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Trends in suicide mortality in Spain, 2000-2019: moderation by foreign-born status

Short title: Recent trends in suicide in Spain by foreign-born status

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Highlights

- Suicide mortality rates were higher among native- than foreign-born individuals in Spain between 2000-2019
- After 2010, suicide rates increased only among the foreign-born – specifically among men aged 15-44 and ≥ 65 years and women aged ≥ 65 years
- Increases in suicide among the foreign born were largely driven by increases specific to individuals without Spanish citizenship
- Rates of suicide among the foreign-born were heterogeneous across countries of origin and particularly high among individuals born in Central European countries
- These findings should guide the implementation of public health and clinical interventions to prevent suicide among migrants living in Spain

Abstract

Background. Suicide rates in Spain remained stable during the early 21st century. Suicide rates among specific socially vulnerable groups, however, remain unknown, and there are no data on suicide mortality rates and trends among migrants living in Spain.

Methods. We analyzed Spain's 2000-2019 suicide mortality data by migration status (native- vs. foreign-born), examining crude and age-standardized rates and trends overall and by sex, age-group, suicide method, Spanish citizenship status, and country of origin, using joinpoint regression models.

Results. Annual crude suicide mortality rates were higher among native- than foreign-born individuals (9.2 versus 6.2 per 100.000 inhabitants, respectively). While suicide rates decreased among native-born men and remained roughly stable among native-born women — with slight decreases among older native-born women, they increased after 2010 among foreign-born men aged 15-44 and ≥ 65 years and foreign-born women aged ≥ 65 years. Increases in suicide trends among foreign-born residents in Spain were largely driven by increases specific to individuals without Spanish citizenship.

Limitations. Suicide mortality data are subject to potential errors due to underreporting of suicide in death certificates

Conclusions. Between 2010-2019, suicide in Spain increased only among foreign-born residents. These findings should enhance our understanding of the dynamics and potential actionable causes of suicide among migrants living in Spain.

Keywords: Suicide, Epidemiology, Stressful Life Events, Foreign-born

Introduction

Migration is a complex social phenomenon, typically conditioned by the pursuit of a better life, that results from factors related to the area of origin (i.e., push factors, such as poverty or armed conflicts) and the destination (i.e., pull factors, such as better employment or educational opportunities) (De la Rica *et al.*, 2015). The migratory process is characterized by an accumulation of stressors including the motives for migrating, the difficulties experienced during the process, and the acculturation stress. Not surprisingly, migrants are generally at increased risk of mental disorders such as anxiety and depression (Mirsky *et al.*, 2008), and of suicidal behaviors (Mirsky *et al.*, 2011).

Previous studies comparing suicide rates between migrant and local populations have reached differing conclusions (Spallek *et al.*, 2015; Forte *et al.*, 2018). Recent work based on high-income countries with high suicide rates such as Sweden [Hollander *et al.*, 2020; Di Thiene *et al.*, 2015], Norway (Puzo *et al.*, 2017; Puzo *et al.*, 2018), Germany (Brennecke *et al.*, 2020), Canada (Saunders *et al.*, 2019), and Australia (Ide *et al.*, 2012) concluded that migrants had a lower suicide mortality than the native-born. This may be explained by (i) migrant selection factors, including the “healthy migrant effect” (i.e., individuals who migrate tend to come from the healthiest sociodemographic subgroups within the population of origin) (Kölves *et al.*, 2015; Kennedy *et al.*, 2015; Marmot *et al.*, 1984); (ii) the positive mental health impact resulting from the host country’s social, economic, and political context (e.g., improvements in employment opportunities, improvements in access to health and social care), (iii) cultural differences between country of origin and destination; (iv) and protective factors (e.g., religion, social status) (Voracek *et al.*, 2008).

In the recent years the migrant population residing in Europe has increased substantially. Europe is now home to 87 million of migrants who make up 11.6% of the population, approximately (IOM, 2021). Since the end of the 20th century, the average number of migrants arriving to Spain annually has been increasing by 8.2%. The current distribution of migrant population in the country is similar to that of the main host countries in the world (CESE, 2019).

