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Homicide drop in seven European countries: General or specific across countries and crime types?

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Abstract

This study examines homicide trends in seven European countries – Denmark, Estonia, Finland, the Netherlands, Scotland, Sweden and Switzerland – all of which manifested a substantial drop in homicide mortality between 1990 and 2016. By using data from the European Homicide Monitor, a coding scheme created to enable cross-country comparisons, combined with the national cause-of-death statistics, we explore generality versus specificity of the homicide drop. We examine changes in the demographic structure of victims and offenders and disaggregate homicides by different subtypes of lethal incidents, such as family-related homicides referring to conflicts between family members, and criminal milieu homicides occurring in the context of robberies, gang-related conflicts or organised crime. Results point to the generality of the drop: in most of the countries studied, the declining trend included all homicide types. The overall decline in homicide mortality was driven mostly by the decline in male victimisation and offending. In most of the countries, the gender distribution of victims and offenders changed only slightly during the study period, whereas the development of the distribution of homicide types manifested greater diversity. Our findings illustrate the benefits of disaggregated analyses in comparative homicide research.

Introduction

From the 1990s until the late 2010s, most European countries experienced a substantial decline in homicide mortality (Aebi and Linde, 2014; Eisner, 2008; LaFree et al., 2015; Lappi-Seppälä and Lehti, 2014, 2016). Regardless of the rich body of research describing this homicide drop, we know little about the *generality* of the drop: it is not clear whether the drop was driven by specific types of lethal violence, such as homicides against young males or homicides occurring in the criminal milieu, and whether some subtypes of lethal violence demonstrated opposing patterns. Disaggregating overall homicide mortality into smaller categories is essential for understanding the nature of lethal violence for at least two reasons. First, aggregated trends can often hide opposite trends of other subtypes of lethal violence (for example, Blumstein, 2005; Blumstein et al., 2000; Ganpat et al., 2020; Messner and Savolainen, 2001; Miles and Buehler, 2022; Lehti, 2014; Skott, 2019; Wolfgang, 1958). Second, correlates and causes of homicides are likely to

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depend on the type of homicide and different types of homicide are likely to benefit from different prevention strategies (Flewelling and Williams, 1999; Blumstein et al., 2000).

The generality and specificity of changes in homicide rates were also of interest to Veli Verkko, a Finnish criminologist of the early 20th century, who suggested that when the overall homicide rate is decreasing, the change is driven by the decrease in male offending and victimisation (Verkko, 1951; see also Kivivuori, 2017). Verkko explained this regularity – also known as Verkko's dynamic law – by referring to the differences between the everyday contexts and routines of men's and women's lives, as he pointed out: 'The fact that the woman lives in a somewhat different and more peaceful atmosphere than the man, and that the factors influencing her [life] are not nearly so subject to changes as those affecting a man' (Verkko, 1951: 54). A decade later, McClintock (1963) analysed homicidal crime in London and found that compared to male homicide mortality, changes in female homicide mortality were slower and more moderate. More recently, Spierenburg (2012) has emphasised the role of men in the variation of homicide rates in Europe since the middle ages. Similarly, Eisner (2008, 2014) has argued that the fluctuation of homicide rates has primarily resulted from the changing levels of physical aggression between young men in public places. Aebi and Linde (2014: 568), on the other hand, argue that the changes in the aggression of young men in public places cannot explain the homicide drop in the1990s, but the explanation of homicide trends should cover both genders and all age groups.

In general, researchers agree on the *existence* of the drop but disagree on the explanations for it. Tonry (2014) and Farrell et al. (2014) link homicide drop to the general crime drop, whereas Aebi and Linde (2014) question the decline of non-lethal violence. Instead, they hypothesise that improvements in health care services should lead to improved chances of surviving violence and to divergent evolution of non-lethal violence and homicide (see also Linde 2018). Moreover, they explain the homicide drop by changes in lifestyle, such as the development of the Internet and increased time spent at home. Changes in lifestyle and routine activities (Cohen and Felson 1979) are also key elements of the security hypothesis by Farrell et al. (2011). According to this approach, the improved security has led to a reduction in crime opportunity, and therefore a decline in theft and violence, including homicide. More recently, Rennó Santos et al. (2019) have underlined the role of decreasing youth populations for declining homicide. We argue that before knowing *why* homicide rates fell, we should examine *what kind of* homicide decreased.

In this descriptive study, we explore the generality versus specificity of the homicide drop in seven European countries by examining how the drop was distributed among victims and offenders in gender and age groups, and among different subtypes of homicides, such as homicide occurring between family members or in the criminal milieu. In other words, we ask whether the drop was observed equally in all demographic groups and homicide types, and whether it continued in the 2010s. Prior internationally comparative homicide research has been hampered by the lack of detailed and standardised empirical data (Liem and Pridemore, 2014). A positive development in this regard has been the creation and dissemination of the European Homicide Monitor (EHM) concept which provides a standardised manual for homicide data processing. In this study, we use the data that were collected and standardised using the classifications of the EHM manual,

or in a manner consistent with the manual. Our data cover Denmark, Estonia, Finland, the Netherlands, Scotland, Sweden and Switzerland, and extend to three decades between 1990 and 2016. Further, by analysing a unique combination of detailed homicide datasets, our study contributes to criminological theory building by shifting the conversation from overall homicide trends to a focus on the contexts and participants of lethal incidents.

Prior research on European homicide rates

In most European countries, homicide mortality increased from the mid-1960s to the late 1980s or the early 1990s and started to decrease since then (Aebi and Linde, 2014; Lappi-Seppälä and Lehti, 2014, 2016). Lappi-Seppälä and Lehti (2014) analysed cause-of-death (COD) statistics from six continents from 1950 to 2010. They reported that in Europe, homicide rates increased an average of 136% from 1960 to 1990, and the rise took place in most European countries. Between 1990 and 2010, homicide rates decreased on average by 37%, and again, this drop occurred in the great majority of European countries. The decline was particularly found in Western Europe (Aebi and Linde, 2014; Lappi-Seppälä and Lehti, 2014, 2016).

Prior to our comparative approach, separate studies have analysed the homicide drop in the seven European countries included in our study. In Estonia, the peak in homicide victimisation in 1990s was most prevalent among males in the 20–49 years age range, partly because of the increase in homicides in the criminal milieu (Salla et al., 2012), a development largely explained by the collapse of the Soviet Union and social unrest (Lappi-Seppälä and Lehti, 2014; Salla et al., 2012; Statamael, 2012). In Finland, the decline in the number of homicides between 1996 and 2012 was driven mostly by a decrease in alcohol-related offending by working-aged men while lethal offending by women increased slightly (Lehti, 2014). Homicide mortality declined in all male groups and among middle-aged women, while the mortality of younger women increased. In the Netherlands, lethal violence declined in all subtypes of homicide between the years 1992 and 2009, and the order of magnitude of the subtypes stayed the same (Ganpat and Liem, 2012). Recent study reported the greatest decline of homicides resulting from disputes and robberies, and intimate partner homicides (Aarten and Liem, 2021). Similarly, in Sweden, the distribution of homicide types remained stable when two datasets from 1990–1996 and 2002–2008 were compared (Granath, 2012), although Sturup and Granath (2015) found the drop to be particularly steep in child homicides. A Danish study analysing homicides between 1992 and 2016 reported that compared to a study on the period from 1946 to 1970, the most pronounced change was the substantial reduction in family-related homicides committed by female offenders (Thomsen et al., 2019). A Scottish study disaggregating the homicide drop between 2000 and 2015 into homicide subtypes reported the largest decrease in feud-motivated homicides between young males in public places and an increase in the relative share of domestic homicides (Skott, 2019). In Switzerland, a drop in all types of homicide was observed, except for the killing of family members other than intimate partners. However, the decline was stronger for homicides in the criminal milieu and

dispute-related homicides, and the relative share of intimate partner and family homicides thus increased considerably over time (Walser et al., 2022).

