



PROJECT INSIGHT

Illicit Firearms Ammunition and Other Explosive Munitions in the European Union

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KEY FINDINGS

- Calibres typically associated with handguns and widely available commercial brands of ammunition usually represent the bulk of the illicit firearm ammunition seen in the countries studied.
- Illicit firearms ammunition is not necessarily trafficked from abroad, as shown by the misuse of domestically produced cartridges in the five surveyed countries. Moreover, cartridges produced legally within the European Union (EU) have been recovered the same year at crime scenes.
- A large percentage of illicit hand grenades and other factory-produced explosive munitions seized in the European countries under review were manufactured in the former Yugoslavia. The seizures are consistent with media reports and government statements indicating that the Balkans are a major source of illicit grenades acquired and used by criminals in the EU.
- The number of illicit grenades documented in the Netherlands and Sweden has decreased significantly in recent years, possibly owing to Covid-19-related travel and shipping disruptions, an increased reliance on other types of explosives by criminals, and national and regional counter-trafficking efforts.

Acknowledgements

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Abbreviations

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|--------|--|
| ABIS | Automated ballistic identification systems |
| CIP | Commission Internationale Permanente pour l'épreuve des armes à feu portatives |
| EMPACT | European Multidisciplinary Platform Against Criminal Threats |
| EU | European Union |
| IED | Improvised explosive device |
| IRCGN | Institut de Recherche Criminelle de la Gendarmerie Nationale |
| NFI | Netherlands Forensic Institute |
| UNIDIR | UN Institute for Disarmament Research |

Introduction

The trafficking of firearms and their use in criminal violence in Europe has received significant attention from researchers and policymakers. Less is known about the illicit proliferation of firearm ammunition and other explosive munitions. The need for detailed, robust data on the acquisition and use of firearm ammunition by criminals is largely self-evident: the firearms used by violent criminals in Europe require a steady supply of ammunition. The need for comparable data on other munitions—particularly hand grenades, shoulder-fired rockets, and portable missiles—is not as obvious, however, because their current and potential role in criminality is less well known. Nonetheless, some of these items, such as hand grenades, are already widely used by armed actors in European countries. This paper addresses the need for detailed, policy-relevant data on illicit munitions in Europe by conducting the first regional analysis and overview of the types, sources, and end users of these items, with a particular focus on the items of greatest utility to groups engaged in terrorism, organized crime, and other violent acts. The study draws on a wide array of sources, including data extracted from ballistic databases, interviews with and data shared by law enforcement officials, and data gleaned from the Gunviolence.eu – Incident Monitor (hereafter referred to as the Incident Monitor).^a

^a The Incident Monitor (www.gunviolence.eu/incident-monitor) aims to collect media articles on firearm-related violence in all EU member states. It processes data in real time through an automated system that uses artificial intelligence. For more detailed information on the development and functioning of the Monitor, consult the methodological report: Cops, D., De Schutter, A. & De Smedt, T. (2023), Gunviolence.eu – Incident Monitor: Methodological report, Brussels: Flemish Peace Institute, <https://vlaamsvredeinstituut.eu/en/project-insight/#methodologicalreport>.

Methodology

This section defines the key terms used in this paper and provides an overview of the research methodology and data sources analysed.

Terms and definitions

For the purposes of this paper, “firearm ammunition” refers to small-calibre cartridges—that is, cartridges with a calibre of less than 20 mm. The term “explosive munitions” refers to factory-built and improvised hand grenades, projected grenades, mortar rounds, portable rockets, portable missiles, ammunition for light weapons, landmines, and improvised explosive devices (IEDs). Both factory-built and improvised explosive munitions are referenced in this paper.

When used to describe firearm ammunition and explosive munitions, the term “illicit” refers to munitions and ammunition (including their components) that are held, modified, produced, transferred, or used in violation of national or international law. The Small Arms Survey (hereafter “the Survey”) uses the term “illicit” rather than “illegal” to account for cases of unclear or contested legality.

Methodological overview

The methodology and analysis presented here makes use of a data set covering five European countries, the bulk of which was generated for a 2021 pilot study analysing the national automated ballistic identification system (ABIS) data sets of Denmark, Germany, Sweden, and Switzerland.¹ The pilot study extracted contextual data about spent cartridges recovered by law enforcement and identified their make along with—when available—their year of production, based on images of headstamps^a (see Images 1–5) stored in the ABIS.^b For this paper, the Survey added similar data from France obtained from the ballistics department of the Institut de Recherche Criminelle de la Gendarmerie Nationale (IRCGN). The combined “ABIS database” includes data on 6,648 cartridges retrieved by law enforcement in the context of 3,705 incidents that occurred in Denmark, France,^c Germany, Sweden,^d and Switzerland in 2015–21 (see Table 1). In addition, the Netherlands Forensic Institute (NFI) provided data on 5,731 rounds of ammunition seized and recovered between 2018 and November 2022.^e A Europol report on ammunition summarizing inputs from 23 states is also used for context and triangulation of findings.²

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- a Headstamps are “alphanumeric characters and/or symbols applied to the base of cartridge cases [and can] provide valuable information on the country of origin, producer, year of production, calibre, or type of cartridge,” Jenzen-Jones, N.R. & Schroeder, M. (Ed.) (2018), *An introductory guide to the identification of small arms, light weapons, and associated ammunition*, Geneva: Small Arms Survey, <https://www.smallarmssurvey.org/sites/default/files/SAS-HB-06-Weapons-ID-Guide-Full.pdf>, p. 153.
- b The Small Arms Survey’s ballistics specialist, André Desmarais, led the identification of cartridges for all countries under review, except for France, where IRCGN performed this task. Desmarais has extensive experience in ammunition identification and consulted other experts, and resources, as listed in Desmarais et al. (2021), *Monitoring illicit ammunition*, pp. 2–3. For a discussion of caveats associated with ABIS data, see Desmarais et al. (2021), pp. 2–4.
- c For France, only the mainland is included.
- d Since 2008, the Swedish Police’s National Forensic Center also systematically enters detailed information on all firearms and ammunition it receives for analysis, including the ammunition headstamp, make, and year of production (when marked), into an electronic database not connected to its ABIS. The data for Sweden used in this paper was extracted from its ABIS system, however, for comparability purposes. Source: Correspondence with Swedish National Forensic Center official, 18 October 2023.
- e Data set shared by the NFI, January 2023. Unlike the ABIS database, the Dutch data set includes data on cases where only cartridges were retrieved, or cartridges and firearms together. For the former, an expert assessment of the type and model of firearm that was likely used to fire it is often included.