The socioeconomic situation of Spain has changed considerably during the 21st century. Up to the year 2008, Spain experienced economic expansion. After 2008, the economic

crisis and ensuing years-long great recession brought increasing inflation and unemployment rates (especially youth unemployment), and worsening social inequality indicators (Anghel et al., 2018). The impact was especially severe on the migrant population's health, largely due to their greater exposure to job insecurity (Agudelo-Suárez *et al.*, 2013) and to specific austerity measures put in place between 2012 and 2018. During those six years, a Royal Decree (Law 16/2012) banned access to health care, except for emergency services, for migrants with no residency permits.

As far as we are aware of, there are no studies examining suicides in the migrant population residing in Spain, one of the countries from the European Union with the lowest suicide rates (OECD). While recent evidence suggests that overall suicide rates have not increased since 2000 in Spain (Cayuela *et al.*, 2020), migrants deserve special attention, given their vulnerability to the negative impact of the great recession.

This study sought to estimate 2000-2019 suicide mortality trends in Spain stratified by foreign-born status, examine the specific role of sex, age group, nationality, and time period, and identify specific migrant subgroups with the highest suicide rates. Our working hypothesis was that suicide rates among migrants may have increased at a faster pace than among the native-born, especially during the most recent years - following onset of the 2008 economic crisis.

Methods

Data source

Mortality data came from the Death Statistics by specific-cause mortality collected by the Spanish National Statistics Institute (INE, for its Spanish acronym). We selected only data for individuals 15 and older and permanently or temporarily residing in Spain between 2000 and 2019. We selected deaths caused by self-inflicting injuries, based on the underlying cause of death as indicated by medical examiners in death certificates, according to the International Classification of Disease version 10 (ICD-10) [codes: X60-X84 and Y87.0]. We designed deceased individuals as foreign-born if they had been born outside of Spain and resided, permanently or temporarily, in Spain, regardless of whether they had Spanish citizenship. For each death, we also obtained information on age in years, sex, Spanish citizenship status, marital status, size of the municipality

of residence, country of origin (only available for the 2009-2019 period), and suicide method defined by the following ICD-10 codes: self-poisoning [ICD-10: X60-X69]; hanging [ICD-10: X70]; self-drowning [ICD-10: X71]; firearms, and explosives [ICD-10: X72-X75]; sharp objects [ICD-10: X78-X79], jumping [ICD-10: X80], other [X76-X77, X81-X84, Y87.0]. Age in years was categorized into the following groups: 15-24 years, 25-44 years, 45-64 years, and ≥ 65 years. Municipality of residence was categorized into capital (defined as any capital city of one of Spain's 50 provinces), urban ($\geq 10,000$ inhabitants but not a capital), and rural ($< 10,000$ inhabitants). Foreign-born and native-born population data, as well as population data by country of origin, were used for the calculation of rates and came from the INE's Continuous Population Register.

Analyses

We estimated crude and age-adjusted rates using the direct method and the standard European population as population of reference (EUROSTAT, 2013). We examined overall, sex-specific, and sex and age-group-specific suicide mortality trends. We report results stratified by migrant status (native-born vs. foreign-born), by Spanish citizenship status, and by country of birth for the 2009-2019 period. Spanish citizenship status was used as a proxy for longer time since migration, social and economic stability, and legal residence permit, a variable that was unavailable in our data. Suicide mortality rates across time were analyzed using joinpoint regression analyses (Kim *et al.*, 2000). This method allows the identification of possible inflection points (years) and the quantification of trends by their annual percent change (APC) and the average annual percent change (AAPC) for the entire period.

All analyses were performed using STATA 16 (StataCorp. 2019. Stata Statistical Software: Release 16. College Station, TX: StataCorp LLC) and Joinpoint Regression program version 4.9.0.0. (Statistical Research and Applications Branch, National Cancer Institute).

Results

Between 2000 and 2019, there were 68,549 suicides among residents of Spain aged 15 years or older, for an average annual 3,427 suicides, including 5928 (8.7%) suicides among foreign-born individuals residing in Spain – of these, 1629 (27.5%) had Spanish citizenship.

