salud mental

Epidemiology of suicide mortality in Mexican young people (ages 15-29) from 1990 to 2020

Hilda Ortiz-Pérez,[1] Enrique Bravo-García,[2] José Samuel Bravo-García[3]

[1] Departamento de Atención a la Salud, Universidad Autónoma Metropolitana Unidad Xochimilco, Ciudad de México, México.
[2] Departamento de Salud Pública, Facultad de Medicina, Universidad Nacional Autónoma de México, Ciudad de México, México.
[3] Spectrum: Educación, Salud y Sociedad, A.C., Ciudad de México, México.

Correspondence:
Hilda Ortiz-Pérez
Departamento de Atención a la Salud, Universidad Autónoma Metropolitana - Unidad Xochimilco.
Calzada del Hueso 1100,
Villa Quietud, Coyoacán,
04960, Ciudad de México, México.
Phone: +52 (55) 3425 - 3153
Email: hortiz@correo.xoc.uam.mx

ABSTRACT

Introduction. In 2020, suicide was the third leading cause of death in Mexico among young people ages 15 and 29, accounting for 43.0% of all suicides in the country, making it a major public health issue. **Objective.** To explore changes in the geographic distribution of suicide rates by state and to analyze the magnitude, distribution, and pattern of suicide mortality in young Mexicans ages 15 to 29 between 1990 and 2020. **Method.** Descriptive, ecological time-series study, based on official information. Standardized mortality rates were calculated using information on deaths (INEGI) and population estimates (CONAPO). The magnitude, distribution, and patterns of suicide mortality at the national level and by state were analyzed using the Joinpoint segmented regression model. **Results.** From 1990 to 2020, suicide mortality in young people increased by 198% and was higher in women (285%) than men (178%). The states with the highest suicide mortality rates from 2016 to 2020 were Chihuahua (18.5 suicides/100,000 young people ages 15-29), Aguascalientes (16.6), Yucatán (14.4), Guanajuato (14.1), and San Luis Potosí (12.9), accounting for 23.0% of total suicide deaths. **Discussion and conclusion.** The study of mortality trends could contribute to the management of a national suicide prevention strategy in young Mexicans, providing support for public health decision-making, such as the identification of the states and regions that should be prioritized.

Keywords: Epidemiologic studies, mortality, suicide, young people, Mexico.

RESUMEN

Introducción. En 2020, el suicidio fue la tercera causa de muerte en México en los jóvenes de 15 a 29 años y concentró el 43.0% del total de suicidios del país. Por lo tanto, es un problema de salud pública muy relevante. **Objetivo.** Explorar los cambios en la distribución geográfica de las tasas de suicidio por entidad federativa, así como analizar la magnitud, distribución y tendencia de la mortalidad por suicidio, en los jóvenes mexicanos de 15 a 29 años entre 1990 y 2020. **Método.** Estudio ecológico descriptivo de series de tiempo, a partir de la información de fuentes oficiales. Se calcularon las tasas estandarizadas de mortalidad utilizando la información sobre defunciones (INEGI) y las estimaciones de población (CONAPO). Se analizó la magnitud, distribución y tendencias de la mortalidad por suicidio a nivel nacional y por entidad federativa, utilizando el modelo de regresión segmentada Joinpoint. **Resultados.** De 1990 a 2020, la mortalidad por suicidio en jóvenes creció 198%, siendo mayor en las mujeres (285%) que en los hombres (178%). Las entidades con mayor mortalidad por suicidio, de 2016 a 2020, fueron Chihuahua (18.5 suicidios/100 mil jóvenes 15-29 años), Aguascalientes (16.6), Yucatán (14.4), Guanajuato (14.1) y San Luis Potosí (12.9), las cuales concentraron el 23.0% del total de muertes por suicidios. **Discusión y conclusión.** El estudio de las tendencias de la mortalidad podría contribuir a la gestión de una estrategia nacional para la prevención del suicidio en jóvenes mexicanos, proporcionando sustento para la toma de decisiones en salud pública, como la identificación de las entidades federativas y regiones del país que deben recibir la máxima prioridad.

Palabras clave: Estudios epidemiológicos, mortalidad, suicidio, jóvenes, México.

INTRODUCTION

In 2019, the WHO estimated that 703,000 people had died from suicide worldwide, accounting for 1.3% of all deaths. The overall suicide rate, standardized by age, was 9.0 per 100,000 population for both sexes, and higher in men (12.6 per 100,000) than women (5.4 per 100,000). Globally, suicide is one of the leading causes of mortality, which is why the WHO considers it a serious public health problem (World Health Organization [WHO], 2021).

One of the groups at the greatest risk of suicide is young people ages 15 to 29. In 2019, 22.8% of suicides occurred in this age group, making it the fourth leading cause of death, after traffic accidents, tuberculosis, and interpersonal violence. In women and men, respectively, suicide was the third and fourth leading cause of death among young people worldwide (WHO, 2020; 2021).

Suicide is preventable, as borne out by the fact that suicide mortality rates have declined in various countries. Between 2000 and 2019, the global suicide rate decreased by 36%, with reductions ranging from 17% in the Eastern Mediterranean Region to 47% in the European Region and 49% in the Western Pacific Region. The only region where an increase in suicide rates was observed was the Americas, where they rose by 17% (WHO, 2021).

In 2019, suicides were one of the leading causes of death from injury in Latin America. Between 1990 and 2019, the number of deaths from suicide increased significantly in most countries in the region. The greatest growth occurred in Paraguay (268.2%), Ecuador (244.9%), and Mexico (188.9%; Dávila-Cervantes, 2022).