Images 1-5 Selected ammunition headstamp markings documented in the European context



9 mm Luger cartridge case produced by Tula Cartridge Works (Russian Federation), year of production unknown



9 mm Luger cartridge case produced by Winchester (United States), year of production unknown



7.62 x 39 mm cartridge case produced by Factory 964 (China) in 1971



7.62 x 39 mm cartridge case produced by Matravideku Femmuvek Sirok (Hungary) in 1989



9 mm PA Blanc cartridge case produced by Giulio Fiocchi Lecco (Italy), year of production unknown

Source: Confidential

Table 1 Number of cartridges examined per criminal case in the ABIS database (covering Denmark, France, Germany, Sweden, and Switzerland), by country

| Country | Period of study | Number of cartridge cases | Number of incidents | Average cartridges per case | Minimum | Maximum |
|--------------|------------------------------|---------------------------|---------------------|-----------------------------|----------|-----------|
| Denmark | January 2015 - March 2020 | 603 | 437 | 1.4 | 1 | 5* |
| France | January 2015 - December 2021 | 3,518 | 1,790 | 2.0 | 1 | 23** |
| Germany | January 2015 - February 2020 | 915 | 441 | 2.1 | 1 | 3 |
| Sweden | January 2015 - March 2020 | 1,459 | 984 | 1.5 | 1 | 4 |
| Switzerland | April 2015 - May 2020 | 153 | 56 | 2.7 | 1 | 8 |
| Total | | 6,648 | 3,708 | 1.8 | 1 | 23 |

Notes:

* The highest number of cartridges linked to a single case in the Denmark data set was five, but one entry comprised 29 cartridges recovered from multiple cases.³

** In the data set for France, only nine cases had ten cartridges or more.

Sources: Desmarais et al. (2021);⁴ Jongleux (2021)⁵

The analysis of explosive munitions draws on data from two main sources:

- data and information on seized munitions and the remnants of expended munitions provided to the Small Arms Survey by authorities from EU member states, including the Czech Republic, Finland, Ireland, Luxembourg, the Netherlands, Spain, and Sweden; and
- anonymized responses to a questionnaire on the criminal misuse of pyrotechnics and explosives distributed to EU member states by Europol.

Interviews and written correspondences with law enforcement officials provide further background on the types of illicit ammunition and trafficking mechanisms used by criminals. The paper also drew upon data on ammunition seized and used in incidents as recorded by the Incident Monitor. Data from these sources was cross-checked against—and supplemented with—information from academic literature and media reports.

Types and uses of illicit firearm ammunition and explosive munitions in the EU

This section offers the first regional analysis and overview of the types, sources, and uses of illicit ammunition in the European context, with a particular focus on the items of greatest utility to groups engaged in terrorism, organized crime, and other violent acts.

Types of illicit firearm ammunition

Compared with firearms, knowledge about the types, specific varieties or brands, and sources of illicit firearm ammunition—both globally and in the European context—is extremely limited. Ammunition is often not reported in national firearm seizure statistics; when it is, information tends to be limited to total quantities and omits the specific calibres and types of cartridges concerned. The resulting data gap is exacerbated by the tendency of both the media and researchers to place greater emphasis on the trafficking of weapons. Consequently, understanding of patterns in ammunition misuse and trafficking is limited. As part of Operational Action 1.5, which began in 2022, the European Multidisciplinary Platform Against Criminal Threats (EMPACT) Firearms and

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Europol have sought to assess available data by requesting information through a questionnaire sent to EU member states and neighbouring countries.^a According to 23 responding law enforcement agencies, the three main sources of illicit ammunition in the region are smuggling from neighbouring countries; theft; and sales on social media, the internet, or the dark net.⁶ Other sources include the resale of legal ammunition on the black market, as well as the use of ammunition that has remained in circulation after conflict, such as in the Western Balkans.

Individual cartridges cases—unlike firearms—are not marked with unique serial numbers, which hampers systematic tracing efforts and makes documenting the full chain of custody of illicit ammunition very difficult. The Europol assessment notes the current limited scope of information sharing on illicit ammunition between European states. Moreover, only four of the 23 responding countries reported frequent attempts to trace ammunition.⁷ This section draws on data

from the ABIS database as well as the Incident Monitor to create a general profile of illicit ammunition in Europe. In addition to the main calibres, the section analyses information on the makes, manufacturers, and years of production of illicit firearm ammunition in the European context and identifies some possible sources.

Calibres

Examining the calibres^b of illicit ammunition can help establish a baseline, or profile, of the ammunition typically misused in a given setting. This can, in turn, be used to detect unusual patterns

a This activity also links to EMPACT Firearms Operational Action 1.3, coordinated by France, which explores the interoperability of ABIS and the international exchange of ballistic intelligence. For more background on EMPACT, see Europol (2022), EU Policy Cycle – EMPACT, updated 20 January, <https://www.europol.europa.eu/crime-areas-and-statistics/empact>.

b The calibre designations used in this paper are adapted from the terminology used by the Permanent International Commission for the Proof of Small Arms (CIP) (s.d.), TDCC – Tables of dimensions of cartridges and chambers, <https://www.cip-bobp.org/en/tdcc>.

that may be the result of new or emerging sources of illicit ammunition. Moreover, calibres are often broadly associated with certain types of weapons. For instance, 9 mm Luger ammunition is primarily used with pistols and sub-machine guns, 9 mm PA Blanc (sometimes modified with an added bullet or projectile) with alarm “blank firing” handguns, and 7.62 x 39 mm with AK-pattern rifles. Calibre data therefore also provides important clues regarding the types of illicit weapons used in a specific context.

