

Firearms and Violent Deaths in Europe

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***An Exploratory Analysis of the Linkages Between Gun
Ownership, Firearms Legislation and Violent Death***

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Introduction

On a regular basis, news stories appear in the media about public shootings where shooters use their guns to open fire and kill people in shopping malls or on school campuses. Mostly these stories deal with incidents in the United States. Over the last years, however, a number of European countries have experienced similar public shooting incidents. Notable cases were the shootings at Tuusula and Kauhajoki in Finland (2007 and 2008), the killings in Cumbria in the UK (2010), the Utøya attacks by Anders Breivik in Norway (2011), and the shootings at Alphen aan den Rijn in the Netherlands and Liège in Belgium in 2011. Public shootings draw a high level of media attention. Less striking in the public eye, but not less significant – not least in quantitative terms –, are the numbers of people in Europe killed by firearms in the context of gun-related crime or in domestic shootings. It is estimated that between 2000 and 2010, over 10,000 victims of murder or manslaughter were killed by firearms in the 28 Member States of the European Union (EU). Every year, over 4000 suicides by firearm are registered in the EU. This means that, on average, there are 0.24 homicides and 0.9 suicides by firearm per 100,000 population in Europe every year.¹

Compared with the US or other countries around the globe, the rates of gun-related violent death in Europe are rather low, certainly where the homicide rates are concerned. This does not mean, however, that the problem of gun violence has not appeared on the European policy radar in recent years. On the contrary, the attention devoted to the problem by law enforcement agencies and policy-makers has been growing. Reacting not only to shooting incidents such as those mentioned above, but also to warnings by police and law enforcement agencies that criminals are increasingly willing to use (heavy) firearms and that illegal trafficking in firearms is on the rise, a number of European countries have announced policy interventions targeted at reducing levels of gun-related violence and crime. The European Commission has also become an active actor in firearms policy. In October 2013 it announced a plan to reduce gun violence in Europe, in which it defined the misuse of firearms, whether legally-owned or illicitly manufactured or acquired, as “a serious threat to the EU’s security from both an internal and an external perspective”. One of the major problems the Commission identified in its initial policy papers was the problem of a lack of sound and adequate knowledge about firearms in Europe. The commission noted that “a lack of solid EU-wide statistics and intelligence hampers effective policy and operational responses”. One of the ambitions of the EU’s firearms policy is, therefore, to address the gaps in knowledge concerning gun violence.²

An additional problem is that the lack of reliable and comprehensive information on firearms in Europe is not limited to the sphere of law enforcement and policy-making. European scholarly research focusing specifically on firearms availability, gun control and gun-related violence is scarce. There is a research

community in Europe focusing on small arms and light weapons (SALW), but it is predominantly concerned with the export of firearms and the connections between these arms flows and violence in developing, transitional or fragile states outside Europe. Scientific research on firearms and gun-related violence in the domestic European context is much less advanced. The scanty research efforts made in this field by epidemiologists, criminologists and legal scholars remain fragmented, and suffer from the fact that there is no integrated scholarly community dealing with gun-related issues. Language barriers, moreover, often prevent the wider dissemination of research results. Given this relative lack of European firearms research, American studies are still clearly dominant at present in research on the links between the availability of firearms and gun-related violence. Greene and Marsh have calculated that out of the 665 studies on firearms and violence that they reviewed, 64% were about the USA. Of the remaining studies not on the USA, 13% concerned cross-national comparisons or articles in which the geographical focus was unspecified (such as reviews), while 8% were about developing countries. Only 15% concerned other developed countries such as Canada, Australia, the UK and Germany.³ Given the particularities of the American context, and more specifically the fact that the US has one of the highest rates of gun-related deaths and crime among industrialized democracies, simply transposing the results of American research to the European context is problematic.

What are the levels of firearms availability in Europe? Are there links between the levels of gun ownership in European countries and these countries' rates of violence and violent death? And what is the impact of European gun laws on public safety and health? The absence of evidence specifically for the European context makes it difficult for policy-makers and researchers to find impartial and unbiased answers to these questions. Hence the pressing need for research that specifically focuses on gun-related violence in the European context: and with the present report, we would like to make a contribution to that effort. As we are moving into largely uncharted territory, our analysis of the European situation will necessarily be exploratory. Our primary ambition is to collect and take stock of the fragmented evidence that is available on gun-related violence in Europe. Our geographical coverage will be broader than the EU and encompasses a group of approximately 40 European countries, although in some instances we will limit our analyses to the EU28.

In the report's first chapter, we briefly dwell on one of the most crucial variables in research on gun control and violence: the level of gun ownership in society. Although the prevalence or availability of firearms is a key variable, collecting adequate data on levels of gun ownership can be troublesome. In chapter 1 we therefore devote some space to a critical assessment of the available statistics for Europe. Next, in chapter 2, we look at gun-related violence in Europe. Given the absence of good data on gun-related violence in general, including information not only on mortality but also on injuries and other forms of firearms-related victimization, we will focus exclusively on violent deaths – which seems a legitimate methodological choice for exploratory purposes. We urge the reader, however, to keep in mind that gun-related violence is a much more complex phenomenon than this focus might suggest. As

is normal in research dealing with gun control not only from a public safety but also a public health perspective⁴, we shall look both at gun-related homicides and at suicides. Taking the analysis further, we then ask in chapters 3 and 4 whether rates of gun possession and violent death in Europe are correlated: do high levels of gun possession in European countries correlate with high levels of homicide and suicide? The results of probing that question lead us to suggest that research into gun possession and violent death should also factor in the effects of firearms legislation. Specific European research into this question is scarce, which makes it difficult at the moment to arrive at conclusions for the whole of Europe. In chapter 5 we therefore focus on the results of three recent studies on the effects of stricter gun legislation on violent death rates in Austria, Belgium and Switzerland.

1 Firearms in European Societies

The rate of firearms possession in a country is a crucial variable in research on the relationship between guns and violent death. Finding out how many guns there are in European countries, however, is a challenging endeavour. Calculating the number of legally-held firearms in Europe is not an easy task given the lack of reliable and comparable official data on gun possession, but reliable statistics on the number of illegally-held and trafficked firearms in Europe are even harder to find. In the first place, of course, this reflects the covert nature of illicit possession, but it is also a function of the lack of reliable and comparable estimates on illegal gun possession and trade for all European countries. The dearth of reliable data becomes very plain in a recent study commissioned by the European Commission where the number of illegally-held firearms is estimated as lying somewhere between 81,000 and 67 million.⁵ This clearly illustrates how hard it is to find out how many firearms there are in Europe. In this chapter we will give an overview of the available figures on European gun ownership rates in Europe, looking particularly at different sources for data on gun prevalence such as administrative registries, self-report surveys and proxies, and paying attention to their specific merits and shortcomings.

1.1 Lack of reliable and comparable administrative data on gun ownership

As already stressed, no reliable and comparable administrative data on gun possession across Europe are currently available. An important explanation for this is that not all European countries have a centralized database to register legally-held firearms. As a positive development, Directive 2008/51/EC (amending the Firearms Directive 91/477/EEC) stipulated that all EU Member States must establish by 31 December 2014, and then maintain, a computerized data filing system in which details of all civilian possessed firearms must be recorded¹. At the moment it is unclear to what extent EU Member States have put in place the required data filing systems. What is clear, however, is that the existence of such data filing systems in all Member States in the near future will improve the authorities' chances of knowing how many and what types of firearms are legally held by civilians in the EU. To achieve this, it will be vital to develop good procedures for data input to ensure reliable data, and to develop software that allows for fast and easy data analysis.

Given their illicit character, the number of illegally-held firearms is harder to estimate. In a recent communication, the European Commission stated that according to the Schengen Information System,

¹ Article 4 of the revised Directive states that each firearm that is subject to the Directive must be recorded in this (centralized or decentralized) data filing system. The filing system must record, and preserve for not less than 20 years, each firearm's type, make, model, calibre and serial number, as well as the names and addresses of the supplier and the person acquiring or possessing the firearm.

almost half a million lost or stolen firearms remain unaccounted for in the EU.⁶ To estimate the number of illegally held guns, a number of studies have looked at official figures - for example, statistics on seized guns - and used the “capture-recapture” method to estimate the scale of illegally-held firearms in society. One of the most accurate estimates of illegal firearms possession using this approach has been made in the Netherlands. Based on the available police data on firearms-related incidents, a 2005 study using the capture-recapture method suggested the figure of approximately 54,000 persons illegally possessing firearms in the country in 2001-2003.⁷ In most other European countries, however, similarly reliable estimates are lacking. Given the different characteristics of illicit firearms markets in different countries, the Dutch figures cannot be extrapolated to the rest of the EU. We must therefore conclude that it is currently impossible to estimate the total number of legally and illegally held firearms in Europe based on official statistics. Other data sources and methods are needed to estimate gun ownership rates in Europe.

1.2 Comparing the results of self-reporting surveys on gun ownership

Self-reporting through surveys is generally considered a valuable way of generating data on gun ownership rates, but there are a number of methodological pitfalls and limitations linked to it. First of all, these surveys only provide us with insight into the level and nature of legal firearms possession. We can assume that illegal gun owners are generally not inclined to give truthful answers to survey questions about their firearms possession. The most often cited problem is the potential for invalid responses as a result of the often controversial nature of (even legal) gun possession in many countries.⁸ Having firearms in the house may be perceived by respondents as sensitive behaviour, which may lead to a social desirability bias and therefore an underestimation of ownership rates. If surveys ask about the guns present in households, another problem is that respondents may misreport about guns kept by other household members. More specifically, women tend to under-report guns present in their home, or may even not be aware that firearms are kept by others in their household.⁹ These limitations notwithstanding, self-reporting offers a useful tool for estimating rates of gun possession. Interestingly, a number of American studies comparing self-reported personal gun ownership with data from administrative records have revealed low false-negative rates.¹⁰ Although we must be cautious in transposing these findings to the European context, where the social desirability bias might work differently than in the US, these studies underline the value of using this type of data for estimating firearms possession in society. In the following sub-sections we summarize the results of our own analyses of data from two major self-reporting studies on firearms possession in Europe: the *International Crime Victims Survey* and the *Flash Eurobarometer 383: Firearms in the European Union*.

International Crime Victims Survey (2004-2005)

The *International Crime Victims Survey* (ICVS) is a solid longitudinal self-reporting study developed to monitor and study crime and the perception of crimes, and attitudes towards the criminal justice system, in a comparative international perspective. Between 1989 and 2005 more than 300,000 people in 78 different countries were interviewed, using standardized questionnaires, about their experiences with victimization and related topics.^I Interestingly, these surveys included questions on gun ownership in the respondents' households.^{II} With regard to gun ownership, data for 24 European countries are available covering the years 2004-2005. In this sub-section we will give an overview of the most important findings of analyses carried out on these data (see figure 1).

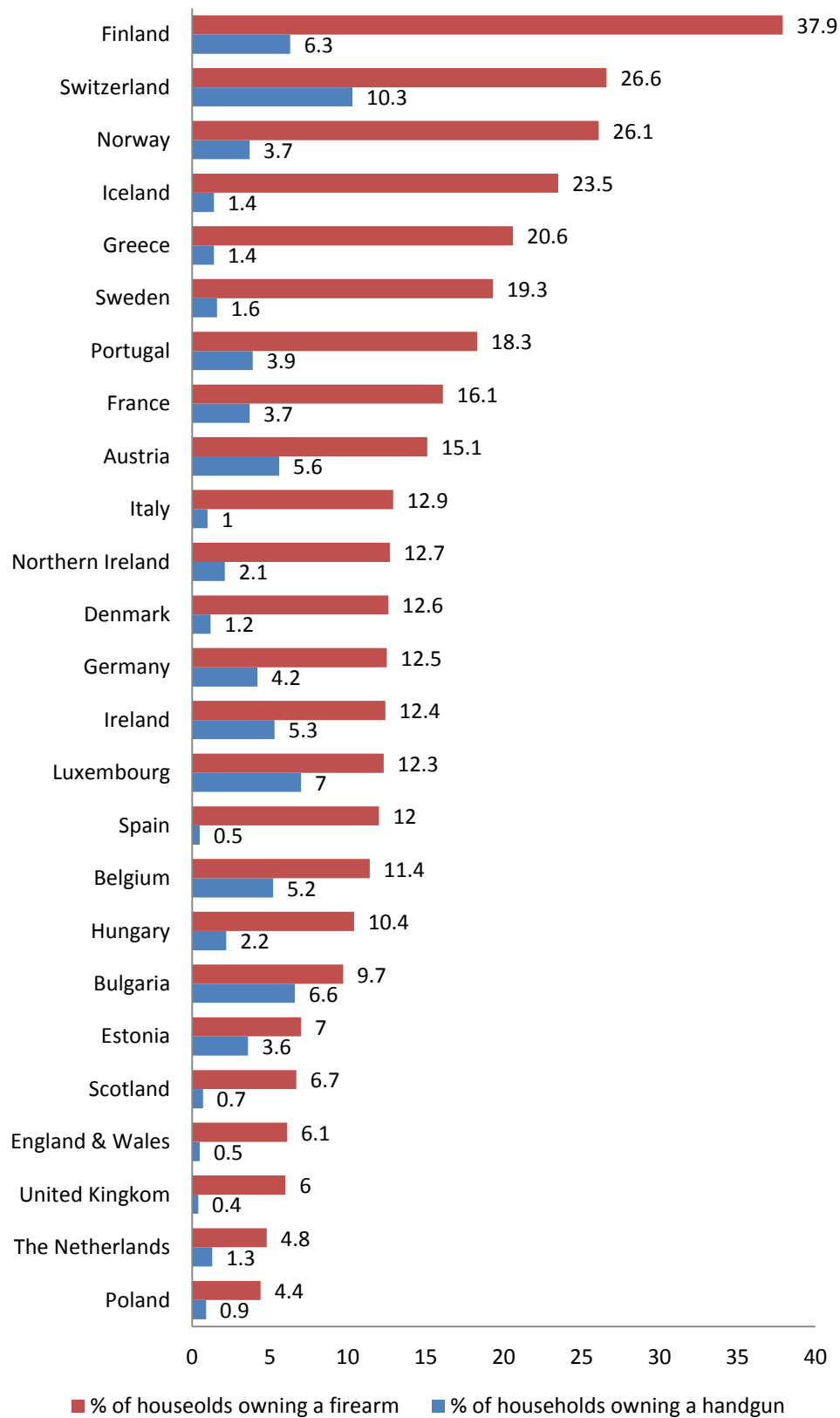
Analysis of the ICVS data indicates a strong variation in national firearms ownership rates in Europe. The countries included in the survey that show the highest household gun ownership rates are Finland (38%), Switzerland (27%), Norway (26%) and Iceland (24%). Other European countries with rather high levels of household firearms possession are Greece, Sweden and Portugal. The countries with the lowest rates in gun ownership are Poland (4%), the Netherlands (5%) and the United Kingdom (6%). Further, this analysis shows that in most European countries the rate of handgun ownership is considerably lower than that of general firearms possession. What is particularly interesting is that most of the countries where a significant proportion of gun-possessing households own a handgun are also the European countries with the largest firearms production such as Austria, Belgium, Bulgaria, Germany, Italy and Switzerland. One possible explanation for this observation could be that countries with significant firearms production have traditionally tended to have a less restrictive legal framework for civilian handgun ownership.

Besides national figures, the ICVS also published the rates of gun ownership in a number of cities worldwide, including 22 European cities. Not surprisingly, the highest rates can be found in cities in the countries with the highest proportions of households owning a firearm (see figure 2).

^I The *International Crime Victims Survey* (ICVS) is an international victimization survey established to generate international comparative crime and victimization data. It is a phone survey that is organized on a regular basis. It was conducted for the first time in 1989 and repeated in 1992, 1996, 2000, 2004-2005 and 2010. For the different rounds of the survey, a total of more than 300.000 respondents in thirty countries were interviewed about their experiences with crime and victimization.

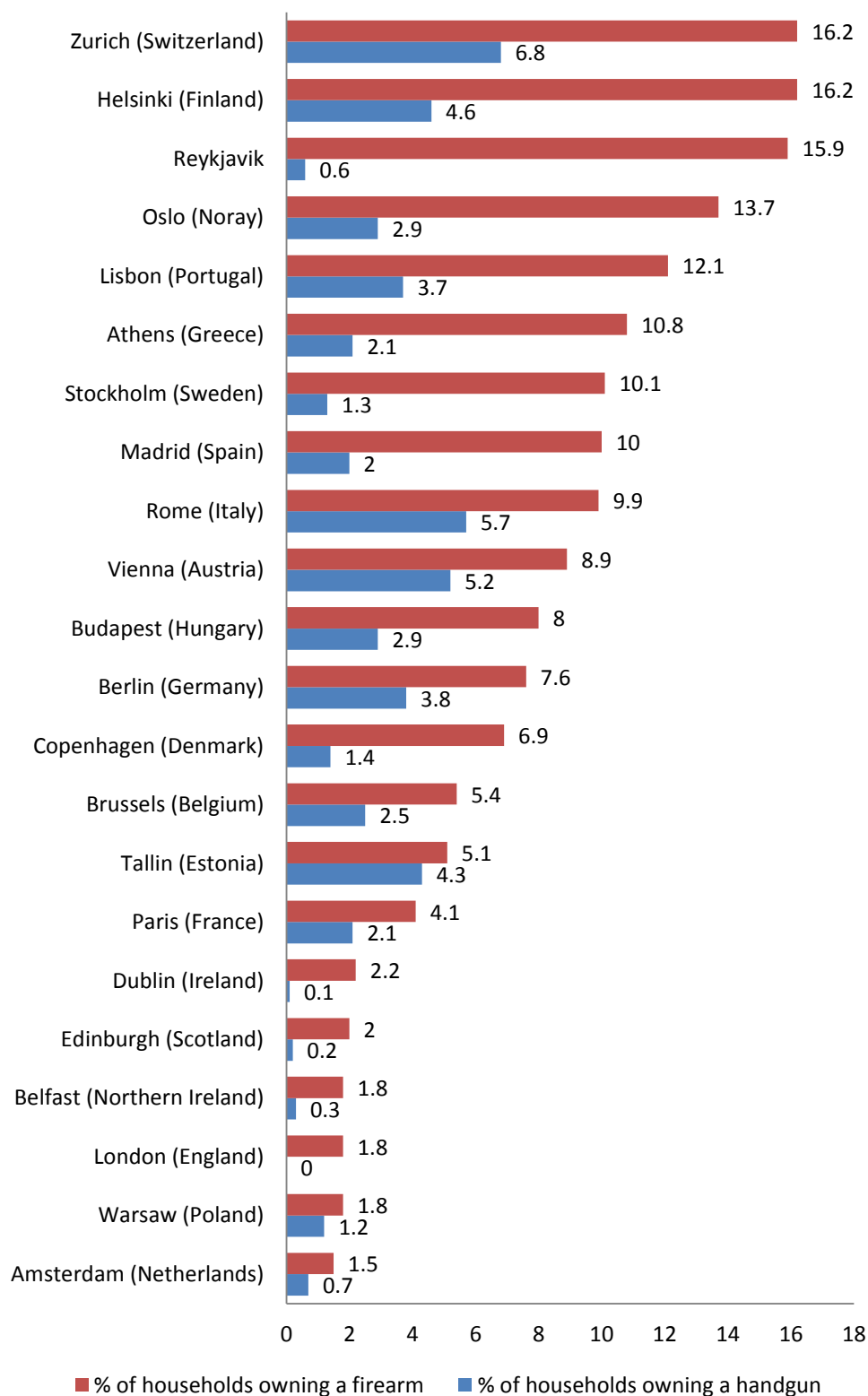
^{II} This type of question poses a number of methodological problems (see *supra*), but the results are nonetheless interesting and indicative, not least because they allow a comparative insight into gun ownership from an international perspective.

Figure 1: Percentage of households owning a firearm and owning a handgun according to ICVS, 2004-2005



Source: ICVS¹¹

Figure 2: Percentage of households owning a firearm and owning a handgun in various European cities, according to ICVS, 2004-2005



Source: ICVS¹²

In the ICVS, respondents who stated there was a gun in their household were asked which sort of gun this was. Our analyses of the ICVS data indicate that in a large number of European countries, the majority of gun owners possess long guns such as shotguns and rifles. The ownership of handguns is clearly not equally widespread in Europe. Only in 5 of the 23 European countries covered did more than 60% of the gun possessors report that they owned a handgun (see table 1).