In Mexico, various authors have observed a significant increase in suicide in recent decades. Between 1990 and 2000, suicide in young people ages 15 to 24 increased by 74%. Already one of the most severely affected populations, this group accounted for 28% of all suicides in 2007 (Borges et al., 2009). From 1970 to 2007, suicide rose by 275%, particularly among those ages 15 to 29, becoming one of the leading causes of death in this age group (Borges, Orozco, Benjet, & Medina-Mora, 2010).

Between 1970 and 2016, the suicide mortality rate in young people almost quintupled, rising from 1.13% in 1970, through 2.63% in 1990, to 5.2% in 2016. In the population ages 15 to 29, it was the third leading cause of death in both sexes and one of the main causes of years of life lost due to premature death (Dávila-Cervantes, 2019). Between 1990 and 2017, the suicide burden in Mexico rose mainly in young men and women, although the increase in older adults poses an additional challenge for health services.

A study analyzing conventional and gray literature on suicidal behavior in the Mexican population ages 15 to 29 between 1980 and 2014 found that the majority of documents reported risk factors, and that only a small percentage (9.37%) explored protective factors, which is why it is important to explore youth suicide from a public health perspective (Vázquez-Vega, Piña-Pozas, González-Forteza, Jiménez-Tapia, & Mondragón-Barrios, 2015).

In short, in 2020, suicide was the third leading cause of death in Mexico in young people ages 15 to 29, accounting for 43.0% of the total number of suicides reported (Bravo-García, 2022), making it a major public health issue. The objectives of the present study were to explore the changes in the geographical distribution of suicide rates by state, and to analyze the magnitude, distribution, and pattern of suicide mortality rates in Mexican youth ages 15 to 29 between 1990 and 2020.

METHOD

Design of the study

Descriptive, ecological, time-series study on suicide in Mexican youth from 1990 to 2020.

Participants/sample description

Young people ages 15 to 29 who died by suicide from 1990 to 2020, primarily resident in Mexico. This period was chosen because of the availability of official information on deaths registered in Mexico, whose annual databases can be downloaded from the INEGI website (Instituto Nacional de Estadística y Geografía [INEGI], 2022a). Deaths by suicide in the period 1990-1997 were identified using codes E950-E959 of the 9th revision of the International Classification of Diseases (ICD; Pan American Health Organization [PAHO], 1975). As of 1998, when the 10th revision of the ICD began to be used in Mexico, they were identified with codes X60-X84 (PAHO, 1995).

Sites

Not applicable.

Measurements

The following variables were included: sex (biological sex of the person who died); age number of years completed between birth and date of death); state of residence (state where the deceased resided permanently during their last six months).

Procedure

The official population estimates compiled by CONAPO (Consejo Nacional de Población, 2012) were used to calculate standardized suicide mortality rates, taking the number of suicide deaths in young people ages 15 to 29 years as

a numerator and the population corresponding to this age range, multiplied by 100,000, as a denominator. Standardization was conducted using the direct method, using the age and sex structure of the 2005 Population and Housing Count of INEGI as the reference population, since this was the survey taken closest to the midpoint of the period studied (INEGI, 2008). The evolution of national mortality and its disaggregation by sex and state were described.

Statistical analysis

The Joinpoint segmented regression model was used for the time analysis of suicide mortality. Based on a log-linear model, it identifies the points where the direction or magnitude of the trend changes significantly, to determine whether a multisegmented line is statistically more useful for describing the time evolution of a set of data than a straight or less segmented line (Kim, Luo, Kim, Chen, & Feuer, 2014; Kim, Fay, Feuer, & Midthune, 2000). This model makes it possible to detect the points where significant changes occur in mortality trends (in other words, whether they remain stable, or increase or decrease) and also estimates the APC and AAPC (Annual Percentage Change and Average Annual Percentage Change) for each segment of the linear regression and the entire time series respectively as well as their 95% confidence intervals and level of significance (Torres-Sánchez, Rojas-Martínez, Escamilla-Núñez, de la Vara-Salazar, & Lazcano-Ponce, 2014). To select the model with the best data fit, the method using the sequence of permutation tests was used to guarantee that the approximate likelihood of a Type I error would be less than .05. This method involves conducting several tests to choose the number of points of union, using the Bonferroni correction for multiple tests (Kim et al., 2000). The analyses were conducted using Joinpoint v. 4.5.0.1 regression software (National Cancer Institute, 2016). For its graphic representation, the same mortality scale was used (with a rate of 0 to 15 deaths per sex and 0 to 25 deaths per 100,00 for the states).

To prepare the thematic maps of suicide mortality rates, the period of study from 1990 to 2020 was divided into six five-year periods, except for the first period covering six years. Mortality rates were grouped into four categories, using the quartiles of the distribution of suicide mortality in the states during the last five-year period (2016-2020) as criteria, so that the most recent five-year period served as a benchmark: low mortality (.0-6.5 per 100,000 population); average mortality (6.6-8.8 per 100,000 population); high mortality (8.9-11.3 per 100,000 population); and very high mortality (for states with mortality rates of 11.4 or more per 100,000 population). Using this uniform criterion in the six periods made it possible to observe how the geographical distribution of suicide mortality rates in young people changes over time. It was therefore possible to visualize the evolution of suicide mortality in young people ages 15 and

29 in every state in the country using the QGIS mapmaking software version 3.4 (QGIS Developer Team, 2019).

