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Objective. To examine how excess mortality from COVID-19 among immigrants is associated with acculturation.

Methods. A cohort study was conducted using Swedish register data. The study includes all Stockholm residents in co-residential unions who were 30 years of age or older and alive on March 4th, 2020 and living in Sweden in December 2019 (n=836,390). The follow-up period was March 4 until May 7, 2020. Cox regression models were conducted to assess the association between different constellations of immigrant-native couples (measure of acculturation) and COVID-19 mortality and all other causes of deaths. Models were adjusted for relevant confounders.

Results. Compared to Swedish-Swedish couples, both immigrants partnered with another immigrant and a native showed excess mortality for COVID-19 (HR 1.45; 95%CI 1.12, 1.88 and HR 1.53; 95%CI 1.15, 2.05, respectively). Moreover, similar results are found for natives partnered with an immigrant (HR 1.39; 95%CI 1.03, 1.88).

Conclusions. Immigrants experience excess mortality relative to Swedes from COVID-19 across levels of acculturation.

Policy implications. Public health strategies based on cultural differences might not only be inefficient but also reinforce stereotypes and health inequalities.

Keywords: Coronavirus, mortality, immigrants, acculturation, integration

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Introduction

International evidence has shown that immigrants and ethnic minorities are disproportionately at risk of severe COVID-19 complications and death[1–8]. In the context of an ongoing pandemic, an effort to understand the causes for why some groups are more affected is a public health priority[9–12]. In the case of immigrants and ethnic minorities, labor market segregation, poor living conditions, underlying health, genetic predisposition, and healthcare access have been listed as potential explanations[2,4,11–14]. Recent studies, however, suggest that immigrants and minorities maintain an excess mortality even after controlling for socio-economic status and housing conditions[1,3]. As a result, a separate explanation has surfaced, with little empirical support, that cultural differences including, but not limited to, frequency of intergenerational contact, lifestyles, lower adherence to health recommendations, and underutilization of health care services are factors that lead immigrant groups to be more severely affected by the virus[2,4,10,12].

The role of culture has also manifested itself in some of the national strategies adopted to fight against the pandemic. Sweden, for example, has justified implementing a relatively less rigid approach by arguing that Swedes have a high level of trust in their institutions and as such follow governmental recommendations[15,16]. The strategy relied primarily on public health advice (regarding hygiene routines, social distancing and suspension from work, school or daycare in case of minor symptoms) in lieu of mandates which are not permitted under Swedish law[15]. The effectiveness of the adopted strategy relies on the assumption that the Swedish society will homogeneously change their social behavior. Under this rationale, it is unsurprising that excess mortality observed among immigrants[17]—especially concentrated among those with more distant origins—could be interpreted as a consequence of less acculturation and/or related factors. This reasoning can be used, in turn, to reinforce anti-immigration, xenophobic sentiments, and stereotypes that have health consequences beyond the present pandemic[18].

The underlying assumption is based on the idea that natives (in this case ethnic Swedes) have certain behaviors (e.g., language, lifestyle, family contact, norms, and understanding of the healthcare system) that make them less vulnerable to COVID-19, whereas, immigrants to a large extent lack these characteristics. Extending this reasoning to the household level, one can assume that immigrants partnered with Swedes share and have access to such protective factors making them less vulnerable (i.e., most acculturated group); whereas, immigrants partnered with other immigrants are more likely to entirely lack access to such protective factors (i.e., less acculturated group). If the explanation that less acculturation explains excess mortality of immigrants is valid, one may expect that immigrants will experience lower mortality if they are partnered with a Swede versus another immigrant. To this end, the aim of this study is to examine the association between acculturation and COVID-19 mortality by examining native-immigrant couple dyads—a well-regarded measure that has been shown to be a marker and facilitator of acculturation[19–21].

Methods

Study population

An observational cohort study was conducted using Swedish register data. The study includes all Stockholm residents who were 30 years of age or older and were cohabiting with another adult who was at least 30 years of age and alive on March 4th, 2020, residing in Sweden in December

2019 (n=853,376). This age restriction was established to ensure cohabiting individuals were family members and not flat mates. The follow-up period was March 4 up until May 7, 2020. We excluded individuals who had not lived in Sweden in the two prior years (n=11,864) and those with missing data on country of birth of either partner (n=35) and income of either partner (n=5,087). The final study population consists of 836,390 individuals (26.5% immigrants) (figure 1).

Data

We use information from several Swedish administrative registers linked through personal identity numbers that are unique to each person with legal residence in Sweden. Data on deaths were retrieved from the Cause of Death Register. Socioeconomic and demographic variables (income, education, and number of children) were drawn from the Longitudinal integrated database for health insurance and labour market studies (LISA), whereas residential information (type and size of dwelling and immigrant density in the neighborhood) were drawn from the dwelling registers. All covariates in our study are time-constant and either measured at the end of 2019 (all variables at the household and neighborhood level) or 2018 (highest education attained, sum of the individual net incomes of the two co-resident adults, total number of individuals in the household under 30). Information on age, sex, and country of birth stem from the Total Population Register.

