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Attempted suicide and violent criminality among Danish second generation immigrants according to parental place of origin

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Abstract

Background—Immigrant populations in Western European countries have grown in their size and diversity, but little is known about risks of self-directed and externalised violence among second generation immigrants.

Aims—To compare risks for attempted suicides and violent offending among second generation immigrants to Denmark according to parental region of origin versus the native Danish population.

Methods—Data from interlinked national Danish registers were used ($N=1,973,614$). Parental origin outside Denmark was categorised thus: Asia, Africa, Middle East, Greenland, other Scandinavian countries, elsewhere in Europe, and all other regions. We estimated gender-specific cumulative incidence and incidence rate ratios (IRRs) versus native Danes.

Results—In virtually all subgroups of second generation immigrants, risk was elevated for the two adverse outcomes in both genders. Females generally had greater elevations in attempted suicide risk, and males had greater elevations in violent offending risk. For attempted suicide, especially large IRRs were observed for males and females whose parents emigrated from Greenland; for violent offending, risks were particularly raised for males and females of Middle Eastern, Greenlandic and African origin. Adjustment for socioeconomic status partially explained these associations.

Conclusions—Western European nations should develop preventive programmes tailored toward specific second generation immigrant populations, with integrated approaches jointly tackling suicidality and violence.

Keywords

Immigrants; suicidal behaviour; violence; ethnicity; epidemiology; acculturation

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Introduction

Immigrant populations in Western European nations have become much larger and more diverse in recent decades (Vertovec, 2007) under the twin influences of globalisation and free movement of labour within the European Union (EU) since 1993 (Heath, Rothon & Kilpi, 2008). By 2013, the EU population contained almost 51 million persons currently residing in a country other than they were born in, constituting more than 10 percent of the total EU population. Almost two thirds of these immigrants were born beyond EU borders (European Commission, 2014), and their children may face adaptive challenges. In particular, second generation immigrants are at risk of psychological distress due to conflicting cultures between their parental country of origin and their own country of birth (van Leeuwen, Rodgers, Regner & Chabrol, 2010), and the interplay between acculturative factors and perceived racial discrimination (Aichberger et al., 2015b). To inform more effective social and health policies we require a better understanding of the impact of discrimination, labour market marginalisation, poverty and psychological distress on second generation immigrants (Kosidou et al. 2012; Di Thiene, Alexanderson, Tinghög, La Torre & Mittendorfer-Rutz, 2015), some of whom may be markedly disadvantaged within the societies that their parents migrated to (Heath et al., 2008). Specifically, we need to know how patterns of risk for adverse outcomes in this population vary according to the regions of the world where their parents migrated from, and the degree to which raised risk can be explained by socioeconomic differences. Such knowledge will help inform future community-based and wider population-based intervention programmes (Aichberger et al., 2015a).

In this study, we examine risks for suicidality and violent criminality amongst second generation immigrants, with stratification for parents' place of birth. Self-directed and externalised violence are strongly related harmful behaviours (Hillbrand, 1995). They have common determinants, including lack of impulse control (Gvion & Apter, 2011) and alcohol misuse (Bergman & Brismar, 1994), with dysregulation in the central serotonergic systems being a frequently postulated shared putative neurobiological mechanism (Gilmore, Corrigan, Ekström, Knight & Garbutt, 1991). A systematic review published during the mid-1990s reported the existence of 40 risk factors for suicide or attempted suicide, 37 for violence, and 23 for suicidality and violence co-occurrence, as well as 17 protective factors associated with reduced risk for both adverse outcomes (Plutchik, 1995). A sizeable subset engages in both behaviours; thus, the majority of people who harm themselves are also aggressive towards others (O'Donnell, House & Waterman, 2015), and violent offenders have a much higher risk of taking their own lives than nonviolent offenders and people without history of criminality (Webb et al., 2012). The combined societal costs of these two harmful behaviours are immense (Corso, Mercy, Simon, Finkelstein & Miller, 2007), prompting calls for a concerted approach in tackling them (Lubell & Vetter, 2006).

