

Electronic Supplementary Material (ESM 1) for

Suicide Rates and Prescription of Antidepressants

Trends in the US, 1999–2020, by Sex and Race/Ethnicity

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p.2 Trends in antidepressant prescription prevalence and suicide rate stratified by race/ethnicity and sex

p.3 Table S1. Annual Percentage Change (APC) in antidepressant prescription prevalence and suicide rate according to joinpoint regression models, stratified by sex and race/ethnicity.

p.5 Figure S1. Trends in antidepressant prescription prevalence (dots for females and diamonds for males) and suicide rate (triangles for females and multiplication symbol for males) in the USA stratified by race/ethnicity and sex (Hispanic in 1a, AI-AN in 1b, A-PI in 1c, Black in 1d, and White in 1e), 1999-2020.

p.6 Table S2. Estimated coefficients according to different tests of association between antidepressant prescription prevalence and suicide rate in the USA overtime (1999-2020).

Trends in antidepressant prescription prevalence and suicide rate stratified by race/ethnicity and sex

Overall, trends in antidepressant prescription and suicide rate were similar between males and females also after stratifying by race/ethnicity (Table S1, Figure S1).

In the Hispanic group (Figure S1a), one joinpoint was shown for both antidepressant prescription and suicide rate except for three joinpoints in antidepressant prescription trends for the female group. antidepressant prescription prevalence in females significantly increased between 1999 and 2003, and between 2010 and 2017 whereas it was stable in the periods 2003-10 and 2017-2020. Trends of antidepressant prescription in males and suicide rate in both sexes were characterized by initial stability (until 2001, and 2007/2013 respectively) followed by significant increases by 1.5% per year in antidepressant in males and by 4% in suicide rate in both sexes. The hypothesis of parallelism of the two joinpoint regression models was rejected for both sexes ($p= 0.01$ and 0.02 in female and male groups, respectively).

Regarding the AI-AN group, the antidepressant prescription prevalence for the male group with the value of 0 (for the year 2000) was replaced by 0.01 to avoid joinpoint analysis from stopping due to Joinpoint Software inability to process records with dependent variables = 0. Antidepressant prescription showed an initial increase in both sexes until 2001 (Figure S1b). In females, it decreased until 2006 and then significantly increased by 6.2%. Whereas, in males, it decreased by 1.8% per year until 2020. Positive trends in suicide rates for both sexes were found. The hypothesis of parallelism of the two joinpoint regression models was not rejected ($p= 0.25$ and 0.17 in female and male groups, respectively). The figure below depicts trends in antidepressant prescription prevalence (dots for females and diamonds for males) and suicide rate (triangles for females and multiplication symbol for males) in the AI-AN group by sex.

Antidepressant prescription prevalence in A-PI females showed an alternation of positive (i.e., 1999-2002, 2008-11, and 2014-2020) and negative (i.e., 2002-08, 2011-2014) trends (Figure S1c). In males, no trend was found. Conversely, suicide rate increased both in females (by 1.2% per year over the entire period) and males (by 1.9% per year between 2005 and 2020). The hypothesis of parallelism of the two joinpoint regression models was rejected ($p= 0.04$) in females whereas not rejected ($p= 0.12$) in males. The figure below depicts trends in antidepressant prescription prevalence (dots for females and diamonds for males) and suicide rate (triangles for females and multiplication symbol for males) in the A-PI group by sex.

Despite increasing, no significant trend emerged in antidepressant prescription prevalence in the non-Hispanic Black group for both sexes except for the significant increase observed in female by 26% per year between 1999 and 2002 (Figure S1d). Instead, suicide rate significantly increased in both females between 1999 and 2008, and in males between 2007 and 2020. The hypothesis of parallelism of the two joinpoint regression models was rejected ($p< 0.001$ and $p= 0.01$ in female and male groups, respectively).

Finally, antidepressant prescription in White females significantly increased between 1999 and 2003 (Figure S1e). Then, the trend was mainly stable until 2010 when a significant positive trend began. In White males, a significant positive trend was detected between 2001 and 2020. Suicide rate significantly increase in females between 1999 and 2015, and in males between 1999 and 2002, and 2005 and 2018. A significant decline was also observed in female suicide rate between 2018 and 2020. The hypothesis of parallelism of the two joinpoint regression models was rejected ($p< 0.001$) in females whereas not rejected ($p= 0.09$) in males.

Table E1. Annual Percentage Change (APC) in antidepressant prescription prevalence and suicide rate according to joinpoint regression models, stratified by race/ethnicity and sex.