To summarise, between the 1990s and the 2010s, overall homicide rates declined substantially throughout Europe, but the precise composition of the drop is far from clear. The previous disaggregated analyses have differed in their data sources, typology of homicides and the periods examined, and international comparisons have been missing. Our aim with this study is to fill this gap in the literature and explore the generality versus specificity of the drop by using standardised data. First, we examine the changes in overall homicide mortality[1] between 1990 and 2016 for both genders and different age groups. Second, we examine changes in the demographic structure of the offenders. Third, we disaggregate the drop to distinct homicide subtypes, such as family-related and criminal milieu homicides.

Current study

Research context

The seven countries selected for this study are small European OECD-member countries with relatively low-income inequality. However, there are also significant differences between them. One reason concerns immigration: Finland has a much smaller immigrant population than all the other countries. Earlier European research has found individuals with a migration background to be overrepresented among violent offenders (for example, Skardhamar et al., 2014). Another difference relates to firearm ownership, which also has sometimes been found to correlate with homicide levels (Hemenway and Miller, 2000; Hepburn and Hemenway, 2004; UNODC, 2019).

According to a survey by Eurobarometer (2013), the proportion of citizens owning a firearm was higher in Finland (13%), Sweden (8%) and Denmark (7%), than in Estonia (5%) and in the Netherlands (4%).[2] According to the same survey, the types of firearms and their main usage differed. In Finland, Sweden and Denmark, firearms were used mainly for hunting or sport and very rarely for personal protection, whereas in Estonia, personal protection was one of the main reasons for gun ownership (Eurobarometer, 2013). Switzerland, on the other hand, has one of the highest firearm ownerships in Europe (approximately 28% of households own at least one firearm) and the firearms are often military weapons, since the militia system requires soldiers to store their army weapons at home (Markwalder and Killias, 2012).

In a worldwide comparison, homicide levels of all the countries included in the study are below the global average, as European homicide rates are among the lowest in the world (Marshall and Summers, 2010; UNODC, 2019). Yet, on closer inspection, the prevalence of homicidal crime substantially differs between the countries. Between 2014 and 2016,[3] Switzerland and the Netherlands had the lowest homicide levels (0.6 per 100,000 population), while the rates for Denmark, Sweden and Scotland (0.9) were 50% higher, and that of Finland (1.3) more than 100% higher. The rate in Estonia (2.9) was 2.3-fold the Finnish rate. This difference is not a new phenomenon: since the 19th century, there has been a clear distinction between the homicide levels in western and eastern European countries, but Finland has been something of a

puzzle by displaying higher homicide levels than its western counterparts (Kivivuori and Lehti, 2011; Lehti and Kivivuori, 2005).

Data and methods

So far, cross-national homicide research has typically used model-based estimates for dealing with the problems of underreporting and other inaccuracies, and this procedure can lead to substantial biases (Kanis et al., 2017). Further, countries differ in terms of their legal definitions of lethal violence, and detailed national datasets contain different information about the events and often use different definitions and classifications (Liem and Pridemore, 2014). For instance, the relationship between the victim and offender is rarely available, and even when it is, definitions may differ (Stöckl et al., 2013). To overcome these limitations, we apply the EHM framework, which was constructed to enable comparisons and analyses among European countries.

The EHM contains information on the homicide event, victim and – considering cleared homicides – the offender. Our seven national total samples have applied the classification scheme from the EHM, and in this study, therefore, we refer to their data as the EHM data. Prior international comparisons using EHM have included Finland, the Netherlands and Sweden (Granath et al. 2011; European Monitoring Centre for Drugs and Drug Addiction 2019; Liem et al. 2013), and Finland, the Netherlands, Sweden and Switzerland (Liem et al. 2019) and focused on differences in homicide characteristics or homicide clearance. In this study, Denmark, Estonia and Scotland have also been included. Although the main reason for selecting these seven countries is the availability of data, the fact that countries belong to both high and low homicide mortality countries in the European context adds to the utility of the comparison. Regardless of adopting the EHM scheme, the national data collecting practices differ somewhat between the countries – detailed information on data sources and institutions maintaining the data of each country is provided in Appendix 1. The EHM data have been available for 1990–2016 in Sweden, 1990–2015 in Scotland, 1990–2014 in Switzerland and 1992–2016 in Denmark and the Netherlands, whereas the data covered shorter periods for Finland (1996, 1998–2000 and 2003–2016) and Estonia (1994–1996 and 2007–2010).

The EHM defines homicide as an intentional criminal act of violence, which results in the death of one or more individuals. In all the countries in the study, the definition covers the legal codes of murder, manslaughter and infanticide. Attempted homicide, involuntary manslaughter, suicide, abortion, euthanasia and assistance with suicide are not included. In addition, cases of intentional but legally justified (by court decision) killings are excluded from the EHM data except in Switzerland and Denmark, where killings with legitimate self-defence by civilians are included. Yet, these are uncommon in both countries and their inclusion has not compromised the comparability of the data. Assaults leading to death are included as homicides in Denmark, Finland, Scotland and Sweden but not in the Netherlands, and Switzerland. In Estonia, the assaults leading to death have been included in our homicide data for the 1990s, when the annual proportion of these homicides ranged between 10 and 20% of all homicides, but not in the data for the 2000s.[4] In principle, the exclusion of assaults leading to death may have had an impact on the comparability of the Dutch, Swiss and Estonian data for the 2000s. Based on the comparison between the

number of the victims in the EHM data with the number of victims in COD statistics, the case loss caused by the exclusion has been 10 to 20% in these three countries (Statistics Estonia, 2021; Statistics Netherlands, 2021; WHO, 2021). However, we do not think that the loss has had any major effect on the results of our analyses nor on our conclusions concerning the Netherlands and Switzerland because, with the EHM data, we focus on the longitudinal structural changes within each country, not between the countries. Regarding Estonia, the changes in the inclusion of assaults leading to death may exaggerate the differences between 1990s and 2000s.

To ensure that the differences in the legal definitions (that is, the inclusion or exclusion of assaults leading to death and killings with legitimate self-defence) or data availability of the EHM have not impacted our results concerning aggregated homicide trends, we obtained *the overall homicide rates* from the national COD statistics (WHO, 2021) which are based on public health records, rather than on legal (criminal justice) definitions. In this group of countries, COD statistics have been compiled according to the same *ICD* classifications and standards during the research period (the comparison of COD statistics and criminal justice statistics, see Lappi-Seppälä and Lehti, 2014; Von Hofer and Lappi-Seppälä, 2014), and they were available for a longer period than the EHM data. The only exception has been Denmark, for which we used only the EHM data.[5]

The demographic structure of the victims was based on the detailed EHM data, except for Estonia and Finland, for which longer time series have been available in national COD statistics (Statistics Estonia, 2021; Statistics Finland, 2021). Victims have been divided into groups by gender and age: *(1) children (0–14 years), (2) youths/young adults (15–29 years), (3) working aged (30–64 years), (4) older population (64 < years), and (5) age unknown.* Also, information about *the demographic structure of the offenders* was from the EHM data. We used the same age groups as with the victims, but offenders aged younger than 15 years were excluded due to their rarity (1% at the most). Due to the small number of female offenders, we have analysed age group-related changes only for men. To obtain the population-level mortality and offending per 100,000 population in each age group, we used publicly available OECD population statistics for Estonia, Denmark, Finland, the Netherlands, Sweden and Switzerland (OECD, 2020), and the National Records of Scotland (2020) for Scotland.