Of the 48 calibres identified in the ABIS database, five calibres dominate the picture and comprise 79 per cent of the cartridges (see Table 2). The most prevalent cartridge in all countries is 9 mm Luger. In all five surveyed countries, 7.65 mm Browning (also typically a handgun calibre) emerges as the second most common type of cartridge. The third is 7.62

x 39 mm, but this calibre appears to be more prevalent in France and Sweden^a than in the other three countries—possibly reflecting French and Swedish criminals’ greater reliance on AK-pattern rifles.^b While the French ammunition profile data set did not include 12-calibre cartridges, the IRCGN stated that the national ballistic database contains 827 rounds of 12-calibre ammunition recovered from crime scenes in 2015–21—making this the second most prevalent calibre for this period in France.⁸ Country responses to the Europol questionnaire confirmed this overall picture by identifying 9 mm Luger, 7.65

mm Browning, and 7.62 x 39 mm (tied with 22 Long Rifle) as the three most dominant types of ammunition used in shooting incidents.⁹ The Dutch database shows similar results, although 7.62 x 25 mm Tokarev only accounts for a few cartridges and is therefore replaced in the top five by 9 mm Browning Court.¹⁰ This calibre is also

The most prevalent cartridge in all countries is 9 mm Luger.

The 9 mm PA Blanc also features in the overall top five calibres in the ABIS database (and is particularly prevalent in Denmark, France, and Germany) as well as in the Dutch database.

Table 2 Top five calibres of the firearm ammunition contained in the ABIS database (covering Denmark, France, Germany, Sweden, and Switzerland)

| Nominal calibres | Denmark | France | Germany | Sweden | Switzerland | Total |
|----------------------|------------|--------------|------------|-------------|-------------|--------------|
| 9 mm Luger | 260 | 1,231 | 298 | 479 | 86 | 2,354 |
| 7.65 mm Browning | 87 | 740 | 245 | 368 | 20 | 1,460 |
| 7.62 x 39 mm | 20 | 476 | 10 | 97 | 1 | 604 |
| 9mm PA Blanc | 33 | 273 | 118 | 36 | 5 | 465 |
| 7.62 x 25 mm Tokarev | 13 | 153 | 35 | 163 | 4 | 368 |
| Total | 413 | 2,873 | 706 | 1143 | 116 | 5,251 |

Sources: Desmarais et al. (2021);¹¹ Jongleux (2021)¹²

a In 2022, the proportion of 7.62 x 39 mm reached 11 per cent of all ammunition recovered from shootings in Sweden, making it the second most documented calibre that year. Source: Correspondence with Swedish National Forensic Center official, 24 October 2023.

b On the use of AK-pattern rifles in Marseille, see Reynoard, J., et al. (2021), Homicides and suicides by firearm in Marseille: An 8-year review, *Legal Medicine*, 2021:52, p. 101909, <https://pubmed.ncbi.nlm.nih.gov/34062367/>.

prevalent in Germany and Sweden and can be used in both lethal-purpose handguns and in some types of illicitly converted alarm pistols, as discussed below.

The 9 mm PA Blanc also features in the overall top five calibres in the ABIS database (and is particularly prevalent in Denmark, France, and Germany) as well as in the Dutch database. The presence of this blank ammunition interestingly signals the criminal use of alarm handguns—weapons not normally designed to fire lethal projectiles. Modified 9 mm PA Blanc ammunition can nevertheless be used in alarm handguns that are illicitly converted to fire lethal rounds.¹³ The ABIS headstamp images are not sufficient to determine whether the 9 mm PA Blanc ammunition recorded was modified or not. Nevertheless, Bulgaria, Cyprus, France, Ireland, Norway, Portugal, Romania, Slovenia, Sweden, and Switzerland all reported recovering converted blank ammunition rounds in cases of seizures and shootings.¹⁴

The Dutch database includes an assessment by forensic experts of the type or model of firearm used to fire the documented spent cartridges. In 116 cases (out of the 1,712 cases in which only the cartridges were retrieved), these firearms were assessed to be modified blank or gas pistols firing ammunition in 9 mm Browning Court, 7.65 mm Browning, 6.35 Browning, 9 mm PA Blanc, 9 mm R Blanc, and 8 mm Blanc, in descending order. The experts also identified the use of nine modified Glock pistols (9 mm Luger), one modified revolver (22 Long Rifle), and one modified or reactivated pistol using 9 mm Browning Court. Additionally, the Dutch database included six cases involving reloaded ammunition with the following calibres: 9 mm Browning Court, 7.65 mm Browning, and 9 mm Luger.¹⁵ Interestingly, only three cases in the ABIS database and one case in the Dutch database involved the use of 6 mm Flobert ammunition. Such ammunition could have been fired by an original Flobert-calibre weapon, or shot by a larger-calibre firearm that had been modified to shoot the smaller Flobert ammunition. Such weapons

were sold with few restrictions in Slovakia until legislative changes were made in 2021, in line with the EU Firearms Directive.¹⁶ Firearms modified to fire Flobert-calibre ammunition were an important source of illicit firearms from 2015 to 2021, as criminals were able to easily “retro-convert” them into the calibre of origin.¹⁷

The Incident Monitor includes 4,228 media articles—12 per cent of the database—that capture information on ammunition. The Monitor, a “media scraping” tool based on machine learning, recognizes reports on the same incident of firearm violence and groups these as one incident. At the time of writing, however, the tool did not always work correctly and sometimes separated articles reporting on the same case, rather than grouping them together. The number of articles therefore does not indicate the absolute number of separate incidents. The Monitor also captures some languages better than others.

Moreover, it is sometimes unclear whether the data on ammunition in the Incident Monitor was inferred from the calibre of the firearm used in the reported incident or specifies the actual cartridges seized—particularly as some of the ammunition calibres were systematically entered based on the type of firearm. For instance, the calibre in articles referencing shotguns was often coded as 12-calibre (12-gauge) ammunition, which may not always be accurate. Another caveat with Monitor data is the lack of specificity of the reported calibres, which often appear to be reported only partially in the media sources. The top five reported calibres are 12-gauge (28 per cent); 9 mm (22 per cent); 7.62 mm (21 per cent); .32 (8 per cent); and 22 mm (4 per cent)—but 9 mm and 7.62 mm could refer to a range of calibres, while 22 mm is erroneous.

Nevertheless, the dominance of 12-calibre (12-gauge) shotgun ammunition (notably in Italy, Portugal, and Spain) stands in sharp contrast to the ABIS and Europol data, which does not indicate widespread use of this calibre in shooting

incidents (except for France, as noted above). This disparity is certainly explained by the caveats mentioned above as well as the different scope of these data sets: the Monitor captures both shootings as well as seizures where firearms were not fired, and the period and geographical coverage of the studies do not fully align. Moreover, calibres identified in media articles may be incorrect due to errors by journalists or the sources present at the site. Media reports, including the Monitor, are therefore of limited use for monitoring illicit firearm ammunition.

