

## Immigrant enclaves and risk of drug involvement among asylum-seeking immigrants in Sweden: A quasi-experimental study



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### ABSTRACT

**Background:** Sweden is a major host nation for asylum-seeking immigrants, and residential placement of these immigrants is an important policy concern. This quasi-experimental study estimated of the impact of being placed into an “immigrant enclave” on risk of officially-recognized drug involvement (ORDI) among asylum-seeking immigrants over a 15-year period.

**Methods:** All data come from Swedish registries. The sample consisted of (a) asylum-seeking immigrants aged 5–35 years old at arrival (N = 51,017) that were subject to a nationwide policy (enforced 1987–1991) that dispersed asylum-seeking immigrants across municipalities, and (b) native-born Swedes aged 15 and older during this same period (N = 1,040,311). Neighborhood immigrant composition was quantified using the Reardon Index; residents of “immigrant enclave” neighborhoods (n = 960) were compared to residents of all other neighborhoods (n = 2,471). Cox proportional hazards models assessed the relationship between living in an enclave and risk of ORDI, identified by national registries, through 2015.

**Results:** Overall, 29.7% of immigrants were assigned to, and 25.5% of Swedes lived in, an enclave. Cumulative incidence of ORDI in enclaves was 6.34% as compared to 6.89% in other neighborhoods. Immigrants living in an enclave had lower risk of ORDI (Hazard ratio (HR): 0.86, 95% Confidence Interval (CI): 0.77 – 0.96). This protective association was marginally stronger in lower poverty areas. Native-born Swedes living in an enclave had higher risk of ORDI (HR: 1.05, 95% CI: 1.03–1.08), a relationship that was exacerbated by neighborhood poverty.

**Conclusions:** Neighborhood immigrant composition is associated with risk of ORDI, with differential associations for immigrants and native-born populations.

### 1. Introduction

The relevance of spatial factors to substance use behaviors is well-recognized. Access to and use of psychoactive substances cluster in physical spaces and in social spaces (Crum et al., 1996; Kendler et al., 2015). Spatial factors (e.g., urbanicity, area-level poverty, social disorganization, residential segregation) have also been linked to a range of substance use outcomes, including misuse of alcohol (Furr-Holden et al., 2008), cannabis (Wells et al., 2009), and other drugs (Crum et al., 1996; Furr-Holden et al., 2008; Petronis and Anthony, 2003; Storr et al., 2004).

Residential segregation refers to the degree to which one's neighbors

are of the same background – whether ethnic, racial, or socioeconomic – as oneself (Massey and Denton, 1998; Borjas, 1998; White and Borrell, 2011). Residential segregation has both spatial and social aspects that may impact substance use. In the US and in many other nations, racial/ethnic minorities are more likely to live in segregated areas that are economically disadvantaged and have poorer access to assets (e.g., greenspace, affordable food, employment opportunities) (Massey and Denton, 1998; Borjas, 1998; Sampson, 2008). However, for immigrants, living in a high-density, segregated area – often referred to as an “immigrant enclave” (Logan et al., 2002) – may have unique social benefits because these spaces provide a resource in terms of cultural goods, language, kinship, and social networks (Edin et al., 2003; Logan et al.,

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2002; Xie and Gough, 2011).

There are two competing hypotheses of how living in an immigrant enclave may influence substance use among immigrants. First, the *ethnic density* hypothesis argues that ethnic minorities living in neighborhoods with a high concentration of immigrants will have lower risk of substance use than those who live in majority-populated neighborhoods because these areas provide social capital in the form of shared cultural values, language, and social support with their neighbors and/or reduced exposure to racism and discrimination (Halpern, 1993; Halpern and Nazroo, 2000). In contrast, the *residential segregation* hypothesis, argues that ethnic minorities who live in neighborhoods with high ethnic density have higher risk of substance use than those who reside in majority-populated areas because these neighborhoods have a concentration of risk factors including economic disadvantage, restricted access to the labor market, lower collective efficacy, and fewer positive resources (Massey and Denton, 1998; Sampson et al., 1997). As immigration patterns have changed over time and the source of immigrants to Northern and Western Europe has shifted to the Middle East, Africa, and Asia, there has been a commensurate increase in studies examining residential factors on immigrant health outcomes. These findings are best described as mixed (Bosqui et al., 2014; Kim, 2008), and most studies have been unable to adequately control for selection into neighborhoods, leaving open the question of whether the observed relationships are a function of context factors, or instead reflect selection bias due to compositional characteristics (Diez Roux and Mair, 2010).