We classified the social context in which the victim died into four *homicide types* based on the relationship between the offender and victim, and the context of the incident (see for example, Flewelling and Williams, 1999). *(1) Family-related homicides* refer to lethal incidents between current or former spouses, or other family members. Globally, most family-related homicides consist of intimate partner homicides against females (Stöckl et al., 2013), with other subtypes including homicides of children, parents, siblings and other family members. Also in this study, the intimate partner homicides accounted for most family-related homicides against women (66.0–77.5%) whereas considering males, the proportion of family-related homicides committed by intimate partner was smaller (30.7–48.1%) (see Appendix 2). *(2) Criminal milieu homicides* consist of cases occurring in a criminal context – for instance, organised crime, gangs, rip deals and narcotic affairs – and homicides committed in conjunction with robbery. *(3) Other context homicides* refer to homicides occurring outside family and criminal circles and

consist mostly of conflicts between friends and acquaintances. For instance, drunken brawls escalating to lethal incidents belong to this category if they do not include family members or occur in criminal milieu. The classification does not allow for multiple types of homicide: for instance, homicides between family members with criminal motives are always coded as family-related, rather than as criminal milieu homicides. *(4) Unknown homicides* refer to cases that have either not been solved or have not contained enough information to be classified. It is important to note that when incidents are classified as unknown, the numbers of at least one of the other three homicide types are bound to be underestimated.

The EHM data used for analysing the age and gender structure of the victims and the evolution of homicide types have been victim-based.[6] Regarding the gender and age of the offenders, we have used offender-based data when only the solved homicides have been included. Thus, if a large proportion of homicides have remained unsolved, the distribution of homicide types and the information regarding offenders are biased. Liem et al. (2019) analysed homicide clearance between 2009 and 2014 in four of the countries in the current study and concluded that clearance rates are higher in Switzerland (98%) and Finland (95%) than in Sweden (83%) and the Netherlands (77%). In Scotland, the clearance rate was 97% from 2005 to 2015 (Scottish Government, 2015). In Estonia, the average clearance rate during the first decade of the 2000s was 80%, and in the 1990s it had been considerably lower (Salla et al., 2012).[7] In general, criminal milieu homicides tend to be more difficult to solve than family-related homicides, and therefore, a substantial proportion of unsolved homicides is likely to lead an underestimation of the number of criminal milieu homicides.

To summarise the use of the data sources selected: For investigating the changes in *homicide subtypes* and *offenders*, we use the detailed EHM data; for tracking *overall homicide mortality*, we use national COD statistics that enable longer study periods and better between-country comparability; and for analysing the demographic structure of the victims, we use the combination of OECD population statistics and the EHM or COD statistics, depending on the country. This triangulation of data improves the reliability of the results. In the results sections, we first present the overall homicide mortality for both genders per 100,000 population, changes in the victim composition and then population-level homicide mortality disaggregated into four age groups. In what follows, we will examine the changes in the composition of offenders and subtypes of homicides. All figures were made by using Stata (StataCorp 2019).

Findings

Changes in the mortality and victim composition

Figure 1 displays annual homicide mortality separately for each country by gender. Homicide rates per 100,000 population are based on COD statistics and cover the years 1990–2016 (for Denmark, the homicide rate is based on the EHM and covers the years 1992–2016). Regardless of the fluctuation in homicide rates, both male and female mortality started to decline in the 1990s. In that regard, the homicide drop was general over the countries. However, in the 2010s, with the relatively low number of
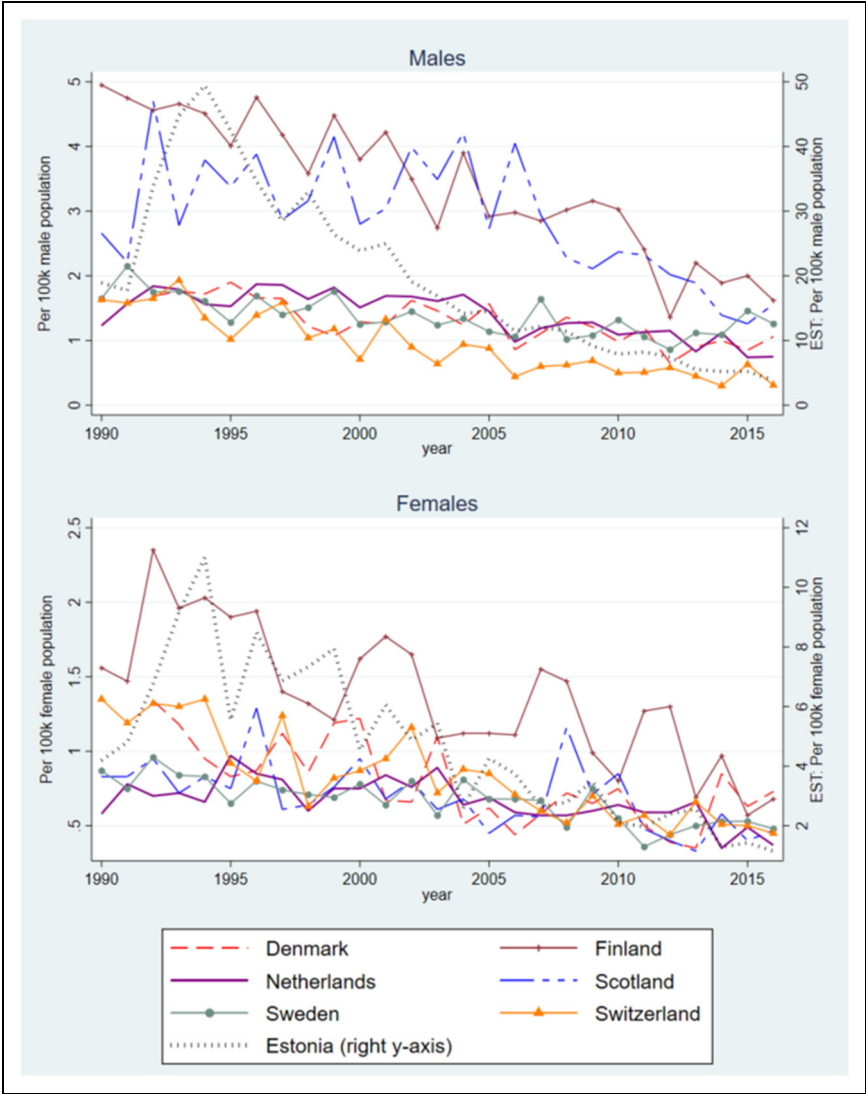
Figure 1. Homicide mortality per 100,000 male and female population from 1990 to 2016.
Note: The different y-axis for Estonia. (Data: COD statistics, EHM).

annual cases, it is difficult to distinguish a clear trend. The data seem to point to an increase in Swedish male mortality and to a lesser degree, in Danish male and female mortality during the last few years of the measurement period. Moreover, although the homicide mortality of males declined in absolute terms more than the mortality of females, male homicide mortality rate stayed higher than female homicide mortality rates in all countries except in Switzerland.

Table 1 displays the relative changes in both male and female mortality between the average homicide rates of 1990–99 and 2010–16. Male mortality manifested the greatest relative decline in Estonia (–81%) and the smallest in Sweden (–30%) whereas among females, the greatest relative decline occurred in Estonia (–74%) and the smallest in the Netherlands (–29%). In most of the countries, the relative drop in male mortality was greater than the decline in female mortality. In particular, this applies to the Netherlands and Switzerland. The opposite was observed in Sweden, where female homicide mortality dropped by 38% and male homicide mortality by 30%. To summarise, considering the timing and magnitude of the drop, we observed considerable consistency in the drop between countries and genders. The most important differences between countries related to the large proportion of female victims in Switzerland, and the increase in male homicide mortality in Sweden at the end of the studied period.