Study variables

COVID-19 mortality was identified by the Swedish National Board of Health and Welfare, the agency responsible for the cause of death register. COVID-19 mortality was identified using the following ICD codes: 490 cases had emergency ICD code U07.1, U07.2 or B342; in 25 cases U07.1, U07.2 or B342 were listed as contributing causes of death, excluding mortality from other causes of death (1,072 cases). Given the timeliness of the data, the assignment of the underlying cause of death should be understood as preliminary.

Immigrant-native couple types were created by combining information from the dwelling and the total population register to create the couple type which include two individuals of at least 30 years of age co-residing in the same household. The variable is classified into the following four ego-partner categories using information on country of birth: (i) native-native, (ii) native-immigrant, (iii) immigrant-native, and (iv) immigrant-immigrant. We chose (i) native-native couples as the reference group for our analyses as they a) constitute the largest category among all groups considered and b) represent the culture and language of the host population from which we expect other groups to deviate. We further disaggregated the groups by immigrant's origins defined according to the World Bank classification based on the Gross National Incomes (GNI) per capita using the WB Atlas method[22] as low-middle and high income countries.

We derive individual income and calculate the sum of the two partners' net incomes, categorized into tertiles based on all adult residents of Sweden. We derive education data from Swedish educational registers and categorize our population into four categories; those with primary schooling, secondary schooling, post-secondary education, and those with missing information on education. Missing information on education is generally very low but 88% of those with missing education are immigrants. From the Swedish dwelling registers we access information on size of the dwelling and a unique dwelling code which enables us to link individuals who live together in a household and determine co-residence. From this information we create: the number of individuals per square meter in the household (with a separate category for a small

group of individuals, due to missing information on square meters in some detached houses), and the number of individuals living in the household. We include in our model also the share of immigrants in the local neighborhood, DeSO (a smaller subdivision in Swedish administrative statistics).

Statistical analysis

We conducted Cox proportional hazards regressions (using age as the timescale) to estimate Hazard Ratios (HR) and 95% Confidence Intervals (CI) for the association between immigrant-native couple type and COVID-19 mortality. Individuals exited the study by (1) dying between March 5, 2020 and May 7, 2020, or (2) being alive on May 7, 2020. We estimated two separate regressions estimating the cause-specific hazard of dying from COVID-19, right-censoring all individuals that die from other causes and (2) the cause-specific hazard of dying from other causes than COVID-19, right-censoring all individuals that die from COVID-19. In addition, we conducted Cox regressions for dying from all causes of death that occurred between March 5, 2019 and May 7, 2019 (981 deaths), the same time of the year we observe COVID-19 deaths in 2020. Since mortality from COVID-19 and other causes of deaths in 2020 are not fully independent of each other, our estimates for all-cause mortality in 2019 were used to evaluate the robustness of our 2020 estimates. In addition, the comparison between all-cause mortality in 2019 and mortality in 2020 by level of acculturation will allow us to examine whether the latter has a distinctive role in relation to the pandemic.

Two models were estimated: 1) a simple model with age as the time scale adjusted for sex and 2) the same model with further adjustments. In the latter analysis we adjust for education and neighborhood characteristics that are confounders, as well as factors that are on the causal pathway that have been previously used to explain the excess mortality of immigrants (i.e, number of individuals in the household below the age of 30, dwelling type, square meters per person in the dwelling, household income). All analyses were conducted using Stata Statistical Software: Release 16 (StataCorp LP, College Station, Texas).

This study was approved by the Central Ethical Review Board in 2020 (Dnr 2020-02199).

Results

During the 149,622 person-years of observation, 1,587 deaths occurred in our study population between March 5, 2020 and May 7, 2020. Table 1 shows the distribution of population at risk and deaths by all covariates. In our population, 17.7% of individuals are in immigrant-native couples. Native-native couples show the lowest deaths per thousand person years (3/1000), whereas all other couple types show higher death rates of COVID-19 mortality (approximately 4 per thousand person-years). Of the study population, 20.8% of COVID-19 deaths were attributed to native-immigrant mixed couples and 22.7% to immigrant-immigrant couples.

Figure 2 displays mortality risks from COVID-19, all other causes of death in 2020, and all-causes of death in 2019 across couple types with native-native as the reference. Panel A presents models adjusted for age and sex, panel B presents the estimates including adjustments. In A, individuals in immigrant-immigrant couples show the highest HR of dying from COVID-19 (HR 2.51; 95%CI: 2.02, 3.12) and those in native-native couples the lowest (reference group) while and immigrants in immigrant-native couples showed intermediate mortality levels (HR: 1.76; 95%CI: 1.32, 2.36). All-causes of death in 2019 and 2020 show similar patterns with little differences between couple constellations. After adjustments (panel B) individuals in all couple

types other than native-native couples display similar and higher HRs from COVID-19 mortality, but almost no differences in HRs across groups in other causes of death in 2020 and all-causes of death in 2019. An excess mortality was also observed for natives in native-immigrant couples (HR 1.60; 95%CI: 1.19, 2.15) that remained after adjustment (HR 1.39; 95%CI: 1.03, 1.88).