Table 1: % of types of firearm (excluding air rifles) possessed in European countries, according to ICVS, 2004-2005

	Handgun	Shotgun	Rifle	N
Austria	65%	34%	47%	158
Belgium	59%	36%	26%	136
Bulgaria	71%	42%	0%	65
Denmark	18%	58%	56%	123
England & Wales	14%	66%	59%	44
Estonia	52%	50%	13%	120
Finland	31%	73%	58%	326
France	30%	57%	34%	172
Germany	77%	26%	40%	101
Greece	17%	88%	10%	242
Hungary	57%	49%	14%	72
Iceland	7%	82%	49%	392
Ireland	11%	78%	25%	130
Italy	55%	19%	47%	190
Lithuania	57%	47%	10%	68
Luxembourg	70%	30%	50%	74
Netherlands	67%	30%	20%	30
Northern Ireland	22%	76%	20%	112
Norway	13%	64%	44%	1078
Poland	57%	44%	9%	77
Portugal	31%	23%	68%	219
Scotland	17%	63%	48%	52
Spain	11%	81%	7%	177
Sweden	15%	66%	68%	207
Switzerland	39%	0%	76%	993
United Kingdom	13%	67%	57%	46

Source: ICVS¹³, own calculations

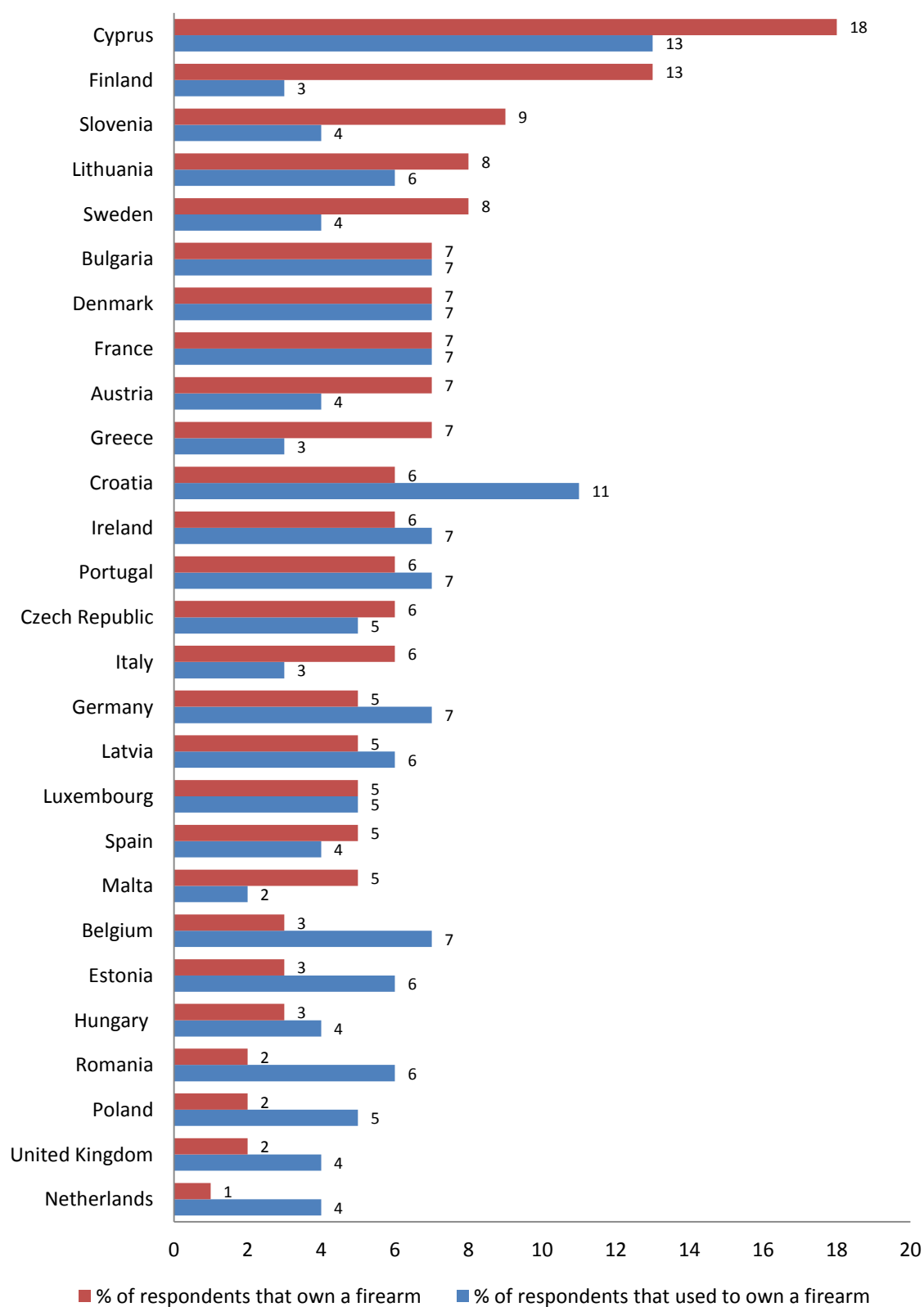
Flash Eurobarometer 383: Firearms in the European Union (2013)

A more recent self-reporting study that included a question on gun ownership is the 2013 Eurobarometer poll on firearms policy (Figure 3). This study reported that 5% of the population in the European Union own a firearm and another 5% used to own a firearm. This would mean that there are currently at least 25 million gun owners in the EU.

As with our analysis of the older ICVS data, significant differences in national gun possession rates can be observed. While the share of population owning a firearm is relatively high in Cyprus (18%) and Finland (13%), it is quite low in countries such as the Netherlands (1%), the United Kingdom (2%), Poland (2%) and Romania (2%). Follow-up questions about the number of firearms and the type of firearms owned in the different EU Member States were not included in the Eurobarometer survey.

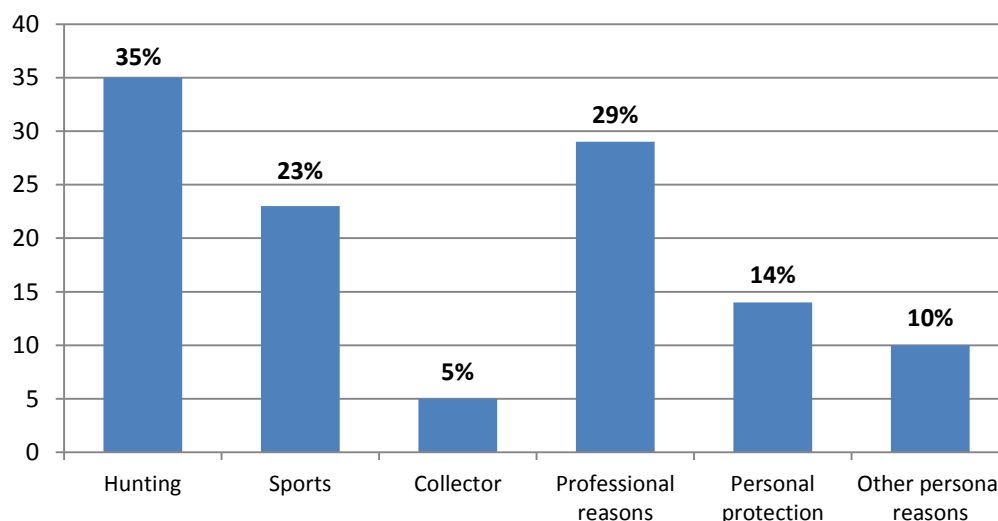
Some background information on the gun possessors is, however, available. The 2013 Eurobarometer data indicate, for example, that gun possession is more likely for men than for women in the EU: while 8% of the men said they owned a firearm at the moment and 9% of the men said they had owned a firearm during their life, these rates were only 1% and 2% among women. In addition, gun ownership in the EU is more prevalent among older generations and in rural areas. The respondents were also asked for their reasons for firearms possession. Hunting was the most cited reason for firearms possession in the EU: 35% of those who owned or used to own a firearm gave hunting as a reason. The two other main reasons for legal firearms possession in Europe were professional reasons (e.g. police, army, security services - 29%) and sports (23%). Personal protection and collection were cited by respectively 14% and 5% of the group of current and previous gun owners.¹⁴

Figure 3: Estimates of gun ownership in Europe according to Eurobarometer, 2013



Source: Eurobarometer¹⁵

Figure 4: reasons for firearms possession by respondents who currently own or used to own a firearm, EU28, 2013



Source: Eurobarometer¹⁶

Although in two thirds of the EU Member States hunting was the most cited reason for owning a firearms, significant national variations with regard to motives can be observed (see table 2). In countries such as Germany and the Netherlands, for example, sport shootings seemed to be the most cited reason for gun ownership, while hunting was only cited by small proportion of gun owners as their reason for gun possession. The observation of country variations in reasons for firearms possession must, however, be interpreted cautiously since for some countries we only have a small number of respondents. Even so, an interesting distinction is that in the EU15 countries (i.e., those who were members before 2004) citizens were apparently more likely to own or to have owned firearms for hunting and sports, while in the new Member States, gun ownership was more often linked to professional reasons (especially in Romania, Estonia and Bulgaria) and personal self-defence (especially in Lithuania, the Czech Republic and Slovakia). Based on the available Eurobarometer figures, we can also deduce that in almost all EU Member States, the collecting of firearms is a not significant reason for firearms ownership.

A comparison of the motives given for firearms possession by current and previous owners indicates that in almost all countries, professional reasons were cited more frequently by previous gun owners than by current gun owners. The opposite can be observed when looking at sport shooting and especially hunting: current gun owners cite these reasons much more often than previous gun owners (see table 12 in Annex). This might suggest an evolution in the reasons for firearms possession over

time. It is clear that not only the current levels of firearms possession are relevant, but longer-term trends in ownership rates also need to be taken into account.

Table 2: reasons for firearms possession by respondents currently owning a firearm, per country, 2013

	Hunting	Sports	Collector	Professional reasons	Personal Protection	Other personal reasons	Number of respondents
Austria	42%	32%	7%	20%	29%	12%	69
Belgium	42%	36%	12%	21%	21%	12%	33
Bulgaria	38%	3%	5%	42%	33%	5%	64
Croatia	37%	6%	2%	30%	17%	13%	54
Cyprus	75%	2%	3%	31%	2%	3%	93
Czech Republic	37%	68%	15%	25%	53%	7%	59
Denmark	73%	17%	5%	3%	3%	7%	77
Estonia	39%	4%	0%	43%	25%	4%	28
Finland	77%	36%	3%	9%	3%	9%	132
France	69%	11%	10%	11%	8%	12%	73
Germany	20%	39%	2%	20%	6%	14%	49
Greece	76%	8%	5%	15%	21%	9%	67
Hungary	42%	13%	0%	7%	39%	16%	31
Ireland	65%	28%	9%	14%	19%	9%	65
Italy	31%	31%	10%	31%	6%	8%	51
Latvia	55%	11%	2%	21%	36%	4%	47
Lithuania	19%	10%	0%	19%	54%	7%	74
Luxembourg	20%	56%	20%	28%	12%	4%	25
Malta	57%	35%	35%	4%	0%	9%	23
Netherlands	10%	60%	0%	20%	10%	0%	10
Poland	44%	33%	0%	28%	22%	0%	18
Portugal	56%	12%	6%	23%	23%	12%	52
Romania	18%	6%	0%	65%	6%	24%	17
Slovakia	34%	26%	11%	37%	51%	3%	35
Slovenia	48%	24%	8%	12%	7%	11%	84
Spain	64%	22%	0%	22%	2%	8%	50
Sweden	73%	28%	8%	3%	0%	9%	80
United Kingdom	44%	44%	20%	19%	19%	6%	16

Source: Eurobarometer, own calculations

International Crime Victims Survey: longitudinal data from 1989-2005

The long series of self-reporting data from the ICVS makes it possible – to a certain extent – to identify trends in gun ownership rates between 1989 and 2005 for a smaller group of (mainly Western) European countries (see table 3). The most important observation is that there is no general trend of increasing or decreasing ownership in European countries. Instead, we observe different trends in different countries. In Belgium, France, Italy, Norway and Switzerland, the numbers of households stating that they owned a firearm decreased substantially over the period, while in Finland, Germany, the Netherlands, Portugal, Sweden, the United Kingdom and Northern Ireland, an opposite evolution took place and the figures increased. Interestingly, the decrease in gun ownership seems to occur more frequently in countries with traditional high rates of gun ownership than in the other countries. We can

observe a significant decrease by 2004-2005 in four of the five countries that had the highest household gun ownership rates in 1989. Unfortunately, a similar long-term data series on gun ownership in Central and Eastern European countries is lacking.

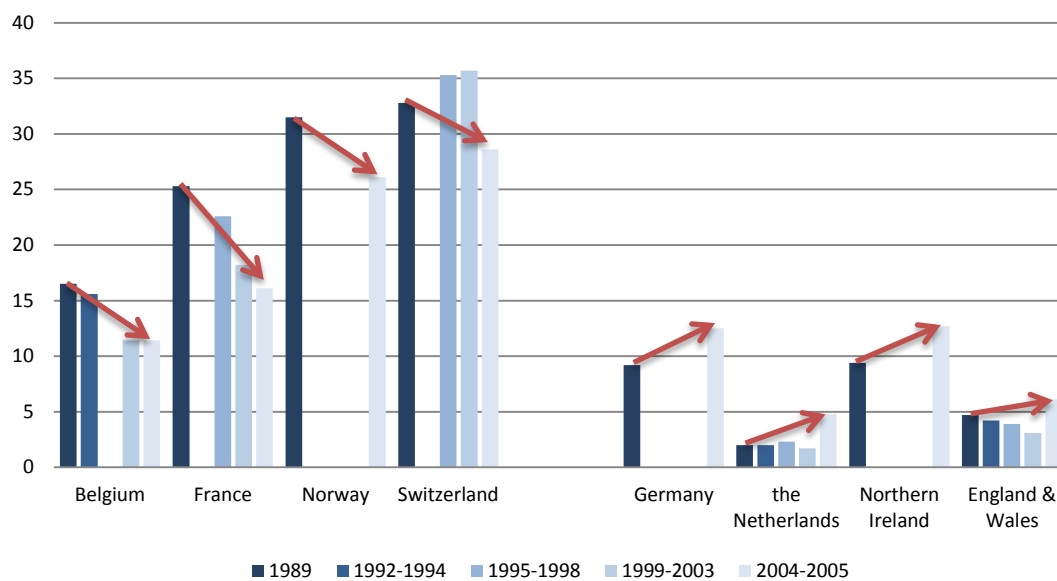
Table 3: % of households with a gun¹, 1989-2005

	1989	1992-1994	1995-1998	1999-2003	2004-2005
Austria	-	-	15.3	-	15.1
Belgium	16.5	15.6	-	11.4	11.4
Bulgaria	-	-	-	-	9.7
Denmark	-	-	-	11.7	12.6
England & Wales	4.7	4.2	3.9	3.1	6.1
Estonia	-	7.5	8.3	7.4	7.0
Finland	25.5	25.4	28.8	23.7	37.9
France	25.3	-	22.6	18.2	16.1
Germany	9.2	-	-	-	12.5
Greece	-	-	-	-	20.6
Hungary	-	-	-	-	10.4
Iceland	-	-	-	-	23.5
Ireland	-	-	-	-	12.4
Italy	-	16.1	-	-	12.9
Luxembourg	-	-	-	-	12.3
Netherlands	2.0	2.0	2.3	1.7	4.8
Northern Ireland	9.4	-	-	-	12.7
Norway	31.5	-	-	-	26.1
Poland	-	2.5	4.7	3.7	4.4
Portugal	-	-	-	13.2	18.3
Scotland	5.1	-	4.2	3.1	6.7
Spain	12.7	-	-	-	12.0
Sweden	-	15.9	16.2	15.9	19.3
Switzerland	32.8	-	35.3	35.7	28.6
United Kingdom	5.2	-	4.1	3.0	6.0

Source: ICVS¹⁷

¹ The question was “Do you or anyone else in your household own a handgun, shotgun, rifle, or air rifle?”

Figure 5: % of households with a gun¹, selected countries, 1989-2005



Source: ICVS¹⁸

1.3 Expert estimates

A third source for calculating the number of guns in Europe is provided by expert estimates. In 2007 the Small Arms Survey (SAS) published a first detailed assessment of the global distribution of factory-made civilian firearms. SAS used various sources and methods to estimate the total civilian gun ownership rates in 178 countries and to provide statistics on the number of weapons per 100 persons.¹⁹ Although these national estimates by SAS are not equally reliable for every country, they are currently considered as one of the most reliable sources for international comparisons of gun ownership.

The SAS estimated that the total number of firearms owned by civilians worldwide was approximately 650 million. In table 4 we present the national estimates by SAS for 42 European countries. These estimates indicate that civilians possessed approximately 93.2 million firearms at the time in all European societies, and approximately 79.8 million in the EU. This comes down to 15.7 firearms per 100 persons. In absolute figures, a large number of these firearms were thought to be owned in Germany (25 million) and France (19 million); yet the European countries with the highest percentage rates of firearms ownership were Switzerland and Finland. In these two countries there were an estimated number of 45 to 46 firearms for every 100 persons. Other countries with high firearms possession rates according to the SAS estimate were Serbia, Cyprus, Sweden, Norway, France, Austria, Iceland and Germany (with more than 30 firearms per 100 persons). At the other end of the spectrum we find countries such as the Netherlands, Poland and Romania, with estimates of less than 5 civilian firearms for every 100 persons. These estimates clearly confirm the existence of large national variations in gun

¹ The question was “Do you or anyone else in your household own a handgun, shotgun, rifle, or air rifle?”

possession rates in Europe, even between neighbouring countries. In Germany (30.3) , for example, the gun possession rate per 100 inhabitants was more than 7 times higher than in the Netherlands (3.9). Other striking examples are the differences in reported gun ownership rates between the Czech Republic (16.3) and Slovakia (8.3), or between Denmark (12.0) and Sweden (31.6). In addition, as stated earlier, it must be borne in mind that large differences in gun possession rates exist even *within* countries. Significant differences in gun ownership rates can be observed even within relatively small countries such as Belgium²⁰ and Austria²¹.

A comparison of the top-ranked and bottom-ranked countries seem to confirm the estimates of levels of firearms possession based on other methods. Of course, certain discrepancies exist, some of which might reflect the different questions posed (individual firearm possession vs household firearm possession vs estimated numbers of firearms in a society). Some discrepancies, however - especially relating to Central and Eastern European countries - are striking and cannot be attributed to different research questions. The SAS estimates for the total number of firearms in Bulgaria, Hungary and Poland, for example, are lower than the household firearm rates reported in the ICVS data for these countries (which – for different reasons – can be considered as an absolute minimum for the total number of firearms in society). These observed differences are presumably not the result of dramatic changes in gun possession rates in these countries, since the figures are from the same time period, but are very likely the result of over-conservative estimates. This underlines that the available figures on gun rates must be used with caution when analyzing the connection between gun ownership and violent death.

Table 4: Estimates of gun ownership in Europe according to the Small Arms Survey (2007)

	Estimated number of civilian firearms ¹	Number of firearms per 100 people
Switzerland	3,400,000	45.7
Finland	2,400,000	45.3
Serbia	3,050,000	37.8
Cyprus	275,000	36.4
Sweden	2,800,000	31.6
Norway	1,400,000	31.3
France	19,000,000	31.2
Austria	2,500,000	30.4
Iceland	90,000	30.3
Germany	25,000,000	30.3
FYR Macedonia	490,000	24.1
Montenegro	150,000	23.1
Greece	2,500,000	22.5
Northern Ireland	380,000	21.9
Croatia	950,000	21.7
Kosovo	415,000	19.5
Latvia	280,000	19.0
Bosnia-Herzegovina	675,000	17.3
Belgium	1,800,000	17.2
Czech republic	1,600,000	16.3
Luxembourg	70,000	15.3
Slovenia	270,000	13.5
Denmark	650,000	12.0
Italy	7,000,000	11.9
Malta	48,000	11.9
Spain	4,500,000	10.4
Estonia	123,000	9.2
Ireland	270,000	8.6
Albania	360,000	8.6
Portugal	900,000	8.5
Slovakia	450,000	8.3
Moldova	300,000	7.1
Ukraine	3,100,000	6.6
Bulgaria	480,000	6.2
England & Wales	3,400,000	6.2
Hungary	560,000	5.5
Scotland	280,000	5.5
Netherlands	510,000	3.9
Poland	510,000	1.3
Lithuania	135,000	0.7
Romania	160,000	0.7
Total	93,231,000	15.7
Total – EU28	79,801,000	15.7

Source: Small Arms Survey²²

¹ The Small Arms Survey presented for each country a “low total estimate”, “a high total estimate” and an “averaged total estimate”. In this table we give the results of the “averaged total estimate”.