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Manufacturers

The headstamp markings of cartridges recorded in the ABIS database allow for the identification of 137 manufacturers based in some 38 countries.^a While most of these countries are European, the overall top ten includes the United States and Brazil (see Table 3), which are, along with the Czech Republic, also in the top five of each country data set.^b In all five data sets in the ABIS database except Sweden, Germany is the primary country of production of the documented illicit ammunition.

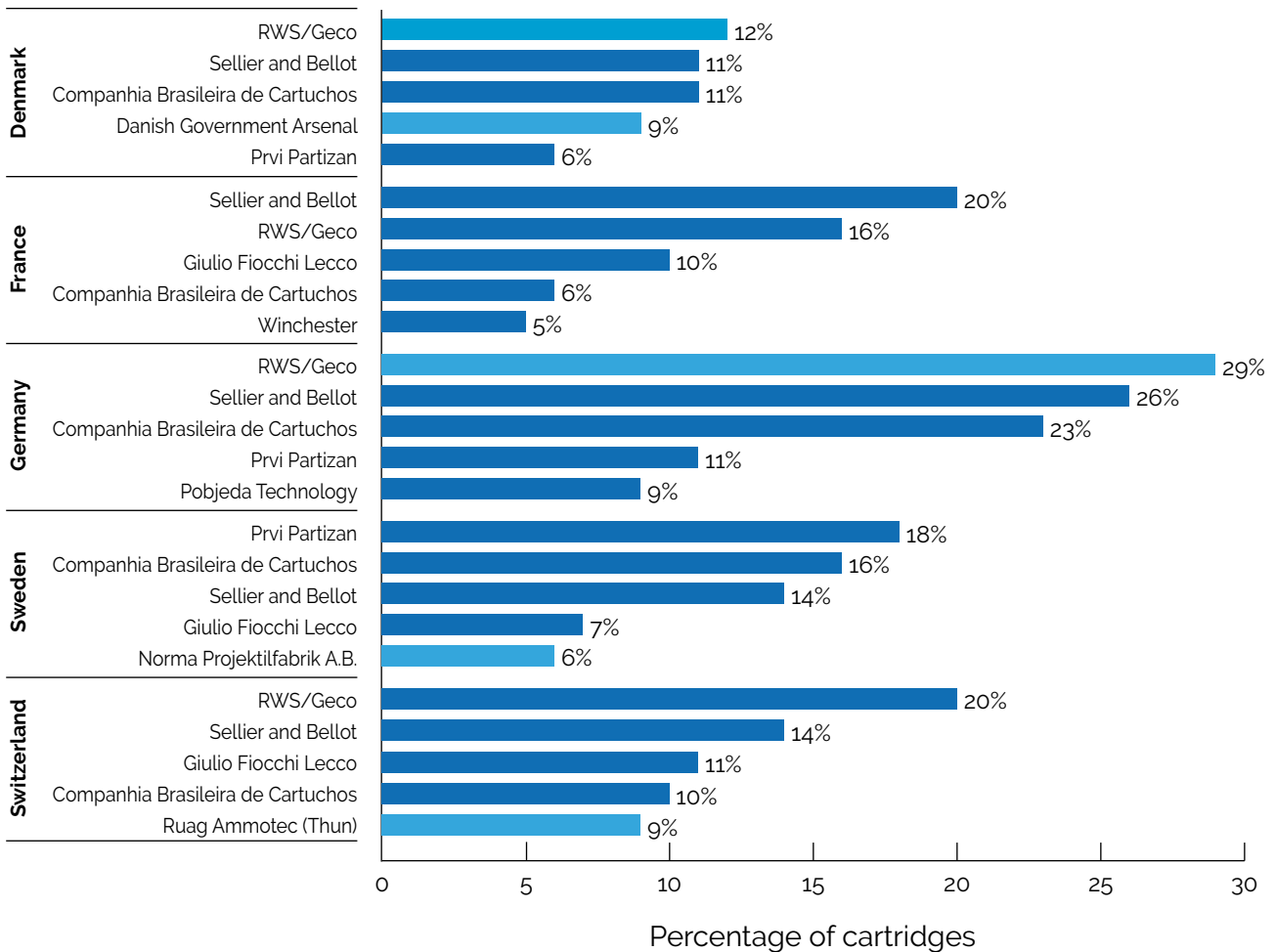
Table 3 Top ten countries of manufacture of the firearm ammunition contained in the ABIS database (covering Denmark, France, Germany, Sweden, and Switzerland)

| Inferred country of manufacture | Number of cartridges |
|--|----------------------|
| Germany | 1,303 |
| Czech Republic | 1,205 |
| United States | 660 |
| Brazil | 622 |
| Italy | 493 |
| Serbia | 403 |
| Sweden | 299 |
| Former Yugoslavia (Bosnia-Herzegovina) | 169 |
| France | 142 |
| Russian Federation | 137 |
| Total | 5,433 |

Sources: Desmarais et al. (2021);¹⁸ Jongleux (2021)¹⁹

a The researchers deduced the country of manufacture based on the manufacturer and, when known, the year of manufacture.
 b Although China does not feature in the top ten shown in Table 3, officials noted a recent increase in seizures and shootings involving Chinese-produced 7.62 x 39 mm ammunition in France in 2023. Correspondence with French law enforcement official, 24 October 2023.

Figure 1 Top five manufacturers by proportion of cartridges in each country data set in the ABIS database (covering Denmark, France, Germany, Sweden, and Switzerland) (n=3,958)



Note: Domestically produced cartridges are highlighted in light blue. For France, the most prevalent domestic producer—Société Française de Munitions—is ranked ninth among the producers in this subset and therefore does not appear on the graph.

Sources: Desmarais et al. (2021);²⁰ Jongleux (2021)²¹

In all five countries covered in the ABIS database, domestic manufacturers are among the top ten producers of the ammunition under review.^a Among the 6,648 cartridges in the database, 11 per cent (728) were manufactured in the country in which the incident took place. In Denmark, for instance, cartridges manufactured by the Danish Government Arsenal were the fourth most common make in the data set (see Figure 1). While this data alone does not necessarily prove the diversion from national legal holdings, it calls for further examination.