Figure 3 is an extension of figure 1 disaggregating the immigrant population by income level of their country of birth. In panel A, there is elevated HRs across all origin groups relative to native-native couples. Individuals in LMIC-immigrant couples display the highest HR (HR 3.59; 95%CI 2.79, 4.63), whereas individuals in all other couple types with at least one immigrant display relatively similar HRs (around 1.5). After adjustment (panel B), all groups with an immigrant still display higher HRs relative to native-native couples, but at a lower level. LMIC-immigrant couples experience a particularly strong reduction in their HRs (HR 1.82; 95%CI 1.31, 2.52). Compared to LMIC-native couples, their HR remains slightly higher (HR 1.56; 95%CI 0.80, 3.06). We also find HIC-native (HR 1.55; 95%CI 1.13, 2.12) and HIC-immigrant (HR 1.15; 95%CI 0.81, 1.64) couples display higher HRs relative to the reference group.

Discussion

Our study shows that being partnered with a Swedish-born person is not protective against COVID-19 mortality for immigrants. In fact, they display the same or higher levels of mortality from COVID-19 when partnered with a Swede as when partnered with another immigrant. These findings challenge the hypothesis that factors related to the familiarity and closeness to the host society, such as lack of awareness of recommendations, language barriers, and access to information are relevant factors when explaining the excess mortality from COVID-19 among immigrants. Importantly, we show that this pattern holds across immigrant groups (HIC and LMIC). The comparison between couple types with respect to mortality from all other causes in 2020 and all-cause mortality in 2019 strengthens our findings as it demonstrates that the excess mortality from COVID-19 is observed in couples that show no excess mortality from other causes before and during the pandemic.

Language has been considered a vital component of acculturation and relevant for accessing information on other types of medical treatments and health outcomes[23]. Although we cannot test this aspect directly, our study shows the lack of language barriers do not seem to be protective for the most acculturated group (immigrants partnered with a Swede), which raises the question as to whether language barriers explain at all the excess mortality among immigrants partnered with another immigrant. Given that the COVID-19 pandemic is a unique occurrence that was accompanied by global diffusion of information, one can argue that even the least acculturated (immigrants cohabiting with an immigrant) have been exposed to recommendations offered in their native languages from either public health officials from their countries of origin or via other international channels. In fact, the information that they may have received from international sources may be more relevant for specific immigrant populations, for example, how to best protect oneself when observing cultural or religious practice. Prior studies in clinical settings have shown that culturally adapted information is associated with better health access and outcomes[23].

Beyond allowing us to disentangle the role of acculturation and language barriers in the excess COVID-19 mortality among immigrants, our study provides suggestive evidence with respect to genetic arguments. Our results suggest that ‘genetic predisposition and/or differences in

susceptibility or response to infection'[12] plays no visible role in explaining the excess COVID-19 mortality among immigrants. Although it is true that Swedes partnered with a Swede show the lowest mortality, those partnered with an immigrant have the same level of COVID-19 mortality as the immigrants themselves. Given that Swedes partnered with an immigrant have the same level of all-cause mortality as Swedes partnered with a Swede (yet high levels of COVID-19 mortality), it seems unlikely that genetic selection into family types matter in these groups. At the same time, there is no evidence that immigrants who partnered with a Swede are inherently different from those who partnered with an immigrant.

In this study, immigrants in different family constellations show higher levels of COVID-19 deaths than the majority of natives, after adjustment for a wide range of individual- and contextual-level factors, including education, income, housing conditions, and neighborhood immigrant density. This set of adjustments also partly accounts for a number of socially patterned chronic health conditions and comorbidities, e.g., insulin resistance, hypertension, smoking and obesity, which have been suggested as risk factors for severe cases of COVID-19[12].

Further research should disentangle why Swedes partnered with immigrants experience higher mortality than those partnered with Swedes. Appendix figure 1 shows that Swedes have equally elevated mortality relative to those partnered with other Swedes regarding of the origin of the immigrant partner (HICs or LMICs). This finding suggests that the negative effect of living with an immigrant (if it exists) is not related to more traditional patterns of family structure or participation in very different cultural practices. It is still possible, however, that differences in terms of the structure of social networks, intensity of social life, and risk-aversion, may be play a greater role. Further studies should disentangle what factors explain the excess mortality of natives partnered with immigrants; however, our study suggests that such factors, if related to immigrants at all, are common to both immigrants from HICs or LMICs and are not risk factors for all other causes of death among natives (in 2019 or 2020).

The main conclusions of our study are possibly generalizable to other national contexts i.e., that acculturation and language barriers do not explain excess mortality among immigrants as compared to natives. However, the sometimes random nature of the spread of COVID-19 may make immigrant-native differences more or less pronounced across contexts. For example, Spain is yet a severely affected country in Europe, but which implemented strict measures of confinement during the pandemic. Preliminary results of a Spanish serological study24 found no differences between migrants and natives in the risk of death from COVID-19. In most other countries, however, immigrants experience higher risks of severe outcomes[7]. Access to international family networks through migration, or networks in different locations, through intermarriage, may be a risk factor in itself, regardless of other socio-demographic characteristics.