The changes in the gender and age composition of the victims are displayed in Table 2. During the whole study period, the typical homicide victim was a working-aged male in all countries except in Switzerland, where the largest victim groups were working-aged males in the 1990s but working-aged females in the 2010s. The relative proportion of the working-aged male victims was greatest in Estonia (55–61%) and Finland (51–52%). Sweden was the only country where the relative proportion of young male victims increased considerably during the study period (from 15% to 25%). In all countries except Switzerland, the changes regarding the gender distribution of the victims were modest. In the 2010s, the proportion of female victims was smallest in Scotland (23%) and Estonia (25%) and highest in Switzerland (54%) and Denmark (39%). Yet, it is important to note that these are relative proportions: a high relative proportion of female victims does not imply that Swiss or Danish women would have a greater risk of homicide than Finnish and Estonian women, for instance (see Table 1).

Since the age and gender distribution of the victims are impacted by the demographic structure of the population, we next examined how the number of homicide victims per 100,000 population varied. To avoid strong fluctuations and ease the interpretations, we present these time series as three-year moving averages (based on the three preceding years) per 100,000 population of each age group for both genders in Figure 2. At the end of the study period, the mortality of all demographic groups had either declined or remained low in most of the countries. The most dramatic drop took place among young (15–29 years) or working aged (30–64 years) male victims. In that regard, the drop was general. The only exception was Sweden where mortality of young males increased instead.

Appendix 3 displays the relative change in the average homicide mortality between 1990–99 and 2010–16. In both the absolute and relative terms, the most notable drop was observed in Estonia, where the number of male victims first peaked rapidly and then declined. Between the 1990s and the 2010s, the average annual homicide mortality of young men dropped by 91% and that of working-aged men by 79%. In most of the countries, the mortality of young men was either higher or almost equal with the mortality of working-aged males. Finland and Estonia were the only two countries where the mortality of working-aged men was higher than the mortality of young men during the entire study period, regardless of the substantial drop of mortality levels in both demographic groups. In Sweden, homicide mortality of young males started to increase in the 2000s

Table 1. Changes in the average annual male and female homicide rate per 100,000 individuals by countries (Data: COD statistics, EHM).

	Denmark[a]		Estonia		Finland		The Netherlands		Scotland		Sweden		Switzerland	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1990–99	1.58	1.04	32.96	7.21	4.44	1.71	1.67	0.74	3.36	0.82	1.66	0.78	1.44	1.09
2010–16	0.95	0.60	6.20	1.84	2.07	0.90	0.97	0.53	1.83	0.50	1.17	0.48	0.47	0.52
Decline (%)	−40.1%	−42.3%	−81.2%	−74.4%	−53.4%	−47.7%	−41.8%	−29.0%	−45.5%	−38.9%	−29.5%	−38.2%	−67.4%	−52.4%

[a] From 1992 onwards.

Table 2. The relative distribution of the victims (Data: EHM, COD statistics).

|		N	Male victims					Female victims					Females %
			0–14	15–29	30–64	65–	Unknown	0–14	15–29	30–64	65–	Unknown	
Denmark	1992–99	548	5.5%	15.3%	35.9%	2.9%	0.0%	5.7%	7.7%	22.4%	4.6%	0.0%	40.3%
	2000–9	543	5.0%	16.0%	38.5%	4.4%	0.0%	4.4%	7.0%	19.5%	5.2%	0.0%	36.1%
	2010–16	304	5.6%	16.1%	33.6%	5.6%	0.0%	4.6%	5.6%	22.7%	6.3%	0.0%	39.1%
Estonia	1990–99	2788	0.9%	19.3%	54.7%	3.7%	1.5%	0.9%	3.0%	11.9%	3.6%	0.3%	19.8%
	2000–9	1290	0.8%	11.3%	58.2%	6.2%	1.1%	0.5%	3.2%	13.3%	5.0%	0.5%	22.4%
	2010–16	355	0.0%	8.2%	61.1%	5.4%	0.0%	1.7%	3.1%	15.2%	5.4%	0.0%	25.4%
Finland	1990–99	1549	2.2%	13.1%	51.8%	4.0%	0.0%	2.0%	5.7%	18.5%	2.6%	0.0%	28.9%
	2000–9	1212	2.3%	12.0%	52.0%	3.9%	0.0%	2.1%	5.8%	17.8%	4.2%	0.0%	29.9%
	2010–16	563	1.2%	11.9%	50.6%	5.3%	0.0%	3.0%	5.2%	18.8%	3.9%	0.0%	30.9%
The Netherlands	1990–99	2059	2.6%	23.0%	39.3%	3.1%	2.5%	2.6%	10.1%	13.0%	3.2%	0.8%	29.5%
	2000–9	2030	3.7%	17.6%	41.6%	3.0%	2.2%	3.6%	8.3%	16.4%	2.7%	1.0%	31.9%
	2010–16	1014	4.4%	17.1%	38.8%	4.9%	1.3%	2.9%	7.0%	17.9%	5.2%	0.6%	33.5%
Scotland	1990–99	1081	4.1%	30.2%	41.2%	3.5%	0.0%	2.5%	5.4%	10.6%	2.5%	0.0%	21.0%
	2000–9	969	2.3%	27.0%	47.9%	2.9%	0.0%	2.4%	5.1%	10.2%	2.3%	0.0%	19.9%
	2010–16	395	4.3%	23.5%	46.3%	2.5%	0.0%	2.0%	4.6%	14.2%	2.5%	0.0%	23.3%
Sweden	1990–99	1078	3.1%	14.8%	32.2%	5.8%	10.8%	4.1%	6.4%	14.2%	3.7%	4.9%	33.3%
	2000–9	915	2.5%	16.1%	30.2%	5.1%	10.5%	2.5%	8.0%	16.1%	5.9%	3.2%	35.6%
	2010–16	608	2.1%	24.8%	33.9%	4.4%	4.4%	2.3%	6.6%	14.8%	6.3%	0.3%	30.3%
Switzerland	1990–99	699	4.7%	18.7%	34.0%	3.0%	0.7%	3.3%	11.3%	20.5%	3.4%	0.3%	38.8%
	2000–9	586	3.4%	13.7%	25.8%	5.1%	0.9%	4.3%	13.0%	24.7%	5.3%	3.9%	51.2%
	2010–16	201	2.5%	10.0%	26.9%	6.5%	0.5%	5.0%	6.5%	32.3%	10.0%	0.0%	53.7%
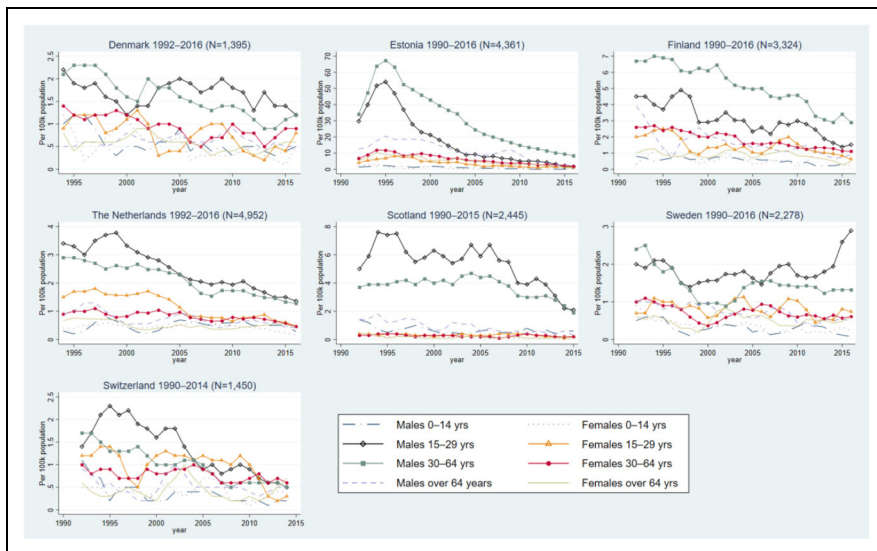
Figure 2. Age structure of the victims by countries from 1990 to 2016. Three-year moving averages. (Data: EHM, COD statistics).

and even exceeded the mortality level in the1990s in the last few years of the study period. The average homicide mortality of Swedish young men was 25% higher in the 2010s compared to the 1990s level.