Ethical considerations

This study did not involve intervention in human subjects, since the analysis was conducted using freely accessible secondary information sources, which do not contain personal or confidential data that must be protected. It therefore does not need to be approved by an Ethics Committee.

RESULTS

From 1990 to 2020, 58,928 suicides were recorded in Mexico in young people ages 15-29 (82.2% males and 17.8% females), accounting for 43.0% of the total suicides in the country. The standardized suicide mortality rate tripled during this period, rising from 3.2 to 9.6 suicides per 100,000 young people ages 15 to 29, equivalent to a 198% increase. In general, the risk of dying by suicide is three times higher in men than in women. However, the mortality rate increased at a faster rate in women (285%) than men (178%). Suicide mortality in young women rose from 1.1 to 4.4 per 100,000 population, whereas in men it increased from 5.3 to 14.7 per 100,000 population (Table 1).

Using the most recent five-year period as a starting point, the states with the highest annual standardized suicide mortality rates in young people between 2016 and 2020 were Chihuahua (18.5 suicides/100,000 young people), Aguascalientes (16.6/100,000), Yucatán (14.4/100,000), Guanajuato (14.1/100,000), and San Luis Potosí (12.9/100,000). These five states accounted for 23.0% of the total suicide deaths in young people. Conversely, Guerrero, Veracruz, Sinaloa, Tamaulipas, and Hidalgo had annual mortality rates of 6.0 per 100,000 population or less, well below the national mortality rate, and accounting for just 9.0% of total suicides. There is enormous heterogeneity among the country's states, since suicide mortality rates are six times higher in Chihuahua than Guerrero (Table 2).

An exploratory analysis made it possible to visualize the evolution of suicide mortality in young people through five-year thematic maps of mortality, except for the first period covering six years. Between 1990 and 1995, only Campeche and Tabasco had high or very high mortality, while the remaining 30 states had medium or low mortality rates. From 1996 to 2000, mortality rates were very high in Campeche; and high in Baja California Sur, Chihuahua, Tabasco, and Yucatán, while the remaining 27 states had medium or low mortality rates. From 2001 to 2005, very high mortality rates were reported in Campeche and Tabasco, together with high mortality rates in Baja California Sur, Chihuahua, Sonora, and Yucatán, while the remaining 26 states had medium or low mortality. From 2006 to 2010, there were already four

states with high or very high mortality. Between 2011 and 2015, 13 states in the country had a high (seven states) or very high (six states) suicide mortality rate. And in the most recent period, from 2016 to 2020, eight states recorded very high mortality; eight states, high mortality; seven states, average mortality; and nine states, low mortality rates. In short, the visual representation reflects the evolution of suicide mortality rates in young people, with the most recent period showing that suicide mortality rates in young people in half the country are high or very high. The states with very high suicide mortality rates are located in the center and north of the country, as well as the Yucatán Peninsula (Figure 1).

The regression model showed six time segments in suicide mortality rates in young people, all of which increased. The first was from 1990 to 1993 (APC = 3.49); the second

from 1993 to 1997 (APC = 10.65); the third from 2007 to 2008 (APC = .88); the fourth, from 1998 to 2011 (APC = 7.82); the fifth from 2011 to 2018 (APC = 1.12); and the sixth from 2018 to 2020 (APC = 7.21). The analysis of mortality rates throughout the period showed a significant upward trend (AAPC = 3.6; 95% CI [2.4, 4.7] $p < .001$), reflecting the increase from 3.2 to 9.6 deaths/100,000 young people between 1990 and 2020 (Figure 2).

The evolution of suicide mortality rates in young men had four-time segments: the first displayed an upward trend from 1990 to 1998 (APC = 7.21); the second showed stable behavior from 1998 to 2008 (APC = .54); the third rose from 2008 to 2011 (APC = 6.50) while the fourth also increased from 2011 to 2020 (APC = 1.88). In women, the evolution of suicide mortality rates contained only two segments, both of

Table 1
Suicide mortality rates in young people ages 15 to 29, by sex and year of registration. Mexico, 1990-2020

Year	Total suicide deaths	Young people ages 15 to 29		Males ages 15 to 29		Females ages 15 to 29	
		Number of deaths	Standardized Mortality Rate*	Number of deaths	Standardized Mortality Rate*	Number of deaths	Standardized Mortality Rate*
1990	1,914	836	3.2	687	5.3	149	1.1
1991	2,091	946	3.7	791	6.3	155	1.2
1992	2,225	991	3.7	825	6.1	166	1.2
1993	2,316	995	3.6	839	6.1	156	1.1
1994	2,557	1,129	4.1	920	6.6	209	1.5
1995	2,849	1,336	4.8	1,093	7.7	243	1.7
1996	2,979	1,392	4.9	1,116	7.9	276	1.9
1997	3,328	1,659	5.8	1,334	9.3	325	2.3
1998	3,282	1,600	5.6	1,303	9.1	297	2.1
1999	3,300	1,606	5.6	1,338	9.3	268	1.9
2000	3,440	1,621	5.6	1,330	9.2	291	2.0
2001	3,760	1,692	5.8	1,358	9.4	334	2.3
2002	3,826	1,723	5.9	1,399	9.6	324	2.2
2003	4,070	1,794	6.1	1,445	9.9	349	2.4
2004	4,061	1,750	5.9	1,426	9.7	324	2.2
2005	4,273	1,826	6.1	1,460	9.9	366	2.4
2006	4,230	1,774	5.9	1,417	9.6	357	2.4
2007	4,362	1,796	6.0	1,428	9.6	368	2.4
2008	4,638	1,920	6.3	1,499	9.9	421	2.8
2009	5,147	2,075	6.8	1,588	10.4	487	3.2
2010	4,960	2,052	6.7	1,595	10.7	457	3.0
2011	5,662	2,489	8.1	1,903	12.6	586	3.8
2012	5,503	2,363	7.6	1,841	12.1	522	3.3
2013	5,838	2,398	7.7	1,873	12.1	525	3.3
2014	6,270	2,530	8.0	1,964	12.6	566	3.6
2015	6,354	2,657	8.4	2,016	12.8	641	4.0
2016	6,292	2,618	8.2	2,072	13.0	546	3.4
2017	6,426	2,676	8.3	2,108	13.2	568	3.6
2018	6,443	2,628	8.2	2,055	12.8	573	3.6
2019	7,018	2,916	8.9	2,289	13.8	627	3.9
2020	7,699	3,140	9.6	2,442	14.7	698	4.4
Total	137,113	58,928		46,754		12,174	