This study is the first to examine acculturation as the mechanism behind the disproportionate burden that COVID-19 has placed on immigrant communities, by comparing the mortality of native-native, immigrant-native, and immigrant-immigrant couples in Stockholm, Sweden. Sweden, and particularly Stockholm, is an ideal setting for our study due to its heterogeneous immigrant population that represent a substantive share of the total population. A major strength of our study is that we use a measure of acculturation that clearly captures the closeness between immigrants and natives. As such, our inference has strong relevance for informing policy. In addition, we have complete coverage of the total population and all deaths in the Stockholm

region, from both COVID-19 and all other causes of deaths. Thus, our analysis does not suffer from selection into our study population. We have similar high quality data for 2019, which allows for an unbiased comparison of mortality patterns between the two years. Our analytical approach is possible because we are able to link total population register data on country of birth to dwelling identifiers of all individuals residing in Stockholm, as well as to individual- and couple level data on socioeconomic and demographic characteristics. Although the Swedish population registers hold high quality and have many advantages, they capture de jure rather than de facto characteristics of individuals. Our data may slightly overestimate the number of individuals living in a co-residential couple relationship. Our definition of couple type is constructed based on apartment registers which assign a unique identification number to each dwelling, such that individuals are defined as a couple if they are both aged 30 or older, and live in the same apartment or house. 79% of the couples in our data are either married or have shared children; while we cannot establish the type of relationship among the remaining 21% with certainty. However, non-marital cohabitation is very common in Sweden, while flat-sharing is not[25], and particularly so for individuals in their 30s and above. It is therefore fair to assume that a substantive share in this remaining group is cohabiting in an amorous relationship without common children, a group that is often overlooked in international studies of health and mortality because of the lack of data. Our register-based approach with dwelling identifiers allows the identification of those couples for mortality studies.

The so-called second generation of Swedish-born individuals to immigrant parents are categorized as Swedes in our analysis because we do not expect the mechanisms regarding acculturation or language barriers to differ between them and children of Swedish-born parents. Nonetheless, we conducted a sensitivity analysis in which we excluded all individuals born in Sweden with at least one foreign-born parent and the results remain unchanged (Appendix figure 2). In addition, it may be considered a limitation that the number of deaths in the group of immigrants partnered with a Swede are rather few. However, the patterns of associations in our disaggregated analysis mirror those for the aggregated group and thus provide robust estimates for all immigrants in Stockholm.

A final limitation is related to a lack of information regarding occupation. Specifically, it has been hypothesized that immigrants are more likely to work in ‘front-line’ occupations; however, a majority of deaths are occurring among retired individuals with no attachment to the labor market. In addition, evidence from Sweden has found little evidence suggesting occupational exposure does not explain the excess mortality among immigrants[26].

In conclusion, our study shows that being partnered with a native is neither protective for immigrants nor contributes to closing the gap with natives, even after adjusting for a wide range of possible confounders on both individual- couple- and residential level. As such, these findings show that poor level of acculturation, unawareness of the Swedish recommendations and language barriers do not explain the excess COVID-19 mortality of immigrants. At the same time, Swedes partnered with immigrants also show excess mortality compared to Swedish-Swedish couples. Therefore, our study shows that focusing on simple native-immigrant dichotomies is not only an oversimplification but may also reinforce ethnic stereotypes and add to existing health inequalities.

Public Health Implications
In multicultural societies public health strategies based on immigrant-native dichotomies might contribute to reinforce stereotypes and health inequalities.

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Table 1. Description of the study population, number, proportion of deaths and death rates

	All		COVID-19		Other cause of death 2020		Exposure time in years	COVID-19 deaths per 1000
	N at March 5	%	N March 5 –	%	N March 5 –	%		
Couple type								
Native-native	54,0515	64.6	291	56.5	748	69.8	96,101	3.03
Native-immigrant	74,247	8.9	52	10.1	88	8.2	13,201	3.94
Immigrant-native	72,989	8.7	55	10.7	82	7.6	12,979	4.24
Immigrant-immigrant	148,639	17.8	117	22.7	154	14.4	26,431	4.43
Couple type, detailed								
Native-native	540,515	64.6	291	56.5	748	69.8	96,101	3.03
Native-immigrant	74,247	8.9	52	10.1	88	8.2	13,201	3.94
HIC-native	40,795	4.9	46	8.9	72	6.7	7,251	6.34
HIC-immigrant	39,950	4.8	37	7.2	58	5.4	7,103	5.21
LMIC-native	32,194	3.8	9	1.7	10	0.9	5,728	1.57
LMIC-immigrant	108,689	13.0	80	15.5	96	9.0	19,328	4.14
Sex								
Man	421,266	50.4	342	66.4	677	63.2	74,885	4.57
Woman	415,124	49.6	173	33.6	395	36.8	73,828	2.34
Education								
Primary	91,205	10.9	143	27.8	305	28.5	16,194	8.83
Secondary	293,506	35.1	208	40.4	441	41.1	52,178	3.99
Post-secondary	440,907	52.7	136	26.4	302	28.2	78,427	1.73
Missing	10,772	1.3	28	5.4	24	2.2	1,913	14.64
Household income (tertile)								
Lowest	204,497	24.4	349	67.8	659	61.5	36,308	9.61
Middle	226,798	27.1	96	18.6	242	22.6	40,333	2.38
Highest	405,095	48.4	70	13.6	171	16.0	72,071	0.97