According to Statistics Sweden, approximately one in five Swedish residents was born abroad, and Sweden has become a major host nations for asylum seekers from conflict areas globally (Gilliver et al., 2014). However, migration of asylum-seeking immigrants is not a new issue in this country. From 1985–1994, Sweden adopted a policy of intentionally “dispersing” asylum-seeking immigrants around the country in a quasi-random fashion (i.e., those who were economically stable or who were reuniting with family members were not subjected to the policy) with the goal of easing labor and housing market conditions in heavily-settled areas and promoting social and economic integration (Åslund et al., 2011; Edin et al., 2003). By 1989, 97.5% (277 of 284) of Swedish municipalities participated in the program, and from 1987 to 1991, nearly 90% of incoming asylum-seeking immigrants were assigned to an initial municipality under the policy (Edin et al., 2003). Prior work has shown that the policy did indeed shift where immigrants lived, resulting more settlement of immigrants in northern Sweden at the expense of urban centers like Stockholm (Edin et al., 2003), and that individual characteristics (e.g., gender, marital status, family size) were not highly correlated with neighborhood socioeconomic status (White et al., 2016), a major confounder of drug involvement. As a result, this policy provides a quasi-experimental test of the hypothesized influence of neighborhood context on subsequent substance use.

The aim of this study is to assess whether residential segregation is associated with substance use among asylum-seeking immigrants in Sweden over a 15-year period, and if so, the degree to which this relationship is explained by neighborhood socioeconomic disadvantage. We sought to (1) test the ethnic density versus residential segregation hypotheses, and (2) contrast these findings for asylum-seeking immigrants to those for native-born Swedes.

## 2. Methods

### 2.1. Sample

The main analysis is limited to asylum-seeking immigrants (N = 51,017) who arrived in Sweden between 1987 and 1991, inclusive, the years that the dispersal policy was most rigorously enforced (the policy was passed in 1985 and repealed in 1994) (Edin et al., 2003). These immigrants originated from Iran (26.9%), North Africa/

other areas of the Middle East (24.4%), other parts of Africa (14.2%), Latin America (13.0%), Eastern Europe (predominantly former Soviet Republics) (11.8%), and Asia (9.5%). The sample was limited to immigrants ages 5 to 35 at arrival, to ensure that they arrived during the developmentally-relevant period for incidence of substance use and were also old enough to experience elements of the neighborhood when they arrived (e.g., peers, schools, etc.). We secured ethical approval for this study from the Regional Ethical Review Board of Lund University (No 2012/795).

### 2.2. Measures

#### 2.2.1. Exposure

All asylum-seeking immigrants, except those reuniting with family members living in Sweden or those having the financial resources to support themselves, were subjected to the dispersal policy. During the period of policy enforcement (1987–1991), immigrants were living in more dispersed areas across the country than in prior or subsequent periods (Edin et al., 2004; White et al., 2016). We assumed that initial neighborhood assignment within a municipality was quasi-random, conditional on immigrant characteristics noted by placement officers which included language, formal schooling, and family size. Because this assumption is not directly testable with the data we have, we assessed the balance of covariates for immigrants assigned to enclaves vs. other areas to test the validity of this assumption.

Residential segregation was quantified using the Reardon *spatial exposure|isolation index* (Reardon and O’Sullivan, 2004). This index is preferable over other metrics of segregation because it incorporates the spatial distribution of the population (e.g., immigrant density of the area surrounding each immigrant’s household), rather than using area-level constructs (e.g., census tract). The Reardon index was created by generating a spatial point map of all households in Sweden and calculating the relative proportion of immigrant households (from all nationalities) and native-born Swede households within a 500 m radius of each point, accounting for the overall proportion of the population that is immigrant. It generates a z-score under the null hypothesis of no dissimilarity (i.e., homogeneity). We used the threshold of  $Z > 1.96$  (corresponding to a significance level of  $p < 0.05$ ) to indicate an immigrant “enclave,” and conducted planned sensitivity analyses using more stringent thresholds. We also estimated the proportion of people who moved within five years of arrival (or baseline year, for the native-born population, described below) to qualitatively assess how much exposure individuals had to the enclave.