Interlinked Danish administrative registers provide a resource that is virtually unique worldwide for conducting whole population epidemiological investigations of these two closely linked adverse outcomes in the same cohort of individuals at risk. The specific aims of the national cohort study reported herein were threefold: first, to estimate absolute risk

among second generation immigrants according to parents' place of birth and in native Danes by plotting cumulative incidence curves from mid-adolescence to early middle age; second, to estimate gender-specific incidence rate ratios for these immigrant subgroups versus native Danes; third, to assess the degree to which observed risk elevation among these immigrants can be explained by socioeconomic status. There was no previously published research to guide us in hypothesising which specific region of origin subgroups would be at greatest risk. However, we did expect to observe elevated risk for both adverse outcomes across the subgroups examined, and we anticipated observing a greater elevation in risk of attempted suicide in female than male immigrants (Bursztein Lipsicas et al., 2013), and *vice versa* with violent criminal offending (Chen, Coccaro & Jacobson, 2012).

Method

Descriptive of the study cohort

Approval to conduct this study was granted formally by the Danish Data Protection Agency, and data access was agreed by the State Serum Institute and Statistics Denmark. Since 1968, the Civil Registration System (CRS) has routinely captured information on all Danish residents regarding their date and place of birth, gender, with continuously updated information on their vital status (Pedersen, Gøtzsche, Møller & Mortensen, 2006). The unique personal identification numbering system enables accurate inter-register and parent-offspring linkage. Our study cohort included all persons born in Denmark between 1st January 1971 and 31st December 2002 who were alive and residing in the country on their 10th birthday: N=1,973,614. We had two different final observation dates for the two adverse outcomes due to differential data availability for the national registers that we examined. For attempted suicide, individuals were followed up from their 10th birthday until their first attempt, emigration from Denmark, death or 31st December 2012, whichever came first. We used the same approach to examine violent offending risk, except that follow up commenced on each cohort member's 15th birthday (the age of criminal responsibility in Denmark), and the final date of follow up for this outcome, at the time of the study's initiation, was 31st December 2011. Thus, cohort members born up to 31st December 2002 were included in the analyses of attempted suicide, whereas for violent offending only those individuals born up to 31st December 1996 were eligible for inclusion. We opted not to discard the extra year of available follow-up from the National Patient Register and Psychiatric Central Research Register as compared with the National Crime Register, as this would have needlessly reduced the statistical precision of our estimates in relation to attempted suicide.

Adverse outcome classification

Cohort members were linked via their personal identifiers to national registers to obtain information on attempted suicides and violent criminal offences. From 1980 onwards the National Crime Register has recorded information on all criminal charges according to offence type, judicial verdict and sentence (Jensen, Greve, Høyer & Spencer, 2006). Our definition of interpersonal violent criminality encompassed all convictions for homicide, assault, robbery, aggravated burglary or arson, possessing a weapon in a public place, violent threats, extortion, human trafficking, abduction or kidnapping, rioting, terrorism, and sexual offences (excluding possession of child pornographic material). Cohort members were

linked via their personal identifiers to the Psychiatric Central Research Register (Mors, Perto & Mortensen, 2011) and to the National Patient Register (Lyng, Sandegaard & Rebolj, 2011) to obtain information on suicide attempts, using the exact same classification as was used previously (Nordentoft, Mortensen & Pedersen, 2011).

Parents' place of birth classification

Using information recorded in the Danish Civil Registration System, second generation immigrants were classified hierarchically according to parents' place of birth as follows: other Scandinavian country, elsewhere in Europe, Greenland, Asia, the Middle East, Africa, and all other regions of the world (including the Americas and Oceania). If only one parent was born abroad, parental region of origin was categorised according to the foreign-born parent's place of birth. If both parents were born abroad, parental region of origin was based on maternal country of birth. In the Civil Registration System there is complete linkage between mothers and their children, whereas for a small proportion of all cohort members the father's identity is unknown (Pedersen, Gøtzsche, Møller & Mortensen, 2006). For that reason mother's country of birth was applied as the primary indicator of place of origin for second generation immigrants with two foreign-born parents. Native Danes, defined as persons born in Denmark and with both parents also Danish-born, were used as the reference category for incidence rate ratio estimation. The place of origin classification that we applied was identical to that used previously (Cantor-Graae & Pedersen, 2007).