Table 1 compares the native-born and foreign-born deceased in terms of sex, age, marital status, place of residence, and suicide method. The study groups were significantly different across all sociodemographic measures. The modal suicide methods were hanging for native- and foreign-born men and foreign-born women and jumping for native-born women.

Over the whole study period, crude suicide mortality rates were 9.2 per 100,000 native-born people aged 15 and older and 6.2 per 100,000 foreign-born people aged 15 and older living in Spain. Suicide mortality trends were also notably different across study groups.

Among the native-born, we observed two drops in rates. First, rates decreased by -1.6% (95% Confidence Interval: -2.4, -0.8) between 2000 and 2010; second, they dropped by -1.9% (95% CI: -3.5, -0.2) between 2013 and 2019. Among the foreign-born, there was a point of inflection in 2010, preceded by a pronounced annual decrease of -6.4% (95% CI: -8.2, -4.5) between 2000 and 2010 and followed by an annual increase of 4.1% (95% CI: 2.1, 6.1) between 2010 and 2019 (figure 1).

Suicide Rates by Sex

Sex-specific analyses show that overall trends were largely driven by suicide deaths among men (figure 2) since men make up about 75% of all suicides for both the native- and the foreign-born. Among women, the overall trend was stable, though there was a noticeable drop between 2000 and 2011 for both native-born and foreign-born women, with annual decreases of -2.3% (95% CI: -3.5, -1.2) and -4.9% (95% CI: -7.3, -2.4), respectively. After 2011, there were no further changes among native-born women; however, rates among foreign-born women increased annually by 5.6% (95% CI: 2.3, 8.9) (figure 2).

Suicide rates by age group and sex

Sex- and age group-specific suicide rates varied substantially between the native- and the foreign-born (figure 3). Among native-born men, we observed a decrease in rates in

all age groups except for the 45-64 y.o., whose annual rate increased an average of 1.4% (95% CI: 0.7, 2.1). In contrast, suicide rates among native-born women remained stable, except for those 65 and over who experienced an average annual decrease of -1.4% (95% CI: -2.7, -0.2).

Among foreign-born men, suicide rates increased across all age groups, except among 45-64 y.o., for whom the rates remained unchanged since 2010. In foreign-born women, the rates stayed constant for those under 44 years of age, decreased for those between 45 and 64 years of age, and increased by 14.1% (95% CI: 5.9, 23.1) among those 65 and older starting in 2013.

Suicide rates by place of birth

We analyzed trends in suicide among the foreign-born by continent of origin (European vs. other) and Spanish citizenship status. Suicide rates increased among foreign-born individuals without Spanish citizenship, regardless of continent of origin, with an AAPC of 6.8% (95% CI: 3.3, 10.5) for Europeans and of 5.9% (95% CI: 3.6, 8.3) for migrants from other continents (figure 4).

By country of origin, we observed that the highest suicide rates were those of the European foreign-born – e.g., migrants from Belgium, Switzerland, Germany, Netherlands, France with rates per 100,000 of 16.9, 14.5, and 13.6, 13.4, 10.7 respectively (figure 5).

Discussion

Between 2000 and 2019, the suicide rate of the foreign-born population residing in Spain was, overall, lower than that of the native-born population. There were substantial changes across time in the suicide rate, especially among the foreign-born. Whereas the native-born population experienced an initial moderate decrease—which plateaued from 2013 on—among migrants the initial drop was larger in magnitude but it was followed by a substantial increase from 2010 onwards. Sex- and age group-specific rates and trends varied differently between the native-born and migrants. Among native-born, the main rate increases were found in middle-age men. In contrast, among foreign-born, rate increases could be found in practically all age groups in men and in women 65 and older.

Although previous work has examined suicide trends in Spain (Cayuela *et al.*, 2018; Delfrade *et al.*, 2017), we know little about the differences in rates and trends between native-born and migrant populations. Our finding that self-inflicted death rates among foreign-born people living in Spain are lower than among the native-born population (6 vs. 9 suicides per 100,000 inhabitants, respectively) supports previous findings from other high-income countries (Hollander *et al.*, 2020; Di Thiene *et al.*, 2015; Puzo *et al.*, 2017; Norredam *et al.*, 2013; Amiri *et al.*, 2020). This phenomenon may be partially explained by the “healthy migrant” effect (Kölvles *et al.*, 2015; Kennedy *et al.*, 2015; Marmot *et al.*, 1984).

