Arredondo et al., 2022; Ramos, 2022).

Nevertheless, this cannot be understood without acknowledging that during President Vicente Fox Quesada’s (2000–2006) and, mainly during Felipe Calderón Hinojosa’s (2006–2012) term, the homeland security compass started to anchor in the Mexican civilian government (Reyes et al., 2015; Morales & Perez, 2015). The main argument for such action was the underlying threat of criminal violence due to organized crime and civilian forces’ impunity, a hypothesis financed by the United States through the Mérida Initiative (Medeiros, 2022).

Even more, during Andrés Manuel López Obrador’s (2018–2024) administration, the National Guard was decreed as a security institution (DOF, 2019; Benítez & Gomez, 2021). This action increased Mexico’s security budget, further strengthening homeland security as a priority in all three-level government agendas. Meanwhile, since the September 11th terrorist attacks, the U.S. Customs has functioned under the homeland security scheme. Therefore, like many other border sister cities, the Mexicali-Imperial County cross-border region cannot escape urban space securitization.

It is inevitable to highlight the contradiction between some of the cross-border region’s social challenges and the heavy homeland security agenda design from Mexico City and Washington, D.C. For example, according to the research results, in 2019, the death rate due to air pollution-related diseases in Mexicali was as much as 103 times higher than the local homicide rate (Table 5).

Yet, Baja California’s public security budget for that year was 184 million dollars, while the health expenditure had a 22 million significant difference, bearing the 206-million-dollar bill (POBC, 2018b).³ Also, the City of Mexicali spent 55 million on public security in the same year; meanwhile, the healthcare budget was unknown (POBC, 2018a; Ortiz, 2022). Within a cross-border homeland security background, the Mexican state and city officially spent 239 million on security that year.

Table 5.
 Air pollution, homicides,
 and COVID-19 death rate in
 Mexicali & Imperial County
 per 100 000 inhabitants
 (2018-2020).

Imperial County, U.S.	Categories	2018	2019	2020
	Homicides	67	60	70
COVID-19	0	0	287	
Air pollution-related	291	227	295	
Mexicali, Mexico	Homicides	15	14	20
	COVID-19	0	0	216
	Air pollution-related	1,052	1,445	1,116

Source: Own elaboration with data of SSCBC, Conacyt, Baja California Health Office, COPLADEMM, NIH, and CDC WONDER

Similarly, even though the homicide death rate is lower than air pollution-related fatal victims (Table 5), in 2019, Imperial County invested 4 million dollars in law enforcement and public protection, in contrast to the 1.5 million in public health and social services (Imperial County, 2019). Correspondingly, in 2019 California had a 12.7-billion-dollar budget for public safety. Again, these are remarkable funds, contrasting with the 6.4 billion dollars to cover the statewide COVID-19 health crisis in 2020 (State of California, 2020; Legislative Analyst’s Office, 2020).

³ The exchange rate for 2019 was approximately 19 pesos per U.S. dollar.

To picture the size of the problem, in 2020, Mexicali (Baja California) recorded 1,116 fatal victims due to air-pollution-related illness per 100,000 inhabitants, whereas Imperial County (California) confirmed 295 cases. Worldwide, the average number of air pollution death is 85 victims per 100,000 inhabitants (Ritchie & Rose, 2021). Even though the governmental agenda focuses on a multi-billion-dollar investment in security, experience shows that – even in a critical situation such as the COVID-19 pandemic that paralyzed the world –, the Mexicali-Imperial County population has passed away mainly from a different cause instead of violence.

In that sense, political agenda priorities are not shared by the population. For decades, Mexico and the United States have financially supported a multi-billion-dollar security policy and agenda, far detached from the population's needs, worsening citizens' quality of life over time. Governments have also redefined new threats, like terrorism, organized crime, drugs, and migrants. Therefore, despite the mild differentiated impacts on the cross-border region, the general outcome is a public policy distant from citizens' needs. It is an agenda that re-victimizes and violates human rights, and far from seeking to improve the population's welfare, it produces necropolitics.

Final considerations

This manuscript delivers a descriptive bilateral comparative analysis of intentional homicides, COVID-19, and air pollution-related fatal victims between 2018 and 2020. The border sister cities examined are Imperial County (California, United States) and Mexicali (Baja California, Mexico), before and during the SARS-CoV-2 global health crisis. Even though analyzing quantitative data with a binational approach implies a methodological challenge, it is also an asset due to the data quality supported by all three levels of government authorities in the case of Mexicali and federal sources for the Imperial County case.

When writing this manuscript, there was no research regarding the lethal impact of COVID-19 in the Mexicali-Imperial County cross-border region, much less the pairing of these to air pollution or homicide deaths on both sides of the border. Consequently, the relevance of conducting this comparative and exploratory exercise is to have a panoramic overview of a unique and complex scenario. Nevertheless, with patience and creativity, valuable outcomes can be achieved for everyone: academics, policymakers, and citizens of a cross-border community.

The main limitations during the research were related to the jurisdiction where the official data was systematized. In addition to the different methodologies used, in the Mexican case, the approach was municipal, whereas, in the United States, it was a county scope. Although urban characteristics are slightly different, the fact is that both case studies are medium-sized twin cities with solid rural characteristics, making the comparative study feasible.

Furthermore, as the urban sprawl increases, municipal-level official data will become relevant for local tailor policies and programs.

Through this study, the author intends to contextualize the seriousness of air pollution and other extreme situations in the cross-border region, including extraordinary crises such as a pandemic. Within this intense background, the description allows us to identify the fatalities recorded on each side of the border for decision-makers to implement social policies and programs according to needs within a cross-border approach.

The research results show that Imperial County was fatally more violent, registering 70 victims in contrast to the 20 victims per 100,000 inhabitants in Mexicali. Likewise, COVID-19 is devastating on both sides of the border; even so, the most challenging impact was in Imperial County, recording 287 deaths per 100,000 residents. Still, neither of the two variables touched the population as much as deaths related to air pollution diseases, especially among Mexicans. In that case, they are five times higher than deaths due to COVID-19 in 2020.

Despite positioning homicides and insecurity as a priority on the public agenda, statistics demonstrate that the population is deeply affected by air pollution-related illnesses in the Mexicali-Imperial County cross-border region. In contrast to other cities on the U.S.-Mexican border, where homicidal violence is the main hazard factor, air pollution-related deaths are ranked well above other variables studied. Therefore, there should be a cross-border joint public agenda, prioritizing the attention on public health and public security in the second. Still, ideally, both approaches should be addressed to avoid risk to the population.

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