2 Gun-related Deaths in Europe

After looking at the prevalence of guns in European societies, in this section we turn to the number of violent deaths in Europe and more particularly, gun-related homicides and suicides. Relatively good statistical information on violent deaths is available for most European countries, although data are often partial and time series incomplete. This explains why the figures mentioned in policy notes are often estimates. The best source for international mortality data at the moment is provided by the World Health Organization (WHO). For data on European countries we can specifically turn to the European Detailed Mortality Database of the WHO Regional Office for Europe²³, which contains detailed mortality data by cause of death. These data are submitted to the WHO by the European member states. It is important, however, to note some of the problems associated with data from medical sources. First, the context of death is not revised after a police investigation or trial. This implies that deaths initially recorded as homicide could have been subsequently determined to be accidental. The numbers of such discrepancies might be low, but as many European countries have small numbers of gun-related homicides and accidents, a small number of revisions could have a significant influence on apparent trends. Further, it is always possible that the medical personnel responsible for generating the data will misreport the context of a death. They might, for instance, register cases of suicide as accidents. Another problem is that police and WHO data on homicides can be systematically mismatched. In Western Europe, WHO data on homicide are for example lower than those reported by the police, while in Eastern Europe police data are lower than those provided by health agencies to the WHO.²⁴ These caveats notwithstanding, the WHO database provides sufficiently reliable data for our present analysis.

First, it is interesting to look at how many gun-related deaths there are in Europe. Figures in the WHO database indicate that between 2000 and 2012, more than 81,000 persons died from lethal firearms wounds in the 33 European countries covered. Given the significant number of missing year-values, we can estimate the total figure of firearms-related deaths in Europe in this period as approximately 94,000ⁱ. For the 27 EU Member States for which data is available,ⁱⁱ this figure corresponds to almost 87,000 deaths. This means that within the EU, approximately 6,700 persons die each year as a result of gunshot wounds. The European countries with the highest (age-standardized) death rates per 100,000 are Montenegro, Serbia, Finland, Cyprus, Croatia and France. The countries with the lowest death rates per 100,000 are Romania, Poland, the United Kingdom, Spain and the Netherlands (see table 5).

ⁱ In this calculation, the missing values for each country were replaced by the average number of firearms-related deaths in the available years.

ⁱⁱ Data for Greece are not available.

Table 5: Firearms-related deaths in 33 European countries, 2000-2012

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average /year	Age- standardized death rate per 100 000
Austria			280	245	229	249	242	210	215	235	247	216	230	236,2	2.10
Belgium				330	309	315	256	210	231	189	197			254,6	1.60
Bulgaria						139	135	107	136	170	107	99	120	112,6	1.50
Croatia	200	160	153	140	165	162	139	146	148	145	133	103	120	147,2	2.37
Cyprus					9	11	12	11	13	15	7	7	24	12,1	2.59
Czech Republic	232	254	223	249	208	188	220	193	191	179	185	224	213	212,2	1.71
Denmark	102	89	96	70	99	92	79	65	67	75	86	71	53	80,3	0.84
Estonia	62	45	48	42	36	38	29	24	26	38	34	41	34	38,2	2.22
Finland	235	270	229	255	253	184	206	197	238	206	195	184	157	216,1	2.68
France	2,479	2,340	2,219	2,263	2,063	2,105	2,041	1,836	1,956	1,864	1,736	1,793		2,057.9	2.35
Germany	1,112	1,102	1,061	1,122	1,145	1,044	953	959	953	936	903	878	819	999.0	0.71
Hungary	117	136	124	112	112	105	85	87	95	85	95	91	95	103.0	0.83
Iceland	8	6	3	5	4	5	8	6	4	4				5.3	1.31
Ireland								41	52	57	46			49.0	1.00
Italy				966			807	799	793	769	798	780		816.0	1.07
Latvia	69	72	69	58	47	43	52	48	47	43	32	42	34	50.5	1.52
Lithuania	111	76	62	66	66	63	45	38	47	50	53	37	39	57.9	1.21
Luxembourg	11	9	13	6	6	9	11	14	11	7	11	6	9	9.5	1.54
FYR Macedonia							50	49	35	34	38			41.2	1.85
Malta	8	5	2	2	7	1	4	8	7	6	9	2	6	5.2	1.52
Montenegro ^{II}						68		49	57	54				57.0	8.20
Netherlands	115	114	105	104	100	104	82	82	78	93	76	96	92	95.5	0.55
Norway	126	109	106	115	103	87	98	67	88	107	87	142	88	101.8	1.62
Poland	211	160	182	154	141	121	97	116	114	116	98	99	104	131.8	0.25
Portugal			221	208				158	160	152	188	142	141	171.3	1.12
Moldova	65	76	57	53	49	33	30	34	21	21	26	37	29	40.8	0.73
Romania	76	59	67	62	51	57	48	35	34	37	42	32	34	48.8	0.15
Serbia	326	350	290	303	276	271	258	289	257	285	284	263	254	285.1	3.03
Slovakia	155	122	128	131	145	113	0	0	83	106	95			98.0	1.62
Slovenia	73	48	65	80	67	61	56	54	61	44	50			59.9	1.95
Spain	331	308	324	350	310	278	293	267	307	322	288	257	261	299.7	0.51
Sweden	169	164	192	141	156	137	139	135	138	157	138	135	141	149.4	1.48
United Kingdom		184	169	174	182	167	199	136	164	138	155			166.8	0.25

Source: European Detailed Mortality Database (WHO)²⁵

Secondly, we can observe a downward trend in the number of firearm related deaths in Europe.

Between 2000 and 2012 the annual number of firearms-related deaths decreased by approximately

20%. With the exception of Cyprus and Ireland, a decrease in the total number of firearms-related

deaths can be observed in all the European countries covered. In larger countries such as France and

^I For the most recent available year

^{II} In the WHO database, the number of firearms deaths in Montenegro for 2000 and 2006 are given as 0. Since these numbers are most probably not correct, we exclude them from this table and further analyses.

Germany, for example, the total number of firearms-related deaths decreased by as much as 26-28%. While a general downward trend can be observed, this trend seems to have been especially strong among Central and Eastern European countries. In countries such as Estonia, Latvia, Lithuania, Poland, Moldova and Romania, the total number of firearm-related deaths halved from 2000-2012.

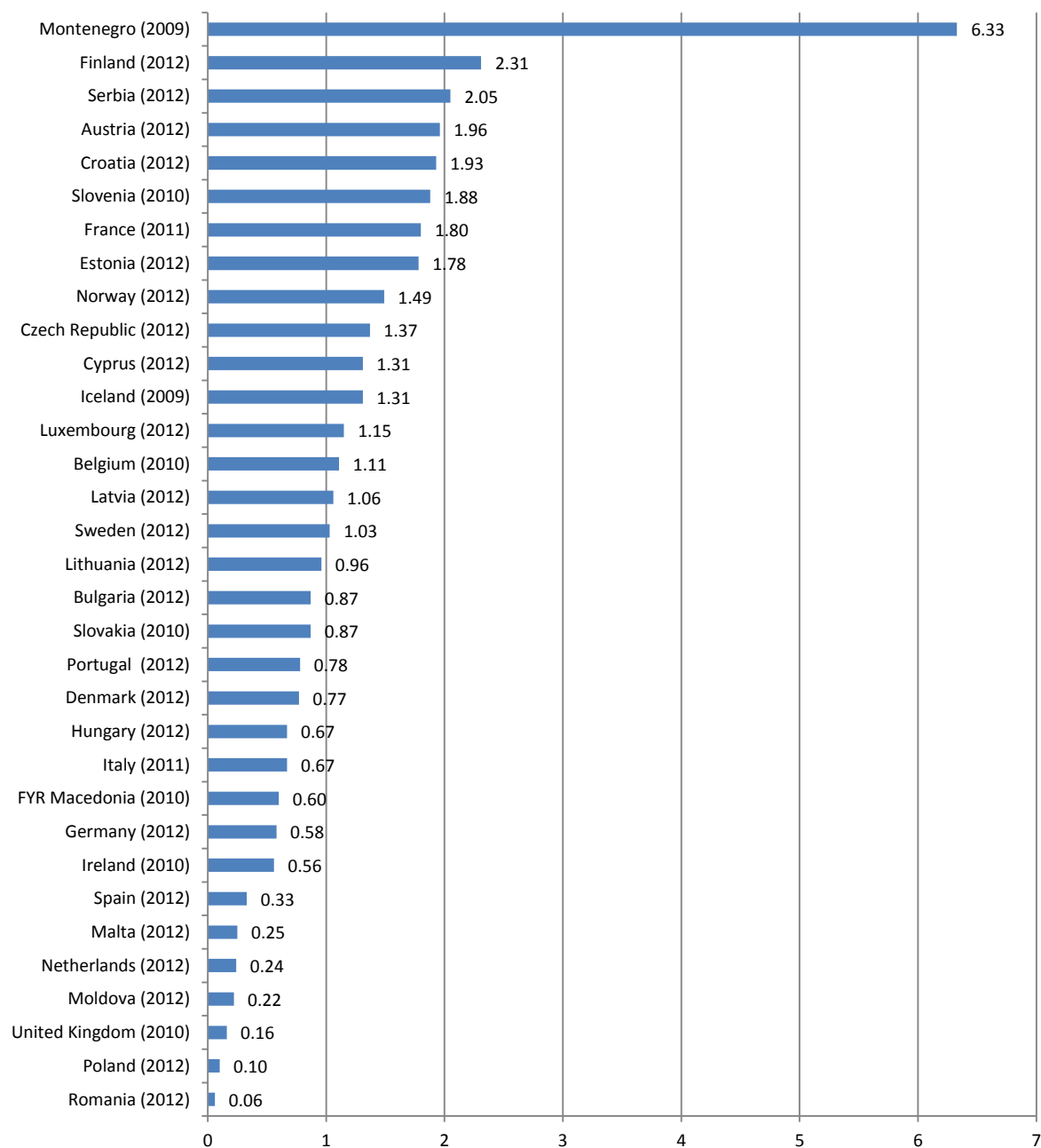
Third, our analyses of WHO data show that the vast majority of firearms-related deaths in Europe are the result of successful suicide attempts. Approximately three-quarter of the reported gun deaths in this period were suicides: of the 81,556 recorded cases of gun deaths in Europe in 2000-2012, almost 60,000 were cases of suicide. Gun suicides were the most important form of gun deaths in almost all European countries: only in the Netherlands, FYR Macedonia and Moldova could a higher number of gun homicides than gun suicides be observed. With 12,016 recorded cases in the same period, homicides accounted for 15% of the firearms-related deaths in Europe (see tables 13 and 15 in Annex). The other firearms-related deaths were the result of accidents, or cases in which the cause of death could not easily be determined. In the remaining paragraphs of this section, we will go more deeply into the findings of our analyses of available data on gun suicides and gun homicides.

2.1 Suicide

Based on the available WHO data, we can reliably estimate the total annual number of gun suicides in the 33 European countries concerned to be approximately 5,250, of which 5,000 take place within the EU. Of all successful suicide attempts in Europe, approximately 9% are undertaken with a firearm. Significant differences can be discerned between different European countries in this respect. In countries such as Montenegro, Cyprus, Austria, Finland and Norway the relevant percentage is 16-38%, while in countries such as Poland, Moldova, Romania and the Netherlands the percentage is 2% or lower (see table 13 in Annex). In contrast to the general strong decline in total numbers of gun deaths, no similar trend can be seen with regard to gun suicides. While the number of gun suicides decreased spectacularly over the reporting period in France and Germany (see table 13 in Annex), this was not a general trend in Europe. In most European countries a decrease could be observed, but this decrease was often rather small. In addition, the available data indicates that in countries such as Bulgaria, Cyprus and Portugal the number of gunshot suicides increased quite strongly in the later years of the period. This finding of divergent national trends in the number of gun suicides is not surprising and confirms the results of earlier studies.²⁶

According to the WHO data, the countries with the highest (age-standardized) gun suicide rates per 100,000 were Montenegro, Finland, Serbia, Austria and Croatia, while the countries with the lowest gun suicide rates were Romania, Poland, the United Kingdom, Moldova and the Netherlands (see figure 6).

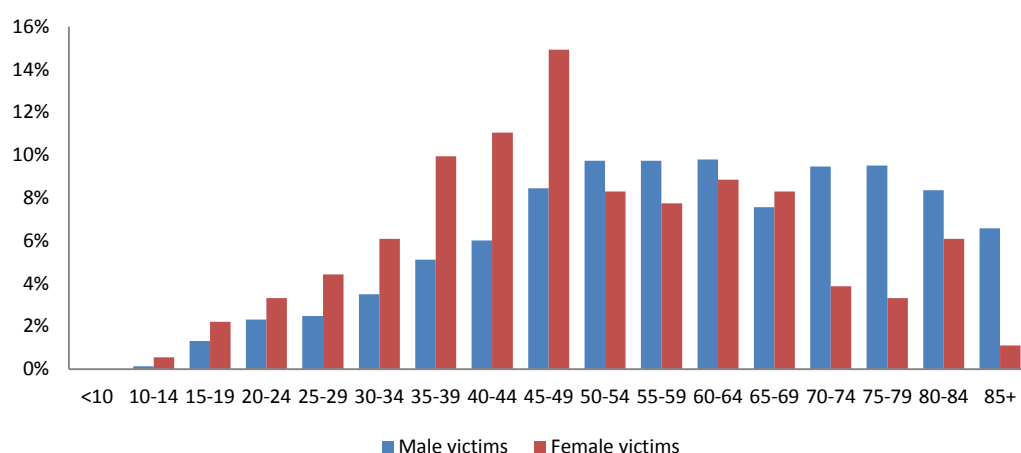
Figure 6: age-standardized gun suicide rates per 100,000 persons in 33 European countries, most recent available year



Source: European Detailed Mortality Database (WHO)²⁷

The international literature suggests that it is mainly men who use firearms to commit suicide, and this is confirmed by the European WHO data. The overwhelming majority of gun suicides in Europe over the period involved men (96%), while the number of women using a firearm was limited. Most gun suicides were perpetrated by older men: more than two thirds of all male suicide victims were at least 50 years old and almost half (42%) of all male suicide victims were aged at least 65 (see figure 7). Those few women who used a firearm to commit suicide were generally somewhat younger: half of them were between 30 and 55 years old. While in the United States much attention has been given to minors committing suicides with firearms, youth suicides with firearms are not common in Europe. When analysing the European WHO data we find that 71 gunshot suicides victims younger than 20 years old were recorded in Europe in the most recent available year. This group therefore represented only 1.3% of all gun suicide victims. More information on the context in which these gun suicides took place is lacking in the WHO data. Previous research has consistently demonstrated that the shots are usually aimed at the head (mouth, temple, forehead) or the chest.²⁸ In addition, research has indicated that gun suicides most frequently take place at home,²⁹ that the suicides often had alcohol in their blood,³⁰ and that a majority were neither in contact with psychiatric services nor had a history of previous self-harm.³¹

Figure 7: age-distribution of male and female gunshot suicide victims, Europe, most recent year



Source: European Detailed Mortality Database (WHO)³²

A comparison of the results of previous studies on gun suicides in specific European countries (Denmark, Italy, England, Germany, Scotland and Sweden)³³ shows rather inconsistent findings with regard to the type of gun used. Although in most countries shotguns were the main type of gun used to commit suicide, the distribution of the types of guns used for the purpose differed from country to country. The WHO database does not contain reliable information on the type of firearm used to commit suicides for all European countries covered. Although distinct categories are provided for suicides using a (1) handgun, (2) rifle, shotgun or larger firearm, and (3) other or unspecified firearms, for most

European countries the vast majority of suicides are categorized in the latter category. We analysed the distribution of the types of firearms used to commit suicide for the five most recent available years for the 33 European countries included in the WHO database (see table 14 in Annex) and found only 11 countries where the share of “other or unspecified firearm discharge” was below 50%.

An analysis of the types of guns used for suicide in these 11 countries shows a remarkable difference. For the Nordic and Western European countries (Denmark, Finland, Iceland, Ireland, Sweden and the United Kingdom), the data suggest that long guns such as shotguns or rifles were used in the overwhelming majority of successful gunshot suicides, while for the other countries (Bulgaria, Czech Republic, Lithuania, Serbia, Slovakia), handguns were most frequently used in successful gunshot suicides (see table 6).

Table 6: Types of firearms used for gun suicides¹ in 11 selected European countries (over the five most recent available years)

	Handgun discharge	Rifle/shotgun/ larger firearm discharge	Other and unspecified firearms discharge	Total
Bulgaria (2008-2012)	225	26	97	348
%	65%	7%	28%	100
Czech Republic (2008-2012)	326	74	358	758
%	43%	10%	47%	100
Denmark (2008-2012)	69	216	21	306
%	23%	71%	7%	100
Finland (2008-2012)	283	541	47	871
%	32%	62%	5%	100
Iceland (2005-2009)	0	17	7	24
%	0%	71%	29%	100
Ireland (2007-2010)*	5	51	47	103
%	5%	50%	46%	100
Lithuania (2008-2012)	43	23	60	126
%	34%	18%	48%	100
Serbia (2008-2012)	550	131	243	924
%	60%	14%	26%	100
Slovakia (2006-2010)	91	33	28	152
%	60%	22%	18%	100
Sweden (2008-2012)	88	372	140	600
%	15%	62%	23%	100
United Kingdom (2006-2010)	8	303	250	561
%	1%	54%	45%	100

* For Ireland only data from 2007-2010 is available

Source: European Detailed Mortality Database (WHO)³⁴, own calculations

¹ We used ICD10 codes x72 (Intentional self-harm by handgun discharge), x73 (Intentional self-harm by rifle, shotgun and larger firearm discharge) and x74 (Intentional self-harm by other and unspecified firearm discharge)

Comparing these results with the analysis of types of firearms possessed in the different countries according to the ICVS (see table 1) strongly suggests that the types of firearms used to commit suicides across European countries reflect the general ownership rates of the different types of firearms in these countries. In countries with rather lower percentages of handgun possession, we tend to observe low percentages of the use of a handgun in gunshot suicides.

A relationship between gun possession and gun suicides can also be deduced from other findings of the rather limited number of European studies focusing on gun suicides. The results of a UK study, for example, indicate that a large majority of the firearms used were owned by the deceased. In the other cases, the firearm was most often acquired within 24 hours of death and usually belonged to relatives or a friend.³⁵ Despite the differences in types of guns used for suicide, the studies that looked into the legal status of the firearms used generally indicate that most gunshot suicides are committed with legally-held firearms.³⁶ In addition, some studies have found that a significant share of guns used were service weapons³⁷ or were perpetrated by persons with professional access to firearms³⁸. Information on the legal status of the firearm used is not available in the WHO data and can therefore not be analysed in this report.

2.2 Homicide

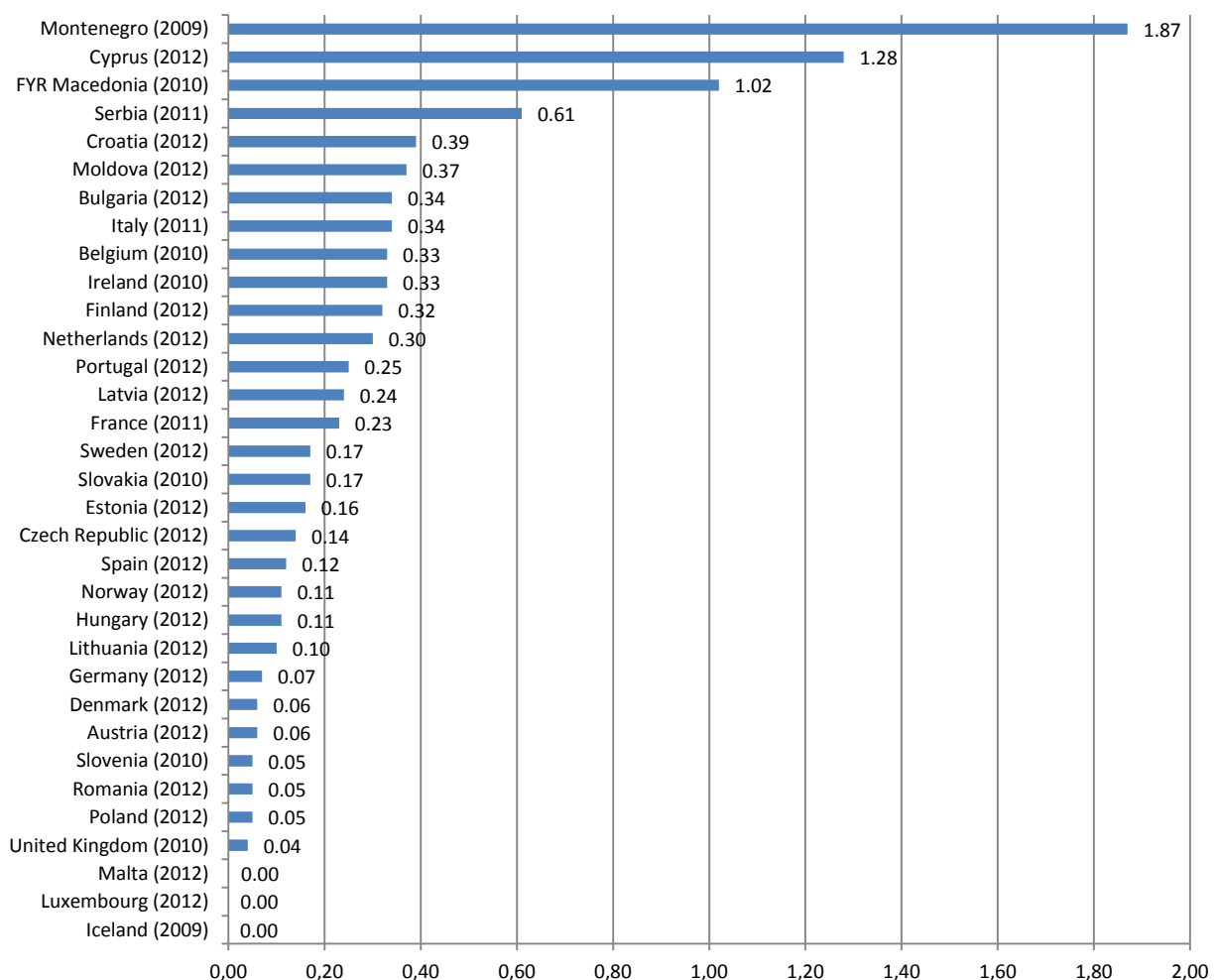
In a recent study the United Nations Office on Drugs and Crime (UNODC) estimated that in 2012 approximately 437,000 persons across the world died as the result of an intentional homicide in a non-conflict situation. This comes down to 6.2 homicide victims per 100,000 persons. There are, however, large differences in homicide rates between regions and sub-regions. The homicide rate in Europe is considered among the lowest in the world³⁹ and this is probably one of the main reasons for the relative scarcity of homicide research in Europe. Research on homicides has long been dominated by scholars from the United States. An increasing amount of European homicide research has, indeed, been undertaken, often examining whether US-based findings hold good in Europe as well. But much of this research has been relatively concentrated in specific countries with strong homicide research traditions such as the United Kingdom, the Netherlands and Finland, or has focused on specific sub-types of homicide such as intimate partner homicides or murder-suicides.⁴⁰ This means that rather little information is available on gun homicides across Europe.