From the beginning of the 21st century Spain has experienced an increase in immigration. In the year 2000, migrants made up 2% of Spain’s residents; this proportion reached 11.3% by the year 2020. However, there was an important population exodus between 2010 and 2015 mainly due to the great recession of 2008, which led to negative migration balance (INE, 2014; INE, 2021). Our time trend analyses show that, though the overall suicide rate in Spain decreased between 2000 and 2019 mainly due to a drop in suicides among the native-born starting in 2013, the rate among foreign-born has increased by 4% annually since 2010. Previous work (Oliva *et al.*, 2020; Gotsens *et al.*, 2015) has examined the effects of the Spanish great recession on overall health, including mental health, especially among social and economically vulnerable groups, such as the migrant populations. Our findings suggest that suicide rates increased among migrants following the onset of the great economic recession, and that this increase was especially salient among migrants without Spanish citizenship, a proposed proxy for legal residence permit (and hence access to specialized healthcare and social welfare) and for social and economic stability. As mentioned, only foreign-born people with residence permits could access specialized healthcare and welfare services for a large proportion of the study period, due to specific austerity measures.

It is worth underscoring that the age distribution of the 2010-2019 increase in suicide rates among migrants varied significantly by sex. Whereas rates increased for both men and women across all age groups except among the 45-64 y.o., the surge for foreign-born females was mainly due to a 14% annual increase among women 65 and older. Though the reasons behind this phenomenon are unknown, it is possible that the gradual cutbacks in social benefits, including the modifications and access restrictions to the

Dependency Law resulting from the economic crisis (Ruiz-Perez *et al.*, 2017), may have played a salient role in suicide rates among older migrant women – as noted before, migration is an important marker of socioeconomic vulnerability in Spain.

As other authors (Shah *et al.*, 2009; Shah *et al.*, 2011) point out, the similarity between suicide rates of migrants and their country of birth likely dissipates at older ages since most migrants move during their working age; thus, older migrants tend to have been residing at their host country for longer than younger migrants. Therefore, cultural factors from the country of origin lose relevance in favor of other factors such as age, comorbidities, cognitive and physical decline, loneliness, and loss of social role. Implementing specific suicide prevention interventions aimed at the elderly is a major unmet public health goal.

When we analyzed 2009-2019 suicide rates of migrants by specific country of origin we found that those from a handful of central European countries (e.g., Belgium, Switzerland, Germany, Netherlands, France) had the highest suicide rates - even higher than those of the native-born. Whereas possible reasons for this phenomenon remain speculative, three factors might help contextualize this finding. First, these countries have relatively high suicide rates – higher than Spain’s overall national rate—and there is substantial evidence that migrant populations’ rates tend to partially resemble those of their countries of origin (Ide *et al.*, 2012; Kliewer *et al.*, 1991). Second, as migration within Europe is legal - substantially reducing the risk and hardship of the migrant’s experience, the “healthy migrant” effect may play a more modest role in migrations within than to Europe. Third, most non-European migrants to Spain come from Latin American Spanish-speaking countries and may, hence, experience a somewhat easier acculturation process than their northern-European counterparts. As previously reported (Jongsma *et al.*, 2021), linguistic distance substantially increases the risk of negative mental health outcomes among migrants and minoritized populations in Europe.

According to Stack’s review (Stack *et al.*, 1982) of Durkheim’s classic theories, the longer migrants live in the host country, the more their suicide risk resembles that of the native-born population due to increasing levels of social integration. Our finding that suicide rates did not change over time among foreign-born individuals with Spanish citizenship supports Durkheim’s theory. These specific migrants have likely been in the country longer than counterparts without Spanish citizenship and hence enjoy better access to social support and services. In fact, increases in migrant suicide rates were

almost entirely driven by increases in suicide rates among individuals without Spanish citizenship.