Sellier & Bellot (Czech Republic), RWS/Geco (Germany), and Companhia Brasileira de Cartuchos (Brazil) are the top three producers of cartridges in the ABIS database. Sellier & Bellot and Companhia Brasileira de Cartuchos are also among the top five producers of cartridges in each of the five surveyed countries, and account for more than a quarter of cartridges in the ABIS database. Sellier & Bellot, RWS/Geco, and Giulio Fiocchi Lecco account for half of the Dutch database, followed by Magtech and Prvi Partizan.²²

a The Survey has found no evidence of domestic ammunition production in the Netherlands.

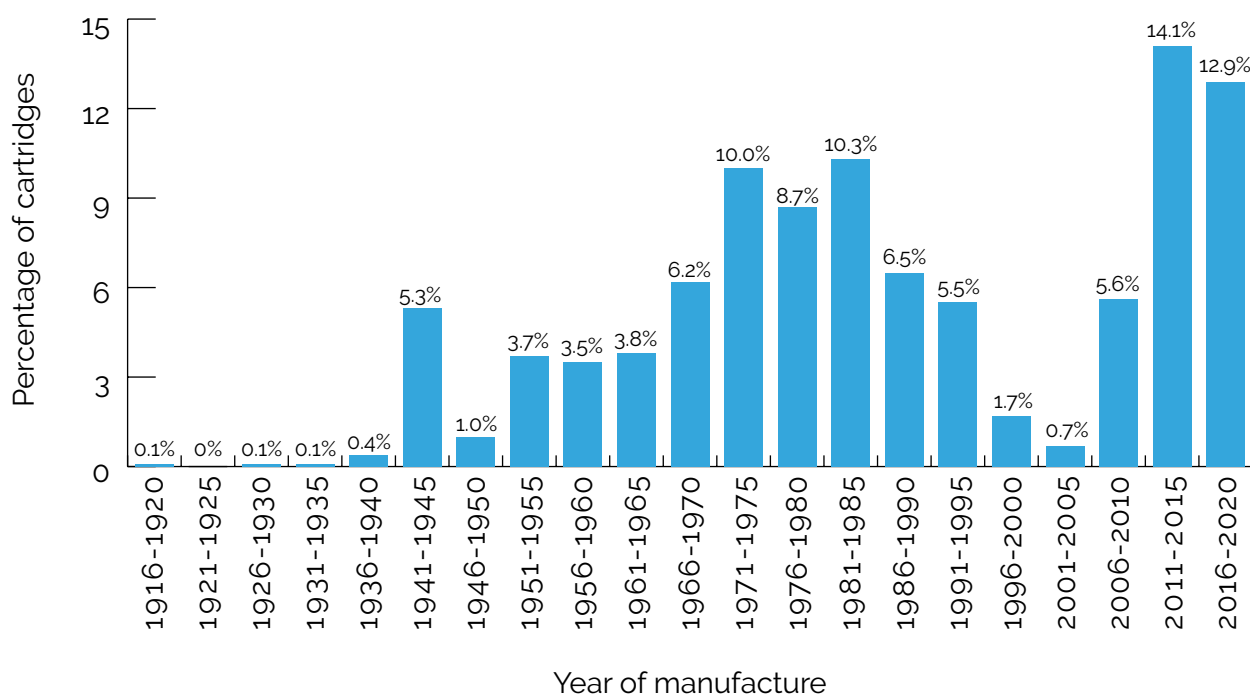
Year of manufacture

Some headstamps—29 per cent (1,937) of the 6,648 cartridges under review in the ABIS database^a—specify the year of manufacture of the cartridge. This data makes it possible to calculate the “time to crime”—the time between the production of the ammunition and its illicit use—which provides insight into how quickly a legally produced round of ammunition is misused or diverted to unauthorized end users. Most of the cartridges in the ABIS database are old—when known, the average time-to-crime of cartridges was 32 years.^b This is more than three times higher than in other regions such as the Caribbean, for instance, where a similar study found an average time-to-crime of 8.5 years.²³

Most of the cartridges in the ABIS database are old—when known, the average time-to-crime of cartridges was 32 years.

Data on the cartridges with the shortest time-to-crime can indicate the sources of this ammunition, as the chain of custody leading to their use in crime will probably be shorter. More than a quarter (523 cartridges) of all cartridges in the ABIS database with a year stamp were produced since 2011 (see Figure 2). In addition, the great majority of the 132 cartridges with a time-to-crime value of one year or less were produced by Sellier & Bellot. Ammunition with a short time-to-crime can be valuable for intelligence-led policing by providing leads to further investigate the sources of recently produced ammunition. Follow-up investigations into known local sources for these types of ammunition can potentially support measures to prevent future trafficking and diversion.

Figure 2 Distribution of cartridges by year of manufacture in the ABIS database (covering Denmark, France, Germany, Sweden, and Switzerland) (n=1,937)



Sources: Desmarais et al. (2021);²⁴ Jongleux (2021)²⁵

- a Each country data set had the same percentage of headstamps specifying the year of manufacture, except for that of Germany which dropped to 22 per cent.
- b In the national data sets, the country with the shortest average time-to-crime was Germany (27 years), followed by France (30 years), Switzerland (31 years), Sweden (33 years), and Denmark (40 years).

Misuses of firearm ammunition

This subsection reviews information on the types of crime and offences that involve firearm ammunition. It also explores whether different types of firearm ammunition are used for specific types of crime.

As noted above, 12 calibre (12 gauge), 9 mm Luger, and 7.62 x 39 mm—tied with the erroneous “.22 mm”—appear to be the main calibres identified in cases of seizures or crimes (such as murders or gang- and drug-related incidents) in the Incident Monitor.

Due to the scope of ballistic systems, the ABIS database captures spent cartridges recovered by law enforcement in different situations. It identifies the type of criminal investigation underway when the forensic experts analysed the ammunition. This designation may change during the course of the investigation, so the data may not necessarily match exactly other statistics on firearm-related crimes. In the ABIS database under review, homicides and assaults are the most frequent crimes concerned, accounting for 73 per cent of all cartridges (see Figure 3). This contrasts with the small proportion (1 per cent) of drug-related incidents, although some homicides and assaults may also be drug related but not recorded as such.