Analysis of the WHO data indicates that between 2000 and 2012, European countries registered more than 12,000 homicides committed using a firearm. From these figures we can estimate the total number of gun homicides in this period to be approximately 15,000 in Europe and 13,200 within the EU (see table 15 in Annex). This comes down to 1,500 gun homicides per year in Europe and 1,000 gun homicides per year within the EU. The WHO data indicate that a gun was used in approximately 20% of all successful homicide attempts in Europe. This is a rather low proportion, given that firearms are the

most widely used weapons for homicides on a global level (41%).⁴¹ The European countries with the highest shares of gun homicide in the total numbers of homicides were Montenegro (93%), Cyprus (63%), FYR Macedonia (50%), Italy (45%) and Ireland (42%).

The chance of becoming a victim of gun homicide differs strongly across Europe (see figure 8). The European countries with the highest firearm homicide rates per 100,000 inhabitants are Montenegro, Cyprus, and FYR Macedonia. The European countries with the lowest firearm homicide rates per 100,000 inhabitants are Iceland, Luxembourg, Malta, the United Kingdom, Poland, Slovenia, Austria, Denmark and Germany.

Figure 8: age-standardized gun homicide rates per 100,000 persons in 33 European countries, most recent available year



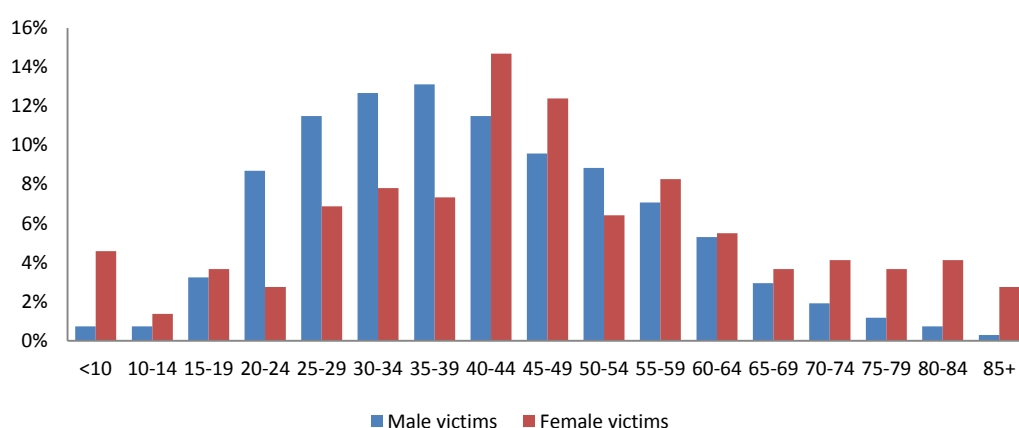
Source: European Detailed Mortality Database (WHO)⁴²

Interestingly, as with the total number of gun deaths, a general downward trend can also be observed in the number of gun homicides in Europe: of the 30 countries with a total of more than 5 gun homicides in 2000, 27 experienced a significant decrease in gun homicides by 2012. In countries such as Germany and Spain, for example, the number of gun homicides decreased from respectively 101 and 105 in 2000

to 61 in 2012. An especially spectacular decline can be observed in Central and Eastern European countries and the Baltic States. In countries such as Croatia and Poland the number of gun homicides decreased from respectively 48 and 79 in 2000 to 17 and 20 in 2012, while in Estonia, Latvia and Lithuania we can observe a decrease from respectively 23, 31 and 51 gun homicides in 2000 to 2, 5 and 3 gun homicides in 2012 (see table 15 in Annex). Only in France, FYR Macedonia and Ireland does a slightly different picture emerge: in the first two countries the decline was rather limited, while in the latter a slight increase in the (rather small) number of gun homicides can be observed in recent years. The decrease in gunshot homicides in Europe does not come as a surprise, since the given period also showed a general decline in overall homicides rates across Europe.

European studies on gun homicide indicate that men are more often the victims of homicide than women.⁴³ The high proportion of men among homicide victims is confirmed by the European WHO data: in all European countries the number of male gun homicide victims was higher than the number of female gun homicide victims. In total 76% of all homicide victims in Europe over the period were men. Our analysis of the WHO data further indicates that the risk of becoming a homicide victim increases significantly when men enter their early twenties, and this homicide risk reaches its peak for them between the age of 35 and 39. Half of all male homicide victims over the period were between 25 and 44 years old. The female homicide risk, on the other hand, reaches its peak between the age of 40-49. While younger men are particularly vulnerable for homicide, most female homicide victims are older women (see figure 9). In the UK, a trend towards increasingly younger victims of firearm-related violence has been observed;⁴⁴ but it is unclear to what extent this trend can be generalized to other European countries.

Figure 9: age-distribution of male and female gunshot homicide victims, Europe, most recent year



Source: European Detailed Mortality Database (WHO)⁴⁵

Some research has been undertaken into the types of firearms used for gun homicides in Europe, but they have yielded divergent results.⁴⁶ In the WHO database, reliable information on the type of firearm used in gun homicides in Europe is lacking for most European countries. There are only seven European

countries for which the WHO data show a proportion of “other or unspecified firearm discharge” lower than 50%. With the exception of Slovakia (which recorded only a small number of gunshot homicides), we can observe that in all of these countries more homicides were committed with handguns than with shotguns or rifles (see table 7). Even though most countries in this table are Central European ones, this finding suggests that different types of firearms are generally used for homicides than for suicides. Comparing the results of analyses on the types of firearm used for homicides and suicides for all available European countries (see tables 14 and 16 in Annex), we can observe that even in countries with high ratios of shotgun/rifle use for suicides, handguns are more regularly used for homicides.

Table 7: Types of firearms used for gun homicides¹ in seven selected European countries (for the five most recent available years)

	Handgun discharge	Rifle/shotgun/larger firearm discharge	Other and unspecified firearms discharge	Total
Bulgaria (2008-2012)	86	17	45	148
%	58%	11%	30%	100
Czech Republic (2008-2012)	49	6	25	80
%	61%	8%	31%	16
Denmark (2008-2012)	22	11	8	41
%	54%	27%	20%	6
Finland (2008-2012)	34	31	35	100
%	34%	31%	35%	100
Lithuania (2008-2012)	19	7	15	41
%	46%	17%	37%	100
Serbia (2008-2012)	143	22	72	237
%	60%	9%	30%	100
Slovakia (2006-2010)	9	12	8	29
%	31%	41%	28%	100

Source: European Detailed Mortality Database (WHO)⁴⁷, own calculations

The UN Office on Drugs and Crime has identified three types of homicides: homicide related to other criminal activities, interpersonal homicide, and socio-political homicide. These types of homicide take place in very different contexts. Within the group of *homicides related to other criminal activities*, two sub-groups can be distinguished. First are the homicides committed by organized criminal groups, which are generally deliberate and aimed at achieving long-term goals, for example the elimination of rivals, making a show of strength and/or securing territory. The perpetrators and victims of homicides related to criminal activities are generally male. The second type are homicides committed while perpetrating other conventional criminal activities such as a robbery. Although they are sometimes perpetrated in order to accomplish the original crime and/or avoid detection, these homicides are generally less deliberate and can be considered as collateral damage from the perpetrators’ viewpoint.

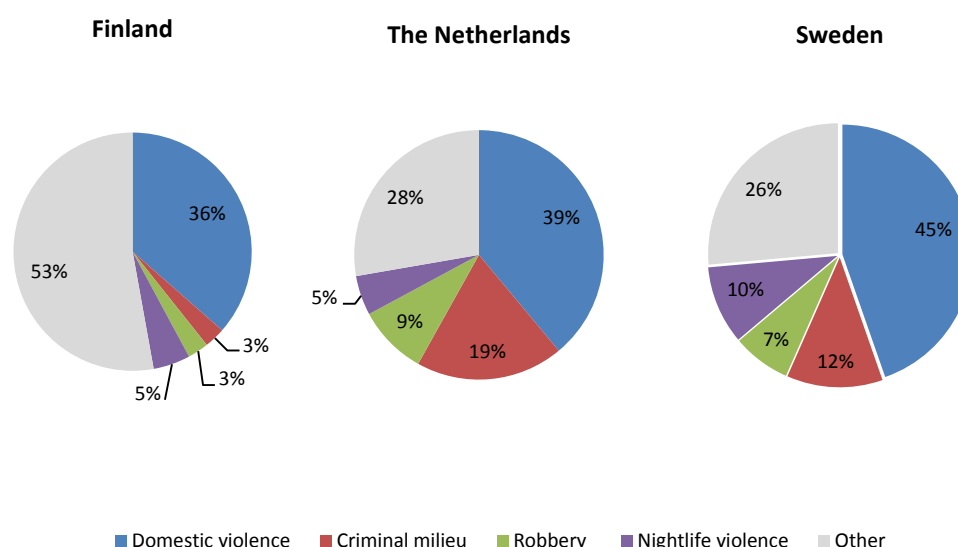
¹ We used ICD10 codes x93 (Assault by handgun discharge), x94 (Assault by rifle, shotgun and larger firearm discharge) and x95 (Assault by other and unspecified firearm discharge)

Interpersonal homicides are generally linked to an interpersonal conflict; often involve intimate partners or family members; and can be the result of a premeditated design or a more impulsive act of violence. In contrast to the other types of homicide, the incidence of intimate partner/family violence is rather stable on a global level. In addition, the female victim rates of these homicides are generally higher than the male victim rates.

Socio-political homicides such as hate crimes or terrorist attacks are generally committed in the public sphere and seen by the perpetrator as instrumental in pushing a social or political agenda. These homicides are generally the result of premeditation and organization. In contrast to interpersonal homicides, the perpetrator often does not know the victim; victims are chosen for what they represent and/or for the message the homicide sends to the rest of the population.⁴⁸

The WHO data do not provide an insight into the distribution of firearms-related homicides between these three different types, but an analysis of homicides in three European countries (Finland, the Netherlands and Sweden) suggests that the majority of homicides in Europe are the fatal result of interpersonal violence in the domestic sphere (perpetrated by the intimate (ex-)partner, or other family-related violence).⁴⁹ The number of homicides in the criminal milieu varies from country to country, but they occur much less frequently (see figure 10). Despite the recent terrorist attacks in Paris (January 2015) and Utøya (in July 2011), killing respectively 12 and 77 persons, socio-political homicides in Europe do not occur very frequently and are thus not representative for most homicides in Europe.⁵⁰ Interestingly, gender differences have been frequently observed in the relationship between victim and perpetrator: female victims are much more likely to be killed by an (ex-)partner or family member than are men.⁵¹ The pattern that often emerges is that women are typically killed following domestic disputes, while men are killed in a wider array of contexts.

Figure 10: Share of homicides, by typology, in Finland, the Netherlands and Sweden, 2003-2006



Source: European Homicide Monitor⁵²

The observation that younger men and older women in particular are vulnerable to gunshot homicides (see figure 9) may be a reflection of the existence of different types of homicide with specific demographics groups as their prime targets. One could argue, for example, that young men are at a higher risk of becoming the victim of criminal-related homicides, while older women are particularly at risk for homicides following domestic disputes; but until more data becomes available this remains a hypothesis.

In addition, previous research suggests that different types of guns are used for different types of homicides. A study on gun homicides in Oslo (Norway) and Copenhagen (Denmark) found that female victims were typically shot with a shotgun in their own house by their partner, while male victims were shot on different locations, most often with a handgun, for a variety of reasons such as revenge or financial disputes and for the most part by an acquaintance.⁵³ Handguns seem to be more popular as a weapon in criminal homicides. An analysis of all homicides occurring between 1988 and 2003 in the southern Italian province of Apulia, where organized crime groups hold control over illegal business, indicate that pistols were used in almost two thirds of cases where the type of firearm was known.⁵⁴ The overwhelming majority of homicides in that region are motivated by battles for turf control between rival organized crime groups, including juvenile gangs; in the context of a robbery; or in an attempt to avoid arrest.⁵⁵

Research on the legal status of the firearms used in gun homicides in Europe is largely lacking. In contrast to the findings of studies on gun suicides, the few European studies on gun homicides that have analysed the legal status of the guns used found that the majority of them were illegally held.⁵⁶ Not all

European studies came to this conclusion, however. An older study on gun deaths in Denmark found that the majority of gun homicides in Denmark were committed with legally held firearms (either freely accessible weapons, or licensed firearms).⁵⁷

3 *Gun Ownership and Violent Death: lessons from previous research*

In the previous paragraphs we looked at the available data on firearms ownership and the levels of violent death in Europe. Based on these data, we will now review the results of previous research on the possible associations between these two variables. The central question is whether the prevalence or availability of guns in societies is positively or negatively linked to the rates of violent death (gun-related and overall), or whether they are not related in any systematic way. In other words, we ask whether more guns in society are linked to higher levels of violent death, or (to test a hypothesis sometimes put forward by pro-gun lobbies) whether high levels of gun possession are related to low levels of violent death.

Studies analyzing the relationship between firearms availability and violent death specifically for the European context are relatively scarce. There is a body of literature on the links between gun possession and violence but, as we have noted, most of it is American. Given the particularities of the gun situation in the US, we should be careful in translating the results of this literature to the European context. Nonetheless, this literature offers an interesting starting-point for seeking insight into the relationship between gun availability and violent deaths. The existing studies originate from different disciplines and use various research designs and methods. An important distinction can be made, for instance, between individual-level and population-level studies. In the following paragraphs we will give an overview of the main findings of both types of studies. In public debates, it often happens that only a limited number of dispersed case studies are cited: which of course brings the risk of bias. To avoid this risk, we will primarily focus on the findings of systematic reviews of available studies.

3.1 Individual-level versus population-level studies

Individual-level studies, often conducted by public health experts, relate gun possession by a person or in a household to the risk of that person's dying as a result of suicide or homicide. These studies are generally case-controls studies in which a group of suicide or homicide victims is compared to a matched group of persons who are either still alive or dead from other causes. The goal is to identify risk factors for victimization. These controls are typically matched with carefully selected individual variables that might be relevant, such as gender and different socio-economic variables, and result in a number of probability ratios that reflect the increased risk of suicide or homicide when possessing a firearm at home. Some of the limitations of this method arise from the non-random selection of cases or controls,

and from mis-classification of the outcome (suicide or homicide) or of the facts of gun ownership¹. In addition, the results may always be confounded by other variables that were not included in the analysis.⁵⁸

In *population-level* studies the unit of analysis is not the individual but a larger community. These studies typically assess the correlations between the rate of gun ownership and suicide and/or homicide rates at the international or national level. As in individual-level studies, a number of unobserved and complicating factors might be associated both with gun ownership and with the risk of falling victim to violent death. Because these variables are not counted in, there is always the risk that research results point to associations that may be spurious. Most population-level studies therefore try to limit this danger by including several control variables such as rates of criminality, urbanization, poverty, unemployment or depression.⁵⁹

In a recent study, Bangalore and Messerli looked at the relationship between guns and deaths in 27 developed countries.⁶⁰ They found a significant positive correlation between the number of guns per capita per country and the rate of firearm-related deaths. These findings, however, have a limited range. First, the authors did not check for correlations with *overall* violent death rates. Further, looking at absolute levels of violent death is crucial. The overriding motivation of policy efforts to restrict the availability of guns is, after all, to reduce deaths and injuries from all sources, not only through the use of firearms. Moreover, Bangalore and Messerli's findings have limited significance because the authors did not distinguish between suicides and homicides, a distinction that is commonly considered important in research on connections between guns and violent deaths. Over the last decades there have been a number of studies that not only took into account the absolute levels of violent deaths, but also looked at homicide and suicide separately. The following paragraphs offer an overview of the most important findings of these studies, and elaborate on the dynamics that seem to be at play to explain the relationship between gun availability, suicide rates and homicide rates.

3.2 Suicide

In a 2014 international review of individual-level studies, Anglemeyer and colleagues found that access to firearms is associated with a higher risk for completed suicide. Among persons with access to firearms, they found significantly increased odds of completed suicide compared with those without access. Citing previous studies, they noted that the increased risk for suicide associated with firearms in the house is not unique to persons with a history of mental illness, and may be more of an indicator of the ease of impulsive suicide. In other words, guns in the home appear to convey a particularly

¹ Stroebe illustrates this last point by pointing to the result of a study on the validity of self-reported data on the presence of a firearm in the household, which suggested that 11% of the responses by household members on gun possession were invalid. Stroebe, W (2013), 'Firearm possession and violent death: A critical review', *Aggression and Violent Behavior*, 18 (6), p.709-721.

increased risk for suicide in persons with no apparent psychopathology. They add that the way weapons are kept plays a role: firearms that are stored loaded or unlocked are more likely to be used than those that are unloaded or locked away. Anglemeyer and colleagues concluded that the evidence they reviewed highlighted the risks of having a firearm in the home, and that restricting that access might effectively prevent injury.⁶¹

A number of population-level studies have also focused on the potential relationship between gun possession and suicide rates. A multi-level modelling of the available international longitudinal data by Ajdacic-Gross and colleagues confirms the effect of gun availability on firearms suicides: the proportion of households possessing firearms overwhelmingly influences gun suicide rates.⁶² Looking at the societal level, David Hemenway points out that evidence from many population-level studies of guns and violent deaths is as strong as that from individual-level studies. Mainly reviewing US studies, he notes that across US cities, states, and regions, higher levels of household gun ownership are associated with higher firearm-related *and* overall suicide rates. He adds that these studies show that adults in households with firearms are no more depressed or suicidal than those in households without firearms, yet they are far more likely to die of suicide.⁶³ In Europe a limited number of population-level studies have been conducted to investigate the relationship between gun availability and firearm suicides. In 2010, Ajdacic-Gross and colleagues found that Swiss cantons where firearms ownership in private households is more frequent also tend to have higher proportions of firearms suicides.⁶⁴ In Austria, Etzersdorfer et al. found a strong correlation between the average number of gun licences issued in the nine Austrian *Länder* (1990-2000) and gunshot suicides. The number of licences was only weakly correlated, and for some of the years under investigation negatively correlated, with other methods of committing suicide and with the suicide rate in general.⁶⁵

The link between the availability of a weapon and committing suicide, among other things, can also be deduced from findings in studies on gunshot suicides with regard to the type of firearm used. First of all, a number of studies have demonstrated that the proportion of handguns used for gunshot suicides is much lower in places where they are less available because the legal acquisition of these firearms is limited (Avis, 1994). Secondly, some citizens have easier access to (certain types of) firearms because of their professional activities. This difference in access is reflected in the type of weapon used to commit suicide. A study on gun-shot suicides in Northern Ireland, for example, found an interesting difference with regard to the types of firearms used by security forces and by civilians who committed suicide. While civilians mostly used shotguns to commit suicide (78%), members of the security forces mostly used handguns (84%).