Housing								
Multi-family	452,305	54.1	314	61.0	640	59.7	80,412	3.90
Single-family	379,232	45.3	142	27.6	359	33.5	67,447	2.11
Care home	4,853	0.6	59	11.5	73	6.8	853	69.19
N under 30 in HH								
0	379,111	45.3	449	87.2	964	89.9	67,348	6.67
1	151,330	18.1	39	7.6	48	4.5	26,924	1.45
2	213,803	25.6	17	3.3	42	3.9	38,044	0.45
3+	92,146	11.0	10	1.9	18	1.7	16,396	0.61
SqM per person in HH								
0-	106,763	12.8	56	10.9	80	7.5	18,988	2.95
20-	230,997	27.6	72	14.0	149	13.9	41,089	1.75
30-	199,904	23.9	148	28.7	291	27.1	35,539	4.16
40-	194,915	23.3	153	29.7	341	31.8	34,646	4.42
60-	97,904	11.7	85	16.5	205	19.1	17,399	4.89
Missing	5,907	0.7	1	0.2	6	0.6	1,051	0.95
Share immigrants in DeSO								
0-	51,045	6.1	17	3.3	58	5.4	9,078	1.87
0.10-	205,426	24.6	70	13.6	232	21.6	36,531	1.92
0.15-	235,209	28.1	127	24.7	261	24.3	41,825	3.04
0.20-	158,718	19.0	115	22.3	216	20.1	28,218	4.08
0.30-	117,886	14.1	91	17.7	195	18.2	20,955	4.34
0.50-	68,106	8.1	95	18.4	110	10.3	12,104	7.85
TOTAL	836,390	100.0	515	100.0	1072	100.0	148,712	3.46

Figure 1. Selection flow and final sample

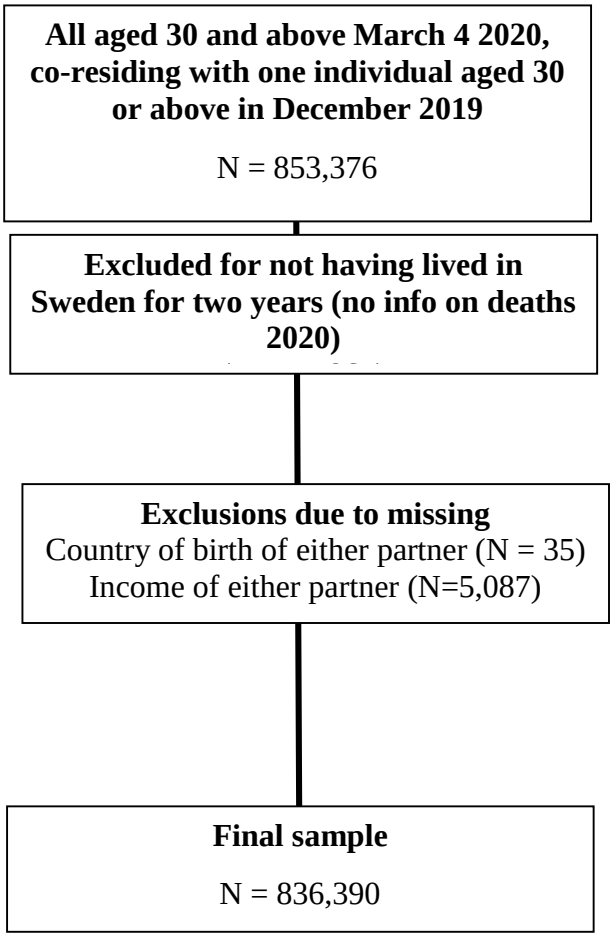


Figure 2. Hazard Ratios for (A) adjusted for age and sex only and (B) further adjusted associations between immigrant-native couple type (reference group: native-native couples), COVID-19 and all-cause mortality in 2020 in Stockholm, Sweden.