#### 2.2.2. Outcome

We indexed officially-recognized drug involvement (ORDI) using data from several nationwide Swedish registers, summarized in eTable 1: The Hospital Discharge Register (1987–2015); the Outpatient Care Register (2001–2015); the Primary Care Registry, which includes ICD-9 diagnoses from a large, but not nationwide, set of primary health care centers (1998–2015); the Mortality Register (1987–2015); the Prescription Register, which records all prescription medications dispersed (2005 to 2015); the Criminal Register (1987–2015); and the Suspicion Register (1998–2015). ORDI was operationalized in the medical and mortality registries by ICD codes (i.e., ICD9: Drug psychoses (292) and Drug dependence (304); ICD10: Mental and behavioral disorders due to psychoactive substance use (F10-F19), except those due to alcohol (F10) or tobacco (F17)); the majority of these ICD-9 diagnoses were related to opioids, sedatives, or cannabis. ORDI was operationalized in the Suspicion Register by codes 3070, 5010, 5011, and 5012, which reflect crimes related to substance use; and in the Crime Register by references to laws covering narcotics (law 1968:64, paragraph 1, point 6) and drug-related driving offences (law 1951:649, paragraph 4, Subsection 2 and paragraph 4A, Subsection 2). ORDI was operationalized in the Prescription Drug Register as having retrieved (in average) more than four defined daily doses a day for 12 months of

either of Hypnotics, Sedatives (Anatomical Therapeutic Chemical (ATC) Classification System N05C and N05BA) or Opioids (ATC: N02A). Individuals with a history of cancer were excluded from this operationalization from the Prescription Drug Register, as these dosages may represent appropriate pain management. Selling drugs is not a component of the definition of ORDI. This is the same definition we have used in our prior work (Kendler et al., 2015).

### 2.2.3. Analysis

First, we compared the characteristics of immigrants assigned to enclaves versus those assigned to other areas in terms of demographics and nationality. Next, we used Cox proportional hazards models to estimate the relationship between being assigned to an enclave on risk of subsequent ORDI, from date of arrival until first ORDI registration, death, emigration, or the end of the study period (2015-12-31). Exposure assignment was indexed as whether the area the immigrant was assigned to was considered an “enclave” or not in the year prior to their arrival. These models were adjusted for age, sex, and neighborhood poverty. Neighborhood poverty was assessed using the Neighborhood Deprivation Index (NDI), a composite of educational attainment, household income, unemployment, and social welfare assistance; this index was generated at the level of small area market statistics (SAMS), geographic units defined by homogeneous types of buildings by Statistics Sweden (Sundquist et al., 2004). Higher values on the NDI indicate poorer neighborhoods. We tested the proportionality assumption by including an interaction between the dummy variable ‘enclave’ (yes/no) and time, and there was no indication of violation. In all models we included a separate stratum for each municipality to account for all time-invariant factors at the municipality level. We then applied this same analytic approach to estimate the relationship between living in an immigrant enclave on risk of ORDI for native-born Swedes, beginning at age 15 (the earliest possible age of ORDI registration), during this same time period (1987–1991,  $N = 1,040,311$ , 49.7% female, mean year of birth 1969 (SD: 8.6)). As with the immigrant sample, native-born Swedes were right-censored at date of first ORDI registration, death, emigration, or 2015-12-31. The Wald test was used to evaluate the significance of differences between the hazard ratios for enclave vs. not on ORDI for immigrants and native-born Swedes.

We then conducted a series of planned sensitivity analyses. We tested whether the relationship between living in an enclave and ORDI varied as a function of age at arrival (5–15, 16–25, and 26–35 years old), or as a function of neighborhood poverty at the SAMS level, using interaction terms. We repeated our analysis for immigrants that arrived between 1999 and 2001, a period where there was no residential placement policy in effect. We assessed whether immigrants were more likely to be identified by the Suspicion/Criminal registries only versus native-born Swedes. If this were the case, living in an enclave may be associated with higher levels of ORDI as a result of increased law enforcement surveillance. To address this potential source of bias, we repeated our analysis by source of data (e.g., suspicion/criminal registries vs. medical registries).

Analyses were conducted using SAS v9.4 (SAS Institute, Cary, N.C.) and ArcGIS v10.5.1.