* Standardized mortality rate per 100,000 young people ages 15 to 29.
Note: Only deaths of young people with known sex and age, who mainly resided in Mexican s tates, were included.
Source: Compiled by the authors based on (Instituto Nacional de Estadística y Geografía, 2022a).

which increased, from 1990 to 1996 (APC = 10.46) and from 1996 to 2020 (APC = 3.48; Figure 1). The time analysis of the entire period (1990 to 2020) showed an upward trend in both sexes, with a greater increase in women (AAPC = 4.8; 95% CI [3.5, 6.2] p < .001), than in men (AAPC = 3.3; 95% CI [2.1, 4.5] p < .001).

In addition to the number of deaths and the risk of dying by suicide, the most recent trend in suicide mortality was analyzed within the period 1990-2020. Suicide mortality in young people increased in 22 of the 32 states in Mexico. It decreased in five whereas in the remaining five states, it remained stable (Table 2). The highest annual growth rate corresponded to Michoacán (26.45), followed by Yucatán (APC = 8.09), Chihuahua (APC = 7.36), Aguascalientes (APC = 6.73), Durango (APC = 6.56), and Puebla (APC = 5.01). Mexico City (APC = 27.39), the state of Mexico (APC = 23.25), and Oaxaca (APC = 21.52) displayed significant increases that were not statistically significant.

Table 2
Suicide mortality rates in young people ages 15 to 29 and their most recent trend, by state. Mexico, 1990-2020

States	Period 2016-2020				Period 1990-2020				
	State deaths by suicide	%	Mortality rate[&]	National ranking	Number of segments	Last segment	Years of last segment	APC[#]	Trend of last segment
Aguascalientes	302	2.2	16.6	2	1	1990-2020	31	6.73*	Upward
Baja California	295	2.1	6.2	27	4	2018-2020	3	-27.05	Downward
Baja California Sur	93	.7	8.1	19	1	1990-2020	31	-.13*	Downward
Campeche	148	1.1	11.5	8	2	1990-2020	31	.07	Stable
Coahuila	478	3.4	12.2	6	2	1998-2020	23	2.48*	Upward
Colima	93	.7	9.1	15	1	1990-2020	31	1.07*	Upward
Chiapas	504	3.6	6.5	24	2	2016-2020	5	-15.30*	Downward
Chihuahua	889	6.4	18.5	1	3	2008-2020	13	7.36*	Upward
Ciudad de México	661	4.7	6.5	25	5	2018-2020	3	27.39	Upward
Durango	255	1.8	10.8	12	5	2012-2020	9	6.56*	Upward
Guanajuato	1,126	8.1	14.1	4	4	2015-2020	6	-1.85*	Downward
Guerrero	161	1.2	3.2	32	1	1990-2020	31	.97	Stable
Hidalgo	222	1.6	6.0	28	4	2011-2020	10	-.26	Stable
Jalisco	1,198	8.6	11.3	9	4	2011-2020	10	1.96*	Upward
México	1,579	11.3	7.1	23	3	2018-2020	3	23.25	Upward
Michoacán	536	3.8	8.7	17	3	2017-2020	4	26.45*	Upward
Morelos	200	1.4	7.9	20	1	1990-2020	31	3.29*	Upward
Nayarit	137	1.0	8.6	18	1	1990-2020	31	3.26*	Upward
Nuevo León	609	4.4	9.3	14	2	2006-2020	15	1.16	Stable
Oaxaca	337	2.4	6.3	26	3	2017-2020	4	21.52	Upward
Puebla	762	5.5	9.0	16	1	1990-2020	31	5.01*	Upward
Querétaro	307	2.2	11.2	11	1	1990-2020	31	4.26*	Upward
Quintana Roo	285	2.0	12.1	7	1	1990-2020	31	1.79*	Upward
San Luis Potosí	479	3.4	12.9	5	1	1990-2020	31	3.51*	Upward
Sinaloa	182	1.3	4.6	30	1	1990-2020	31	1.15*	Upward
Sonora	441	3.2	11.3	10	3	2010-2020	11	4.92*	Upward
Tabasco	248	1.8	7.7	21	2	2011-2020	10	-6.57	Downward
Tamaulipas	236	1.7	5.2	29	1	1990-2020	31	.28	Stable
Tlaxcala	126	.9	7.4	22	1	1990-2020	31	4.63*	Upward
Veracruz	456	3.3	4.3	31	1	1990-2020	31	.90*	Upward
Yucatán	415	3.0	14.4	3	3	2014-2020	7	8.09*	Upward
Zacatecas	218	1.6	10.3	13	1	1990-2020	31	3.10*	Upward
National	**13,978**	**100.0**	**8.7**		**6**	**2018-2020**	**3**	**7.21***	**Upward**

[&] Standardized mortality rate per 100,000 young people ages 15 to 29.
[#] APC = Annual Percentage Change.
* The annual percentage change (APC) is significantly different from zero in alpha = .05

Source: Compiled by the authors based on (Instituto Nacional de Estadística y Geografía, 2022b; H.J. Kim et al., 2000).