Also, among women, a homicide drop took place mainly among young and working-aged women. In each country, the victimisation of these two groups declined. Homicide mortality of young women decreased more rapidly (in absolute terms) than of working-aged women in the Netherlands and Switzerland, and by a marginal difference in Scotland, whereas the drop among both groups was of similar size in Denmark and Sweden. In Estonia and Finland, the drop was greater among working-aged women, yet their homicide mortality stayed higher than that of younger women throughout the study period. In all the countries except Estonia, homicide mortality of children and the older population of both genders was rare and declining throughout the study period. In Estonia, these groups also had a high rate of homicide mortality in the 1990s, particularly the older male victims, but their mortality experienced a substantial drop in the 2000s.

In the 2010s, the population groups with the highest mortality per 100,000 population were the working-aged men in Estonia (10.3) and in Finland (3.2), and young men in Scotland (3.0), Sweden (2.3), the Netherlands (1.6) and Denmark (1.3). In Switzerland, working-aged women had the highest overall homicide mortality (0.7); the homicide mortality of both young and working-aged men was about 30% lower and equal to each other (0.5). In the 2010s, working-aged women experienced a higher homicide mortality rate than young women in Estonia (2.4), Finland (1.2) and Denmark (0.8), whereas homicide mortality rates of the two age groups were (almost)

equal to each other in the Netherlands (0.7 and 0.6), Sweden (both age groups 0.6) and Scotland (both age groups 0.2).

Changes in the offender composition

Next, we examined the changes in the demographic composition of the offenders. As described in the data and methods section, the information about the offenders came from the cleared homicides only and therefore underestimates the number of offenders. As shown in Table 3, the changes in the gender distribution of the offenders were modest. For instance, the female offenders accounted for between 8 and 15% of the total number of homicide offenders in the 1990s, and between 7 and 14% in the 2010s. In the 2010s, the proportion of female offenders was smallest in Switzerland (7%) and Sweden (9%) and highest in Scotland (14%) and Estonia (13%). Moreover, in most of the countries, the largest offender groups were working aged males in all three decades. In the 2010s, the proportion of homicides committed by working aged males was greatest in Switzerland (58%) and Finland (55%), and smallest in Scotland (43%).

In addition to the age and gender distribution of the offenders – which is impacted by the demographic structure of the population – we examined how the number of homicide offenders per 100,000 population varied (Table 3 rightmost bars). Due to the small number of all female and older male offenders, we focused only on male offenders of young age and working age. In each country, homicide offending was more common among young than working-aged men, and both groups reduced homicidal offending. Except in Finland and Sweden, the greatest absolute and relative drop (which ranged from −47% to −77%) in the number of offenders per 100,000 male population was observed among young men. In Finland, a greater absolute and relative (−43%) drop was observed among working aged men, whereas in Sweden – the only country in which the number of young male victims increased during the study period – the relative drop of the two male offender groups was almost identical (−32% vs. −33%).

Varying contexts of lethal violence

Lastly, we examined the contexts in which the victim died by disaggregating homicides into four subtypes. We again present the results as three-year moving averages but, due to the gaps in the time series, report the raw numbers (not averages) for Estonia and Finland. Regarding Scotland, we omitted the first 10 years from the analysis due to a large amount of missing information (ranging from 52% to 77%). As illustrated in Figure 3, we observed considerable variation in the annual number of homicide types. Yet, in most of the countries, all subtypes seemed to either decrease or remain uncommon. In this regard, the drop indicated generality. The only clear exception was again Sweden, where the number of male victims of criminal milieu homicide started to increase in the 2000s and exceeded the average level of the 1990s.

In all the countries except Switzerland, the most common homicide type was the other context homicide towards male victims referring to lethal incidents outside the criminal milieu or family and consisting mostly of conflicts between friends and acquaintances.

Table 3. The relative distribution of the offenders (left column) and the number of the offenders per 100,000 of population (right column) (Data: EHM).

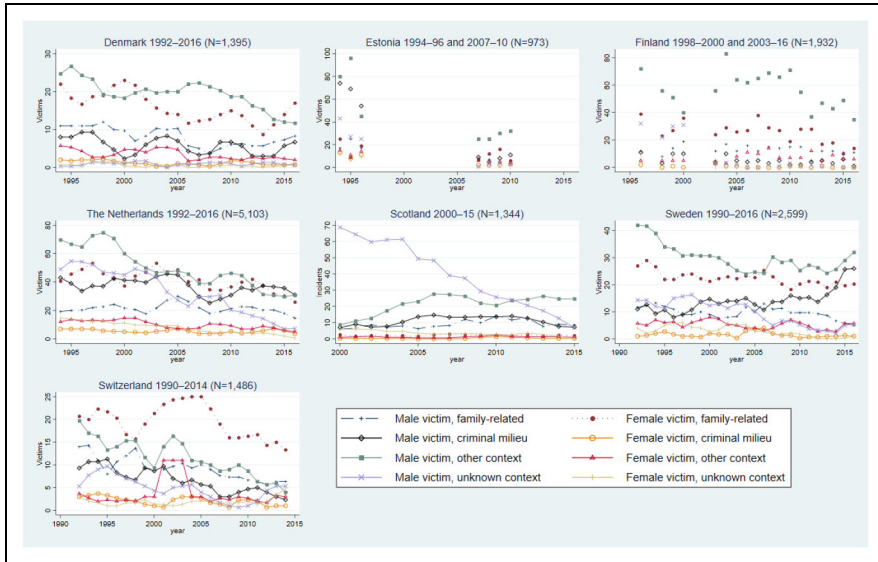|		N	Male offenders				Female offenders	Male offenders per 100k population	
			15–29	30–64	65–	Unknown	%	15–29	30–64
Denmark	1992–99	432	35.0%	48.1%	2.1%	0.0%	14.8%	3.38	2.11
	2000–9	387	29.7%	57.9%	3.9%	0.0%	8.5%	2.36	1.69
	2010–16	223	28.7%	52.5%	7.6%	0.0%	11.2%	1.71	1.28
	Change							−49.5%	−39.1%
Estonia	1994–96	667	30.7%	36.3%	1.3%	20.1%	11.5%	46.44	26.37
	2001–9	850	39.8%	48.4%	2.2%	0.0%	9.6%	24.81	15.35
	2010–16	325	30.5%	53.8%	2.5%	0.0%	13.2%	10.72	8.32
	Change							−76.9%	−68.5%
Finland	1996, 1998–99	422	28.2%	60.9%	2.6%	0.0%	8.3%	8.01	6.90
	2000, 2003–09	995	29.5%	55.3%	3.5%	0.0%	11.7%	7.29	5.42
	2010–16	638	30.1%	55.0%	3.1%	0.0%	11.8%	5.38	3.96
	Change							−32.9%	−42.6%
The Netherlands	1992–99	1976	45.2%	42.3%	0.6%	3.6%	8.4%	6.65	2.82
	2000–9	2414	42.1%	43.6%	0.7%	2.0%	11.6%	6.74	2.60
	2010–16	1069	36.3%	46.8%	1.9%	3.9%	11.1%	3.54	1.78
	Change							−46.7%	−37.0%
Scotland	1990–99	1473	59.6%	31.2%	0.5%	0.1%	8.6%	16.43	4.11
	2000–9	1383	54.4%	35.0%	0.9%	0.0%	9.8%	15.55	4.07
	2010–15	564	42.6%	42.6%	0.4%	0.7%	13.8%	7.73	3.28
	Change							−52.9%	−20.3%
Sweden	1990–99	867	38.5%	47.5%	2.9%	0.8%	10.3%	3.80	2.10
	2000–9	787	39.5%	47.6%	4.1%	1.0%	7.8%	3.63	1.76
	2010–16	457	37.6%	47.3%	2.4%	3.3%	9.4%	2.59	1.42
	Change							−31.8%	−32.6%
Switzerland	1990–99	608	36.8%	44.4%	3.0%	6.7%	9.0%	3.14	1.63
	2000–9	487	30.6%	51.5%	4.1%	2.5%	11.3%	2.20	1.36
	2010–14	185	24.9%	58.4%	8.6%	1.1%	7.0%	1.23	1.09
	Change							−60.7%	−33.4%