Limitations

The main limitations of our research are data-related. First, death records do not collect data on migrants' date of arrival to Spain making it impossible to know whether they are first- or second-generation migrants. According to Spain's laws (Ministry of Foreign Affairs, European Union, and Cooperation), second generation migrants may acquire Spanish nationality after residing in the country for one year. Thus, it is very likely that most of our cases are first generation migrants. Second, lack of data on important correlates, such as motive to migrate, mental health history, family or social support networks, time since migration, or legal residence status precludes us from performing more specific analyses that would shed a light on the more vulnerable groups and potential related causes of suicide. Third, data on suicide mortality are subject to potential errors in suicide mortality certification (Bakst *et al.*, 2016). Fourth, while there is no reason to believe that Spanish suicide mortality data quality may be different across study groups or have varied substantially over time, it is not possible to completely rule out potential data artifacts partially explaining some of our findings – as is common in studies based on administrative databases (Gusmão *et al.*, 2021). Last, we could only examine differences in foreign-born suicide by Spanish citizenship status. Future research should examine additional social, legal, and economic covariates to enhance understanding of suicide risk among foreign-born individuals.

Conclusions

Our results are highly relevant for public health and clinical decision-making. First, identifying emerging high-risk population groups is paramount for suicide prevention efforts, especially in regards to development and implementation of public health and clinical interventions. Our results highlight the importance of improving migrants' access to and engagement with healthcare. This effort should eliminate barriers to mental healthcare and suicide-specific interventions through the implementation of cultural adaptive programs (Alegría *et al.*, 2016) that ensure linguistically-, culturally-, and structurally-competent (Metzl *et al.*, 2014), easy-to-access care. Second, our findings suggest that recent increases in suicide risk among migrants in Spain may reflect broader threats to health caused by the great economic recession including

subsequent austerity politics. Accordingly, our findings underscore the importance of expanding access to critical components of the welfare system to migrants regardless of their citizenship and residence permit status, as many foreign-born individuals with an irregular migratory status belong to social groups at increased risk of social and economic exclusion.

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Table 1. Characteristics by place of birth, period 2000-2019.

	Native-born 62 554 (91.3)	Foreign-born 5928 (8.7)	P-value
Nationality			<0.001
Spanish	62 504 (99.8)	1629 (27.5)	
Non-Spanish	106 (0.2)	4296 (72.4)	
Gender			0.006
Men	47550 (75.9)	4409 (74.3)	
Women	15067 (24.1)	1523 (25.7)	
Age-group			<0.001
15-24y	2876 (4.6)	632 (10.7)	
25-44y	17114 (27.3)	2682 (45.2)	
45-64y	20552 (32.8)	1869 (31.5)	
>64y	22075 (35.3)	749 (12.6)	
Marital status			<0.001
Single	19532 (31.2)	2120 (35.7)	
Married	27146 (43.4)	2340 (39.5)	
Divorced	9932 (15.9)	781 (13.2)	
Widow/er	6007 (9.6)	691 (11.6)	
Suicide Method used			<0.001
Hanging	29834 (47.7)	3036 (51.2)	
Jump	14465 (23.1)	1189 (20.0)	
Poisoning	6584 (10.5)	644 (10.9)	
Firearms, and explosives	3505 (5.6)	222 (3.7)	
Drowning	2411 (3.8)	166 (2.8)	
Sharp objects	1245 (2.0)	166 (2.8)	
Other	4570 (7.3)	509 (8.6)	
Place of residence			<0.001
Capital city	17787 (28.4)	1691 (28.5)	
Urban area	27363 (43.7)	3123 (52.7)	
Rural area (<10,000 hab)	17450 (27.9)	1117 (18.8)	

Title of figures

Figure 1. Crude and age-adjusted suicide rates by place of birth, Spain, 2000-2019

Figure 2. Crude and age-adjusted suicide rates in men and women by place of birth, Spain, 2000-2019

Figure 3. Sex- and age group-specific suicide rates by place of birth, Spain, 2000-2019.