When comparing the results of cross-national studies, the National Research Council, a research body linked to the US National Academies, concluded that a consistent association between gun ownership and the share of gun suicides exists, but in contrast to US studies, the cross-national studies do not reveal a consistent association between gun ownership and *overall* suicide rates.⁶⁶ The results of two

often-cited studies illustrate this pattern of non-consistent findings. Using data from the 1989 International Crime Survey on gun ownership and WHO data on suicides for 14 countries, Killias found significant positive correlations between the rates of household gun ownership and the national rates of suicide (with a gun and overall), as well as with the proportion of suicides committed with a gun. This would mean not only that the more guns there were in a country, the higher the suicide rates were, but also that more of these suicides were committed with a gun. The study showed no negative correlation between the rates of gun ownership and the rates of suicide committed by other means. This, according to Killias, indicated that the other means were not used to substitute for the absence of guns in countries with a lower rate of gun ownership.⁶⁷ When this study was updated in 2001 by Killias, Van Kesteren and Rindlisbacher, using data from the International Victimization Surveys of 1989, 1992 and 1996, the results were different: while very strong correlations between the presence of guns in the home and suicide committed with a gun were found, only non-significant correlations were found for overall suicide rates.⁶⁸

The results of the above-mentioned studies consistently demonstrate a clear link between gun possession rates and gun-related suicides, and some studies suggest a link between gun possession rates and the overall suicide rate. Going beyond merely analyzing connections between gun availability and violent death, a number of studies have looked more in detail at the dynamics that seem to play a role in explaining these relationships. With regard to suicide, an important distinction should be made between suicide intent and suicide risk. Several factors play a role in the outcome of a suicide attempt, including the degree of intent and the lethality of the method used. In this section we will elaborate on the different dynamics that seem to be at play. Two key concepts deserve particular attention: the lethality of firearms, and the degree of impulsiveness on the perpetrator's part.

A first factor we need to take into account is that using a firearm is generally considered to be the most lethal method for committing suicide. Traditionally, much of the literature on suicide risks has emphasized the lethality of the chosen method. Individuals generally have a preference for a specific suicide method, formed by an interplay of personal characteristics and cultural factors. A number of more context-specific aspects will also play a role, such as the availability of certain means, the technical skills needed, the degree of disfigurement after death, or the symbolism of choosing a particular way to die.⁶⁹ An analysis of the success rate of different suicide methods in the United States demonstrates that the use of a firearm is by far the most lethal for committing suicide: while 85% of all suicide attempts with a firearm are fatal, this percentage drops to 69% for hanging and 31% for jumping off a high building (see table 8). The highly lethal nature of firearms-related suicide attempts has been confirmed by other studies, and it has been shown that the lethal nature of gunshot suicide attempts does not differ significantly as between men and women or between adults or minors.⁷⁰

Table 8: Overview of percentage of fatal injuries resulting from an attempted suicide by different methods, United States, 2001 (N=353,613)

Method	% fatal
Firearm	85%
Suffocation/inhalation	69%
Fall	31%
Poisoning/overdose	2%
Cutting/piercing	1%
Other	3%
Unspecified	7%
Total	9%

Source: Vyrostek, Annest & Ryan⁷¹

After reviewing almost 100 studies evaluating different suicide prevention strategies, Mann and colleagues confirm that suicide attempts using highly lethal methods result in higher death rates. They further conclude that the suicide rates under study decreased after restricting access to these means, for example by placing restrictions on pesticides, by constructing barriers at jumping sites, or by increasing firearm controls. Where the use of these lethal methods is common, such restrictions on available means have led to lower overall suicide rates.⁷²

A second factor we need to take into account is the nature of a suicide attempt, in particular the question of whether it results from an impulsive decision or reflects a longer history of psychiatric treatment or previous suicide attempts. In their study on suicide prevention methods, Florentine and Crane argue that *“the fundamental assumption underlying attempts to limit access to suicide methods is that, in many cases, periods of high suicide risk are relatively short and limiting access may delay an attempt until the period of high-risk passes”*.⁷³ It is clear that cases of suicide can vary strongly in the degree of premeditation. Earlier research suggests that a significant proportion of suicide attempts are impulsive acts.⁷⁴ According to American research, for example, more than two thirds of persons who made near lethal suicide attempts took less than one hour between the decision to kill themselves and the actual attempt. Almost a quarter took less than five hours.⁷⁵ Similar findings from other studies also point to the short-time frame between the first thought of suicide and the actual attempt, for a large number of suicide attempts.⁷⁶

A number of studies have indicated that the availability of firearms to impulsive persons may account for high rates of gunshot suicides.⁷⁷ In their review of the UK literature on gunshot suicides, Haw et al (2004) conclude that those who commit suicide with a firearm are less likely to have current or past mental health problems, are less likely to have a history of self-harm, and are more likely to have had a recent relationship dispute than people who committed suicide by other means.⁷⁸ Similar results were found in a study on differences in characteristics of suicides using different methods in Finland: persons who committed suicide by using a firearm less often had a history of psychiatric treatment or previous suicide attempts. Their suicides were often associated with recent life events and with alcohol in the

blood at the time of death.⁷⁹ This finding is not surprising, since previous US studies demonstrated that a significant share of the perpetrators of gunshot suicides had used alcohol or drugs and/or had experienced an interpersonal conflict within 24 hours before the attempt, while only a small minority of the perpetrators had a past history of suicide attempts.⁸⁰ Jackson and Marsh have noted that such findings “supports the hypothesis that access to firearms is particularly relevant in cases in which the suicide was impulsive and major risk factors were absent”. They conclude that “if they are determined, people will be able to find the means to kill themselves”, but that “in practice it appears that as many suicides are impulsive the availability of firearms does affect overall levels of suicide”.⁸¹ US studies suggest that impulsive behaviour is especially problematic with regard to potential youth suicides. More particularly, an alcohol/gun-suicide connection seems to exist among adolescents, given that adolescents who used a firearm to commit suicide were substantially more likely to have been drinking than those who used a different method.⁸²

The lethality of the instrument of choice and impulsiveness seem to be mutually reinforcing dynamics in explaining the outcome of suicide attempts: “Firearms are lethal instruments requiring relatively little expert knowledge to operate them, so they may be the instrument of choice to those acting on impulse who are seeking a certain and rapid death”.⁸³ The question that must be raised here is whether a substitution of means will occur when the availability of instruments of first choice is limited – for example through policy intervention – and what the impact of this substitution will be on the lethality of suicide attempts. After reviewing more than 40 different studies on the risk of method substitution with regard to suicide, Daigle concluded that the risk of a preferred instrument being substituted by other means seems small. In particular, individual-level studies demonstrate that many suicidal persons have a preference for a specific method, and that limited access to this means by an individual will not automatically lead to a shift towards another suicide method.⁸⁴ Other studies have acknowledged the impact of limiting access to certain means on the short-term, but have stressed that this does little to prevent suicidal behaviour in the longer term except by buying time for medical or psychosocial interventions.⁸⁵

Although we know that the restriction of means does not address the root problem of many persons who contemplate committing suicide, this restriction of means can play an important role in the prevention of suicides. As Florentine and Crane correctly point out: “The fundamental assumption underlying attempts to limit access to suicide methods is that, in many cases, periods of high suicide risk are relatively short and limiting access may delay an attempt until the period of high-risk passes”.⁸⁶ Despite the possibility of substitution, limiting access to highly lethal means such as firearms can play an important role in decreasing overall suicide rates: “It is recognized that suicidal crisis are usually of short duration and that, if their fatal outcome is prevented, they will not be repeated or help will be made available in the meantime. At worst, suicidal individuals deprived of their preferred means of committing suicide will fall back on another, possibly less lethal, method”.⁸⁷ Reducing access to a highly lethal

method, such as a firearm, can thus decrease the total number of suicides even where substitution occurs, since the proportion of people who survive the suicide attempts will increase.

Another factor we must take into account when trying to interpret the correlations found between gun possession and gun suicides is that some people acquire a firearm for the specific purpose of committing suicide or for killing someone else (reversed causality). A number of American studies have demonstrated that the risk of suicide is significantly higher after a recent purchase of a firearm. Based on a case-control study among members of a health maintenance organization in Washington State (USA), Cummings and colleagues found, for example, that within the first year of the purchase of a handgun by a family member the relative risk of committing suicide was more than five times higher than that of the general population.⁸⁸ A similar observation was made by Wintemute and colleagues. In addition, they found that the relative risk of suicide was the highest in the first week after the purchase, and declined thereafter. This strongly suggests that a significant number of persons buy a firearm with the specific intention to commit suicide with it.⁸⁹ Yet this reversed causality alone cannot entirely explain the oft-demonstrated correlations, since several studies have found that minors - who are generally not allowed to purchase firearms - are also at a higher risk of suicide if a firearm is present at home.⁹⁰ Interestingly, the above-mentioned studies found that after the first year, the increased relative risk for suicide persisted at a lower level for years. This corresponds with the hypothesis that a gun at home may facilitate suicide in times of despair.

3.3 Homicide

Most studies on the possible linkages between gun possession and firearms related deaths have focused on suicide. Sound research, and especially European studies, on the specific linkage between gun ownership and homicides is more difficult to find.

The lack of good data and sound research is an important stumbling block in advancing our knowledge on this issue. According to the UNODC, hypotheses about these linkages tend to fall into two categories: *“One suggests that easy access to firearms may facilitate the commission of homicide in a variety of ways, including by fostering violent confrontations and by increasing their lethality, as well as, on a different note, by facilitating the commission of crimes and the execution of targeted killings. The second hypothesis suggests, on the other hand, that widespread availability of firearms may be a deterrent to assault and aggressions, in that it may reduce the leverage and motivation of an armed perpetrator. A number of methodological challenges, starting with the shortage of data on firearm availability, make it difficult to provide definitive answers in either direction”.*⁹¹ Nonetheless, the results of a recent survey among 85 authors of studies on firearms that were published in peer-reviewed journals indicates that only 12% disagreed with the statement that “strong gun laws help reduce homicide”, while 71% of them agreed. Among those who believed they were knowledgeable or very knowledgeable about this issue

the latter percentage increased to 77%. The support for this statement was most pronounced among public health and medicine experts.⁹²

In their 2014 review of individual-level studies, Anglemeyer and colleagues found that access to firearms is associated with a higher risk of being the victim of homicide. They found evidence for increased odds of becoming a victim of homicide, certainly among women, when persons with and without access to firearms were compared. Yet the association between firearm availability and homicide was found to be more modest than that between firearm availability and suicide. With regard to homicide, the results of previous population-level studies are not very consistent. Again we can illustrate this by mentioning the two often-cited studies by Killias and colleagues, using the International Crime Survey data. In their first study, using data from the 1989 International Crime Survey on gun ownership and WHO data on homicides for 14 countries, significant positive correlations were found between the rates of household gun ownership on the one hand and both national gunshot homicide rates and overall homicide rates on the other. Similarly with the results on suicide, the proportion of homicides committed with a gun was correlated with gun ownership rates, while no negative correlation was found between the gun ownership and the rates of homicide committed by other means. This suggests the absence of a significant substitution effect in countries with a lower rate of gun ownership.⁹³ In their updated study, using data from the International Victimization Surveys of 1989, 1992 and 1996, the only correlation found was between household gun ownership rates and gunshot homicide rates involving female victims. For gun-related male homicide and overall homicide rates, no significant correlation was found.⁹⁴

In the previous section we argued that in many cases the periods of high suicide risk are relatively short, and that limiting access to lethal means such as firearms can therefore delay suicide attempts or drive people towards less lethal means, resulting in lower overall suicide rates. A similar argument can be made for limiting access to firearms as a way of preventing successful homicide attempts, since a considerable proportion of homicides do not reflect a long-planned and deliberate rational choice to kill someone, but rather, impulsive acts that can occur in high-stress situations. In homicide research a distinction is often made between instrumental and expressive aggression. This distinction is regularly considered fundamental for understanding aggressive behaviour and is often used in homicide research. In instrumental aggression, the aggression is not an end in itself but is motivated by gain, and occurs when a person feels that an act of violence is necessary to achieve another specific goal - for instance a robbery that results in homicide. This aggression has been characterized as intentional, rational and often premeditated. Expressive aggression, on the other hand, is often an emotional response to frustration and actually motivated by the urge to harm someone. This type of aggression is generally characterized by impulsiveness, emotions, passion, anger and lack of control. This instrumental-expressive continuum has been further expanded upon by several authors.⁹⁵

There are strong reasons to suspect that a significant share of all gun homicides in Europe are the result of expressive violence, especially when domestic disputes are involved. Homicide figures from the UK for 2009/10, for example, indicate that approximately half of all homicides resulted from a quarrel, a revenge attack or a loss of temper. When the perpetrator and victim were acquaintances, this percentage rose to 60% compared to 38% when they were strangers to one another.⁹⁶ Previous studies have found that domestic violence is often an act of expressive violence, since it is frequently characterized by a loss of temper, impulsiveness and/or emotional reactions to (real or perceived) provocation. Homicides that take place outside of the domestic sphere are more often characterized by premeditation, calculation, control and the absence of emotional arousal.⁹⁷ In particular, homicides in the criminal milieu, or those related to carrying out other felonies such as robbery or sexual assault, are believed to be related to these latter characteristics and are thus often considered as primarily instrumental acts of violence.

We believe that the different types of homicide are linked not only to different types of violence, but also to different types of weapons. American research, for example, has indicated that the use of firearms is more likely in homicides committed by acquaintances and strangers compared with homicides committed by partners or family members.⁹⁸ This probably partially explains the consistent research finding that gun ownership rates, which generally tend to reflect the number of legally held firearms, are especially correlated with the risk for women of becoming the victim of homicide. While female victims of homicide can usually be placed in a context of domestic disputes or other types of interpersonal violence, male victims are generally more likely to be found in a criminal context. Further, the results of a recent Finnish study on the choice of weapons used in lethal or potentially lethal violence against parents indicated that adolescent perpetrators were more likely than adult perpetrators to use a firearm in lethal or potentially lethal violence against their fathers. This was explained by the physical strength hypothesis which suggests that, given that adults are generally stronger than adolescents, using a firearm is a more rational choice than choosing a method that requires physical contact.⁹⁹

4 Gun Ownership and Violent Deaths in Europe: A New Analysis

Studies investigating the correlations between gun ownership and violent deaths in a purely European context seem to be lacking. For the present report, we collected information on gun ownership and violent deaths for 33 European countries^I in order to calculate and analyse the correlations between these variables in a European perspective. For the rate of gun ownership we used the estimates of civilian firearms ownership (guns per 100 people) made by the Small Arms Survey in 2007^{100 II}. The data on violent deaths were taken from the European Detailed Mortality Database of the WHO Regional Office for Europe.¹⁰¹ Given that the estimates of gun ownership were made in 2007, we chose to use the death rates from 2007 as well. Additional variables for possible complicating factors such as unemployment rates, alcohol consumption or criminality rates were not available, and could therefore not be included in our analysis. This means we were not able to control for possible confounders. The results of our analysis are given in table 9.

A first observation is that our analysis indicates a strong positive correlation between the gun ownership rate in a country and the rate of firearms-related deaths (model 1, $R=.527$, $p=.002$). This means that in Europe, the countries with the highest rates of gun ownership generally also have the highest rates of gun deaths. The association with gun ownership is particularly strong when looking at male gun deaths ($R=.562$, $p=.001$). For female gun deaths we also observe a significant correlation, but weaker than for male gun deaths and only statistically significant when the outlier (in this case Montenegro) was excluded ($R=.412$, $p=.019$). This gender difference can probably be attributed to the fact that most gun deaths in Europe are the result of suicide and that gunshot suicides are primarily committed by (older) men.

When looking at the specific results for suicide (model 2), we can observe a very strong positive correlation between gun possession rates and gunshot suicides by male victims ($R=.538$, $p=.001$). Not surprisingly given the high share of male suicides in the overall suicide rates (96%), the results of our analyses indicate a strong positive correlation between gun possession rates and the total number of gun suicides in Europe ($R=.495$, $p=.003$). The correlation between gun possession rates and female gun suicides is weaker, and only statistically significant when the outlier (again Montenegro) was excluded

^I Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, FRY Macedonia, Malta, Moldova, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

^{II} For this analysis we preferred to use the Small Arms Survey estimates for gun ownership over the ICVS data because data for more countries was available and more recent in the Small Arms Survey estimates.

($R=.371$, $p=.037$). This observation might be attributed to the small number of women committing suicide with a firearm in Europe.

The correlation established in model 2 between national gun ownership rates and national gun suicide rates in Europe is not surprising, and in line with the results of previous research using different data sources (see chapter 3). In countries where people can easily access firearms, there will be more suicides in which firearms are used. An important question that now arises is whether gun possession rates are also connected to overall suicide rates. Our analyses show there is no statistically significant correlation between gun possession rates and overall suicide rates ($R=.008$, $p=.96$), neither for male suicides ($R=-0.075$, $p=.676$) nor for female suicides ($R=0.237$, $p=.185$). At first sight this could be interpreted as a sign that substitution of means is taking place: that is, that persons in countries where less firearms are less easily available will use other means to commit suicide. A closer look at model 2, however, indicates that neither for men ($R=-.201$, $p=.575$) nor for women ($R=.221$, $p=.216$) can a significant correlation be found between gun possession rates and the rates of suicide in which no firearm was used. This is an important finding with regard to substitution of means. If there was in fact a considerable degree of substitution, one would expect that the rate of suicides committed with other means than firearms would be significantly higher in countries with low gun ownership rates than in countries with high gun ownership rates: but this is not the case. This suggests that means substitution sometimes does occur in suicide attempts, but not very frequently and not with a similarly lethal outcome. The more plausible explanation for the lack of significant correlations between national gun possession rates and overall suicides in Europe is the fact that gun suicides only account for a small proportion (9%) of all suicides in Europe (see chapter 2.1). While a strong impact of ownership on gun suicides is obvious (and there is no indication for a substantial substitution effect), the share of gun suicides in overall suicide rates is just too small to have a sizeable (and statistically measurable) effect on overall suicide rates across Europe.

In model 3 we analyse the correlations between gun ownership rates and homicide rates. In this model hardly any significant correlations were found. Only for the levels of female victims in gunshot homicides was a (barely statistically significant) correlation with gun possession rates found, and this only when the outliers were excluded from the analysis ($R=.361$, $p=.042$)¹. This observed significant correlation between gun possession rates and homicide rates involving female victims is in line with previous research (see chapter 3.3). Since female homicide victims are generally the result of fatal domestic disputes (see chapter 2.2), we can therefore assume that the impact of gun ownership on gun homicides is greatest when dealing with the more expressive forms of aggression that are typically connected with domestic disputes.

¹ When the female gunshot homicide rates were correlated with the ICVS data on gun ownership a statistically significant correlation was found.

Table 9: correlations between gun ownership (Small Arms Survey) and violent deaths in 33 European countries¹

	Pearson's R with outliers	Pearson's R without outliers ^{II}
Model 1: Firearms-related mortality (2007)		
- Total	.527 P=.002	.681° P=.000
- Total – men	.562 P=.001	.684° P=.000
- Total – women	.268 P=.132	.412° P=.019
Model 2: Suicide (2007)		
- Total	.008 P=.966	Idem
- Total – men	-.075 P=.676	Idem
- Total – women	0.237 P=.185	Idem
- With gun	.495 P=.003	.678° P=.000
- With gun – men	.538 P=.001	.673° P=.000
- With gun – women	.166 P=.355	.371° P=.037
- Without gun	-.101 P=.575	Idem
- Without gun – men	-.201 P=.261	-.070°° P=.702
- Without gun –women	.221 P=.216	Idem
Model 3: Homicide (2007)		
- Total	-.187 P=.298	.163°°° P=.397
- Total – men	-.200 P=.264	.103°°° P=.595
- Total – women	-.134 P=.457	.229°°° P=.231
- With gun	.297 P=.093	.302°°°° P=0.093
- With gun – men	.255 P=.152	Idem
- With gun – women	.344 P=.050	.361°°°° P=.042
- Without gun	-.235 P=.188	-0.019°°° P=.921
- Without gun – men	-.241 P=.178	-.080°°° P=.681
- Without gun –women	-.198 P=.269	.088°°° P=.649

° Excluding Montenegro °° Excluding Lithuania °°°Excluding Estonia, Latvia, Lithuania & Moldova °°°° Excluding FRY Macedonia

^I Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, FYR Macedonia, Malta, Moldova, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, United Kingdom

^{II} To calculate outliers the following formula was used: $Y < (Q1 - (2.2 \times (Q3 - Q1)))$ or $Y > (Q3 + (2.2 \times (Q3 - Q1)))$

The results of this analysis should be considered in the light of a number of limitations. First, for the variable of gun ownership we used the results of the expert estimates made by Small Arms Survey. As mentioned in chapter 1, these figures need be treated with care, and analyses using these figures must accordingly be interpreted with caution. Secondly, our data on firearms do not specify the types of firearm used in lethal incidents, their legal status, nor the way these weapons were stored. Integrating more detailed information on type, legal status and storage modalities of firearms should enhance our understanding of the relationship between gun ownership and violent deaths. Thirdly, although results from population-level correlational studies are frequently used in arguments about the causal impact of firearms availability on violent deaths, we must remain cautious about answering questions of causality merely on the basis of this type of research. The level of lethal violence in society is affected by many factors: besides the potential effects of gun availability, violent death rates are impacted by numerous socio-economic and psychological factors such as income inequality, unemployment rates, poverty, mental illness, divorce rates and so forth. As these factors vary across countries, they are important for explaining why overall suicide and homicide rates vary widely across different European countries (see figures 6 and 8); but we did not control for such variables in our analysis.