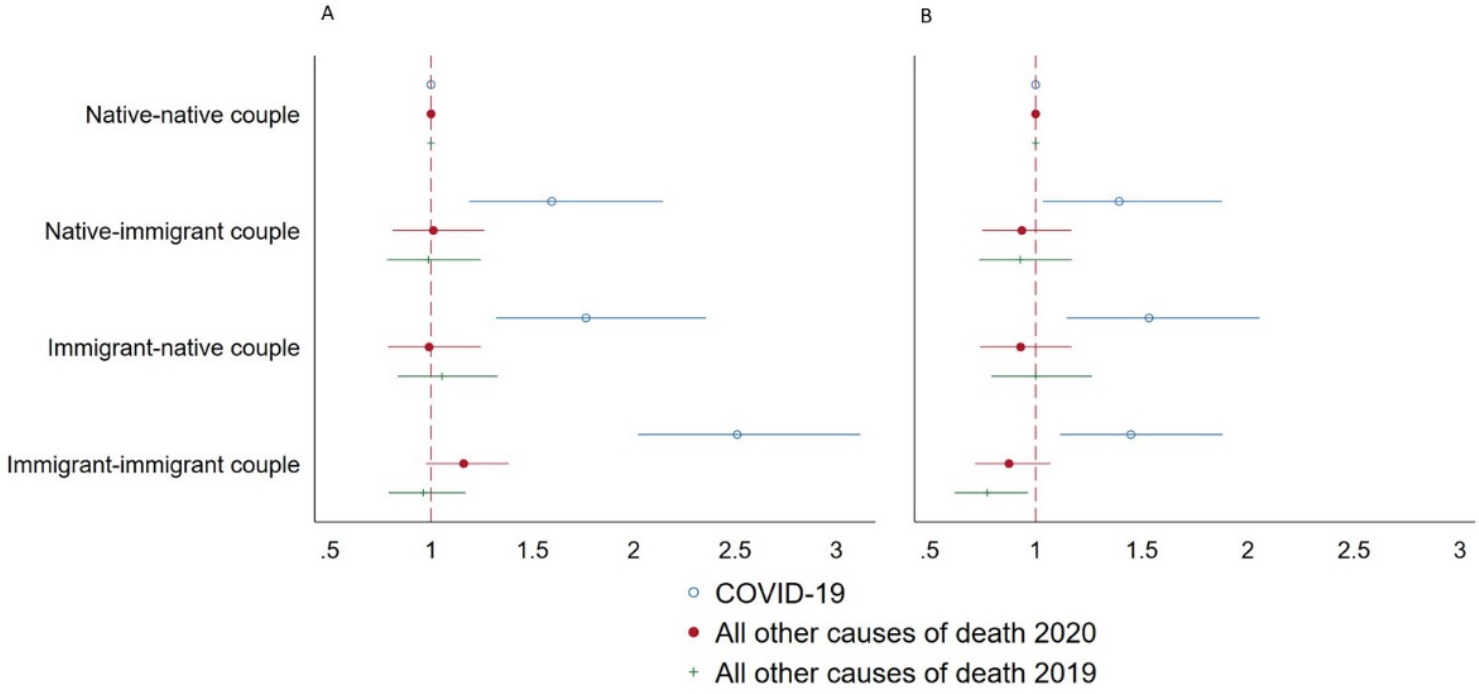
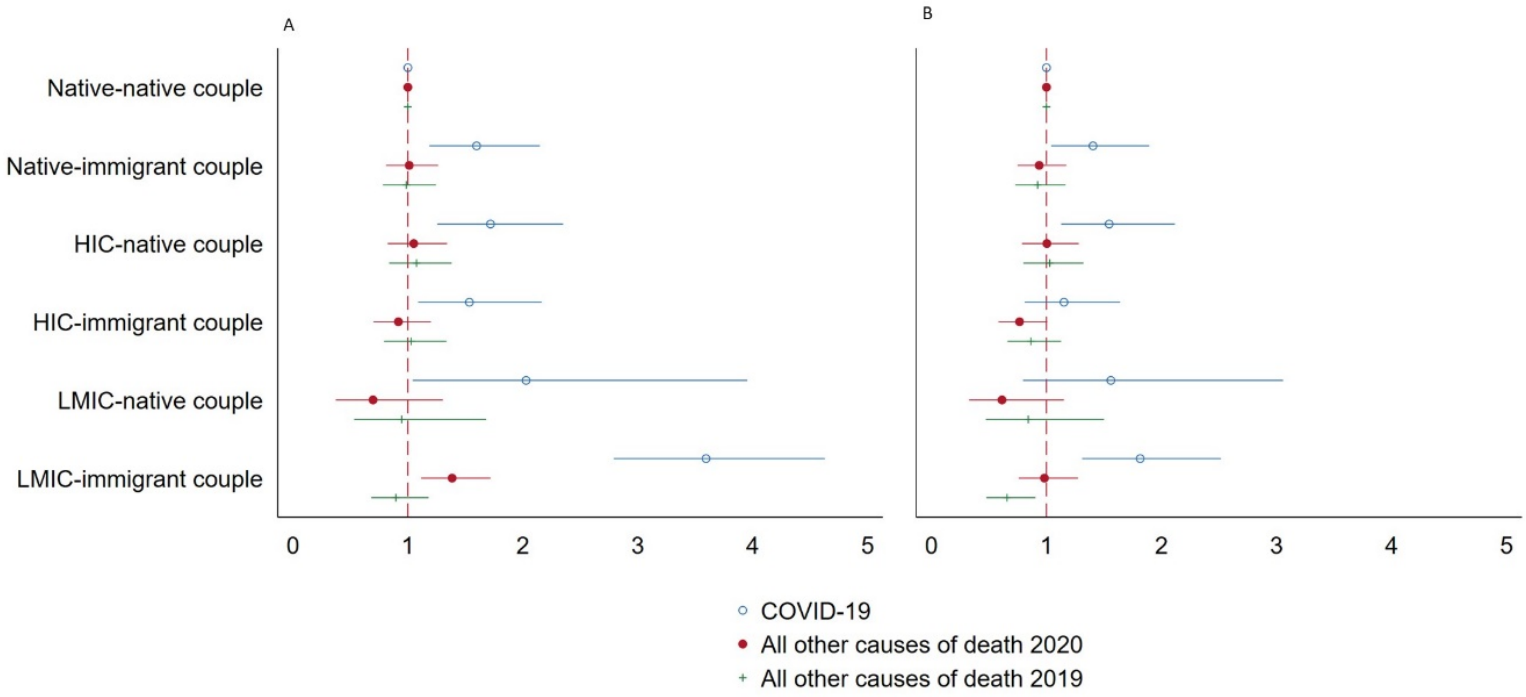