## 3. Results

During the policy enforcement period, 29.7% of asylum-seeking immigrants were assigned to, and 25.5% of native-born Swedes lived in, an immigrant enclave (Table 1). In general, immigrants assigned to an enclave were similar to those assigned to other neighborhoods in terms of individual-level demographic characteristics, however, the enclaves had significantly higher levels of poverty than comparison areas.

While the specific number and location of the enclaves changed each year, Fig. 1 provides an exemplar of the geographic distribution of these enclaves in 1987, overlaid with neighborhood poverty (i.e., NDI

score) at the SAMS level. Relative to other areas, enclave neighborhoods had more residential stability: 17% of immigrants living in an enclave were in the same household, and 26% were in the same SAMS, five years later as compared to only 11% in the same household and 17% in the same SAMS, for immigrants living in other areas. In contrast, residential stability for the native-born population did not vary by enclave status: 32% vs. 33% were in the same household and 38% vs. 40% were in the same SAMS, comparing immigrant enclaves vs. other areas, respectively, over the subsequent five years,

The cumulative incidence of ORDI in immigrant enclaves was 6.34% as compared to 6.89% in other neighborhoods. For both immigrants and native-born Swedes, neighborhood poverty was associated with increased risk of ORDI. Immigrants assigned to an enclave had a significantly lower risk of ORDI (Hazard ratio (HR): 0.86, 95% Confidence Interval (CI): 0.77 – 0.96) (Table 2). As shown by eFig. 1, this protective effect was evident for all immigrants, regardless of age at arrival. The protective association between living in an enclave was stronger in low-poverty areas (HR: 0.70) compared to high poverty areas (HR: 1.20), although the p-value for the interaction between NDI and enclave status was not statistically significant (p-value = 0.07). In contrast, living in an immigrant enclave was associated with higher likelihood of ORDI for native-born Swedes (HR: 1.05, 95% CI: 1.03–1.08). For this group, neighborhood poverty exacerbated the association between living in an enclave and ORDI (HR<sub>enclave</sub> for high-poverty areas: 1.41 vs. HR<sub>enclave</sub> for low-poverty areas: 0.50, p-value for interaction  $\leq 0.0001$ ).

Sensitivity analyses indicated that these results were robust to definition of the enclave (eTable 2) and registry source (eTable 3). In fact, the protective effect of living in an enclave among immigrants was most pronounced when limiting analysis to the Criminal/Suspicion register, suggesting that the potential for heightened surveillance of immigrant neighborhoods by increased law enforcement did not bias our results. eTable 4 shows that living in an immigrant enclave was not associated with ORDI among immigrants who arrived during 1999–2001, with no residential dispersal policy in place, suggesting that the protective effect observed among immigrants who arrived in 1987–1991 was not a result of unobserved factors that could have potentially resulted in placement of immigrants with lower inherent likelihood of ORDI into enclave neighborhoods (Table 3).

## 4. Discussion

The primary finding from this study is that asylum-seeking immigrants who were assigned to live in an area with a higher relative concentration of immigrants had moderately lower risk of ORDI over a nearly 20-year period than immigrants living in other neighborhoods. In contrast, native-born Swedes living in these same areas during this time period had higher risk of ORDI, suggesting that the apparent protective effect for immigrants was not simply a function of differential surveillance of immigrant enclaves. The quasi-experimental nature of this study, and the comparison to the native-born population, provide some of the most robust evidence to date that neighborhood context influences risk of substance use for asylum-seeking immigrants in the Swedish context.

While it is long-established that substance use clusters in neighborhoods, the factors that contribute to this clustering are only now beginning to be understood (Linton et al., 2017). Experimental and quasi-experimental study designs provide an important cleavage of compositional and contextual aspects of neighborhoods (Sampson, 2008). These types of studies have also challenged several notions of how neighborhood socioeconomic disadvantage relates to health (Sharkey, 2010; Sharkey and Sampson, 2010). While the enclaves in this study had higher poverty, the immigrants assigned to these areas were less likely to move in the subsequent five years than those assigned to other areas, suggesting that the former provided a more stable social environment. This interpretation is consistent with findings from

**Table 1**  
Demographic characteristics of asylum-seeking immigrants aged 5–35 who arrived in Sweden between 1987–1991.