These limitations notwithstanding, the results of our analyses indicate the existence of significant correlations between gun ownership and 1) gun suicides and 2) gun homicides with female victims, but not between gun ownership and *overall* rates of homicide and suicide. If our analysis shows that in European countries higher levels of gun ownership are not systematically related with higher levels of violent death, it follows that lower rates of gun ownership do not systematically translate in lower levels of violent deaths. It also means that there is no negative correlation: higher levels of gun possession do not translate into lower levels of violent deaths. In other words: there may be European countries with high levels of gun ownership and low or average levels of violent death, but there also may be countries with high levels of gun ownership *and* high levels of violent death.

This means that we need to look at other factors than gun possession to fully explain the variations in levels of violent death in European countries; for example income inequality, unemployment rates, poverty, mental illness, divorce rates and so on. One of the factors we must also take into account is the potential impact of firearms legislation, a variable that we did not integrate in our correlational analysis. Although we can expect a connection between the restrictiveness of firearms legislation and the number of guns held by the population in a country, our analysis above tells us little about the possible effects of stricter gun laws on the rates of violent deaths. The strictness of gun laws in European countries may, however, help to explain why some countries have high levels of ownership but low or average levels of violent death while other countries have equally high levels of gun prevalence and face high levels of violent death.

Importantly, the question also remains open whether stricter guns regulations in Europe could be instrumental in reducing the rate of homicides and suicides, especially in countries where these rates

are high. Could stricter legislation lead to fewer gun-related homicides and suicides? And could these reductions also lead to a reduction in the overall levels of violent death, or will substitution of means occur? In the next and final chapter we explore the question of the impact of stricter gun regulations on rates of violent death in Europe, looking in particular at evidence from Austria, Belgium and Switzerland.

5 The impact of stricter gun legislation?

The idea behind the introduction of stricter gun legislation is that it will reduce the risk of violent death by influencing the availability of firearms. Limiting the legal ownership of firearms to persons with a good cause (such as using them for hunting or target shooting), and to those who are unlikely to be a danger to themselves or others (for example by excluding individuals with a history of violent behaviour or severe mental problems), is assumed to reduce the misuse of legally-held firearms, while rules on the storage of guns might prevent minors' access to firearms and potential fatal outcomes resulting therefrom. In addition, gun buy-back programmes may lower the general level of firearms ownership in a country, while waiting periods^I can provide a “cooling off” period which might avoid impulsive acts of violence. Gun control proponents will argue that restricting the accessibility and availability of firearms through stricter gun laws will lead to fewer gun-related deaths and therefore to decreased total rates of violent death. Opponents of strict gun laws take issue with this thesis and argue that substitution of means will take place: perpetrators will find other weapons to commit their acts. In this final chapter we will test the hypothesis that the introduction of stricter gun legislation influences the gun-related *and* overall rates of suicide and homicide in Europe.

Most studies on the possible effects of different aspects of firearms legislation and violent deaths are focused on the situation in the United States. In general, the relationship between firearms legislation and the number of firearms-related suicides is well-established. More discussion exists with regard to the potential impact of firearms legislation on the overall suicide rates and on the prevalence of firearms-related and overall homicide rates. In their review of the findings of - mainly American and relatively old - cross-sectional studies on the relationship between firearms legislation and suicide, the National Research Council observed that in general stricter gun laws have been associated with lower rates of gun suicides, while the findings with regard to overall suicides rates have been less consistent.¹⁰² In 2005 the Task Force on Community Preventive Services reviewed a number of American studies that focused on measuring the impact of firearms regulation (both federal and state laws) on preventing violence. They concluded that because of the small number of available studies, limitations in design and execution of these studies, and/or inconsistent or statistically insignificant effects, the available evidence for each type of firearms regulation included in the study^{II} was insufficient to determine the effectiveness or ineffectiveness of firearms regulation on violent outcomes. They pointed to the lack of a critical mass of high-quality studies evaluating the impact of gun legislation, and

^I This means that a specified number of days must pass between the moment of purchase of a firearm and the physical transfer of the weapon to the purchaser.

^{II} The studies that were reviewed focused on one or a combination of seven types of regulation: bans on specific firearm and ammunition, restrictions on firearms acquisition, waiting periods, “shall issue” laws on concealed weapons carrying, child access prevention laws requiring the safe storage of firearms, and zero tolerance of firearms in school.

concluded that further research was needed to understand the potential impact of gun legislation on the rate of violent deaths.¹⁰³

Most of these previous studies on the impact of firearms regulation on mortality have focused on specific laws, not on the aggregate effect of all regulation. In a recent population-level study, Fleege et al analysed the relationship between an aggregate level of restrictiveness in firearms legislation (measures to curb trafficking, strengthen background checks, ensure child safety, ban military style assault weapons and restrict guns in public spaces) in all US states, on the one hand, and firearms-related fatalities (overall, suicide and homicide) on the other hand, and controlled this relationship for a number of socio-economic factors. Their analyses indicated that more restrictive gun legislation was associated with lower rates of firearm-related fatalities, and little evidence of substitution was found. Interestingly, they also controlled the relationship between the restrictiveness of firearms legislation and firearms-related fatalities for household firearms rates, and observed that the relationship with firearms-related suicides and homicides weakened. This suggests that part of the initially observed relationship between firearms legislation and violent deaths can be explained by the rates of gun ownership in these states. Of the different legislative categories, only background checks had a significant correlation across all outcomes after controlling for firearm ownership rates.¹⁰⁴

Establishing causality between firearms regulation and the number of firearm-related and overall violent deaths is a difficult endeavour, since these variables may affect each other and are not mutually exclusive. While high-levels of violence may prompt policy action to increase the regulation of firearms, an increased regulation of firearms might lead to a reduction in violence. Simple cross-sectional studies alone, therefore, do not suffice for a thorough interpretation of the linkage since this interpretation depends also on temporal sequence.¹⁰⁵ Besides population-level studies, the relationship between firearms legislation and violent death has therefore also been researched using time-series studies in which trends in mortality before and after the passage of a gun control law are analysed. The National Research Council also reviewed the findings of a number of time-series studies, mainly conducted in the 1990s, and observed conflicting findings about the association between firearms legislation and suicide.¹⁰⁶

An often-cited – non-American – example when discussing the possible effects of firearms legislation on violent death is Australia. Several time-series studies have analysed the impact of the legislative reform carried out in Australia in 1996 which was accompanied by a large-scale gun buy-back programme in which more than 600,000 guns were collected - on firearms-related fatalities in the country. The results of these studies, however, contradict each other. A number of studies show that the introduction of more restrictive gun legislation across the country accelerated the declining trend in gun-related fatalities, both suicides and homicides.¹⁰⁷ Importantly, Chapman et al also studied a possible substitution effect. Since the overall suicide and homicide rates were relatively stable before the

legislative reform but declined afterwards, they concluded that there was no indication for a significant substitution effect. Other studies using different methods, however, came to a different conclusion and observed no significant effects of the new legislation on homicide rates.¹⁰⁸ In addition, the findings of Baker and McPhedran suggested that the observed decrease in the number of firearms suicide was accompanied by an increase in non-firearm suicide rates in the years following the law's introduction. However, these last studies have come in for much methodological criticism: on replicating the analyses, and for example using longer time-series, Neill & Leigh found a statistically significant reduction in firearm-related suicides and homicides and found no indication for a substantial method substitution effect.¹⁰⁹ Their findings have, again, been questioned. Using different statistical Structural Break Tests, Lee & Suardi came to the conclusion that there was little evidence to suggest that the new firearms legislation had a significant effect on gun deaths.¹¹⁰

The possible impact of gun legislation on violent deaths in Europe has received much less research attention. In the following paragraphs we will analyze the results of three European time-series studies on the impact of gun legislation on violent deaths, to see if the adoption of more restrictive firearms legislation has an impact on the gun-related and overall rates of suicide and homicide. More precisely, we will look at the rates of violent death from a temporal perspective and analyze trends in violent deaths before and after the introduction of stricter firearms regulation in Austria, Belgium and Switzerland. These cases are interesting for several reasons: first of all, because the introduction of new legislation constituted a clear break in all three countries. Instead of incrementally implementing changes in legislation, the Belgian government in 2006 drastically changed the regulatory framework. This also happened in Austria when new firearms legislation was adopted in 1997 in order to comply with the European Directive 91/477/EEC. Although the firearms legislation in Switzerland has not changed drastically in recent years, and in a 2011 referendum Swiss voters rejected a proposal to tighten controls on gun ownership¹¹¹, a similar observation can be made vis-à-vis Switzerland since in 2003 reforms in the terms for military service severely restricted access to firearms across the country. We can therefore clearly delineate the relevant policy interventions in terms of time. Secondly, since the introduction of these regulations, a number of years have already passed, making it possible to collect reliable and comprehensive data on trends in violent deaths since the regulation was implemented. At the same time, the regulatory reforms took place not too long ago, so that comparable data can be collected for the period before the introduction of the law. All these elements enable us to try and track the effects of stricter gun laws. The main limitation of this time-series approach is that it is hard to isolate the potential impact of the implementation of firearms legislation from other factors that influence mortality, and which might also have changed over the same period. The analysis of the Belgium case, which did not include control variables for possible confounders, is therefore exploratory and the results should be interpreted cautiously. The analyses of the Austrian and Swiss cases, on the other hand, have included such variables and can therefore be interpreted with more confidence.

5.1 The impact of the 1997 firearms legislation in Austria

In Austria a new more restrictive weapons act was adopted in 1997 (Waffengesetz 1996) following the adoption of European Directive 91/477/EEC on the control of the acquisition and possession of weapons. The new Austrian weapons act introduced the principle of a “good reason” for legally possessing firearms, and imposed a number of additional restrictions on the ownership of certain types of firearms including background checks, age requirements, psychological testing, safe storage regulations and a cooling-off waiting period.

One of the first in-depth European time-series studies on the impact of firearms legislation on violent death rates was made by Kapusta and colleagues in 2007, when they evaluated the impact of the Austrian firearm legislation reform in 1997 on violent death rates as well as on the availability of firearms in Austria by using the official statistics on suicides, gun homicides and firearms licences issued from 1985 to 2005.¹¹² In their analysis, Kapusta and colleagues used Poisson regressions to compare trends over time in gunshot suicides, in gunshot suicides as a percentage of total suicides, in overall suicides and in gun homicides. For these variables they calculated time trends before 1998 and after 1998, and analyzed whether a statistically significant change in trend took place. In a second model, unemployment rates and average alcohol consumption per capita were also included as covariates in the analysis.

Interestingly significant changes in time trends after 1998 were found in the rate of gunshot suicides ($\chi^2 = 45.7$, $p < 0.0001$) and gun homicides ($\chi^2 = 14.3$, $p < 0.0001$), even when controlled (and adjusted) for unemployment and alcohol consumption rates (see table 10). While no significant time trend was found in the gunshot suicide rate between 1985 and 1997, a significant negative trend was observed between 1998 and 2005. In this period the gunshot suicide rate declined by 4.7% annually¹. A similar observation was made with regard to gun homicides: while no significant trend over time was found before 1998, a significant annual decrease of 2.3% per year was observed after 1998. These results clearly suggest that the introduction of more restrictive firearms legislation effectively reduced the rates of firearm suicide and homicide.

The authors also investigated whether there was a significant change in the time series relating to overall suicide rates. While the overall suicide rates decreased from 27.6 per 100,000 persons in 1985 to

¹ Kapusta et al also analyzed the firearms suicide rates by age group and gender. A significant trend change was observed for women aged 20-64 years, men aged 20-64 years and men aged 65 years or older. For younger persons and women aged 65 years or older, no significant change in time trend was observed.

16.7 per 100,000 persons in 2005, no significant change in time trend was observed after the introduction of the new legislation. This means that the decrease in overall suicide rates that was observed before 1998 did not accelerate significantly afterwards. At first sight this suggests that a substitution of methods in suicides took place after the introduction of the new legislation. However, although not included in their tables, Kapusta and colleagues also analyzed the rate of suicide by other means than firearms. Since no significant increase was observed here, they concluded that their analyses did not suggest the existence of a substantial substitution effect. The authors added that after the introduction of the more stringent firearm law, the numbers of firearms licences issued decreased. They concluded that the decline in firearm-related deaths seemed to have been mediated by the legal restriction of firearm availability. No analyses were made of overall homicide rates.¹¹³

Table 10: Impact of firearms legislation on suicide and homicide rates (1985-1997 and 1998-2005) in Austria: parameter estimates derived from the Poisson regression model

	Growth factor (95% CI)		Change in growth factor % (95% CI)	Test for trend change	
	Before 1998	After 1998		χ^2	P
Model 1 (unadjusted)					
% of firearm suicides among all suicides	1.026 (1.019 to 1.032)	0.971 (0.961 to 0.981)	-5.2 (-6.7 to -3.9)	53.0	<0.0001
Firearm suicide rate	1.000 (0.994 to 1.010)	0.949 (0.935 to 0.964)	-4.9 (-5.9 to -3.9)	45.7	<0.0001
Total suicide rate	0.975 (0.971 to 0.979)	0.978 (0.971 to 0.985)	0.3 (-1.0 to 1.3)	0.28	0.59
Firearm homicide rate	1.002 (0.977 to 1.029)	0.877 (0.832 to 0.923)	-12.5 (-18.2 to -6.2)	14.3	<0.0001
Model 2 (adjusted)					
% of firearm suicides among all suicides	1.026 (1.016 to 1.038)	0.978 (0.963 to 0.993)	-4.8 (-6.7 to -2.8)	21.8	<0.0001
Firearm suicide rate	1.00 (0.968 to 1.013)	0.953 (0.937 to 0.969)	-4.8 (-6.9 to -2.7)	19.9	<0.0001
Total suicide rate	0.975 (0.969 to 0.982)	0.974 (0.964 to 0.984)	-0.1 (-1.4 to 1.3)	0.03	0.87
Firearm homicide rate	0.994 (0.894 to 1.10)	0.895 (0.791 to 1.013)	-9.9 (-18.9 to -0.1)	3.9	<0.0001

Source: Kapusta et al (2007)¹¹⁴

5.2 The impact of the 2006 weapons act in Belgium

In Belgium, a stricter weapons law was enacted in June 2006. The new legislation prescribed that all firearms required a licence unless they were either categorized as ‘prohibited’ or as ‘freely obtainable’ weapons (the latter category was drastically reduced compared with the previous control regime). As prescribed by the European firearms directive, the new law implemented the principle of the ‘good reason’, limiting civilian gun ownership to those who could prove they needed their guns for specific purposes. The law of 2006 also listed a series of personal criteria that had to be fulfilled before an authorization could be obtained, such as not having been convicted for certain crimes, not having been interned as a mentally ill person, presenting a medical certificate proving mental and physical fitness, and succeeding in theoretical and practical tests. In addition, local police forces were to assess all applications for licences, and adults living with the applicant had to attest that they approved of having a gun in their household. Other stipulations in the Belgian weapons act concerned rules for the sale and purchase, the marking and registering, and the safe storage and transportation of firearms. In addition to the new provisions, a collection and amnesty programme was set up in Belgium after the introduction of the new law in which more than 200,000 firearms were collected and later destroyed. Assessing the exact impact of the collection programme, however, is difficult since the authorities responsible did not use uniform registration methods. It is therefore unclear what types of firearms were handed in and whether they were legally or illegally held.¹¹⁵

In a recent study exploring the effects of the introduction of the 2006 weapons act in Belgium, Duquet & Van Alstein analyzed trends in the gun-related and overall suicide and homicide rates. To track violent death rates before and after the introduction of the new law (2003-2009) they relied on data from the European Detailed Mortality Database of the WHO Regional Office for Europe. The figures for Belgium show that in the period 2003-2010 more than 2,000 persons died as a result of firearm injuries. These figures show a strong decrease in the number of gun deaths in the years following the change of legislation in 2006: the annual average of gun-deaths in 2007-2010 decreased by 35% compared with the period 2003-2005 (see table 11). No regression analyses were performed on this dataset.

As in Europe in general, most of the firearms-related deaths in Belgium are the result of successful suicide attempts. Between 2003 and 2010, 1,593 deaths were classified as firearms-related suicides, which comes down to an average of almost 200 gun suicides per year in Belgium. The data indicate a significant decrease (-34%) in the number of gun suicides in the years following the change of legislation: from an annual average of 245 gun suicides in 2003-2005 to 169 gun suicides in 2007-2009¹. Importantly, the overall number of suicides also decreased (-4%) between these periods, and it appears that almost the entire decrease in total suicides can be attributed to the decrease in gun suicides after 2006 (see figure 11).

¹ Since the legislation changed in mid-2006, we do not take the figures for 2006 into account but only the years before and after the change of legislation.

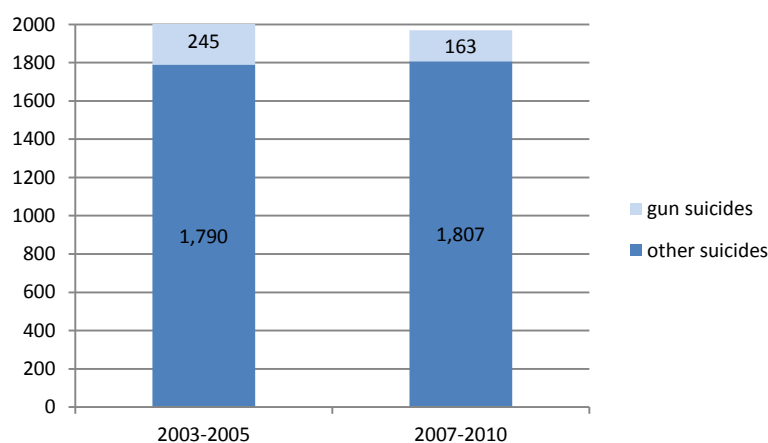
Table 11: Firearms-related deaths, Belgium, 2003-2010

	Total mortality	Suicide		Homicide	
		With firearm	total	With firearm	Total
2003	330	261	2,091	53	144
2004	309	234	1,986	59	178
2005	315	240	2,028	46	163
2006	256	207	1,934	31	146
2007	210	165	1,856	35	157
2008	231	189	2,000	29	128
2009	189	153	2,013	33	134
2010	197	144	2,011	36	117
Total	2,037	1,593	15,919	322	1,167
Annual average 2003-2005	318.0	245.0	2,035.0	52.7	161.7
Annual average 2007-2010	206.8	162.8	1,970.0	33.3	134.0

* The total mortality rate involving a firearm includes, besides suicides and homicides, also a small number of accidents (average: 2,4 per year) and deaths in which the cause is unclear (average: 13,7 per year). These statistics are not included in table 11 but can be obtained from the authors.

Source: Duquet & Van Alstein (2015)¹¹⁶

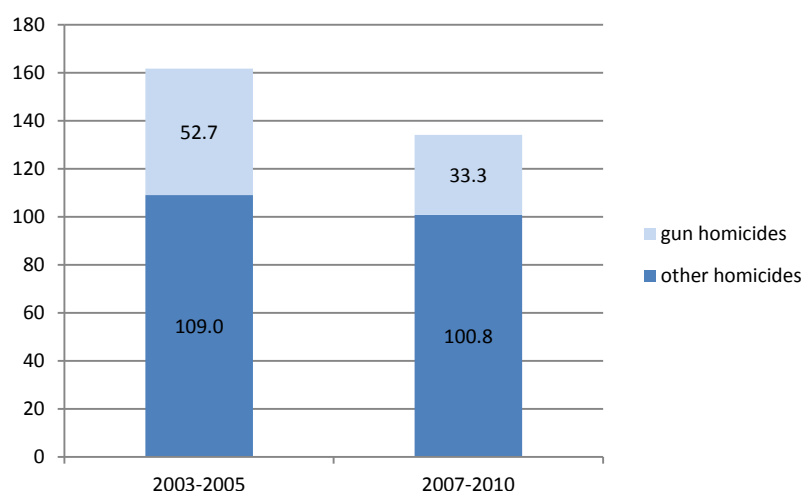
Figure 11: Annual average of firearms-related and other suicides, Belgium, 2003-2005 and 2007-2010



Source: Duquet & Van Alstein (2015)¹¹⁷

The number of firearms related homicides also dropped significantly (-39%): from 52.7 annual deaths in 2003-2005 to 33.3 deaths in 2007-2010. Further, the overall number of homicides decreased between these periods (-17%). As with the suicide data, almost the whole decrease in total homicide figures can be attributed to the decrease in gun-related homicides (see figure 12).