Figure 3. Homicide type by countries from 1990 to 2016. Three-year moving averages[9]. (Data: EHM).

This subtype manifested the greatest decline, and therefore, was the most important factor for the homicide drop in male victims. In Estonia, the decrease in homicides was also attributed to the decline of criminal milieu homicides of male victims: the number of this subtype was extremely high in 1994–96, when the overall homicide rate peaked and was substantially lower in 2007–10.

Family-related homicides against women were the second most common homicide type in Denmark, Finland, the Netherlands and Sweden, and the most common type in Switzerland. Indeed, Switzerland was the only country in which the overall female homicide mortality rate slightly exceeded the overall male rate in the 2010s. The number of family-related homicides against women fluctuated considerably, but in each country, the number of this subtype decreased during the study period. This decrease was the main factor for the drop in the overall number of female homicide victims.

In the last few years of the study period, the results indicated an increase in the number of criminal milieu and other context homicides involving men in Sweden and family-related homicides against women in Denmark. In Scotland and the Netherlands, large proportions of the homicides of men were classified as unknown, and in the 1990s, this was also true in Finland.

Finally, we examined whether the distribution of homicide types changed during the study period – in other words, the question of the most typical homicide of each country. Table 4 displays the relative distributions of different homicide types in the 1990s, the 2000s and the 2010s (a shorter time series for Estonia and Scotland). In the 1990s, the number of criminal milieu homicides against males was considerably higher in Estonia (27% of all homicides), regardless of the relatively large proportion of unclassified

Table 4. The relative distribution of homicide types (Data: EHM).

		N	Male victims				Female victims			
			Family	Criminal	Other	Unknown	Family	Criminal	Other	Unknown
Denmark	1992–99	548	15.7%	10.2%	32.8%	0.9%	30.3%	2.6%	6.0%	1.5%
	2000–9	543	13.3%	10.9%	37.8%	2.0%	27.4%	1.7%	6.4%	0.6%
	2010–16	304	16.1%	10.9%	31.9%	2.0%	30.3%	2.0%	5.3%	1.6%
Estonia	1994–96	724	8.1%	27.2%	30.5%	13.1%	7.3%	4.4%	5.5%	3.7%
	2007–10	249	8.8%	13.3%	45.0%	4.4%	16.5%	3.6%	7.6%	0.8%
Finland	1996, 98–99	452	7.5%	5.3%	39.6%	18.6%	19.7%	0.7%	3.3%	5.3%
	2000–9	1022	11.4%	4.5%	49.4%	4.1%	23.1%	0.5%	6.0%	1.0%
	2010–16	640	12.7%	3.6%	52.7%	1.4%	20.9%	0.5%	8.1%	0.2%
The Netherlands	1992–99	2059	8.4%	15.9%	26.9%	19.3%	17.2%	2.5%	5.0%	4.8%
	2000–9	2030	10.7%	18.1%	22.9%	16.4%	20.8%	2.5%	4.9%	3.7%
	2010–16	1014	13.0%	23.4%	22.3%	7.8%	23.6%	3.4%	4.6%	2.0%
Scotland	2000–9	953	8.9%	12.5%	21.5%	49.0%	2.2%	0.4%	1.4%	4.1%
	2010–15	391	16.6%	15.3%	37.6%	21.2%	3.6%	0.8%	1.8%	3.1%
Sweden	1990–99	1078	10.1%	10.4%	33.0%	13.2%	22.4%	1.3%	5.8%	3.9%
	2000–9	915	10.7%	15.0%	28.9%	9.8%	23.9%	2.3%	5.7%	3.7%
	2010–16	606	8.6%	23.9%	32.8%	4.5%	23.8%	1.0%	5.0%	0.5%
Switzerland	1990–99	699	16.2%	13.7%	21.7%	9.6%	28.3%	3.6%	4.0%	2.9%
	2000–9	586	15.2%	9.0%	19.5%	5.1%	36.0%	3.8%	8.9%	2.6%
	2010–14	201	14.9%	8.0%	12.4%	10.9%	37.3%	2.0%	6.0%	8.5%

homicides with male victims (13%). Finland, Denmark and Sweden were the countries where the most common homicide type was the other context homicide against male victims (40%, 33% and 33% of homicides, respectively). However, at least in Finland, even this high figure was probably an underestimation due to the substantial proportion of unknown homicides against males (19%). In the 1990s, family-related homicides against female victims were particularly common homicide types in Denmark (30%) and Switzerland (28%).

In the 2010s, the most typical homicides in Finland, Switzerland and Denmark had not changed. In Finland, the proportion of other context homicides against male victims (53%) had increased when compared to the 1990s, which was likely to be at least partly due to the improvement in the quality of the data. Similarly, in Switzerland, the proportion of family-related homicides against females (37%) increased while homicides involving male victims decreased. Scotland resembled Finland with a large proportion of other context homicides involving males (38%), although the number of unknown homicides (21%) was still high. In the Netherlands, the three almost equally common subtypes were family-related homicides of females (24%), criminal milieu homicides of males (23%) and other context homicides of males (22%).

Regarding Estonia and Sweden, we observed a clear qualitative shift in lethal victimisation in the 2010s: in Estonia, other context homicide against male victims (45%) had become by far the most typical homicide type whereas criminal milieu homicides (13%) had become relatively rare.[8] In Sweden, the other context homicides were still the largest category (33%) but the proportion of criminal milieu homicides against male victims (24%) had increased considerably. Sweden had thus started to resemble the Netherlands, where almost one-quarter of all homicides (23%) were criminal milieu homicides with male victims. To summarise, the substantial decline in the number of homicides altered the distribution of homicide types in Estonia, Sweden and Switzerland. In Denmark and Finland, the basic structure of lethal violence remained largely stable, whereas regarding Scotland and the Netherlands, the results were inconclusive due to the relatively high proportion of unknown homicides.

Discussion

We analysed the homicide drop between the 1990s and the 2010s in seven north-western European countries, with particular attention to the changes in homicide mortality and offending according to demographic characteristics, and in trends of three major types of homicide: family-related homicide, criminal milieu homicide and other context homicides. The findings show a clear decline in homicide mortality in all seven countries and in the majority of the victim groups and homicide types. In each country, the demographic groups experiencing the largest decreases in homicide victimisation were either young or working-aged men. Therefore, as suggested by Aebi and Linde (2014), the decreased aggression of young men only cannot explain the whole drop. Regardless of the substantial drop in overall homicide levels, the changes in the offender and victim composition were rather modest. Both offenders and victims were typically working-aged men during the whole study period; the only exception was Switzerland, where the largest victim group of the 2010s was working-aged women, and women

accounted for more than half of all victims. Sweden was the only country where relative proportion of young male victims considerably increased in the 2010.