Covariate measurements

Socioeconomic indicators were obtained from the Integrated Database for Labour Market Research (IDA) (Danmarks Statistik, 1991). Parental income (quintiles for each year and gender), highest educational attainment level (primary school, high school / vocational training, higher education) and employment status (employed, unemployed, outside workforce for other reasons) were measured during middle childhood, in the year of cohort members' 10th birthdays. We stratified socioeconomic status using the following algorithm:

- 'Lower' - Both parents score low in at least one of the three domains: income = lowest quintile; highest education = primary school; employment status = outside the workforce.
- 'Higher' - Mother and father both employed and score high in at least one of the other two domains: income = highest quintile; education = higher education.
- 'Middle' - All other combinations.

Study design and statistical analyses

We implemented a cohort design in which each cohort member contributed varying amounts of person-time at risk to the denominator (Rothman & Greenland, 1998). Thus, provided they were alive and at risk for at least one day, all persons were included in the analyses. This design was advantageous in that it ensured that selection biases were entirely absent in the delineated cohort. Incidence rate ratios (IRRs) for adverse outcome were estimated by log-linear Poisson regression (SAS Institute Inc., 2008; Breslow & Day, 1987). All IRRs

were stratified by gender and adjusted for age group and calendar period as time-dependent variables (Clayton & Hills, 1993), whereas all other covariates were treated as being time-fixed. P-values and 95% confidence intervals (CIs) were calculated from likelihood ratio tests. Using competing risks survival analyses (Anderson, Borgan, Gill & Keilding, 1997), the cumulative incidences (absolute risks) of adverse outcome were calculated as the percentages of persons in the population experiencing the adverse outcome of interest before a given age, taking into account that people may emigrate or die (Anderson et al., 1997; Rosthøj, Andersen & Abildstrøm, 2004). These analyses were performed separately by gender and by parental region of origin. Cumulative incidence at the 40th birthday was also calculated for both outcomes. Finally, we estimated population attributable fractions (Rothman & Greenland, 1998), for all second generation immigrant groups combined, as the percentage of the total number of outcome cases in the whole population that would not have occurred if all persons had the same incidence rate as those in the reference group - in this study, native Danes.

Results

Attempted suicide

Table 1 presents IRRs and cumulative incidences for attempted suicide up to 40th birthday, and in Figure 1 (A & B) we show cumulative incidence plots from 10th birthday to age early '40s. Second generation male immigrants had significantly elevated risk of attempted suicide for all parental region of origin subgroups examined, except for Asia, the Middle East and all other regions of the world. In females risk was elevated in all immigrant categories except for all other regions. In both males and females there was a markedly elevated risk among those whose parents emigrated from Greenland. Almost 9% of these men and 12.5% of these women will have attempted suicide on reaching their 40th birthday. Female immigrants with origins in the Middle East or Asia also had sizeable elevations in risk. For each immigrant subgroup examined in relation to attempted suicide risk, both the IRR and the cumulative incidence at age 40 years were higher in females than in males.

Violent criminal offending

Table 2 presents IRRs and cumulative incidences for violent criminal offending up to 40th birthday and Figure 1 (C & D) shows cumulative incidence plots from 15th birthday to age early '40s. In males, all subgroups had elevated risk of perpetrating violent crime, and these IRRs varied from a modest level of elevation (all other regions of the world and other Scandinavian countries) to a marked increase (Middle East and Africa). Twenty percent and 22% of male immigrants with parents from Africa and the Middle East, respectively, will have been convicted for a violent crime on reaching their 40th birthday. In males, the three subgroups with the highest risk were those with origins in the Middle East, Africa, and Greenland (in that order); in the females, these three same subgroups were again the three highest risk subgroups, albeit with a different rank order: Greenland, Africa, and the Middle East. As was observed with the males, the female IRRs varied markedly across the subgroups, with a greater than fourfold increase in risk observed in women whose parents emigrated from Greenland.