Conversely, Chiapas recorded a significant decrease in mortality (APC = -15.30), followed by Guanajuato (APC = 1.85) and Baja California Sur (-.13). For their part, Baja California and Tabasco experienced significant decreases (APC = -27.05 and -6.57) respectively, which were statistically significant (Table 2 and Figure 3).
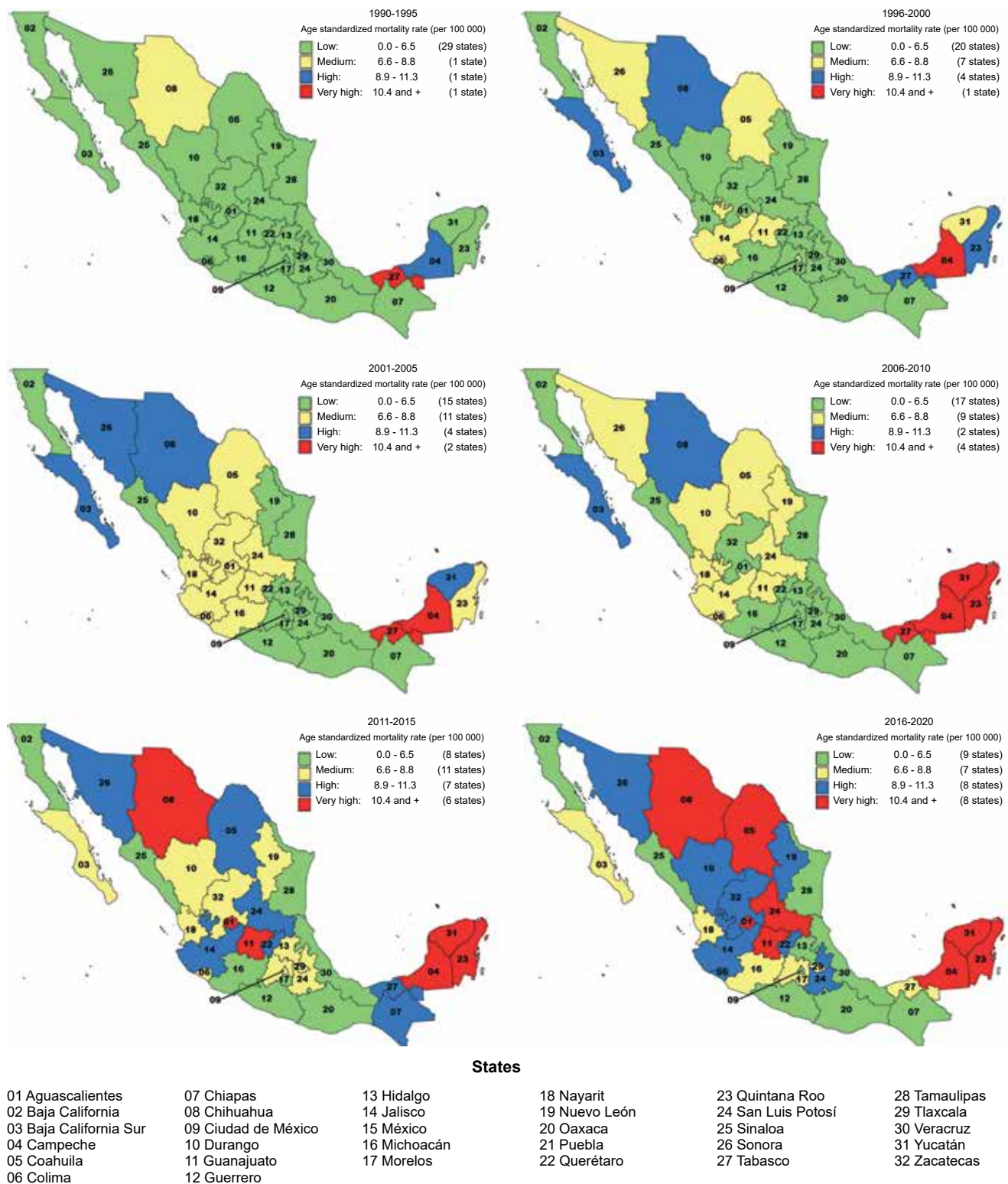

Figure 1. Mortality rate maps by suicide in young people ages 15 to 29 by state. Mexico, 1990-2020.