Figure 12: Annual average of firearms-related and other homicides, Belgium, 2003-2005 and 2007-2010



Source: Duquet & Van Alstein (2015)¹¹⁸

These analyses indicate that the implementation of a more restrictive firearms legislation in Belgium has led to less gun-related deaths, but importantly also suggests a decrease in the overall suicide rates, and possibly also in the overall homicide rates. While very marked decreases in gunshot suicides and gun homicides can be observed, the number of suicides and homicides committed with other means than firearms largely remained at the same level. This suggests that, although some people who did not have access to firearms chose a different method to commit suicide or homicide, most did not, and taken together no substantial substitution of means took place.

This analysis of the Belgian case is exploratory and has clear limitations. First of all, the available time series is short.ⁱ Secondly, the statistical analysis used is rather crude: for example, no interrupted time series analysis to control for pre-existing temporal trends was usedⁱⁱ. Thirdly, no controls for relevant socio-demographic variables such as unemployment, rates of mental disorders or substance dependence were included. This makes it difficult to conclusively link the decrease in the total number of suicides to the introduction of the weapons law: other factors and societal trends could also have played a role. Fourthly, as the number of homicides under study was small, it is difficult to draw strong conclusions regarding a decrease in the homicide rate.

ⁱ In their report Duquet & Van Alstein (2015) also analyzed the available mortality data for the Flemish Region (the Northern part of Belgium). Although the population in this region is smaller, the time series that are available were longer (2000-2012). Similar results were found for the Flemish Region as for Belgium as a whole.

ⁱⁱ This technique uses data from the pre-intervention to compute a forecast for the post-intervention period, which is then compared with observed post-intervention data.

5.3 The impact of military service reforms in Switzerland in 2003

In 2013 Reisch and colleagues studied the change in suicide rates in Switzerland before and after the firearms restriction resulting from reforms in the military system in 2003 (1995-2008). Switzerland historically uses a militia army for its defence. This means that during their time of service, many men keep army-issued guns in their homes throughout the year. After their service, soldiers can buy these service weapons for a small fee. Most soldiers and veterans retain this single military gun but do not possess other firearms. At the same time, the authors note, Swiss firearms laws are generally less restrictive compared with other European countries .

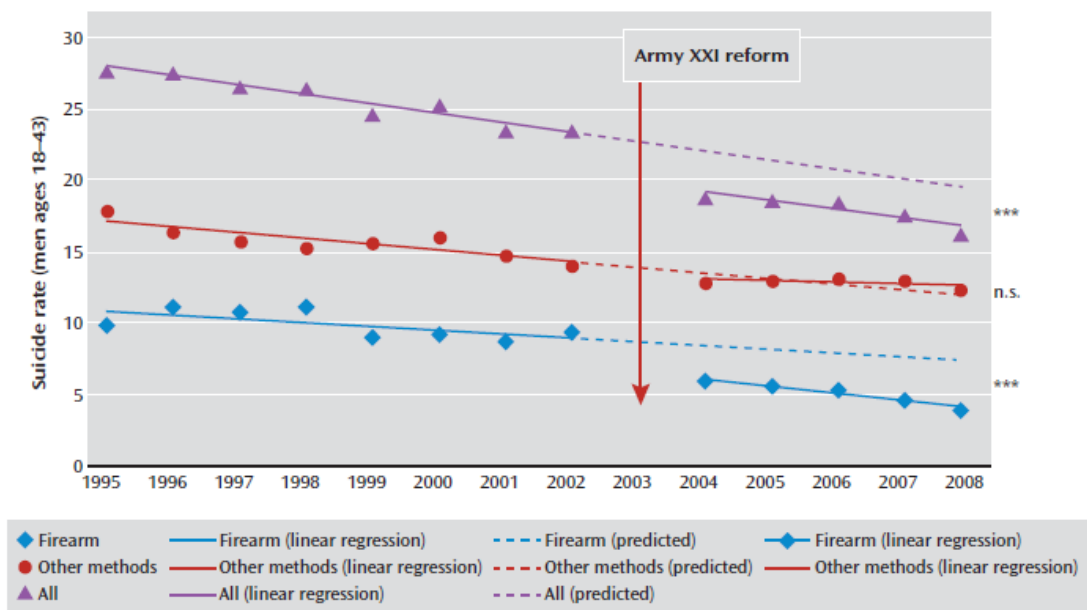
A significant share of the gunshot suicides in Switzerland are committed with army weapons. An analysis of suicides committed in 2004 indicates that in 44% of all gunshot suicides an army weapon was used.¹¹⁹ Given the association of the large number of gunshot suicides with army weapons in Switzerland, and the high lethality of these weapons, changes in the regulation of these firearms have been identified as key elements for successful suicide prevention programmes.

In 2003 the Swiss army was restructured, reducing troop numbers from approximately 400,000 to 200,000. This had a significant impact on the availability of military guns. Moreover, the conditions for buying these guns after the end of service were made more restrictive by increasing the fee and the requirement to take out a licence. In their study, Reisch and colleagues analyzed the impact of the military reform on suicide rates by using an interrupted time-series approach in which detailed data from a pre-intervention period were used to compute a forecast for the post-intervention period. Their analysis was based on monthly data on suicides, based on death certificates provided by the Federal Statistical Office. Possible confounders such as a number of socio-demographic variables, and various other variables such as levels of mental disorders, were included in the statistical models. In a second step, the forecast values were compared to the observed values after 2003. If statistically significant differences were seen between the forecast and observed values, there was a clear indication of an impact of the newly introduced legislation. The authors tested the validity of their approach by using several alternative statistical approaches.

The analyses of Reisch et al. showed a reduction both in the overall suicide rate and in the firearms suicide rate in the case group (men aged 18-43) in a five-year period after the military reform of 2003 (2003-2008). No significant increases were found for suicides committed with other means than firearms, although an increase in railway suicides was observed. In addition, the comparison groups (women aged 18-44 and men aged 44-53) showed no statistically significant changes in their firearms suicide rates and overall suicide rates. These results suggest a clear impact of the introduction of the new legislation on gunshot suicides *and* overall suicide rates. Interestingly, a partial method-substitution

effect was found. Using their more advanced statistical approach, the authors were able to calculate this substitution effect and estimated that 22% of the reduction in firearms was substituted by other suicide methods. While some persons used a different way of committing suicide when access to firearms was no longer possible (especially railway suicides), more than three quarters of the risk group prone to gunshot suicide did not switch to other means. Reisch and colleagues therefore conclude that the restriction of firearm availability in Switzerland resulting from military reforms was followed by an enduring decrease in the general suicide rate.¹²⁰

Figure 13: Suicide rates in Switzerland before and after implementation of the 2003 Army XXI Reform¹



*** p<0.001. n.s.=not significant

Source: Reisch et al. (2013)¹²¹

¹ The Army XXI reform was implemented during the period from March 1, 2003, to the end of February 2004. Each depicted year reflects the overall suicide rate for a 12-month period starting in March and ending in February the following year. In 2008, data was available up to December 31 and the suicide rate was adjusted accordingly.

Conclusion

Many studies have been carried out in recent decades on the linkages between violent deaths, gun ownership and/or firearms legislation. Yet only a rather small selection of these studies has focused on the situation in Europe, partially because gun death rates in Europe are traditionally rather low by global standards. While European policy-makers are paying increasing attention to gun violence, there is a lack of reliable and comprehensive information on the linkages between gun ownership and legislation on the one hand, and gun violence on the other hand, in Europe and this in turn impedes the development of appropriate and effective firearms policies. In this report we have therefore explored the relevant linkages for Europe, focusing on lethal gun violence and the connections between this violence, gun ownership and firearms legislation. Setting out into largely unexplored territory, we took with us the lessons of the few earlier studies on Europe and, in particular, the more developed body of evidence from other parts of the world.

In the first chapter we analysed the available data on gun ownership in Europe and discussed the methodological limitations of this data. In the second chapter we focused on gun-related deaths in Europe and explored the data on gun-related suicides and homicides. In the following chapters we focused on the findings of previous studies on the linkage between gun ownership and violent deaths (chapter three), and performed a new population-level analysis specifically for European countries (chapter four). In chapter five we reviewed the literature on the impact of firearms legislation on violent death rates, focusing particularly on the results of three recent European time-series studies analysing this impact. Before coming to our main conclusions on the linkages between gun ownership, firearms legislation and violent deaths in Europe, we will first give a brief overview of our main findings both on firearm possession and on gun-related deaths in Europe.

Gun ownership

At the moment there are at least 25 million gun owners, mainly men, in the European Union (EU), who - according to estimates by the Small Arms Survey - possess some 79.8 million firearms. This corresponds to around 15.7 firearms per 100 persons. There seems to be no general trend of increasing or decreasing ownership in European countries, but the limited available longitudinal data suggest that there seems to be a decrease in these rates, especially in countries with traditional high rates of gun ownership. Hunting is the reason most often cited for firearms possession in the EU, followed by professional reasons and sports. Gun possession is less frequently motivated by personal protection and collection purposes. Given the importance of hunting, it is no surprise that gun owners in most European countries mainly possess shotguns and/or rifles. The possession of handguns is not equally widespread in Europe. An interesting observation is that the motivations for gun possession can differ

greatly between countries: in the older EU Member States citizens are generally more likely to own firearms for hunting and sports, while in the more recent Member States gun ownership is more often linked to professional reasons and personal self-defence. The available data also suggest that owning guns for professional reasons or personal protection was probably more prevalent before than it is nowadays.

Given the lack of reliable and comparable official figures on firearms possession in most European countries, the above-mentioned figures are based on the results of self-reporting surveys and expert estimates. Although the figures on gun possession used in this report draw on the most reliable currently available estimates for firearms possession in Europe, they need to be interpreted with caution. More official figures will become available in the near future, since Directive 2008/51/EC (amending the Firearms Directive 91/477/EEC) stipulates that all EU MS must establish and maintain a computerized data filing system on civilian-owned firearms. This will strongly enhance the authorities' prospects of knowing the numbers and types of legally held firearms present in their country. The total number of illegally-held firearms in European societies is harder to estimate. There is an urgent need for solid research into the illicit firearms market in Europe.

Gun-related violent death

In the EU over recent years, an average of approximately 6,700 persons have died annually as a result of gunshot wounds. Two countries aside, a strong downward trend in the number of gun deaths can be observed across Europe. Between 2000 and 2012 the number of annual gun deaths decreased by 19% in Europe overall, with an especially spectacular decrease in gun deaths in Central and Eastern Europe.

Most gun deaths (75%) in Europe are the result of successful suicide attempts. In the EU, 5,000 persons commit suicide every year using a firearm. Approximately 9% of all successful suicide attempts in Europe in 2000-12 were undertaken with a firearm. The overwhelming majority of gunshot suicide victims (96%) were men, particularly older men. Women and minors make up only a very small proportion of all gun suicides in Europe. Our analyses suggest that in the Nordic and Western European countries, long guns are used in most suicides, while in the Eastern European countries handguns are more frequently used. The distribution of types of firearms used for committing suicides probably reflects the general (legal) ownership rates of the different types of firearms in these countries. Reliable data on the legal status of the guns used are lacking in the WHO database. The results of most previous studies, however, indicate that the majority of gun suicides are committed with legally-held firearms.

Homicides make up 15% of all firearms-related deaths in Europe. On an annual basis, an average of 1,000 homicides are committed with a firearm in the EU, but significant national differences in gun homicide rates can be observed. In approximately 20% of all homicides in Europe a gun was used, which is considerably lower than the global average (41%). Despite the large national differences mentioned,

what all European countries have in common is that men are much more likely to become a gun homicide victim than women. The available data further suggest that handguns are used more frequently for homicides than for suicides. Interestingly, most female homicide victims are older women while younger men in particular have a higher gun homicide rate. This can probably be connected to the different types of contexts in which homicides take place: while women are typically killed at home by their (ex-)partner or in a similar context of interpersonal violence, men are killed in a wider range of settings, including the context of organized crime or as a result of financial disputes. Our analyses have found a general downward trend in the number of gun homicides across Europe, and an especially spectacular decline can be observed in Eastern European countries and the Baltic States. Information is lacking on the legal status of the firearms used to commit these homicides.

Linkages between gun ownership, firearms legislation and violent deaths

Our population-level analysis of the relationship between gun ownership rates and violent death rates in Europe indicates a strong positive correlation between gun ownership rates in a country and the rate of firearms-related deaths, especially gunshot suicides with male victims. With regard to gun homicides a statistically significant correlation was found only for homicides with female victims. In other words, in European countries with lower rates of gun ownership we will typically find fewer gun deaths, fewer men committing suicide with a gun, and fewer women being killed with a firearm. These findings are largely in line with previous studies on the situation in the United States and with cross-national comparisons. Most opponents of stricter gun laws have acknowledged this observation, but argue that if people are really determined to commit suicide or homicide they will find a way to do so, regardless of whether firearms are readily available. We concur with this statement: but it needs to be nuanced and, more importantly, it does not imply there is no room for policy to intervene to prevent suicide and homicide.

As shown in this report, a significant proportion of all suicides are rather impulsive acts while a significant share of homicides are the result of expressive violence, especially in the domestic sphere. Previous research suggests that in these contexts in particular, firearms are a frequently used means of committing violence. Studies further indicate that a significant proportion of these firearms are legally held: a majority of suicides and a portion of the homicides are committed with legally-held firearms, for example with service weapons. This observation provides us with potential for effective policy intervention. Especially in the context of impulsive acts, limiting access to firearms can not only play an important role in delaying suicide or homicide attempts, but also in impeding possible future attempts. The goal of firearms legislation in Europe is to restrict access to firearms to persons who are capable of using and storing a firearm in a responsible manner. Several restrictions such as the need to cite a good reason for possessing firearms, background checks, and safe storage rules are therefore typically included in European firearms regulations. Other measures that can be taken to limit the misuse of firearms include prohibiting the storing of service weapons at home. The Swiss example in chapter 5

clearly indicates that this last example can have a strong impact, not only on gun-related suicides, but also on overall suicide rates.

Obviously, a substitution of means can occur in the context of suicide or homicide attempts, but the analyses in this report indicate that there is not a full but rather a partial substitution effect. Our population-level analysis of the relationship between gun ownership rates and suicide and homicide rates in Europe shows that the low gun suicide and homicide rates typically found in countries with low levels of gun ownership are not compensated by significant higher rates for suicide and homicide committed by means other than a firearm. Similar results were found in the time-series studies that we analysed on the impact of firearms legislation: in neither of these studies was the strong observed decrease in gun deaths in the years following the introduction of new legislation accompanied by a significant increase in the rates of suicide and homicide committed with other means than firearms. In other words, some people will find a different means of committing suicide or homicide if they do not have access to firearms, but others will not do so. In addition, the highly lethal nature of firearms as an instrument for suicide or homicide implies that even if some degree of substitution occurs, this will typically involve less lethal means, which in turn should lower the success rate of these attempts and thus prevent some violent deaths. These findings strongly suggest that implementing firearms regulation that curbs access of firearms has a strong impact not only on the number of gun deaths in a given country, but also in lowering the overall levels of violent death.

The way ahead

The results of the time-series studies on Austria, Belgium and Switzerland presented in this report illustrate the impact of firearms legislation on gun suicides, and possibly also on homicides, which in turn affects overall suicide and homicide rates. What is unclear, however, is which specific element of the firearms legislation has the greatest effect on violent death rates: the principle of citing a good reason for possession, background checks, waiting periods, safe storage rules, or the amnesty and gun collection programmes that usually follow the introduction of new legislation. This is a very important, but difficult question that requires more in-depth research to provide a conclusive answer. Even in the United States, where much more research has been undertaken on this topic, a review of previous studies suggests that the available evidence so far is inadequate for reaching solid conclusions. It is thus imperative to set up more research on the possible impact of gun legislation on gun violence in different European countries: research that should also focus on non-lethal gun violence, and address issues such as the legal status of the firearms used and the consequences of this gun violence for society.

As we have argued consistently throughout this report, more research is needed into European aspects of gun control. It is also important in this context that European governments increase their efforts in generating and managing appropriate, comprehensive and solid statistical information on the levels of firearms ownership, violent incidents and gun-related crime. Solid statistical information constitutes the

basis for further scientific research. To be useful, these statistics need to be adequately detailed. Gun-related crime, for example, is not a single, unified phenomenon. It has many aspects and covers many different offences ranging from illegal possession and trafficking to armed robbery and murder with a gun. Crime statistics should distinguish between these different aspects of gun crime in order to do justice to its complexity. In other words, good statistics are a necessary condition for addressing gaps in our knowledge of gun laws and firearms in European societies. Anything that governments can do to generate and manage more data on firearms will, of course, also serve more immediate policy objectives: effective investigative and prosecutorial capabilities and strategies also depend on good intelligence and a good, realistic picture of gun-related crime. With the present report, we hope to have contributed to this project of generating more empirical knowledge about gun control in the European context.

Annex

Table 12: reasons for firearms possession by respondents who used to own a firearm, per country, 2013

	Hunting	Sports	Collector	Professional reasons	Personal Protection	Other personal reasons	Number of respondents
Austria	15%	20%	15%	33%	28%	0%	46
Belgium	19%	18%	16%	20%	37%	12%	74
Bulgaria	10%	6%	2%	65%	14%	3%	63
Croatia	16%	6%	6%	49%	16%	10%	110
Cyprus	21%	6%	0%	73%	2%	2%	67
Czech Republic	18%	28%	6%	51%	29%	8%	51
Denmark	37%	19%	5%	17%	4%	14%	79
Estonia	25%	16%	2%	38%	22%	0%	64
Finland	58%	23%	3%	8%	5%	13%	40
France	39%	18%	3%	21%	11%	16%	71
Germany	6%	32%	7%	24%	9%	25%	68
Greece	56%	8%	3%	31%	18%	8%	39
Hungary	29%	10%	0%	56%	15%	0%	41
Ireland	62%	25%	1%	12%	5%	3%	81
Italy	26%	10%	7%	45%	13%	7%	31
Latvia	20%	3%	5%	56%	14%	5%	59
Lithuania	13%	13%	2%	37%	32%	7%	62
Luxembourg	21%	29%	21%	42%	8%	17%	24
Malta	46%	18%	0%	36%	9%	9%	11
Netherlands	7%	29%	2%	60%	7%	5%	42
Poland	8%	11%	0%	62%	19%	4%	53
Portugal	21%	8%	3%	55%	19%	15%	73
Romania	5%	3%	2%	78%	10%	0%	58
Slovakia	11%	19%	11%	44%	19%	0%	36
Slovenia	15%	29%	0%	37%	4%	10%	52
Spain	58%	28%	0%	17%	6%	8%	36
Sweden	37%	20%	6%	22%	0%	18%	49
United Kingdom	23%	45%	5%	33%	20%	10%	40

Source: Eurobarometer¹²² - own calculations

Table 13: Firearms-related suicides (also as % of total suicides) in 33 European countries, 2000-2012

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average /year	Age- standardized gun suicide rate per 100 000 ^I	Suicides as % of total gun deaths ^{II}	Gun suicides as % of all suicides ^{III}
Austria			261	227	215	233	228	195	196	204	225	205	217	218,7	1.96	94,3%	17%
Belgium				261	234	240	207	165	189	153	144			199,1	1.11	73,1%	7%
Bulgaria						55	75	57	71	83	58	64	71	66,8	0.87	59,2%	8%
Croatia	143	113	124	108	124	126	93	107	110	116	104	89	101	112,2	1.93	84,2%	13%
Cyprus					2	2	4	4	7	9	4	5	12	5,4	1.31	50,0%	33%
Czech Republic	174	193	161	204	159	139	164	146	130	122	146	186	174	161,4	1.37	81,7%	11%
Denmark	82	71	73	59	83	80	63	48	58	66	74	59	49	66,5	0.77	92,5%	7%
Estonia	31	25	21	23	24	24	14	18	19	23	21	25	28	22,8	1.78	82,4%	12%
Finland	200	234	205	232	219	169	183	172	207	181	179	165	139	191,2	2.31	88,5%	16%
France	2053	1887	1713	1742	1604	1653	1578	1406	1548	1446	1378	1398		1617,2	1.80	78,0%	13%
Germany	836	866	815	915	907	868	799	805	800	767	772	753	690	814,8	0.58	84,2%	7%
Hungary	86	108	98	92	91	89	69	76	77	72	83	83	80	84,9	0.67	84,2%	3%
Iceland	7	6	3	5	4	4	7	5	4	4				4,9	1.31	100,0%	11%
Ireland								22	31	25	25			25,8	0.56	54,3%	5%
Italy				539			459	460	477	485	525	533		496,9	0.67	68,3%	13%
Latvia	32	29	37	30	29	22	33	33	27	31	21	32	24	29,2	1.06	70,6%	5%
Lithuania	40	34	31	31	30	33	23	16	24	17	33	40	31	29,5	0.96	79,5%	3%
Luxembourg	6	7	11	5	5	6	10	11	8	5	9	6	7	7,4	1.15	77,8%	14%
Malta	5	3	1	2	3	1	3	6	2	6	7	2	1	3,2	0.25	16,7%	4%
FYR Macedonia							19	18	17	18	13			17,0	0.60	34,2%	11%
Moldova	8	11	11	14	13	7	4	8	5	6	10	15	8	9,2	0.22	27,6%	1%
Montenegro						46		44	43	41				43,5	6.33	75,9%	38%
Netherlands	47	43	39	46	45	49	50	42	40	52	40	47	42	44,8	0.24	45,7%	2%
Norway	108	103	89	101	89	80	87	62	85	97	84	69	82	87,4	1.49	93,2%	16%
Poland	63	36	58	48	60	45	41	48	54	55	46	35	42	48,5	0.10	40,4%	1%
Portugal			92	127				107	99	102	116	107	102	106,5	0.78	72,3%	9%
Romania	30	21	26	24	17	22	18	11	17	9	12	12	14	17,9	0.06	41,2%	1%
Serbia	192	208	159	195	158	184	177	180	166	189	205	185	179	182,8	2.05	70,5%	14%
Slovakia ^{IV}	85	68	71	76	80	81			36	65	51			68,1	0.87	53,7%	8%
Slovenia	62	40	52	69	52	50	53	45	56	38	48			51,4	1.88	96,0%	12%
Spain	187	169	192	203	188	170	181	170	194	205	193	176	175	184,8	0.33	67,0%	5%
Sweden	136	139	169	120	138	119	121	107	120	132	113	146	122	129,4	1.03	86,5%	11%
United Kingdom		120	111	112	115	107	130	100	120	101	109			112,5	0.16	70,3%	3%

Source: European Detailed Mortality Database (WHO)¹²³

^I For most recent available year

^{II} For most recent available year

^{III} For most recent available year

^{IV} In the WHO database the number of firearms deaths in Slovakia for 2006 and 2007 is given as 0. Since these numbers are most probably not correct, we exclude them from this table and from further analyses.