Despite these caveats, the ABIS database allows a broad comparison of the types of ammunition used in violent types of crime, such as homicides and assaults, with those of less serious offences, such as acts against property and violations of

firearm legislation. As shown in Figure 4, these crime categories are dominated by 9 mm Luger and 7.65 mm Browning calibre ammunition, followed by 7.62 x 39 mm, 9 mm PA Blanc, and 7.62 x 25 mm Tokarev ammunition—with some inconsistencies in their order of magnitude across crime categories. The results of the Dutch database are similar: of the 539 cartridges used in homicides,^a 56 per cent of cases were 9 mm Luger, 22 per cent 7.62 x 39 mm, and 11 per cent 7.65 mm

Browning.²⁶ In the ABIS database, the use of 9 mm PA Blanc ammunition is less frequent in homicides than in the other categories of crime, as may be expected for a round not designed to be lethal. Some homicide cases, however, involve the use of such blank ammunition,

Some homicide cases involve the use of such blank ammunition, suggesting that certain cartridges could have been modified to fire lethal projectiles or used at point blank.

suggesting that certain cartridges could have been modified to fire lethal projectiles or used at point blank. Only two homicide cases involve the use of blank ammunition in the Dutch database, while those cartridges account for 11 per cent of the ammunition.²⁷

While present in the top five calibres for all types of crime in the ABIS database, 7.62 x 39 mm cartridges are less prevalent here than in the Incident Monitor. In the latter, 7.62 x 39 mm appears more frequently than 9 mm Luger in media articles related to homicides, acts against property, and drug-related incidents. While the scope of the two data sets is different, this disparity could suggest that media articles report incidents involving automatic rifles more systematically than those involving handguns.

- a The Dutch database uses the following four classifications for incidents (the last two of which—‘c’ (assaults) and ‘d’ (homicides)—are similar to the ABIS database categorizations):
- ammunition seized, found, or surrendered in a residence, car, or public road;
 - ammunition retrieved after being shot at a residence, car, or road sign; in a forest or on the street (such as celebratory shootings); or after poaching;
 - ammunition retrieved after the shooting of people (in a home, public space, or car) or in a burglary or armed robbery (to intimidate or threaten); and
 - ammunition retrieved after a fatal shooting of one or more people.

Figure 3 Distribution of crime category for the ABIS database (covering Denmark, France, Germany, Sweden, and Switzerland) (n=6,648)

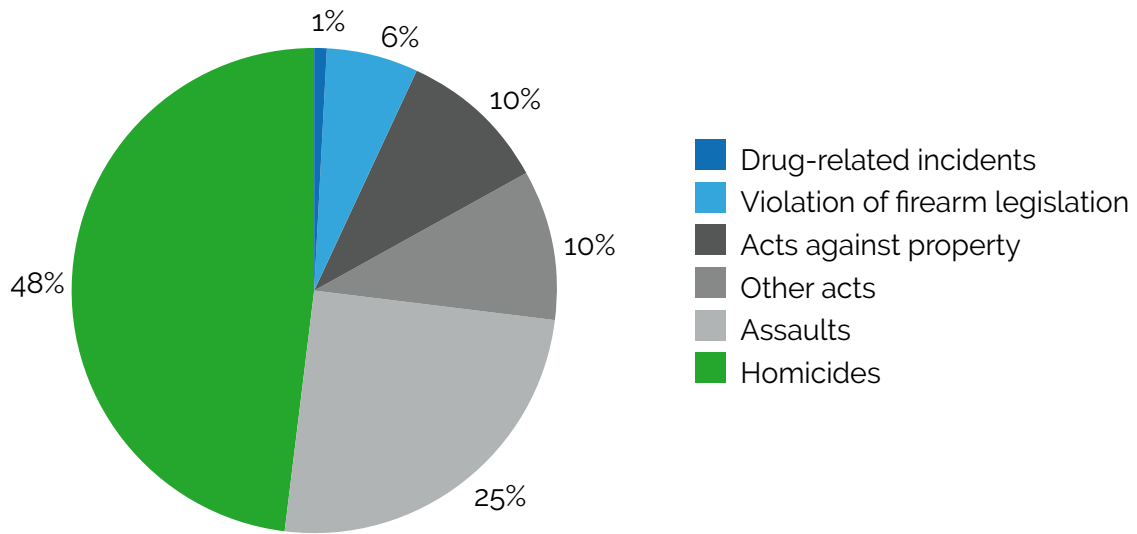
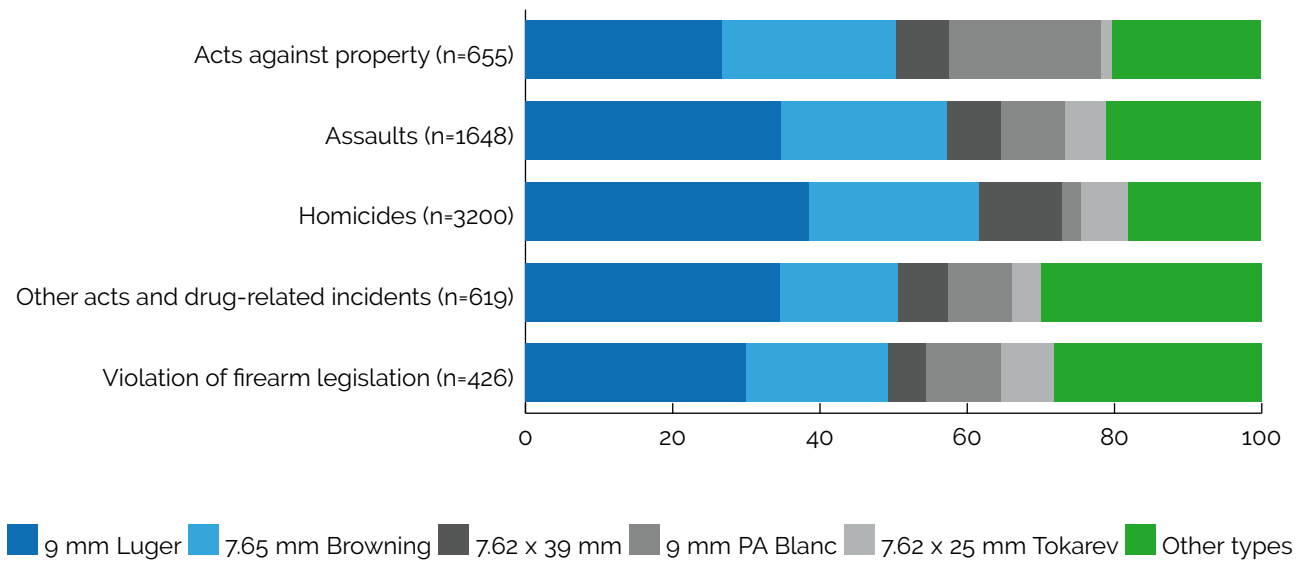