Direct comparison of gender-specific IRRs for attempted suicide vs. violent offending

The two adverse outcomes are presented as gender-specific estimates separately in Tables 1 and 2, making it challenging to compare these estimates directly for the same place of origin subgroup. Thus, Figure 2 plots the IRRs for the two adverse outcomes directly alongside one another for males and females separately. In males, much greater elevations in violent offending risk than attempted suicide risk were observed among those of Middle Eastern origin compared to native Danes, and also those whose parents came from Africa and elsewhere in Europe. In men originating from Greenland, both outcomes were at similarly elevated risk and in men with Asian origin a marked increase in risk was seen only for violent offending. In women, greater elevations in risk for violent offending than attempted suicide were seen in immigrants with origins in Africa, Greenland and the Middle East. For women whose parents came from elsewhere in Europe, relative risk of violent offending was only slightly greater than it was for attempted suicide, and for females of Asian origin the elevation in risk of attempted suicide was greater than it was for violent criminality.

IRRs adjusted for socioeconomic indices

IRRs for attempted suicide and violent offending, with and without additional adjustment for socioeconomic status, are presented in Table 3. In males, significant elevations in risk of attempted suicide persisted after adjustment, for those with origins in Greenland and other Scandinavian countries. For males with origins in Asia and the Middle East, having accounted for socioeconomic status, attempted suicide risk was significantly lower than in native Danes. These apparent protective effects were quite strong. In females, independently raised risk of attempted suicide was observed in those with origins in Greenland, other Scandinavian countries, and elsewhere in Europe. In women with parents born in the Middle East, attempted suicide risk adjusted for socioeconomic status was lower than among native Danish women, as was also the case among males in this subgroup.

For violent offending, risk was significantly elevated in all male immigrant subgroups examined, and remained so with adjustment for socioeconomic status. The large elevations in risk that were observed in some male subgroups were, however, substantially attenuated after these confounders were accounted for. Thus, more than a third of the elevations in risk in males of Middle Eastern and African origin, 36.3% and 33.8% respectively, were explained by socioeconomic differences between these groups and native Danish males. In women, violent offending risk remained raised in those with parental origins in Greenland, Africa and elsewhere in Europe, after adjusting for socioeconomic status.

Population attributable fractions

For the association between second generation immigrant status and attempted suicide these estimates of population impact were 1.6% in males and 4.4% in females; in relation to violent offending they were 7.9% in males and 6.6% in females.

Discussion

Main findings

We observed marked heterogeneity in absolute and relative risks of attempted suicide and violent criminal offending, by parental place of birth and by gender, in the national cohort of second generation Danish immigrants. For most subgroups examined, risk was elevated for both outcomes in males and females. As expected, female immigrants generally had greater elevations in attempted suicide risk (vs. native Danish females) than male immigrants (vs. native Danish males) and *vice versa* with risk of violent offending. For attempted suicide, especially high cumulative incidence and incidence rate ratio values were observed for male and female immigrants with parents born in Greenland; for violent offending, absolute and relative risks were particularly raised for males and females with origins in the Middle East, Greenland and Africa. For these three subgroups, the cumulative incidence values for violent criminal conviction before reaching age 40 years in male immigrants were in the range 17-22% compared with 7% in native Danish males. Adjustment for socioeconomic status accounted for some of the elevated risks observed. In these multiple regression models, males and females of Middle Eastern descent, and also males whose parents emigrated from Asia, had a significantly lower attempted suicide risk versus native Danish males. Although large incidence rate ratios and cumulative incidence were observed in specific second generation immigrant subgroups, the population impact of these associations, as indicated by the population attributable fraction estimates, was low for both outcomes.

Comparison with existing literature and interpretation

Given the considerable diversity in parental place of origin that we hereby report (i.e. all second generation immigrants residing in Denmark), we have restricted comparison with existing literature to that concerning immigrants from Greenland, the Middle East and Africa, because these were the three populations with the greatest risk elevations for both of the adverse outcomes examined. Although this discussion is far from being comprehensive, a more detailed review is beyond the scope of this paper.