Figure 4. Crude suicide rates among foreign-born residents by continent of origin (Europe or non-Europe) and citizenship (Spanish or non-Spanish), Spain, 2000-2019

Figure 5. Crude suicide rates among foreign-born residents, Spain, 2000-2019

Figure 1

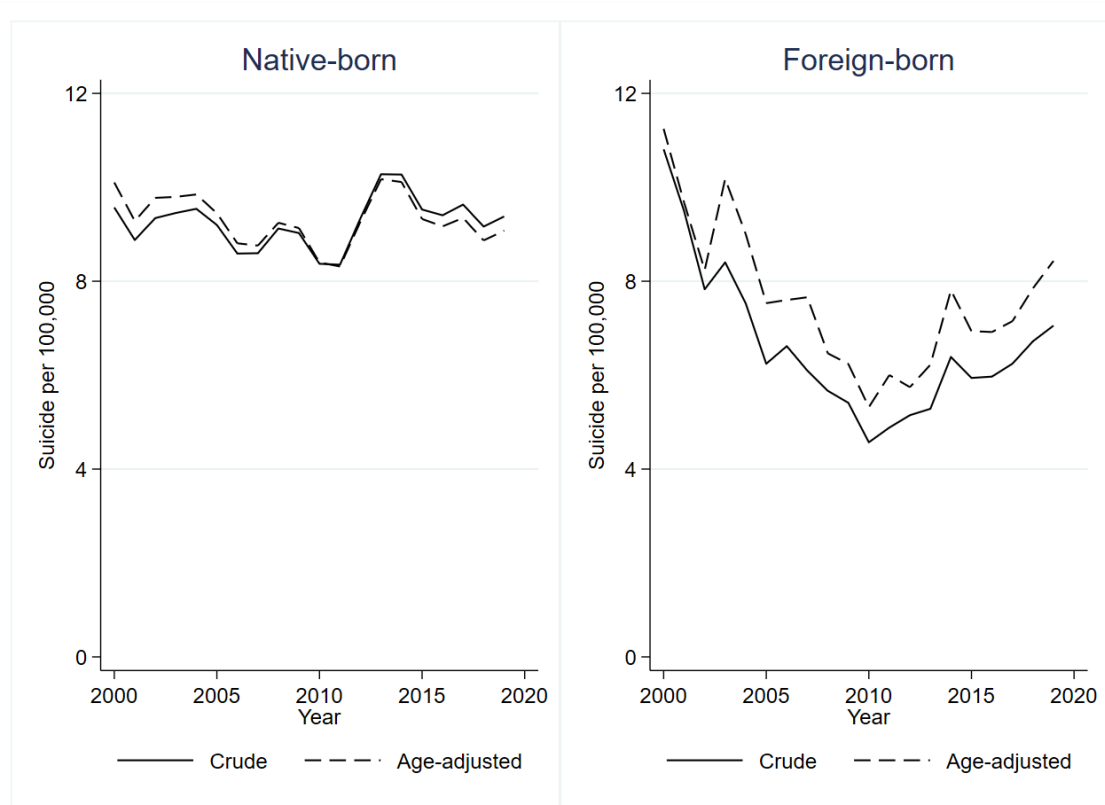


Figure 2.