Figure 4 Proportion of top five calibres by crime category for the ABIS database (covering Denmark, France, Germany, Sweden, and Switzerland) (n=6,648)



Sources: Desmarais et al. (2021);²⁸ Jongleux (2021)²⁹

Types and uses of explosive munitions

Illicit explosive munitions in the EU range from World War I- and World War II-era grenades and mines unearthed by scavengers in Latvia to improperly demilitarized man-portable air defence systems (MANPADS) components seized from suspected arms traffickers in Spain.³⁰ Most media reports on illicit explosive munitions in Europe have focused on the trafficking of grenades from the Balkans, which fuelled a spike in grenade attacks in some EU states in the mid- and late 2010s.

Serbian and Bosnian suppliers reportedly had so many grenades that they famously gave them away for free with large firearm orders.³¹

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Media coverage of the surge in grenade attacks often implies that most illicit explosive munitions in the EU come from the Balkans, but government data paints a more complicated picture. As part of Project INSIGHT, the Survey obtained information on seized grenades and other munitions from 14 EU member states, including detailed, item-specific data from Ireland, Finland, Luxembourg, the Netherlands, and Sweden—with the latter two among the three countries most affected by criminal use of grenades in recent years.^a The data indicates that the make, model, and country of manufacture of illicit hand grenades, as well as the circumstances in which they are encountered by law enforcement, varies significantly between countries. The same is true of other illicit explo-

Table 4 Seized and detonated hand grenades examined by authorities in Sweden, 2018-22

| Grenade models | 2018 | 2019 | 2020 | 2021 | 2022 | Total | Percentage |
|--------------------|-----------|-----------|-----------|-----------|-----------|------------|------------|
| Yugoslavian models | 51 | 29 | 44 | 16 | 21 | 161 | 90% |
| Other models | 4 | 1 | 3 | 0 | 5 | 13 | 7% |
| Unknown models | 2 | 2 | 0 | 0 | 1 | 5 | 3% |
| Total | 57 | 32 | 47 | 16 | 27 | 179 | |

Source: Data obtained from the Swedish Police Authority, 2023

Table 5 Seized and detonated hand grenades examined by authorities in the Netherlands, 2019-22

| Grenade models | 2019 | 2020 | 2021 | 2022 | Total | Percentage |
|--------------------|-----------|-----------|-----------|-----------|------------|------------|
| Yugoslavian models | 53 | 62 | 32 | 17 | 164 | 92% |
| Other models | 4 | 8 | 2 | 0 | 14 | 8% |
| Unknown models | 0 | 0 | 0 | 0 | 0 | 0% |
| Total | 57 | 70 | 34 | 17 | 178 | |

Source: Data obtained from the NFI, 2023

^a The third country is Belgium. See Krusselmann, K., Rabolini, A. & Liem, M. (2021), *The illegal use of hand grenades in the Netherlands*, Leiden: Leiden University, <https://www.universiteitleiden.nl/binaries/content/assets/governance-and-global-affairs/isga/the-illegal-use-of-hand-grenades.pdf>.

sive munitions, although data on these items is less complete.

In some countries, the vast majority of seized grenades and other factory-made munitions were makes and models produced in the countries that comprised the former Yugoslavia. Of the 179 grenades examined by authorities in Sweden from 2018 to 2022, more than 90 per cent were identified as Yugoslavian models (see Table 4).

The percentage of illicit grenades from the former Yugoslavia in the Netherlands is even higher. Data provided by the NFI reveals that 92 per cent of

grenades examined by Dutch authorities were Yugoslav models (see Table 5). The remaining 8 per cent (14 grenades) were Belgian, British, Czech, German, and Soviet-designed models, many of which were first fielded in the early to mid-20th century.

Yugoslavian grenades have also been seized by authorities in other EU member states (see Images 6-7); authorities in at least five of the ten other EU countries for which the Survey was able to obtain data on illicit grenades reported seizing one or more Yugoslavian models.

Images 6 and 7 Yugoslavian M75 hand grenade seized by authorities in Luxembourg



Source: Grand-Ducal Police

Table 6 Seized explosive munitions other than grenades, Netherlands, 2019-22

| Year | Type | Description | Country of manufacture | Quantity |
|------|-----------------------|-------------|------------------------|----------|
| 2019 | Anti-personnel mine | PMA-3 | Yugoslavia | 10 |
| 2019 | Shoulder-fired rocket | M80 | Yugoslavia | 1 |
| 2020 | Anti-personnel mine | MRUD | Yugoslavia | * |
| 2020 | Shoulder-fired rocket | M80 | Yugoslavia | * |
| 2021 | Anti-personnel mine | MRUD | Yugoslavia | 1 |
| 2021 | Shoulder-fired rocket | M80 | Yugoslavia | 1 |
| 2022 | Shoulder-fired rocket | M80 | Yugoslavia | 4 |
| 2022 | Shoulder-fired rocket | RPG-75 | Czech Republic | 1 |

Note: * Data unavailable

Source: Data obtained from the NFI, 2023

Data from the Dutch authorities indicates that grenades are not the only illicit Yugoslavian munitions circulating in the Netherlands. Since 2019, they have seized more than 17 other Yugoslavian anti-tank rockets and landmines (see Table 6).