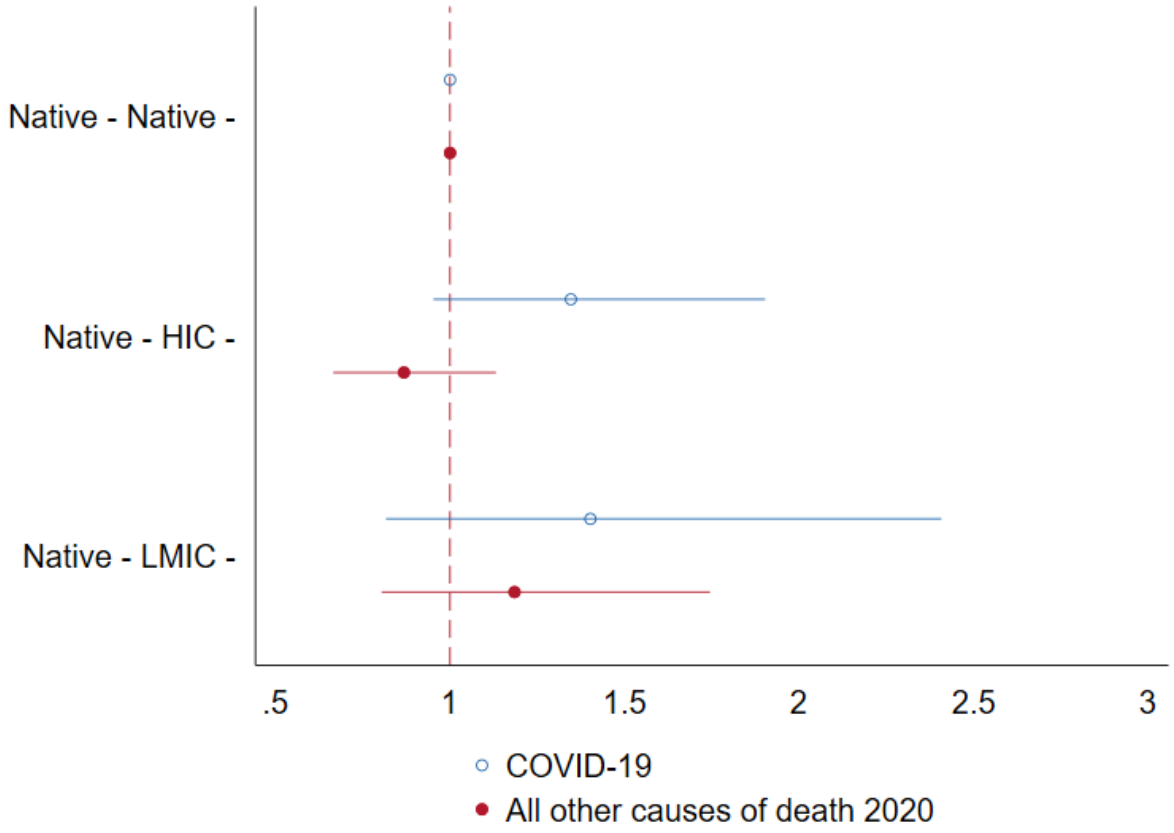