States

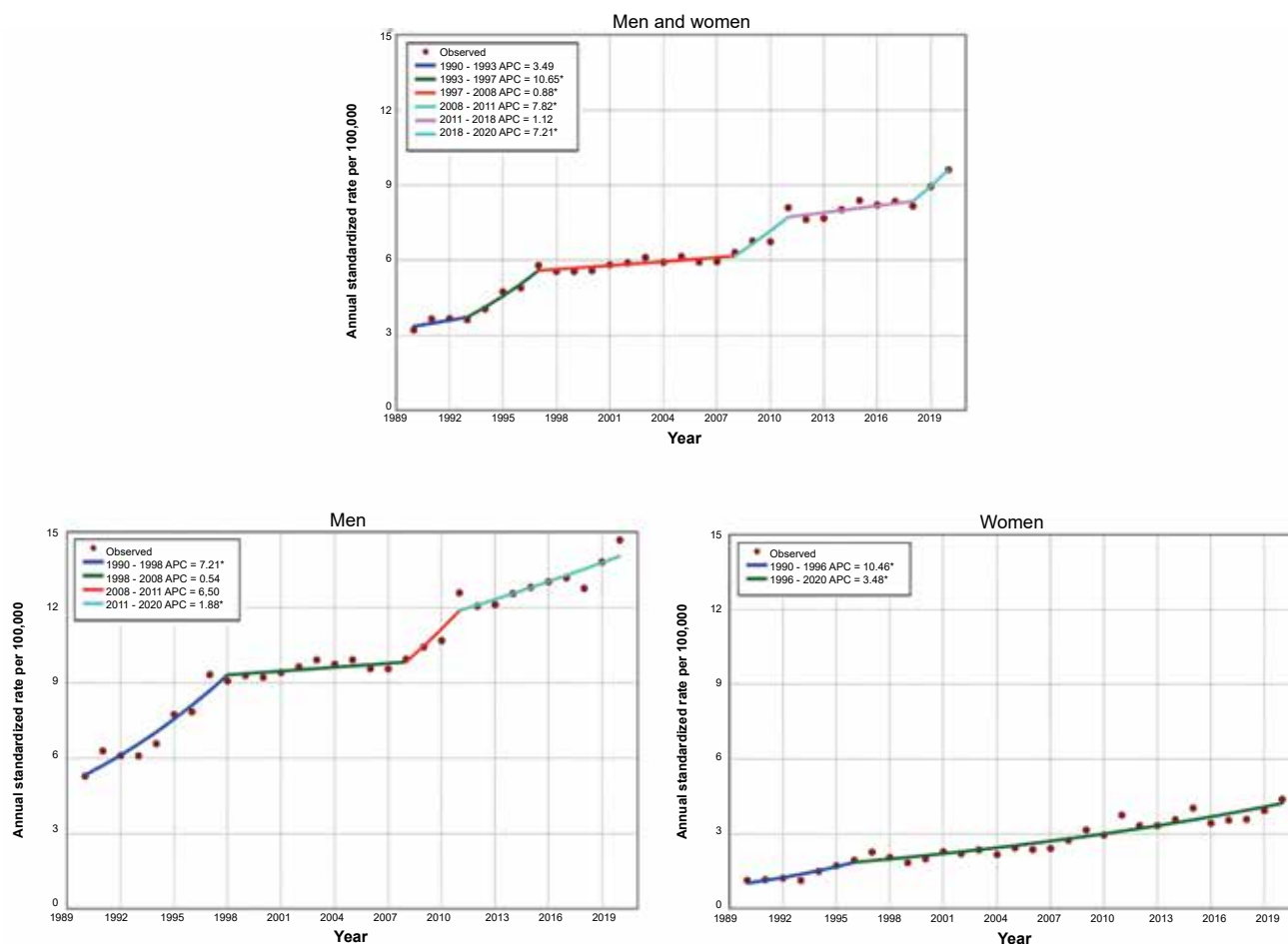|					
01 Aguascalientes	07 Chiapas	13 Hidalgo	18 Nayarit	23 Quintana Roo	28 Tamaulipas
02 Baja California	08 Chihuahua	14 Jalisco	19 Nuevo León	24 San Luis Potosí	29 Tlaxcala
03 Baja California Sur	09 Ciudad de México	15 México	20 Oaxaca	25 Sinaloa	30 Veracruz
04 Campeche	10 Durango	16 Michoacán	21 Puebla	26 Sonora	31 Yucatán
05 Coahuila	11 Guanajuato	17 Morelos	22 Querétaro	27 Tabasco	32 Zacatecas
06 Colima	12 Guerrero				

Figure 2. Standardized annual mortality from suicide in young people 15-24 years old, by sex. Mexico, 1990-2020.

* The annual percentage change (APC) is significantly different from zero at alpha = .05.

DISCUSSION AND CONCLUSION

WHO data show that, between 1995 and 2019, suicide mortality rates decreased in all the world regions, except for the Region of the Americas, where they increased by 17% (WHO, 2021). During that same period, suicide increased by 188.9% in Mexico (Dávila-Cervantes, 2022). Our study showed that, among young people ages 15 to 29, this increase was greater, amounting to 198%. Globally, suicide in young people accounted for 22.8% of total suicide deaths (WHO, 2020), while the data presented here show that in Mexico, this proportion is 43.0%.

This study shows that suicide mortality in young people has grown steadily for over three decades (1990-2020), which is consistent with the upward trends reported by previous studies analyzing other shorter time periods (Borges et al., 2009; 2010; Dávila-Cervantes, 2019). The regression analysis in this study showed average annual growth in suicide mortality rates in young people of 3.6%, with a greater increase in women (4.8%) than men (4.3%). The rise in all

forms of violence against women, which rose from 66.1% to 70.1% between 2016 and 2021, may be a key factor in the more rapid increase in youth suicide among girls and women (INEG, 2022b). The aspect of greatest concern, however, is that there is no indication of a reduction in mortality in any period. Some authors suggest that the sustained growth of youth suicide in recent decades is related to growing economic and social deterioration, school dropouts, difficulty finding jobs, and low salary levels (Hernández-Bringas & Flores-Arenales, 2011) while others consider that it is associated with marital status, underemployment, high alcohol consumption and having family members who died by suicide or suffered mental disorders (Dávila-Cervantes, Torres, & Casique, 2015). The fact is that a great deal of research is required to demonstrate rather than just state the main causes of this increase.