In most of the countries, all three homicide subtypes we studied declined during the homicide drop. In general, the decline in homicide mortality among females was driven mostly by the decline in family-related homicides, whereas regarding male victimisation other homicides decreased more than family-related ones; that is, for both genders, the change was driven by the homicide type responsible for most homicide deaths. Because a substantial decline was observed in all seven countries and in the majority of the victim groups and homicide types, a pattern of generality rather than specificity emerged – a finding that would seem to contradict Verkko's laws. However, regardless of parallel trends, the *magnitude* of the changes was different among different categories. Regarding family-related homicides, female mortality produced a greater change, as suggested by McClintock (1963), who stated that female homicide mortality was linked with domestic violence, and Verkko (1951) who wrote that different factors influenced the lives of men and women.

Closer scrutiny of the magnitude of the drop revealed that there were also meaningful between-country differences. In Finland and Denmark, the relative distribution of homicide types remained stable whereas in Switzerland, Estonia and Sweden, the drop substantially altered the structure of homicidal crime. In Estonia, we observed a qualitative shift from criminal milieu homicides to other context homicides against male victims, that is, alcohol-related brawls. In Sweden, the trend was the opposite one: the proportion of criminal milieu homicides increased substantially in the 2010s when compared with the level in the 1990s – a finding supported by prior studies (Sturup et al., 2019, 2020). In Switzerland, the subdued drop in family-related homicides against women increased their relative proportion of all homicides considerably. A relatively high degree of missing cases prevented us from drawing strong conclusions regarding the evolution of homicide types in Scotland and the Netherlands, although a recent Scottish study found the largest decline in dispute-related homicides between young males (Skott, 2019). Thus, the general drop seems to have been truly general only in Finland and Denmark, that is, influencing all types of lethal violence similarly, whereas in the other countries, the drop had been concentrated in specific subtypes of violent behaviour. According to Miles and Buehler (2022), the latter has also been true in England and Wales, where all homicide categories declined during the last two decades but some subtypes – such as fatal assaults involving intoxicated young men in public spaces – decreased more substantially than others.

Taken together, the results suggest that recent homicide trends are far from unanimous among the countries studied, and disaggregated analyses are needed to reveal what kinds of homicide are decreasing (or increasing) when the general homicide mortality fluctuates. Changes in homicide levels are often the outcome of more than one phenomenon and these phenomena may have different intervals of effects: Short- and medium-term trends that act within a long-term trend (together or separately) can either reinforce or dampen the long-term change, or even reverse it. In our data, this was clearly seen in Estonia in the 1990s and in Sweden in the 2010s. In both countries, a sharp change in the level of criminal milieu homicides had a major impact on overall homicide levels.

In Estonia, the change intensified the increase in the overall homicide rate; in Sweden, again, the change reversed the decreasing trend of homicide mortality.

Different types of homicide may require different criminal policies: there are hardly any one-size-fits-all solutions. Similarly, the characteristics of typical homicide and victims and offenders depend on the country: for instance, in Switzerland, the most common homicide victim is a working-aged female who dies at the hand of a family member whereas in Estonia and Finland, the typical victim would be a working-aged male. Furthermore, it is too early to interpret what the long-term impact on homicide rates of the current Covid-19 crisis in Europe will be. The homicide drop was already showing signs of ending, or at least decelerating, before the crisis in some countries, notably Sweden and Denmark, and outside our study, in the United Kingdom (Ellis, 2019). Yet, it is too early to draw any conclusions considering the future of homicidal crime, and the current crisis may have such a profound impact on European societies that such conclusions would soon be obsolete.

Limitations and future research needs

Our research was the very first attempt to disaggregate the overall homicide drop between the 1990s and the 2010s in seven European countries to different victim and offender groups and homicide types. However, this study is not without limitations. First, regardless of the attempt to build a uniform coding scheme, the definitions of homicide differ slightly between countries. Most importantly, assaults leading to death were not included in the Dutch and Swiss data, and Estonian data for the 2000s, and thus the EHM data will underestimate the number of homicides in these countries. Yet, considering the Dutch and Swiss data, these differences do not threaten the within-country analysis. To minimise the bias, we examined the trends by using both the EHM and COD statistics which adds to the validity of the results. Second, homicide type was often classified as unknown – especially in Scotland and the Netherlands and in the 1990s, in Finland – and this can stem from the high proportion of uncleared homicides, or incomplete information allowing for correct classification. Since criminal milieu homicides tend to be more difficult to solve than two other types, a large proportion of unknown homicides is likely to lead to an underestimation of criminal milieu homicides – at least in the countries with lower clearance rates, such as the Netherlands and Sweden. Since Finland has a high homicide clearance rate (Liem et al., 2019) and a long history of alcohol-related violence between males (Savolainen et al., 2008), we assume that in Finland, the unknown types would largely belong to the other context homicides. Moreover, since offender age and gender are based on the solved homicides alone, offenders who committed criminal milieu homicides are less likely to be included than offenders in family-related homicide cases. Therefore, it is reasonable to assume that the offender data underestimated young male offenders, and more so in countries with lower clearance rates. Lastly, the classification of the EHM leads to a high number of homicides classified as the "other context" homicide, which is a kind of kitchen-sink category, not ideal for research purposes. Future data collection would thus benefit from modifying the EHM manual to include better-capturing categories – such as alcohol-related disputes among friends and acquaintances, which at least in the Nordic and Baltic countries constitute most of the cases

classified now as other context homicides (for example, Lehti, 1997, 2014; Salla et al., 2012; Savolainen et al., 2008).

Possible directions of future research on the changing levels of homicide could include situational factors such as substance abuse and drug market activity (De Bont et al., 2018; Lehti and Sirén, 2018), availability of guns (Sturup et al., 2019) or the role of immigration (Belli and Parkin, 2012; LaFree and Drass, 2001). Furthermore, the findings from our study highlight the need to examine the role of criminal subcultures and gangs in homicide trends. In Sweden, a major increase in shootings among young males has been concentrated in disadvantaged neighbourhoods in the three largest metropolitan areas (Sturup et al., 2019; Sturup et al., 2020). Thus, in the future, the explanations for the changing homicide levels may need to be more local and contextual than they used to be. These kinds of analyses should not be conducted only at the national level but should also analyse smaller geographic units, as upwards turns may not follow national borders but concentrate on metropolitan areas.