The most consistently observed pattern of markedly elevated risk for both adverse outcomes, in females and males, was among individuals whose parents had emigrated from Greenland. The published literature on the mental health status of the Greenlandic population in recent times has reported some alarming findings. National average alcohol consumption in Greenland rose from a very low baseline in the 1950s to a dangerously high level in the 1980s of roughly double the average consumption in the national Danish population (Aage, 2012). Higher total alcohol consumption, and more frequent hazardous excess drinking, has also been reported in a comparative sample of Inuit Greenlandic immigrants living in Denmark versus those residing in their native country (Madsen, Gronbaek, Bjerregaard, Becker & Greenland Population Study, 2005). Suicide rates also rose sharply in Greenland to a peak of 400-500 per 100,000 in men and 100-150 per 100,000 in women by the mid-2000s (Bjerregaard & Lynge, 2006). Furthermore, particularly violent suicide methods such as self-hanging and self-shooting have been unusually common in Greenland, with suicidal ideation more often reported in young people experiencing familial alcohol problems and violence (Bjerregaard & Lynge, 2006). A random two-phase sample from the

primary care registered populations of two towns in Greenland indicated a prevalence of at least one psychiatric diagnosis of almost 50%, as identified via the SCAN (Schedules for Clinical Assessment in Neuropsychiatry) Present Examination psychiatric interview (Lyng, Munk-Jorgensen, Pedersen, Mulvad & Bjerregaard, 2004). Violence has also been shown to occur more often in the general population of Greenland versus that of Denmark, with Greenlandic women reporting experiencing violent assaults or threats almost as commonly as Greenlandic men (Sundaram, Curtis, Helweg-Larsen & Bjerregaard, 2004). Finally, in a study of mortality among alcohol dependent patients in Copenhagen, the median age at death among immigrants from Greenland was 33 years versus 52 years for native Danes, and around two thirds of Greenlanders died violently (Lykke, 1989). Taking all of this evidence into consideration, it is perhaps unsurprising that we found such large elevations in risks of attempted suicide and violence in male and female offspring of emigrants from Greenland to Denmark. It seems plausible that an unusually raised proportion of second generation Danish immigrants of Greenlandic background grow up exposed to familial alcohol misuse, mental illness, suicidality and violence.

The mechanisms that might explain heightened risk of violent offending in second generation males originating from the Middle East and Africa are not so obvious, because we have no published evidence to draw on for these particular associations in Denmark and the other Nordic countries. Researchers in Germany have reported Turkish and Russian immigrant youths as being more frequently violent than their native German peers, and have attributed this to 'social disintegration' and 'special cultural orientations' rather than to socioeconomic status (Baier & Pfeffer, 2008). The specific factors they implicated as driving higher violence risk among these immigrant males included increased likelihood compared to native Germans of experiencing serious violence at home, watching or playing violent media genres to affirm violence-legitimising norms of masculinity, and seeking out and developing friendships with delinquent peers. Acculturative dissonance has been proposed as the mechanism that explains elevated violence risk among second generation Asian immigrants in the United States (Le & Stockdale, 2008). Thus, intergenerational conflict occurs when immigrant parents and their children experience acculturation differentially, pushing disaffected youths to seek support from delinquent peers and gangs. Maladaptive responses to acculturative dissonance have also been reported in relation to raised suicidality risk among second generation immigrant female high school students in France (van Leeuwen et al., 2010). These sociological interpretations may not explain why we observed such particularly elevated risk of violent offending in second generation immigrants whose parents migrated to Denmark specifically from the Middle East and Africa. Across Western Europe, second generation immigrants originating from less-developed world regions are reported to be disadvantaged in terms of access to education and the labour market and subsequently their occupational attainment (Heath et al., 2008). In Sweden, non-European (but not European) second generation immigrants reportedly have higher rates of psychological distress than native Swedes (Kosidou et al., 2012).