	Total	Immigrant enclave	Not enclave
N	51,017	15,141 – 29.7%	35,876 – 70.3%
Cumulative incidence of ORDI (n, %)*	3,431 (6.73%)	960 (6.34%)	2,471 (6.89%)
Age at incident ORDI registration (Mean, SD)*	33.6 (10.2)	33.8 (10.2)	33.5 (10.2)
Months from arrival to incident ORDI registration (Mean, SD)	186.9 (65.7)	188.5 (67.0)	186.3 (65.3)
Male (n, %)	31,142 (61.0%)	9,125 (60.3%)	22,017 (61.4%)
Age at immigration (n, %)			
5-15	12,593 (24.7%)	3,687 (24.4%)	8,906 (24.8%)
16-25	16,070 (31.5%)	4,933 (32.6%)	11,137 (31.0%)
26-35	22,354 (43.8%)	6,521 (43.1%)	15,833 (44.1%)
Year of immigration (n, %)			
1987	7,832 (15.4%)	2,676 (17.7%)	5,156 (14.4%)
1988	9,132 (17.9%)	2,694 (17.8%)	6,438 (18.0%)
1989	13,550 (26.6%)	3,897 (25.7%)	9,653 (26.9%)
1990	9,729 (19.1%)	2,855 (18.9%)	6,874 (19.2%)
1991	10,774 (21.1%)	3,019 (19.9%)	7,755 (21.6%)
Region of origin (n, %)			
Africa	7,266 (14.2%)	1,735 (11.5%)	5,531 (15.4%)
Asia	4,867 (9.5%)	1,990 (13.1%)	2,877 (8.0%)
East-Europe	6,041 (11.8%)	1,901 (12.6%)	4,140 (11.5%)
Iran	13,734 (26.9%)	3,556 (23.5%)	10,178 (28.4%)
Latin America	6,638 (13.0%)	1,889 (12.5%)	4,749 (13.2%)
Middle East – North Africa	12,470 (24.4%)	4,069 (26.9%)	8,401 (23.4%)
Neighbourhood poverty (Mean, SD)	1.26 (1.79)	2.78 (2.00)	0.76 (1.41)

\* Cumulative incidence of drug abuse is estimated from date of arrival until 12/31/2015.

the Moving to Opportunity experiment which suggest that residential mobility itself, particularly during adolescence, may be harmful to mental health and related behaviors (Schmidt et al., 2018, 2017). Taken together, this suggests that policy and programmatic efforts to settle immigrants should be mindful of the neighborhood characteristics of their placement, including but not limited to residential mobility and immigrant composition.

#### 4.1. Strengths and limitations

Findings should be interpreted considering study strengths and limitations. Residential segregation is a relative construct and can be difficult to understand in the context of major changes in population composition, as has happened in Sweden (Nielsen and Hennerdal, 2017; Reardon and O’Sullivan, 2004). In this study we sought to address this by modeling the exposure as whether an area was an “enclave” in the year prior to an immigrant’s arrival. Moreover, the economic, social and cultural meaning of an “enclave” changes over time as individuals move into, and out of, physical spaces (Andersson and BråmÅ, 2004; Andersson and Hedman, 2016; Müller et al., 2018; Sampson, 2008). While the detailed geographic data used in this study provide a precise quantification of residential segregation, we do not claim that these data capture the qualitative nature of living in an enclave vs. a predominantly Swedish neighborhood. Moreover, the experience of living in an enclave likely differs across immigrant groups. During the time of the dispersal policy, the majority of immigrants were arriving from the Middle East (Table 1), and our prior work has shown that the association between living in an enclave and mental health outcomes may vary by nation of origin (Mezuk et al., 2015).

Another limitation concerns the outcome assessment. While registry data have a major advantage relative to other measurement approaches in that they encompass the entire population, a key limitation is that they underestimate the true prevalence and likely represent more severe cases (i.e., those that have come to the attention of clinicians or law enforcement) (Kraus et al., 2003). We readily acknowledge that ORDI is only a proxy indicator of substance use behavior and associated disorders.