This study updates the geographic distribution, at the state level, of suicide mortality rates in young people, presented in previous studies (Borges et al., 2010). The main contribution, however, consists of the presentation of epi-
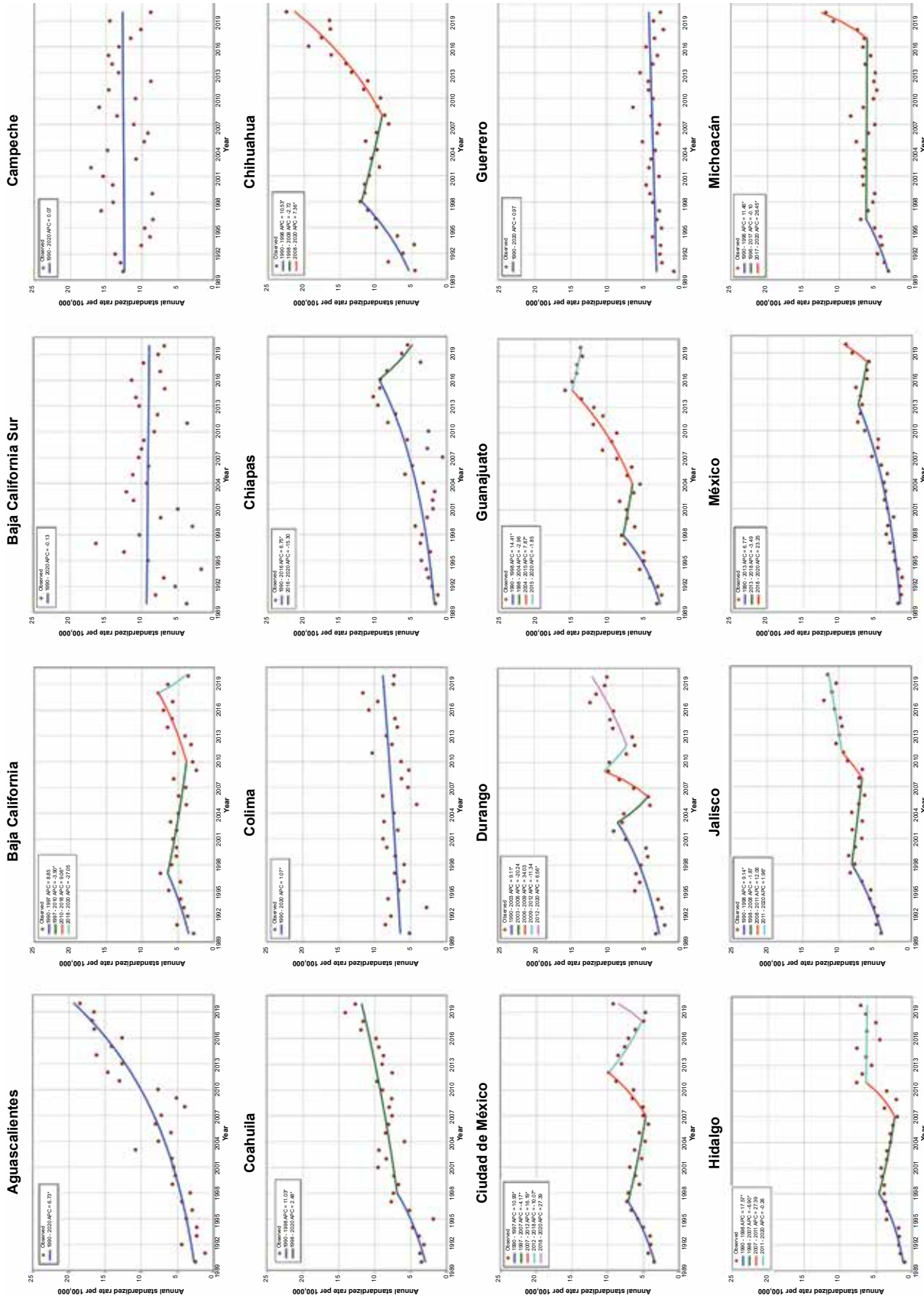
Figure 3. Mortality rates by suicide in young people ages 15 to 29 by state. Mexico, 1990-2020.