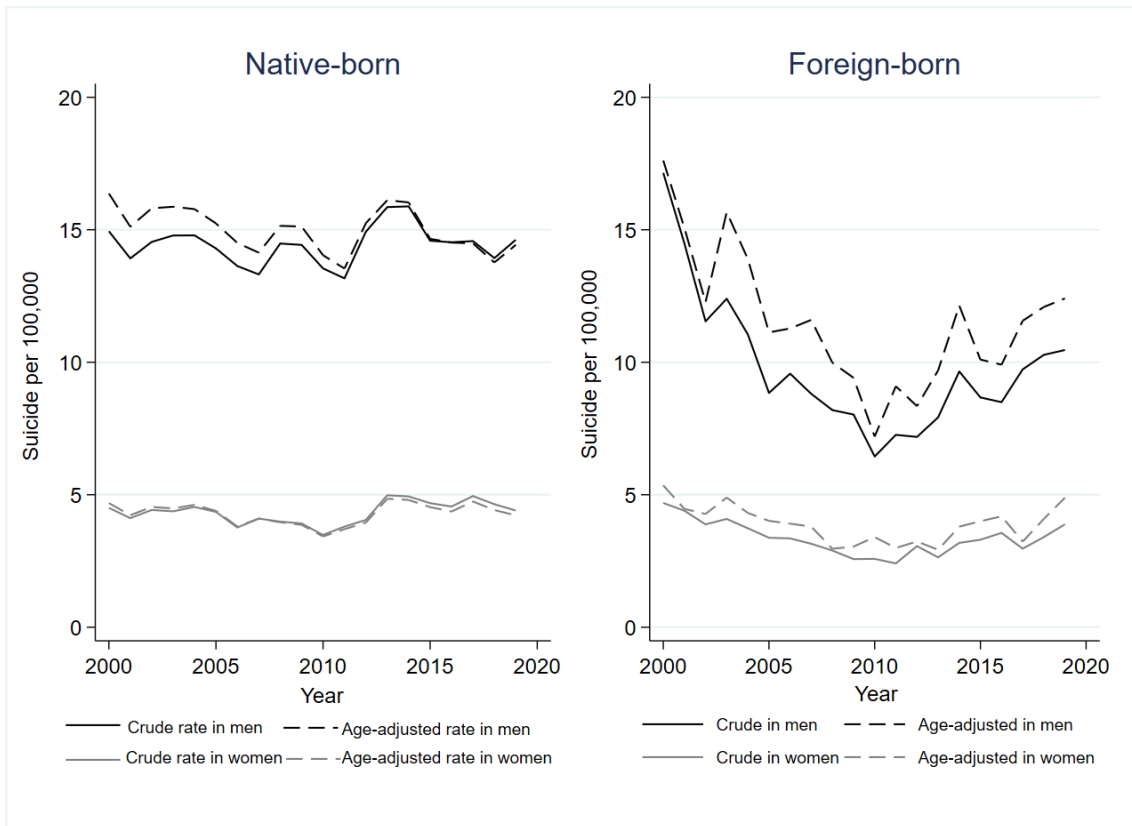


Figure 3.