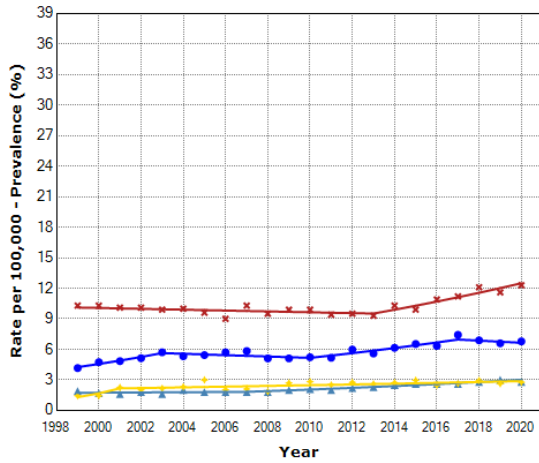
Race/Ethnicity	Sex	Variable	Period	APC (95% CI)
Hispanic	Female	Antidepressant prescription	1999 - 2003	7.3 (2.4, 12.4)
			2003 - 2010	-1.2 (-3.2, 0.7)
			2010 - 2017	4.4 (2.6, 6.1)
			2017 - 2020	-1.5 (-8.2, 5.6)
		Suicide	1999 - 2007	0.7 (-0.9, 2.2)
	Male	Antidepressant prescription	2007 - 2020	4.0 (3.4, 4.5)
			1999 - 2001	29.4 (-27.7, 131.5)
		Suicide	2001 - 2020	1.5 (0.6, 2.4)
		1999 - 2013	-0.4 (-0.8, -0.1)	
		2013 - 2020	4.0 (3.1, 4.8)	
AI-AN	Female	Antidepressant prescription	1999 - 2001	111.9 (-60.4, 1033.5)
			2001 - 2006	-8.4 (-26.4, 14)
			2006 - 2020	6.2 (2.8, 9.8)
	Male	Suicide	1999 - 2020	4.6 (3.9, 5.3)
			AD prescription	1999 - 2001
		Suicide	2001 - 2020	-1.8 (-4.3, 0.7)
		1999 - 2009	1.8 (0.9, 2.8)	
		2009 - 2020	3.8 (3.1, 4.4)	
A-PI	Female	Antidepressant prescription	1999 - 2002	21.9 (3.1, 44.3)
			2002 - 2008	-8.9 (-13.4, -4.1)
			2008 - 2011	19.1 (-11.7, 60.6)
			2011 - 2014	-7.4 (-27.3, 18.0)
	Male	Suicide	2014 - 2020	7.3 (3.6, 11.1)
			1999 - 2020	1.2 (0.9, 1.6)
		Antidepressant prescription	1999 - 2020	0.2 (-2.0, 2.5)
		Suicide	1999 - 2005	-1.5 (-4.0, 1.0)
2005 - 2020	1.9 (1.5, 2.4)			
Black	Female	Antidepressant prescription	1999 - 2002	26.0 (13.1, 40.4)
			2002 - 2009	-0.5 (-2.6, 1.7)
			2009 - 2013	5.7 (-0.6, 12.4)
		Suicide	2013 - 2020	-0.9 (-2.5, 0.6)
			1999 - 2014	1.1 (0.3, 2)
			2014 - 2018	10.4 (1, 20.7)
	Male	Antidepressant prescription	2018 - 2020	-1.4 (-18.3, 18.9)
			1999 - 2009	1.2 (-1.2, 3.6)
		Suicide	2009 - 2012	9.4 (-20.9, 51.3)
		2012 - 2020	-1 (-3.6, 1.7)	
		1999 - 2007	-1.3 (-1.9, -0.7)	
White	Female	Antidepressant prescription	2007 - 2015	1.0 (0.4, 1.6)
			2015 - 2020	5.8 (4.7, 6.9)
			1999 - 2003	9.4 (6.2, 12.7)
			2003 - 2007	-2.1 (-6.9, 2.9)
			2007 - 2010	6.0 (-4.3, 17.3)
Suicide	2010 - 2020	2.0 (1.3, 2.7)		
	1999 - 2010	2.9 (2.6, 3.1)		
	2010 - 2015	4.4 (3.4, 5.3)		
	2015 - 2018	0.9 (-2.7, 4.7)		

		2018 - 2020	-6.6 (-10.7, -2.4)
Male	Antidepressant prescription	1999 - 2001	17.4 (-2.7, 41.6)
		2001 - 2020	2.3 (2.0, 2.7)
	Suicide	1999 - 2002	2.1 (0.5, 3.6)
		2002 - 2005	-0.1 (-3.4, 3.3)
		2005 - 2018	2.3 (2.1, 2.5)
		2018 - 2020	-2.6 (-7.6, 2.7)

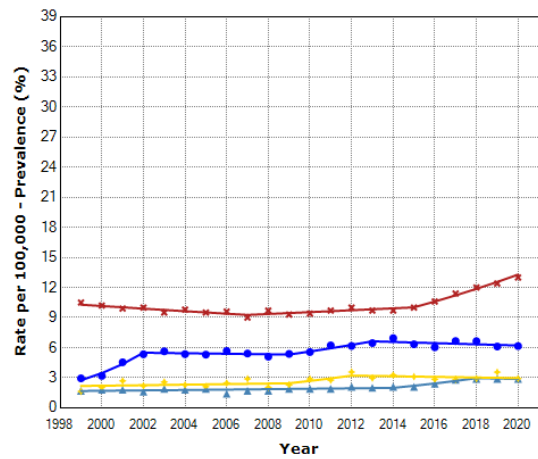
AI-AN: non-Hispanic American Indian or Alaska Native, *A-PI*: non-Hispanic Asian or Pacific Islander.