The characteristics of the neighbourhoods in which Middle Eastern and African immigrant groups reside in Denmark may also be a key determinant (Haynie, Silver & Teasdale, 2006). For the first time in modern times, distinct ghettos have developed in recent years in Danish urban centres. In his opening address to the Folketing (the Danish Parliament) on 5th

October 2010 (Statsministeriat, 2010), Prime Minister Lars Løkke Rasmussen identified 29 ghetto areas across the country. These neighbourhoods are sharply delineated by low income, unemployment, poor housing, social exclusion, antisocial behaviour and crime, as well as having a disproportionately high number of non-white immigrant residents (Johansen, 2011; Jensen & Christensen, 2012). Thus, territorial marginalisation of young male immigrants in deprived enclaves provides an ideal breeding ground for violent criminal gangs. Being more likely to have violence inflicted upon them by other people in antagonistic discriminatory environments (Colorado-Yohar et al., 2012) may also influence some immigrant victims to subsequently perpetrate violence as a protective mechanism or a retaliatory reaction. Finally, young male immigrants, particularly those of Middle Eastern or African descent who are clearly identifiable as non-natives due to their skin colour and appearance, may be more likely to have their crimes detected and be apprehended for them (Holmberg & Kyvsgaard, 2003). They may attract disproportionately close attention from police officers, a phenomenon that has been evidenced in the UK by the Scarman and Lawrence inquiries into 'Stop & Search' policing tactics directed towards young men of African-Caribbean heritage (Bowling & Phillips, 2007). Researchers in the Netherlands have reported that admission to a juvenile correctional institution has been more frequently recommended for ethnic minority versus native Dutch youths (Vinkers & Duits, 2011). These authors speculated as to whether or not their finding reflected "... a false stereotype of ethnic minority populations as being more dangerous and threatening." (p.131).

In the light of our findings, it is important to consider the provision of mental health services in Denmark for immigrant populations. Firstly, it is noteworthy that all types of immigrants in Denmark, including those of second generation status, have elevated risk of mental illness (Cantor-Graae & Pedersen, 2013). The literature also highlights some examples of the Danish healthcare system responding proactively to the needs of immigrants, and specifically the complex needs of newly arrived refugees and asylum seekers. For example, in 1984 the world's first rehabilitation centre for people traumatised by torture opened in Copenhagen (Jensen, Norredam, Priebe & Krasnik, 2013). On a less positive note, a register-based retrospective cohort study of all refugees (n=29,174) and immigrants (n=33,287) who received residence permission in Denmark during 1993-1999 reported that coercive measures in mental health services were more likely to be experienced by these migrants than by native Danes (Norredam, Garcia-Lopez, Keiding & Krasnik, 2010). These coercive measures included compulsory detention, coerced treatment and use of physical force during psychiatric hospitalisation. Also, a smaller cohort study of n=132 immigrants from non-Western countries reported a lower likelihood of these individuals receiving recommended antidepressant treatment following inpatient treatment for depression (Wallach-Kildemoes, Thomsen, Kriegbaum, Petersen & Norredam, 2014). We found no published studies reporting on mental health service provision specifically for second generation immigrants in Denmark, but the examples we have cited here are relevant nonetheless, because they pertain to the psychiatric care provided to the parents of our study's cohort members.

Strengths and limitations

As with numerous Danish register-based investigations, our national study was strengthened by having virtually complete linkage between nationwide population-based registers, by

being able to account comprehensively for death or emigration during follow-up, and by its abundant statistical power and precision for examining relatively rare nonfatal adverse events. Our study had some specific strengths including complete country of birth classification for the parents of all cohort members. High agreement between genotypic profile and foreign country of birth as recorded in the Danish registers has been documented (Pedersen et al., 2012), which points toward the validity of the country of birth information. The registers enabled full ascertainment of secondary care episodes of attempted suicide and all convictions for violent crimes. The major limitation of our study was its lack of statistical power for examining risk of dying by suicide due to small event counts having stratified on parental place of birth and gender. A further limitation is that our findings may not be entirely generalisable to certain countries in Western Europe; for example, to much larger nations such as the UK and France, which have experienced mass immigration over many years from their former overseas colonial territories (Heath et al., 2008).