Table 14a: Types of firearms used for gun suicides in different European countries, over the most recent available 5-year period

	Handgun discharge	Rifle/shotgun/ larger firearm discharge	Other and unspecified firearms discharge	Total
Austria (2008-2012)	92	139	816	1047
2008	21	28	147	196
2009	20	21	163	204
2010	17	27	181	225
2011	21	30	154	205
2012	13	33	171	217
Belgium (2006-2010)	48	104	706	858
2006	13	26	168	207
2007	9	27	129	165
2008	9	21	159	189
2009	13	15	125	153
2010	4	15	125	144
Bulgaria (2008-2012)	225	26	97	348
2008	35	8	28	71
2009	55	12	16	83
2010	43	1	15	59
2011	43	2	19	64
2012	49	3	19	71
Croatia (2008-2012)	143	57	320	520
2008	19	15	76	110
2009	35	11	70	116
2010	28	9	67	104
2011	28	8	53	89
2012	33	14	54	101
Cyprus (2008-2012)	0	14	23	37
2008	0	4	3	7
2009	0	3	6	9
2010	0	2	2	4
2011	0	3	2	5
2012	0	2	10	12
Czech Republic (2008-2012)	326	74	358	758
2008	54	22	54	130
2009	56	10	56	122
2010	59	15	72	146
2011	89	14	83	186
2012	68	13	93	174
Denmark (2008-2012)	69	216	21	306
2008	16	40	2	58
2009	16	46	4	66
2010	12	55	7	74
2011	18	40	1	59
2012	7	35	7	49

Source: European Detailed Mortality Database (WHO)¹²⁴

Table 14b: Types of firearms used for gun suicides in different European countries, over the most recent available 5-year period

	Handgun discharge	Rifle/shotgun/ larger firearm discharge	Other and unspecified firearms discharge	Total
Estonia (2008-2012)	17	27	72	116
2008	1	3	15	19
2009	3	3	17	23
2010	4	7	10	21
2011	2	7	16	25
2012	7	7	14	28
Finland (2008-2012)	283	541	47	871
2008	57	140	10	207
2009	62	109	10	181
2010	58	110	11	179
2011	55	104	6	165
2012	51	78	10	139
France (2007-2011)	71	544	6561	7176
2007	12	108	1286	1406
2008	16	96	1436	1548
2009	11	97	1333	1441
2010	16	113	1254	1383
2011	16	130	1252	1398
Germany (2008-2012)	1161	331	2320	3812
2008	217	77	506	800
2009	253	67	477	797
2010	238	64	470	772
2011	237	72	444	753
2012	216	51	423	690
Hungary (2008-2012)	88	40	267	395
2008	16	3	58	77
2009	12	5	55	72
2010	17	9	57	83
2011	21	15	47	83
2012	22	8	50	80
Iceland (2005-2009)	0	17	7	24
2005	0	3	1	4
2006	0	6	1	7
2007	0	1	4	5
2008	0	3	1	4
2009	0	4	0	4
Ireland (2007*-2010)	5	51	47	103
2007	1	14	7	22
2008	1	19	11	31
2009	2	11	12	25
2010	1	7	17	25

* For Ireland only data from 2007-2010 is available

Source: European Detailed Mortality Database (WHO)125

Table 14c: Types of firearms used for gun suicides in different European countries, over the most recent available 5-year period

	Handgun discharge	Rifle/shotgun/ larger firearm discharge	Other and unspecified firearms discharge	Total
Italy (2007-2011)	403	604	1473	2480
2007	86	125	249	460
2008	107	109	261	477
2009	74	100	311	485
2010	76	127	322	525
2011	60	143	330	533
Latvia (2008-2012)	24	33	73	130
2008	7	4	16	27
2009	3	5	23	31
2010	4	6	11	21
2011	4	13	10	27
2012	6	5	13	24
Lithuania (2008-2012)	43	23	60	126
2008	7	7	10	24
2009	8	5	4	17
2010	11	7	15	33
2011	7	4	10	21
2012	10	0	21	31
Luxembourg (2008-2012)	6	3	26	35
2008	1	2	5	8
2009	1	0	4	5
2010	4	1	4	9
2011	0	0	6	6
2012	0	0	7	7
Malta (2008-2012)	2	2	14	18
2008	0	0	2	2
2009	0	0	6	6
2010	0	2	5	7
2011	2	0	0	2
2012	0	0	1	1
Malta (2008-2012)	4	1	168	173
2005	3	1	43	47
2006	0	0	0	0
2007	0	0	43	43
2008	0	0	42	42
2009	1	0	40	41
FYR Macedonia (2006-2010)	22	8	55	85
2006	5	1	13	19
2007	5	1	12	18
2008	4	3	10	17
2009	6	2	10	18
2010	2	1	10	13

Source: European Detailed Mortality Database (WHO)¹²⁶

Table 14d: Types of firearms used for gun suicides in different European countries, over the most recent available 5-year period

	Handgun discharge	Rifle/shotgun/ larger firearm discharge	Other and unspecified firearms discharge	Total
Netherlands (2008-2012)	27	21	173	221
2008	6	3	31	40
2009	7	6	39	52
2010	1	3	36	40
2011	8	3	36	47
2012	5	6	31	42
Norway (2008-2012)	33	81	303	417
2008	10	20	55	85
2009	4	15	78	97
2010	7	11	66	84
2011	7	14	48	69
2012	5	21	56	82
Poland (2008-2012)	67	44	121	232
2008	17	8	29	54
2009	11	14	30	55
2010	16	6	24	46
2011	8	10	17	35
2012	15	6	21	42
Portugal (2008-2012)	5	79	442	526
2008	2	22	75	99
2009	1	16	85	102
2010	0	12	104	116
2011	0	17	90	107
2012	2	12	88	102
Romania (2008-2012)	17	5	42	64
2008	5	1	11	17
2009	2	0	7	9
2010	2	2	8	12
2011	5	1	6	12
2012	3	1	10	14
Serbia (2008-2012)	550	131	243	924
2008	100	17	49	166
2009	129	18	42	189
2010	125	32	48	205
2011	105	29	51	185
2012	91	35	53	179
Slovakia (2006-2010)	91	33	28	152
2006	0	0	0	0
2007	0	0	0	0
2008	26	3	7	36
2009	34	16	15	65
2010	31	14	6	51

Source: European Detailed Mortality Database (WHO)¹²⁷

Table 14e: Types of firearms used for gun suicides in different European countries, over the most recent available 5-year period

	Handgun discharge	Rifle/shotgun/ larger firearm discharge	Other and unspecified firearms discharge	Total
Slovenia (2006-2010)	55	16	169	240
2006	22	6	25	53
2007	9	1	35	45
2008	15	2	39	56
2009	5	3	30	38
2010	4	4	40	48
Spain (2008-2012)	104	215	624	943
2008	24	50	120	194
2009	18	58	129	205
2010	24	32	137	193
2011	18	38	120	176
2012	20	37	118	175
Sweden (2008-2012)	88	372	140	600
2008	21	64	35	120
2009	16	77	39	132
2010	15	63	35	113
2011	11	75	27	113
2012	25	93	4	122
United Kingdom (2006-2010)	8	303	250	561
2006	2	73	55	130
2007	1	52	47	100
2008	4	64	53	121
2009	0	55	46	101
2010	1	59	49	109

Source: European Detailed Mortality Database (WHO) ¹²⁸

Table 15: Firearms-related homicides (also as % of total homicides) in 33 European countries, 2000-2011

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Average /year	Age- standardized gun homicides rate per 100 000 ^I	Homicides as % of total gun deaths ^I	Gun homicides as % of all homicides ^{III}
Austria			13	16	13	13	10	13	14	20	15	8	5	12,7	0,06	2%	14%
Belgium				53	59	46	31	35	29	33	36			40,3	0,33	18%	31%
Bulgaria						49	27	33	28	47	31	17	25	32,1	0,34	21%	23%
Croatia	48	33	23	27	37	27	41	33	30	23	25	12	17	28,9	0,39	14%	32%
Cyprus					1	7	6	3	5	5	2	2	12	4,8	1,28	50%	63%
Czech Republic	36	36	39	37	18	16	19	20	16	18	13	17	16	23,2	0,14	8%	18%
Denmark	15	17	13	6	10	9	12	6	6	9	11	12	3	9,9	0,06	6%	17%
Estonia	23	18	21	14	5	5	9	5	3	7	4	9	2	9,6	0,16	6%	3%
Finland	32	30	20	18	30	11	17	23	30	22	14	18	16	21,6	0,32	10%	22%
France	155	163	156	123	132	124	111	99	142	134	127	146		134,3	0,23	8%	37%
Germany	101	84	106	85	98	89	65	59	57	75	51	54	61	75,8	0,07	7%	15%
Hungary	22	20	22	15	19	10	9	6	16	13	10	6	11	13,8	0,11	12%	8%
Iceland	1	0	0	0	0	1	1	1	0	0	0			0,4	0,00	0%	0%
Ireland								14	17	24	16			21,8	0,33	35%	42%
Italy				347			262	269	246	218	209	202		250,4	0,34	26%	45%
Latvia	31	36	25	21	9	13	15	7	9	3	4	7	5	14,2	0,24	15%	4%
Lithuania	51	29	18	20	19	14	13	12	12	14	8	7	3	16,9	0,10	8%	2%
Luxembourg	4	2	1	1	0	1	0	1	2	1	0	0	0	1,0	0,00	0%	0%
Malta	2	2	1	0	4	0	0	2	5	0	2	0	0	1,4	0,00	0%	0%
FYR Macedonia							25	30	17	12	22			25,6	1,02	58%	50%
Moldova	46	57	42	31	24	19	20	15	11	11	9	16	15	24,3	0,37	52%	7%
Montenegro						22		5	14	13				16,8	1,87	24%	93%
Netherlands	66	69	63	56	53	54	31	39	37	41	33	49	49	49,2	0,30	53%	34%
Norway	17	6	16	12	12	5	10	2	3	9	2	71	5	13,1	0,11	6%	17%
Poland	79	58	74	47	26	24	25	34	19	15	9	16	20	34,3	0,05	19%	5%
Portugal			67	57				35	44	30	51	19	28	41,4	0,25	20%	23%
Romania	22	17	23	17	19	16	11	11	6	12	9	11	10	14,2	0,05	29%	2%
Serbia	77	80	69	67	48	48	63	85	60	63	45	49	44	61,4	0,61	17%	37%
Slovakia	34	20	23	23	26	13			6	3	10			18,7	0,17	11%	15%
Slovenia	11	7	10	8	14	10	3	9	4	3	1			7,4	0,05	2%	10%
Spain	105	104	103	115	86	74	82	57	80	78	67	57	61	82,2	0,12	23%	20%
Sweden	22	19	16	18	15	11	13	21	14	22	18	19	16	15,8	0,17	11%	26%
United Kingdom		41	31	41	52	41	51	22	32	18	27			38,3	0,04	17%	15%

Source: European Detailed Mortality Database (WHO)¹²⁹

^I For most recent available year

^{II} For most recent available year

^{III} For most recent available year

Table 16a: Types of firearms used for gun homicides in 33 European countries (most recent available 5 years)

	Handgun discharge	Rifle/shotgun/ larger firearm discharge	Other and unspecified firearms discharge	Total
Austria (2008-2012)	9	1	52	62
2008	1	0	13	14
2009	6	0	14	20
2010	1	0	14	15
2011	0	0	8	8
2012	1	1	3	5
Belgium (2006-2010)	2	5	157	164
2006	0	0	31	31
2007	0	1	34	35
2008	0	1	28	29
2009	2	1	30	33
2010	0	2	34	36
Bulgaria (2008-2012)	86	17	45	148
2008	14	5	9	28
2009	22	4	21	47
2010	22	1	8	31
2011	11	3	3	17
2012	17	4	4	25
Croatia (2008-2012)	38	10	58	106
2008	7	2	21	30
2009	4	3	15	22
2010	14	3	8	25
2011	6	1	5	12
2012	7	1	9	17
Cyprus (2008-2012)	0	7	19	26
2008	0	2	3	5
2009	0	2	3	5
2010	0	0	2	2
2011	0	1	1	2
2012	0	2	10	12
Czech Republic (2008-2012)	49	6	25	80
2008	14	1	1	16
2009	12	3	3	18
2010	7	0	6	13
2011	9	1	7	17
2012	7	1	8	16
Denmark (2008-2012)	22	11	8	41
2008	2	1	3	6
2009	5	2	2	9
2010	5	5	1	11
2011	7	3	2	12
2012	3	0	0	3

Source: European Detailed Mortality Database (WHO)¹³⁰

Table 16b: Types of firearms used for gun homicides in 33 European countries (most recent available 5 years)

	Handgun discharge	Rifle/shotgun/ larger firearm discharge	Other and unspecified firearms discharge	Total
Estonia (2008-2012)	5	4	16	25
2008	0	0	3	3
2009	1	1	5	7
2010	0	0	4	4
2011	3	3	3	9
2012	1	0	1	2
Finland (2008-2012)	34	31	35	100
2008	14	8	8	30
2009	8	7	7	22
2010	7	5	2	14
2011	2	2	14	18
2012	3	9	4	16
France (2007-2011)	2	35	611	648
2007	0	5	94	99
2008	0	7	135	142
2009	0	6	128	134
2010	1	6	120	127
2011	1	11	134	146
Germany (2008-2012)	111	15	172	298
2008	21	2	34	57
2009	37	3	35	75
2010	15	1	35	51
2011	18	3	33	54
2012	20	6	35	61
Hungary (2008-2012)	10	2	44	56
2008	0	0	16	16
2009	1	2	10	13
2010	4	0	6	10
2011	1	0	5	6
2012	4	0	7	11
Iceland (2005-2009)	0	0	3	3
2005	0	0	1	1
2006	0	0	1	1
2007	0	0	1	1
2008	0	0	0	0
2009	0	0	0	0
Ireland (2007*-2010)	12	15	44	71
2007	2	3	9	14
2008	3	3	11	17
2009	5	6	13	24
2010	2	3	11	16

* For Ireland only data from 2007-2010 is available

Source: European Detailed Mortality Database (WHO)¹³¹

Table 16c: Types of firearms used for gun homicides in 33 European countries (most recent available 5 years)

	Handgun discharge	Rifle/shotgun/ larger firearm discharge	Other and unspecified firearms discharge	Total
Italy (2007-2011)	136	84	896	1116
2007	31	18	220	269
2008	30	23	193	246
2009	31	20	167	218
2010	25	23	161	209
2011	19	28	155	174
Latvia (2008-2012)	4	3	21	28
2008	1	0	8	9
2009	0	0	3	3
2010	1	0	3	4
2011	2	2	3	7
2012	0	1	4	5
Lithuania (2008-2012)	19	7	15	41
2008	4	5	3	12
2009	7	3	4	11
2010	5	2	1	8
2011	3	0	4	7
2012	0	0	3	3
Luxembourg (2008-2012)	1	0	2	3
2008	1	0	1	2
2009	0	0	1	1
2010	0	0	0	0
2011	0	0	0	0
2012	0	0	0	0
FYR Macedonia (2006-2010)	17	3	90	110
2006	4	1	20	25
2007	2	1	27	30
2008	2	0	15	17
2009	1	1	14	16
2010	8	0	14	22
Malta (2008-2012)	1	2	4	7
2008	1	1	3	5
2009	0	0	0	0
2010	0	1	1	2
2011	0	0	0	0
2012	0	0	0	0
Montenegro (2005-2009)	10	1	43	54
2005	10	1	11	22
2006	0	0	0	0
2007	0	0	5	5
2008	0	0	14	14
2009	0	0	13	13

Source: European Detailed Mortality Database (WHO)¹³²

Table 16c: Types of firearms used for gun homicides in 33 European countries (most recent available 5 years)

	Handgun discharge	Rifle/shotgun/ larger firearm discharge	Other and unspecified firearms discharge	Total
Netherlands (2008-2012)	6	5	198	209
2008	1	1	35	37
2009	2	1	38	41
2010	1	1	31	33
2011	0	1	48	49
2012	2	1	46	49
Norway (2008-2012)	6	3	81	90
2008	0	1	2	3
2009	4	1	4	9
2010	1	0	1	2
2011	0	1	70	71
2012	1	0	4	5
Poland (2008-2012)	15	8	43	66
2008	6	0	13	6
2009	1	3	11	15
2010	0	1	8	9
2011	3	1	12	16
2012	5	3	12	20
Portugal (2008-2012)	8	20	147	175
2008	2	5	37	44
2009	1	4	25	30
2010	0	4	47	51
2011	3	1	18	22
2012	2	6	20	28
Romania (2008-2012)	11	5	32	48
2008	1	1	4	6
2009	2	3	7	12
2010	1	0	8	9
2011	4	1	6	11
2012	3	0	7	10
Serbia (2008-2012)	143	22	72	237
2008	35	2	23	60
2009	38	5	20	63
2010	28	1	15	44
2011	21	9	14	44
2012	21	5	18	26
Slovakia (2006-2010)	9	12	8	29
2006	0	0	0	0
2007	0	0	0	0
2008	6	0	0	6
2009	3	6	4	13
2010	0	6	4	10

Source: European Detailed Mortality Database (WHO) ¹³³

Table 16c: Types of firearms used for gun homicides in 33 European countries (most recent available 5 years)

	Handgun discharge	Rifle/shotgun/ larger firearm discharge	Other and unspecified firearms discharge	Total
Slovenia (2006-2010)	4	2	11	17
2006	1	0	2	3
2007	0	1	8	9
2008	2	1	1	4
2009	0	0	0	0
2010	1	0	0	1
Spain (2008-2012)	50	54	239	343
2008	3	5	72	80
2009	9	10	59	78
2010	14	14	39	67
2011	12	8	37	57
2012	12	17	32	61
Sweden (2008-2012)	13	8	68	89
2008	0	2	12	14
2009	0	1	21	22
2010	1	0	17	18
2011	1	2	16	19
2012	11	3	2	16
United Kingdom (2006-2010)	9	25	116	150
2006	3	7	41	51
2007	2	6	14	22
2008	4	4	24	32
2009	0	3	15	18
2010	0	5	22	27

Source: European Detailed Mortality Database (WHO)¹³⁴

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