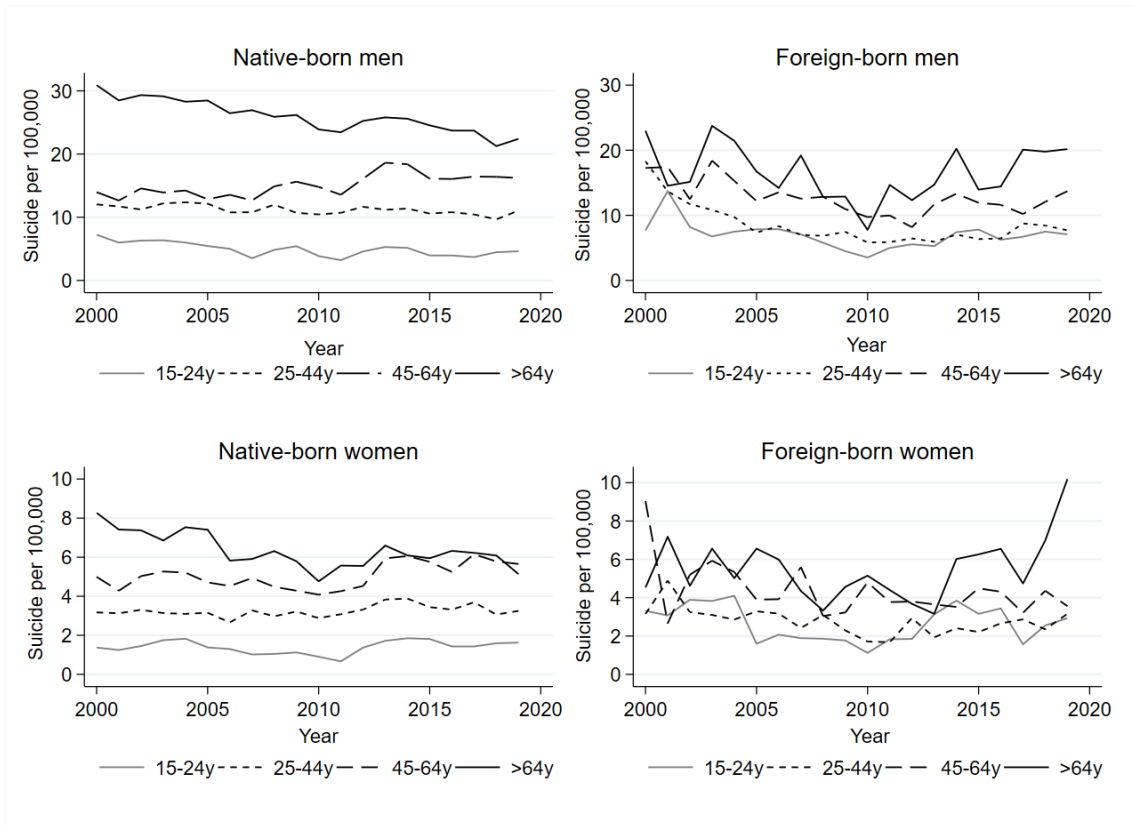


Figure 4.

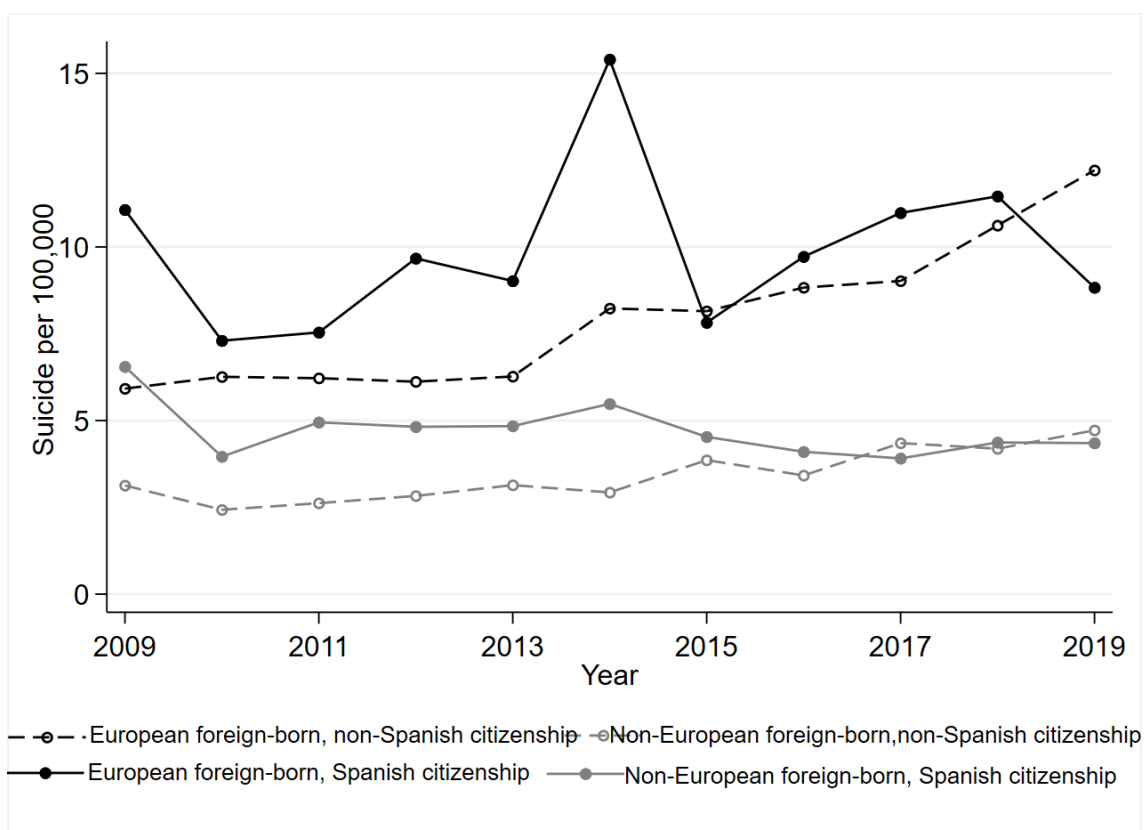


Figure 5.