Conclusion

These findings evidence the need for enhancing cultural competency across mental health and criminal justice system agencies (Hernandez, Nesman, Acevedo-Polakovich & Callejas, 2009; Kapoor, Dike, Burns, Carvalho & Griffith, 2013), and for improving accessibility of services for marginalised minority populations (Koopmans, Uiters, Deville & Foets, 2013). The elevated risks observed were partially explained by familial socioeconomic confounding. Further research is required to quantify the additional contribution of neighbourhood environmental influences, particularly concerning the recent ghettoisation of non-European immigrant populations in Denmark and other Scandinavian countries. Western European nations need to develop tailored preventive programmes for specific second generation immigrant populations living in their multi-cultural urban areas by adopting an integrated approach to tackling both forms of self-destructive and harmful behaviour.

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Figure 1 A-D. Cumulative incidence plots - A: Attempted suicide in males; B: Attempted suicide in females; C: Violent offending in males; D: Violent offending in females

Figure 2 a & b. Comparison of sex-specific incidence rate ratios for attempted suicide (AS) vs. violent offending (VO) - a) Males; b) Females

Table 1
Sex-specific incidence rate ratios and cumulative incidences at 40th birthday: attempted suicide among 2nd generation immigrants by parental place of origin vs. native Danes

Immigrants' region of origin by gender	Events (n)	Incidence / 10k person yrs.	Incidence rate ratio ^a (95% CI)	Cumulative incidence (95% CI)
<i>Males:</i>				
Native Danes	16,901	12.3	(ref.)	3.5% (3.4-3.6)
Scandinavia	375	15.1	(1.12-1.38)	4.0% (3.5-4.5)
Elsewhere in Europe	752	13.9	(1.06-1.24)	4.0% (3.6-4.3)
Greenland	164	31.2	(2.17-2.98)	8.6% (7.2-10.2)
Middle East	115	12.5	(0.98-1.44)	3.4% (2.5-4.4)
Asia	157	10.4	(0.73-1.01)	2.4% (2.0-2.9)
Africa	129	15.2	(1.14-1.62)	4.6% (3.7-5.6)
All other regions	92	11.9	(0.76-1.16)	3.4% (2.5-4.5)
<i>Females:</i>				
Native Danes	22,857	17.9	(ref.)	4.3% (4.2-4.3)
Scandinavia	535	23.2	(1.16-1.38)	5.3% (4.8-5.9)
Elsewhere in Europe	1471	29.2	(1.41-1.58)	6.3% (6.0-6.7)
Greenland	259	56.3	(2.39-3.09)	12.5% (10.7-14.4)
Middle East	342	39.3	(1.53-1.91)	7.0% (5.8-8.4)
Asia	474	33.8	(1.48-1.78)	7.3% (6.5-8.2)
Africa	226	28.3	(1.23-1.60)	6.0% (5.1-6.9)
All other regions	160	21.8	(0.89-1.23)	4.4% (3.5-5.4)

^aIncidence rate ratio adjusted for age and calendar year period. Further adjustment for secondary care treated parental mental illness had only a minor impact on the observed strengths of association

Table 2
Sex-specific incidence rate ratios and cumulative incidences at 40th birthday: violent criminality among 2nd generation immigrants by parental place of origin vs. native Danes