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Notes

1. For simplicity, the term 'homicide mortality' has been used to describe the homicide rates throughout this article, regardless of the fact that we use cause-of-death statistics, and the EHM which combines criminal justice statistics, police statistics and data collected from the media. The various data sources are described in the 'Data and Methods' section and in Appendix 1.
2. The International Crime Victim Survey compared firearm ownership by households and reported greater prevalences, but again firearms were the most common in Finland (38%) and then Switzerland (29%), whereas the lowest gun ownerships were observed in Estonia (7%), Scotland (7%) and the Netherlands (5%) (Van Dijk et al., 2007).
3. Average number of the homicide victims per 100,000 of population between 2014 and 2016. Data source: Institute of Criminology and Legal Policy (ICLP), International Homicide Statistics. For Denmark, the data source was the EHM.
4. In Estonia, the majority of the cases investigated as assaults leading to death in the early 1990s, would later have been investigated as intentional homicides (Lehti, 1997). The additional

media data (2017–18) referred to in footnotes 7 and 8 included also the assaults leading to death.
5. In Denmark, the EHM data have been based on cause of death certificates, but they have been collected and analysed independently of the COD statistics and in our opinion, they are more precise and reliable than the official COD statistics.
6. In the Scottish data, the information about the type of homicide was incident-based.
7. Additional data (available at the ICLP) based on Estonian newspapers were used to examine the clearance rate of Estonian homicides in the 2010s. Between 2017 and 2019, approximately 98% of Estonian homicides were solved.
8. Because the Estonian dataset ended in 2010, we used additional data (available at the ICLP) from the years 2017 and 2018 based on Estonian newspapers to confirm the generalisability of the results. The overall number of homicides and the proportion of criminal milieu homicides had continued to decline. In 2017 ($N = 21$ homicides) 2 criminal milieu homicides (9.5% of annual homicides) and 8 other context homicides (38.1%) against male victims took place, and in 2018 ($N = 21$), the prevalence of these subtypes were 2 (9.5%) and 9 (42.9%) cases, respectively. Therefore, we conclude that the qualitative shift in Estonian homicides was not only a short-lived anomaly. Yet, the combination of different data sources with different inclusion criteria adds uncertainty to Estonian results.
9. For Estonia and Finland, raw data were used instead of three-year averages.

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Appendix
Appendix 1: National homicide monitors following the EHM manual and selected publications.

Country	Source	Maintained by	Selected Publications
Denmark	Autopsy reports, Legal medicine data, Police data, Court data	Department of Forensic Medicine, Aarhus University, Denmark	Thomsen et al., 2019
Estonia	Police data, Court data	Estonian Ministry of Justice	Salla et al., 2012
Finland	Police data, Court data	Institute of Criminology and Legal Policy at the University of Helsinki	Granath et al., 2011; Lehti et al., 2019; Liem et al., 2013, 2019; Suonpää and Savolainen, 2019
The Netherlands	Media reports (Dutch Associated Press, LexisNexis), Police data, Court data	Institute of Security and Global Affairs, Leiden University	Aarten and Liem, 2021; Granath et al., 2011; Leiden University, 2019; Liem et al., 2013, 2019
Scotland	Police data	Police Scotland	Skott, 2019
Sweden	Police data, Court data, Media reports	Swedish National Council for Crime Prevention (Brå)	Granath et al., 2011; Lehti et al., 2019; Liem et al., 2013, 2019
Switzerland	Legal medicine data, Prosecution and Police data, Court data	Swiss Homicide Project by the University of St Gallen	Liem et al., 2019; Markwalder & Killias, 2012; Walser et al., 2022

Appendix 2: The proportion of intimate partner homicides (IPH) of all family-related homicides. (Data: EHM)

		Proportion of IPHs of family-related homicides
Denmark	Male victim	37.7%
	Female victim	73.2%
Estonia	Male victim	48.1%
	Female victim	68.1%
Finland	Male victim	37.8%
	Female victim	77.5%
The Netherlands	Male victim	31.8%
	Female victim	71.6%
Scotland	Male victim	30.7%
	Female victim	66.0%
Sweden	Male victim	34.4%
	Female victim	71.9%
Switzerland	Male victim	43.1%
	Female victim	77.5%

Appendix 3: The relative changes in homicide mortality among sociodemographic groups (Data: EHM, COD statistics).

| | | Male victims per 100,000 population | | | | Female victims per 100,000 population | | | | Missing | Homicides |
		0–14	15–29	30–64	65-	0–14	15–29	30–64	65-	%	N
Denmark	Homicide rate 1992–99 (avg.)	0.8	1.9	2.0	0.6	0.9	1.0	1.3	0.7	0.0%	548
	Homicide rate 2010–16 (avg.)	0.5	1.3	1.1	0.5	0.4	0.5	0.8	0.5	0.0%	304
	Change	−0.3	−0.6	−0.9	−0.1	−0.4	−0.5	−0.5	−0.2		
	Relative change (%)	−39.9%	−30.4%	−44.0%	−11.2%	−51.5%	−52.9%	−40.0%	−27.0%		
Estonia	Homicide rate 1990–99 (avg.)	1.6	35.4	49.5	16.9	1.6	5.8	9.4	7.6	1.9%	2788
	Homicide rate 2010–16 (avg.)	0.0	3.1	10.3	3.4	0.9	1.3	2.4	1.7	0.0%	355
	Change	−1.6	−32.3	−39.2	−13.6	−0.7	−4.4	−7.0	−5.9	0.0	
	Relative change (%)	−100.0%	−91.1%	−79.2%	−80.0%	−46.5%	−77.3%	−74.6%	−77.4%		
Finland	Homicide rate 1990–99 (avg.)	0.7	4.0	6.6	2.4	0.7	1.8	2.4	0.9	0.0%	1549
	Homicide rate 2010–16 (avg.)	0.2	1.9	3.2	1.0	0.6	0.8	1.2	0.5	0.0%	563
	Change	−0.5	−2.1	−3.4	−1.4	−0.1	−1.0	−1.2	−0.4		
	Relative change (%)	−68.2%	−53.1%	−51.4%	−58.8%	−14.8%	−53.5%	−49.3%	−41.4%		
The Netherlands	Homicide rate 1992–99 (avg.)	0.5	3.5	2.7	1.0	0.5	1.6	0.9	0.7	3.3%	2059
	Homicide rate 2010–16 (avg.)	0.4	1.6	1.4	0.6	0.3	0.7	0.6	0.5	1.9%	1014
	Change	0.0	−1.9	−1.3	−0.4	−0.2	−0.9	−0.3	−0.2		
	Relative change (%)	−5.2%	−54.9%	−49.1%	−41.3%	−38.0%	−58.1%	−30.6%	−26.9%		
Scotland	Homicide rate 1990–99 (avg.)	0.9	6.1	4.0	1.2	0.2	0.4	0.3	0.2	0.0%	1081
	Homicide rate 2010–15 (avg.)	0.6	3.0	2.5	0.4	0.1	0.2	0.2	0.1	0.0%	395
	Change	−0.3	−3.1	−1.5	−0.8	−0.1	−0.2	−0.1	−0.1		
	Relative change (%)	−28.0%	−51.2%	−37.3%	−67.2%	−51.4%	−43.5%	−28.5%	−52.3%		
Sweden	Homicide rate 1992–99 (avg.)	0.4	1.8	1.8	1.0	0.6	0.8	0.8	0.5	15.7%	1078
	Homicide rate 2010–16 (avg.)	0.2	2.3	1.4	0.5	0.3	0.6	0.6	0.5	4.8%	608

(Continued)

| | Male victims per 100,000 population | | | | Female victims per 100,000 population | | | | Missing | Homicides |
	0-14	15-29	30-64	65-	0-14	15-29	30-64	65-	%	N
Change	−0.2	0.5	−0.4	−0.5	−0.3	−0.2	−0.2	0.1		
Relative change (%)	−43.4%	25.2%	−24.1%	−53.0%	−55.3%	−22.8%	−24.5%	18.6%		
Switzerland Homicide rate 1990–99 (avg.)	0.5	1.8	1.4	0.5	0.4	1.1	0.9	0.4	1.0%	699
Homicide rate 2010–14 (avg.)	0.2	0.5	0.5	0.4	0.3	0.4	0.7	0.5	0.5%	201
Change	−0.4	−1.3	−0.9	−0.1	0.0	−0.8	−0.2	0.1		
Relative change (%)	−69.7%	−70.8%	−62.3%	−17.6%	−11.7%	−67.8%	−23.7%	29.7%		