Figure 3. Hazard Ratios for (A) adjusted for age and sex only and (B) further adjusted associations between immigrant-native couple type for specific country groups (reference group: native-native couples), COVID-19 mortality and mortality from all other causes in 2020 and 2019 in Stockholm, Sweden.

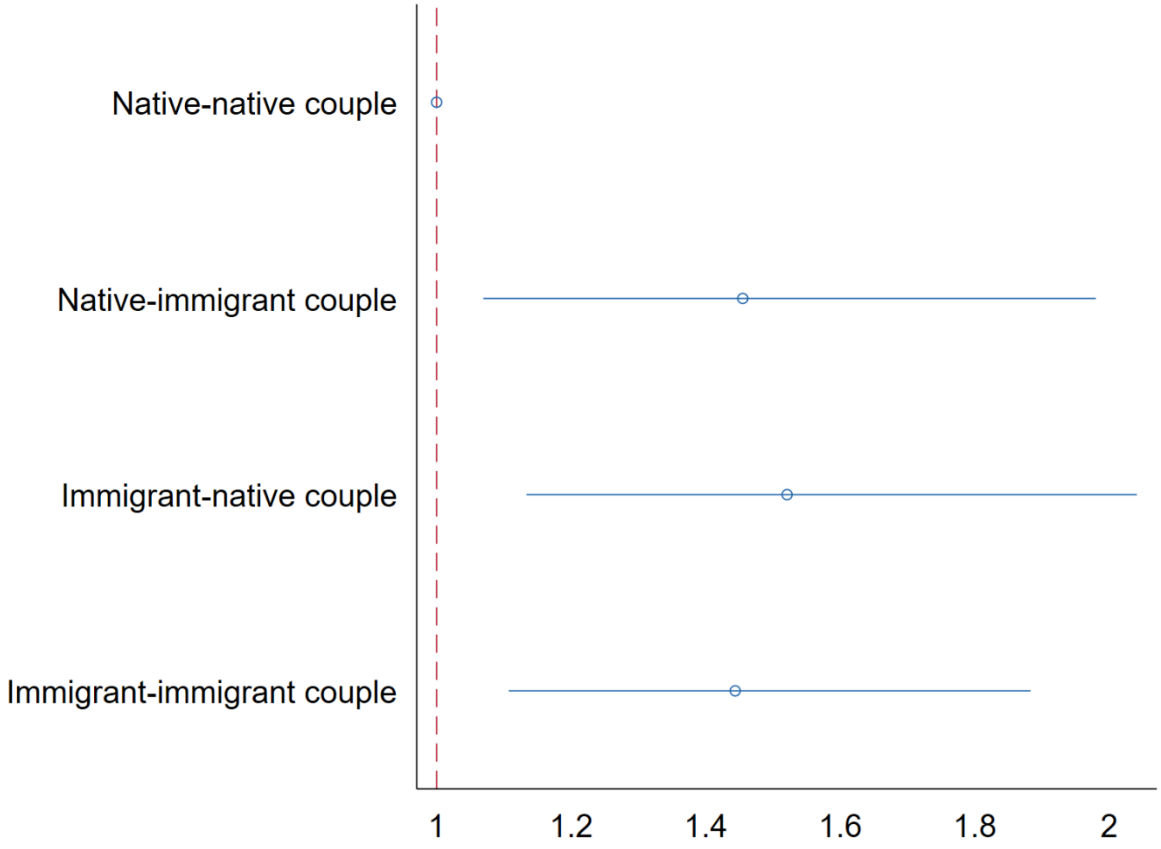


Appendix:

Appendix Figure 1: Sensitivity analysis disaggregating Native-immigrant partnerships by immigrant partners' origin



Appendix Figure 2: Sensitivity analysis of figure 2B excluding second generation immigrants



Appendix table 1: Full regression table for Figure 2

	Model 1: Figure 2A						Model 2: Figure 2B					
	COVID- 19		Other COD 2020		All COD 2019		COVID- 19		Other COD 2020		All COD 2019	
	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI
Partnership type												
Native-native	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Native-immigrant	1.60	(1.19, 2.15)	1.01	(0.81, 1.26)	0.99	(0.78, 1.24)	1.39	(1.03,1.88)	0.94	(0.75,1.17)	0.93	(0.73,1.17)
Immigrant-native	1.76	(1.32, 2.36)	0.99	(0.79, 1.25)	1.05	(0.84, 1.33)	1.53	(1.15,2.05)	0.93	(0.74,1.17)	1.00	(0.79,1.26)
Immigrant-immigrant	2.51	(2.02, 3.12)	1.16	(0.97, 1.38)	0.96	(0.79, 1.17)	1.45	(1.12,1.88)	0.87	(0.71,1.07)	0.77	(0.62,0.96)
Years under risk	148,712.19		148,712.19		148,268.51		148,712.19		148,712.19		148,268.51	
N events	518		1072		981		518		1072		981	
N	836390		836390		833650		836390		836390		833650	

Model 1 includes adjustments for sex; Model 2 includes adjustments for sex, household income, education, housing type, number of individuals in the household, m^2/person in the household (crowdedness), share of immigrants in the neighborhood of residence

Appendix table 2: Full regression table for Figure 3

	Model 3: Figure 3A						Model 4: Figure 3B					
	COVID- 19		Other COD 2020		All COD 2019		COVID- 19		Other COD 2020		All COD 2019	
	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI
Partnership type												
Native-native	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Native-immigrant	1.60	(1.19,2.15)	1.01	(0.81,1.26)	0.99	(0.78,1.24)	1.40	(1.04,1.89)	0.94	(0.75,1.17)	0.92	(0.73,1.17)
HIC-native	1.72	(1.26,2.35)	1.05	(0.82,1.34)	1.08	(0.84,1.38)	1.55	(1.13,2.12)	1.00	(0.79,1.28)	1.03	(0.80,1.32)
HIC-immigrant	1.54	(1.09,2.16)	0.92	(0.70,1.20)	1.03	(0.79,1.34)	1.15	(0.81,1.64)	0.77	(0.58,1.01)	0.86	(0.66,1.13)
LMIC-native	2.03	(1.04,3.95)	0.70	(0.37,1.30)	0.95	(0.53,1.68)	1.56	(0.80,3.06)	0.61	(0.33,1.15)	0.84	(0.47,1.50)
LMIC-immigrant	3.59	(2.79,4.63)	1.38	(1.12,1.72)	0.90	(0.68,1.18)	1.82	(1.31,2.52)	0.98	(0.76,1.27)	0.66	(0.48,0.91)
Years under risk	148,712.19		148,712.19		148,268.51		148,712.19		148,712.19		148,268.51	
N events	518		1072		981		518		1072		981	
N	836,390		836,390		833,650		836,390		836,390		833,650	

Model 3 includes adjustments for sex; Model 4 includes adjustments for sex, household income, education, housing type, number of individuals in the household, m^2/person in the household (crowdedness), share of immigrants in the neighborhood of residence

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