Immigrants' region of origin by gender	Events (n)	Incidence / 10k person yrs.	Incidence rate ratio ^a (95% CI)	Cumulative incidence (95% CI)
<i>Males:</i>				
Native Danes	36,737	41.8	(ref.)	7.3% (7.2-7.4)
Scandinavia	809	52.4	(1.13-1.30)	8.5% (7.9-9.2)
Elsewhere in Europe	2958	98.2	(2.06-2.23)	13.8% (13.2-14.4)
Greenland	311	104.4	(1.94-2.44)	16.7% (14.1-19.5)
Middle East	806	239.4	(4.00-4.61)	22.3% (20.3-24.4)
Asia	746	98.7	(1.85-2.14)	12.8% (11.4-14.2)
Africa	688	174.6	(3.26-3.80)	19.8% (18.3-21.4)
All other regions	240	56.7	(1.02-1.32)	8.6% (7.3-10.0)
<i>Females:</i>				
Native Danes	4179	5.0	(ref.)	0.9% (0.9-0.9)
Scandinavia	92	6.2	(0.97-1.47)	1.2% (0.8-1.8)
Elsewhere in Europe	318	10.7	(1.62-2.05)	1.5% (1.3-1.7)
Greenland	69	25.1	(3.20-5.20)	3.9% (3.0-5.0)
Middle East	74	21.0	(2.04-3.24)	2.2% (1.5-3.0)
Asia	60	8.0	(0.94-1.58)	1.1% (0.7-1.6)
Africa	75	18.1	(2.26-3.58)	3.1% (2.1-4.4)
All other regions	31	7.5	(0.83-1.69)	1.3% (0.7-2.2)

^aIncidence rate ratio adjusted for age and calendar year period. Further adjustment for secondary care treated parental mental illness had only a minor impact on the observed strengths of association

Table 3
Sex-specific incidence rate ratios for attempted suicide and violent with and without adjustment for socioeconomic factors

Region of origin by gender	a. Attempted suicide:			b. Violent offending:		
	IRR ¹	(95% CI)	IRR ²	(95% CI)	IRR ¹	(95% CI)
<i>Males:</i>						
Native Danes	1.00	(ref.)	1.00	(ref.)	1.00	(ref.)
Other Scandinavian country	1.25	(1.12-1.38)	1.19	(1.04-1.35)	1.22	(1.13-1.30)
Elsewhere in Europe	1.15	(1.06-1.24)	0.92	(0.83-1.02)	2.15	(2.06-2.23)
Greenland	2.56	(2.17-2.98)	1.85	(1.46-2.29)	2.18	(1.94-2.44)
Middle East	1.19	(0.98-1.44)	0.70	(0.55-0.89)	4.30	(4.00-4.61)
Asia	0.86	(0.73-1.01)	0.64	(0.51-0.80)	1.99	(1.85-2.14)
Africa	1.37	(1.14-1.62)	0.89	(0.67-1.15)	3.52	(3.26-3.80)
All other regions of the world	0.95	(0.76-1.16)	0.98	(0.74-1.27)	1.16	(1.02-1.32)
Total: all 2 nd generation immigrants	1.20	(1.14-1.26)	0.96	(0.90-1.03)	2.08	(2.02-2.13)
<i>Females:</i>						
Native Danes	1.00	(ref.)	1.00	(ref.)	1.00	(ref.)
Other Scandinavian country	1.27	(1.16-1.38)	1.29	(1.16-1.42)	1.20	(0.97-1.47)
Elsewhere in Europe	1.49	(1.41-1.58)	1.12	(1.03-1.20)	1.83	(1.62-2.05)
Greenland	2.73	(2.39-3.09)	1.89	(1.57-2.26)	4.12	(3.20-5.20)
Middle East	1.71	(1.53-1.91)	0.86	(0.74-1.00)	2.59	(2.04-3.24)
Asia	1.62	(1.48-1.78)	1.10	(0.96-1.25)	1.23	(0.94-1.58)
Africa	1.41	(1.23-1.60)	0.98	(0.81-1.17)	2.87	(2.26-3.58)
All other regions of the world	1.05	(0.89-1.23)	1.03	(0.84-1.26)	1.21	(0.83-1.69)
Total: all 2 nd generation immigrants	1.50	(1.44-1.56)	1.13	(1.08-1.19)	1.81	(1.67-1.96)

IRR¹ Incidence rate ratio adjusted for age and calendar year period

IRR² Incidence rate ratio adjusted for age and calendar year period and additionally adjusted for socioeconomic factors

(Note: In this table only, statistically significant IRRs are highlighted using bold text)