Figure E1. Trends in antidepressant prescription prevalence (dots for females and diamonds for males) and suicide rate (triangles for females and multiplication symbol for males) in the USA stratified by race/ethnicity and sex (Hispanic in 1a, AI-AN in 1b, A-PI in 1c, Black in 1d, and White in 1e), 1999-2020.

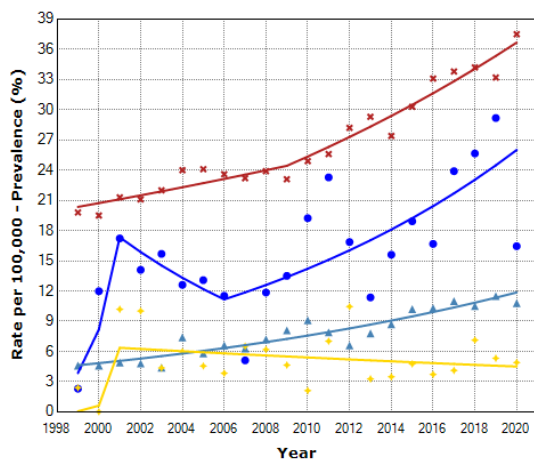
1a



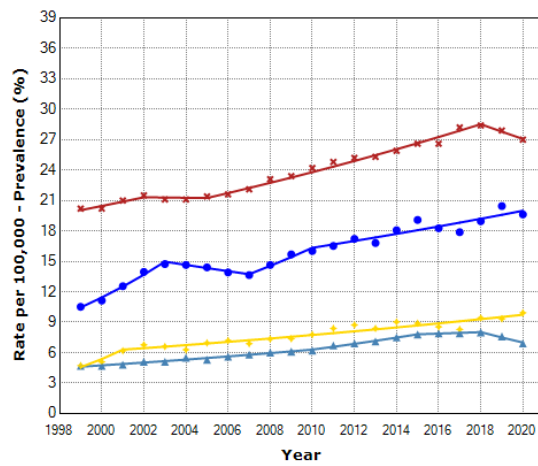
1d



1b



1e



1c

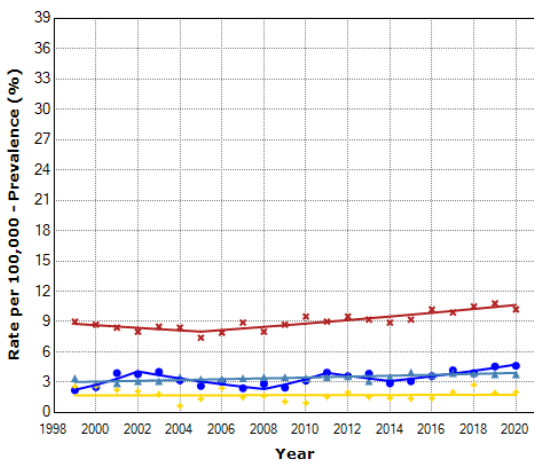


Table E2. Estimated coefficients according to different tests of association between antidepressant prescription prevalence and suicide rate in the USA overtime (1999-2020).

Group	Number of observations	Correlation	Partial correlation (controlling for the effect of time)	Linear regression (controlling for the effect of time)	Annual change correlation (detrended data)	Linear mixed model (controlling for the effect of time)	Linear mixed model of annual change (detrended data)
Total	22	0.91	- 0.11	- 0.08	0.19	0.11	0.18
Gender	44					0.10	0.17
Female	22	0.90	0.05	0.04	0.29		
Male	22	0.87	- 0.22	- 0.17	0.21		
Race/Ethnicity	110					- 0.04	- 0.05
Hispanic	22	0.70	0.07	0.11	0.16		
AI-AN	22	0.52	0.02	0.01	- 0.19		
A-PI	22	0.42	0.23	0.13	- 0.30		
Black	22	0.41	- 0.54	- 0.65	- 0.32		
White	22	0.94	- 0.02	- 0.02	0.17		
Race/Ethnicity and Gender	220					0.04	0.04
<i>Hispanic</i>							
Female	22	0.80	0.06	0.04	- 0.26		
Male	22	0.23	- 0.30	- 0.36	0.19		
<i>AI-AN</i>							
Female	22	0.67	0.20	0.09	0.19		
Male	22	0.01	0.05	0.02	0.15		
<i>A-PI</i>							
Female	22	0.27	- 0.35	- 0.25	- 0.28		
Male	22	0.15	0.40	0.25	- 0.21		
<i>Black</i>							
Female	22	0.53	- 0.45	- 0.42	- 0.13		
Male	22	0.30	- 0.30	- 0.36	- 0.37		
<i>White</i>							
Female	22	0.92	0.08	0.09	0.21		
Male	22	0.92	- 0.16	- 0.12	0.10		

AI-AN: non-Hispanic American Indian or Alaska Native, A-PI: non-Hispanic Asian or Pacific Islander.