Despite these limitations, this study represents one of the most comprehensive tests of whether and how residential segregation relates to substance use among immigrants. These findings suggest that

neighborhoods are not simply geographic spaces where drug use occurs but rather that there are features of neighborhoods, beyond those captured by socioeconomic status, that influence substance use. Consistent with the ethnic density hypothesis, initially living in an area with a relative abundance of other immigrants is protective for subsequent risk of ORDI for asylum-seeking immigrants. These findings are also consistent with prior economic research on this policy, which showed that immigrants assigned to areas with higher density of immigrants were more likely to be employed than those assigned to predominantly-Swedish areas (Edin et al., 2004). In contrast, native-born Swedes living in immigrant enclaves had higher risk of subsequent ORDI, and this relationship was strongest in high-poverty neighborhoods. As Swedes were not subject to the dispersal policy, this finding may reflect downward drift or selection of Swedes with higher propensity for ORDI into less-desirable neighborhoods. It may also reflect that Swedes in these areas experienced more exclusion from labor markets or had greater exposure to negative social networks (Kendler et al., 2019). We cannot directly test these hypotheses, and instead view the findings for the native-born group as a “negative control” that helps exclude other potential explanations for our findings (e.g., differential surveillance and therefore detection of ORDI in enclaves vs. other neighborhoods). Future studies should explore how the changing immigrant composition of neighborhoods relates to substance use and related behavior outcomes for native-born populations.

These findings illustrate that even though enclave neighborhoods tended to be poorer, the immigrants who were assigned to live in those areas had lower risk of ORDI many years after their arrival in Sweden. Contextualizing these findings within the large body of literature on neighborhoods and health, our results suggest that more research is warranted to understand whether enclaves promote social capital, networks, residential stability and other intermediary processes that protect against substance use for immigrants.

#### Author contributions

B. Mezuk conceptualized the study, developed the analysis plan, and wrote the first draft of the manuscript. H. Ohlsson and K. Cederin conducted the analysis. J. Sundquist, K. Sundquist, H. Ohlsson and K. Kendler assisted with the study design, analysis plan, and edited the manuscript.