* The annual percentage change (APC) is significantly different from zero at alpha = .05
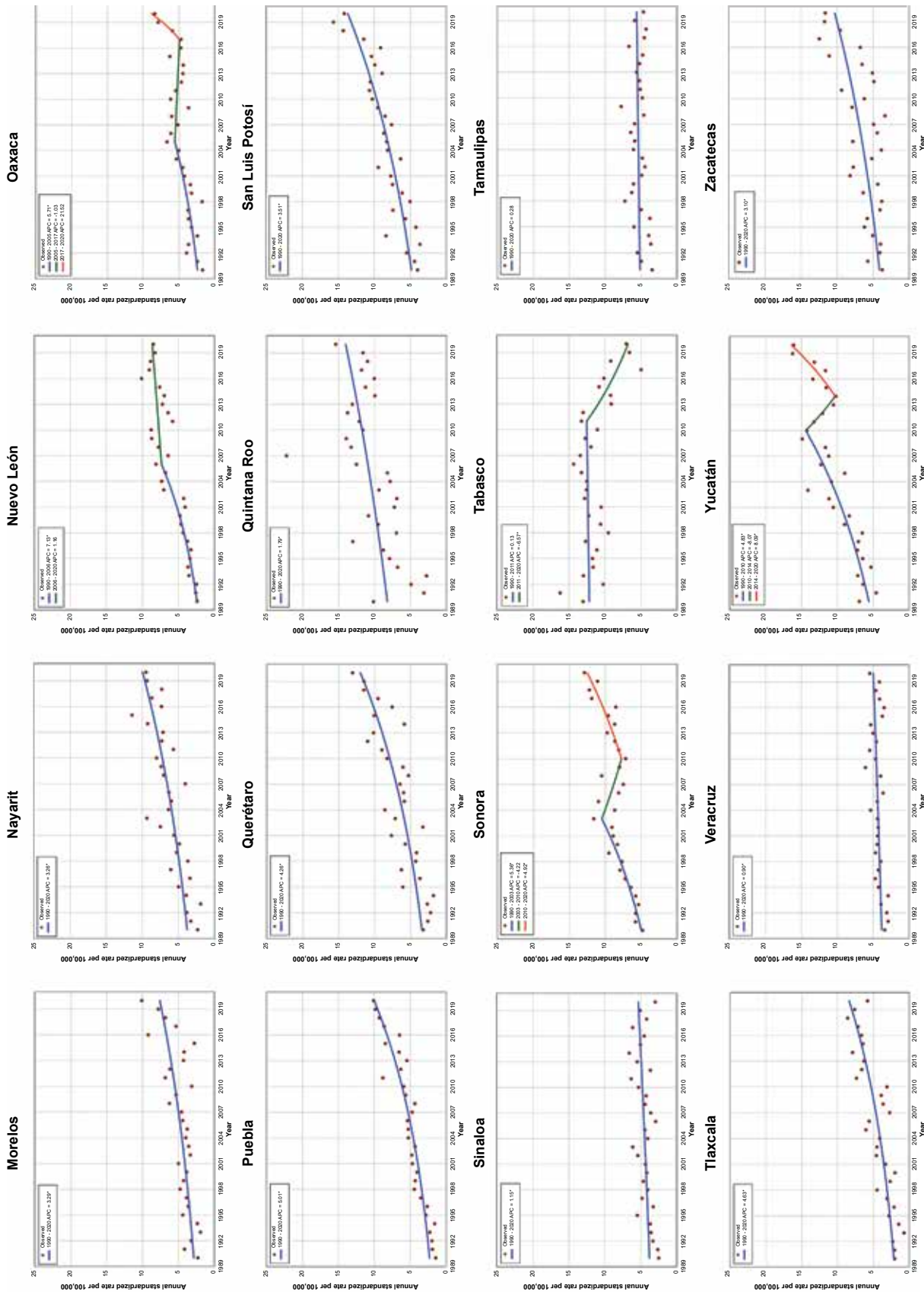
Figure 3. Mortality rates by suicide in young people ages 15 to 29 and its most recent trend, by state. Mexico, 1990-2020 (continued).

* The annual percentage change (APC) is significantly different from zero at alpha = .05

demiological trends and mortality maps in the 32 states in Mexico, showing which states should be prioritized for suicide prevention in young people, depending on their magnitude and epidemiological trends.

Since 2020, the first year of the COVID-19 pandemic, was included in the analysis, it is important to note that a study of 33 middle- and high-income countries or regions in the first 9 to 15 months of the pandemic found no evidence in most of them of a higher number of suicides than expected (Pirkis et al., 2022). In Mexico City, an overall increase in suicides was reported during the first nine months of the COVID-19 pandemic (Borges et al., 2022). And although this study also reports an increase in suicide rates for young people in Mexico City during the period 2018-2020, the result was not statistically significant. It is therefore not yet possible to draw conclusions about the impact of the COVID-19 pandemic on the suicide rate. Future research with information on the most critical years of the COVID-19 pandemic (2020-2022), will undoubtedly allow solid conclusions to be drawn.

Finally, it is important to note that, to date, youth suicide has not been a priority of the federal government as a public health problem, since it continues to grow at an alarming rate, seriously affecting young people ages 15 to 29, who represent the future of the country. Unless action is taken soon, suicide will continue to increase in the coming years.

This situation could change, due to the recent publication of the first National Suicide Prevention Program in Mexico, promoted by the federal Ministry of Health. Its implementation could help modify the growing trend of suicide in Mexico, by "implementing prevention, care and monitoring actions for suicidal behavior at the sectoral level to reduce mortality from this cause, through evidence-based clinical and community strategies" (Secretaría Técnica del Consejo Nacional de Salud Mental, 2022). It could also mitigate the damage to the families and communities affected. Unfortunately, the program lacks explicit goals and fails to define the priority population groups or geographic areas, which will hamper its management and evaluation.

The study of mortality rate trends presented in this study could contribute to the management of a national strategy for the prevention of suicide in young Mexicans, providing support for public health decision making, such as the identification of federal states. and regions of the country that should be prioritized.

Because it is a descriptive study, its main limitation is that it does not explain the causes associated with the total, differentiated increase in suicide mortality rates in young Mexicans. Future research could answer these questions. A second limitation is the under-reporting of deaths due to suicide, related to the stigma associated with this type of death, the limited functioning of the medical or judicial registration systems regarding the cause of death and the "incorrect completion" of death certificates (Sánchez-Cervantes, Serrano-González, & Márquez-Caraveo, 2015).

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Conflict of interest

The authors declare that they have no conflicts of interest.

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