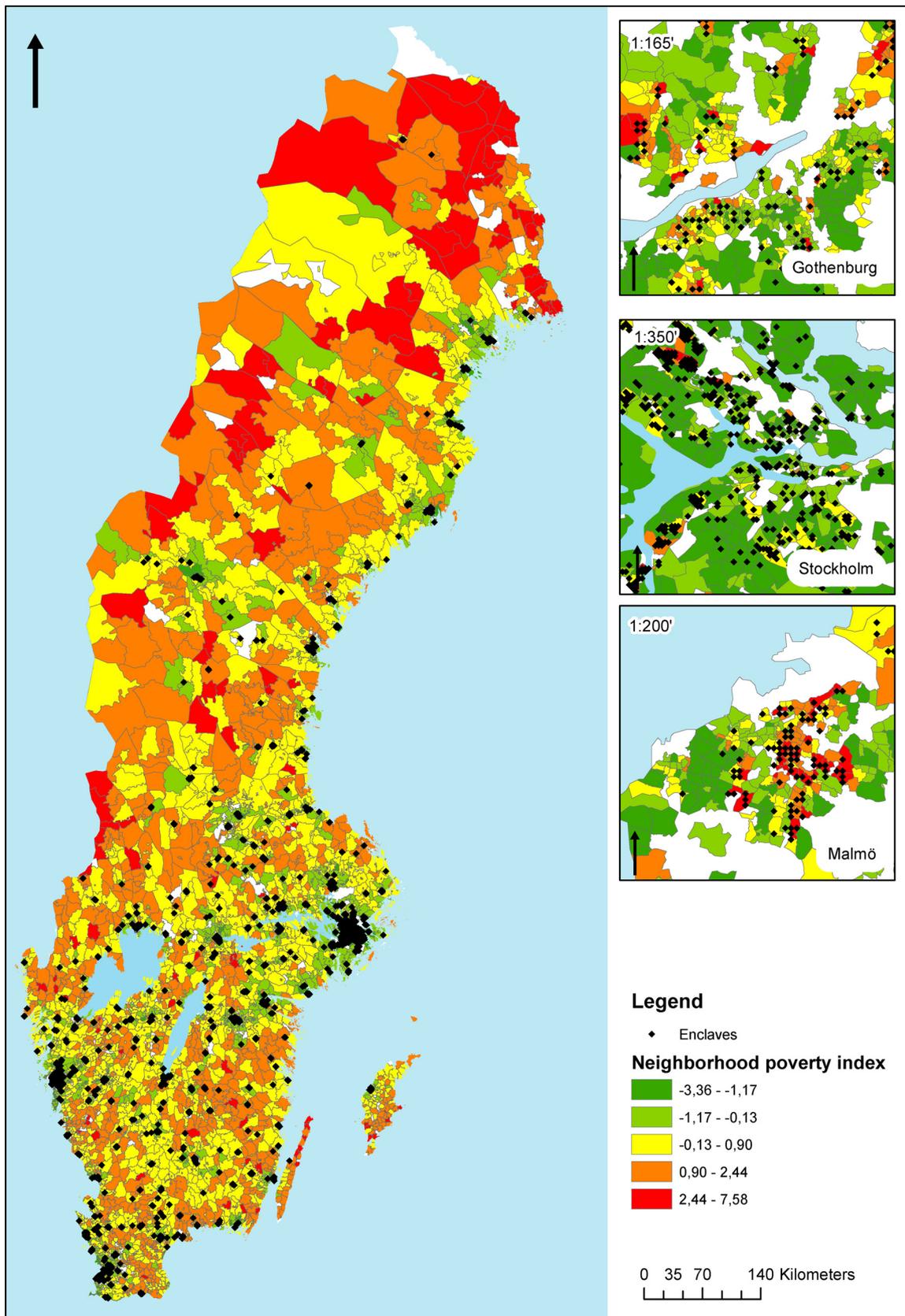


Fig. 1. Map of enclaves overlaid on area-level poverty at the SAMS level in 1987. See attached: In print use black/white version. Online use color version.

**Table 2**

Relationship between living in an immigrant enclave and incidence of ORDI among asylum-seeking immigrants to Sweden (N = 51,017): 1987 – 2015.

	Model 1 HR (95% CI)	Model 2 HR (95% CI)	Model 3 HR (95% CI)	Model 4 HR (95% CI)
Neighborhood type				
Enclave	0.90 (0.82 – 0.99)	0.89 (0.81 – 0.98)	0.86 (0.77 – 0.96)	0.77 (0.66 – 0.91)
Not Enclave	1.0	1.0	1.0	1.0
Age at Immigration		0.95 (0.94 – 0.95)	0.95 (0.95 – 0.95)	0.95 (0.95 – 0.95)
Sex				
Male		4.95 (4.47 – 5.47)	5.16 (4.62 – 5.76)	5.16 (4.62 – 5.76)
Female		1.0	1.0	1.0
Neighborhood poverty			1.01 (0.98 – 1.04)	0.99 (0.95 – 1.02)
Enclave* Neighborhood poverty				1.06 (1.00 – 1.12)
AIC	32898.4	31190.2	31192.1	31190.4

HR: Hazard ratio. CI: Confidence interval. AIC: Akaike's Information Criterion.

**Table 3**

Relationship between living in an immigrant enclave and incidence of ORDI among native-born Swedes living in an immigrant enclave between 1987–1991 (N = 1,040,311).

	Model 1 HR (95% CI)	Model 2 HR (95% CI)	Model 3 HR (95% CI)	Model 4 HR (95% CI)
Enclave (ref. Not enclave)	1.58 (1.55– 1.61)	1.45 (1.42 – 1.48)	1.05 (1.03 – 1.08)	1.12 (1.09; 1.15)
Year of birth		1.09 (1.09 – 1.09)	1.09 (1.09 – 1.09)	1.09 (1.09 – 1.09)
Male (ref. Female)		2.13 (2.10 – 2.17)	2.11 (2.08 – 2.15)	2.11 (2.08 – 2.15)
Social Welfare assistance (ref. no)			1.38 (1.35 – 1.41)	1.38 (1.35 – 1.41)
Years of education			0.95 (0.95 – 0.96)	0.95 (0.95 – 0.96)
Early retirement (ref. no)			2.68 (2.63 – 2.73)	2.68 (2.63 – 2.73)
Neighborhood poverty			1.12 (1.12 – 1.13)	1.16 (1.15; 1.18)
Enclave*Neighborhood poverty				0.93 (0.92 – 0.95)
AIC	1069018.9	1036258.0	1021091.8	1020979.6

HR: Hazard ratio. CI: Confidence interval. AIC: Akaike's Information Criterion.

## Contributors

All authors have read and approved the final manuscript.

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## Role of funder

The funder had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation of the manuscript; or decision to submit the manuscript for publication. The European Research Council reviewed and approved this manuscript before submission.

## Declaration of Competing Interest

The authors have no conflicts of interest, financial or otherwise, to report.

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## Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.drugalcdep.2019.107666>.

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