As revealed in Tables 4 and 5, the number of illicit Yugoslav grenades encountered by authorities in the Netherlands and Sweden has decreased significantly in recent years. The average number of seized and expended Yugoslav grenades documented in Sweden fell by 56 per cent from 2018–20 to 2021–22. The Netherlands saw an even larger drop in incidents involving illicit Yugoslav grenades. Authorities in Belgium have also reported notable decreases in illicit hand grenades, including grenades originating in the Balkans. This decrease is likely due in part to national and regional counter-trafficking efforts. Other contributory factors identified by EU officials include Covid-19-related decreases in travel and trade, the imposition of a curfew in the Netherlands, and the increased use of pyrotechnics and other explosives instead of grenades by criminal groups.³²

The other grenades examined by authorities in the 14 countries studied^a were a mix of, inter alia, Austrian, British, German, Polish, Portuguese, and Soviet/Russian models, many of which were explosive remnants of war from World War II. These grenades, along with other munitions, are unearthed by construction workers, farmers, and hobbyists and foragers (such as metal detector enthusiasts and mushroom hunters). Collections of legacy munitions are sometimes quite large. A cache discovered by authorities in Luxembourg in the home of a participant in a Covid-19-related demonstration consisted of more than 140 munitions ranging

from hand grenades to 105 mm artillery shells. According to police officials, the munitions were in such poor condition that they had to be destroyed for safety reasons.³³

Grenades and other munitions are also found in the belongings of deceased veterans, often by family members. Many of these items are decades-old remnants of previous wars. A Finnish police official estimated that 99 per cent of the explosive munitions taken into custody are World War II-era items. The official was unaware of any cases of trafficking of explosive munitions from the Balkans to Finland.³⁴

In other countries, explosive munitions are occasionally seized during criminal investigations, but are usually not the subject of the investigations. An official from the Czech Republic noted that, in his experience, “most items seized by the police are Czechoslovak army training aids such as smoke pots, flashbangs, 20 mm sub-calibre rounds. These items are, for the most part, found during warranted house searches that are not related to arms or ammunition crimes.”³⁵

IEDs and pyrotechnics are a growing concern for authorities in some EU states.

IEDs and pyrotechnics are a growing concern for authorities in some EU states. The types of IEDs employed by criminals in the EU vary significantly from country to country, as

evidenced by the wide array of components used in IEDs in different states.^b Criminals are increasingly using the explosives (flash powder) from commercial pyrotechnics as the main charge for IEDs. These, in turn, are used in attacks on ATMs, refugee shelters, other criminal groups, law enforcement officials, and firefighters, among other targets.³⁶

a Data on illicit grenades in 12 of these countries identifies the make or model of some or all of the grenades.

b Responses to a questionnaire distributed to EU member states reveals the diversity of components used in IEDs across Europe. This paper does not include a list of these items or the countries where IEDs with these components were found because of the sensitivity of this information.

Implications

This section discusses the implications of the above research findings and reviews the main regional trends identified. It also examines the caveats of the available data of firearm ammunition and explosive munitions, including future challenges and opportunities.

Firearm ammunition

This paper illustrates the challenges associated with documenting and tracing the origins of illicit firearm ammunition. Media reports and official statistics provide few details on the cartridges seized or used in crime. More detailed data must therefore be extracted from restricted law enforcement databases. Securing access to and processing this data requires time and resources. Unless law enforcement agencies adjust their standard operating procedures to more systematically record information from new incidents—including the headstamps and other characteristics such as inkjet markings, and whether the ammunition was converted or modified—profiling illicit firearm ammunition in Europe will remain a resource-intensive and retrospective undertaking.³⁷

A more systematic effort to monitor and analyse recovered firearm ammunition could inform and improve emerging efforts to tackle the misuse and trafficking of ammunition. The ABIS database reveals similarities across borders in terms of illicit ammunition in Europe. Calibres associated with handguns and widely available commercial brands of ammunition usually represent the bulk of the cartridges used in shootings and violent crime. Knowledge of this

baseline makes it possible to detect unusual or emerging trends—such as the greater use of 7.62 x 39 mm ammunition in countries such as France and Sweden, or the presence and use of blank rounds in shootings, including violent crime, in several countries. When it comes to countries of production, ammunition produced in the Western Balkans is commonly used by criminals in Sweden. The picture is quite different in the other surveyed countries, however, where commercial brands produced in Western Europe, Brazil, and the United States often dominate the picture. In all countries under review, domestically produced ammunition, as well as widely available commercial brands of civilian ammunition, are used in local crime; while this finding warrants further scrutiny, it demonstrates that illicit ammunition is not necessarily sourced from abroad. The data also shows how quickly a legally produced round can be misused: some cartridges were produced the same year as the criminal incident took place.

Efforts to establish the chain of custody of seized firearm ammunition are currently limited—hampered by insufficient sharing of ballistic information between countries,³⁸ as well as the lack of unique identifying marks on individual cartridges. The establishment of a new global framework for ammunition management may provide momentum for more systematic marking practices in the future, including for firearm ammunition.^a

As this paper has shown, simple markings such as the year of manufacture provide important analytical insight into the time-to-crime between legal production and misuse, and potential leads for investigators. More detailed markings can only enhance our understanding of illicit firearm ammunition and its sources of supply, provided the adequate surveillance mechanisms are in

A more systematic effort to monitor and analyse recovered firearm ammunition could inform and improve emerging efforts to tackle the misuse and trafficking of ammunition.

a The Global Ammunition Framework can be consulted at: <https://www.undocs.org/Home/Mobile?FinalSymbol=A%2F78%2F111&Language=E&DeviceType=Desktop&LangRequested=False>.

place. Ongoing efforts to establish national firearms focal points, with access to ballistics data, and the development of an EU Firearms Intelligence hub at Europol^a provide opportunities to strengthen the monitoring of illicit ammunition in the European context.³⁹

Explosive munitions

The data on illicit explosive munitions analysed as part of Project INSIGHT reveals both challenges and opportunities for policymakers and practitioners in EU states. The large proportion of Yugoslav grenades and other munitions seized by European authorities indicates a reliance on trafficking networks in the Balkans that have received significant attention from EU authorities. Concerted efforts by Swedish, Dutch, and other national authorities, often in conjunction with Europol, help to explain the notable decrease in seized grenades from the Balkans in Sweden and the Netherlands.⁴⁰ Whether criminal networks will find alternative sources of factory-produced munitions is far from certain. There is little evidence to suggest that these items are readily available within the EU, which is not surprising given the tight controls applied to grenades and other explosive munitions by European militaries.

Ukraine would seem to be the most likely alternative source given the large number of munitions deployed by both sides of the current conflict and the widespread proliferation of grenades and other munitions within the country prior to the Russian invasion in February 2022. Yet outbound arms trafficking from Ukraine was rare prior to the

current conflict, and there is little evidence of widespread trafficking since February 2022.

A 2021 study by the Survey found no indication of large-scale arms trafficking from Ukraine despite the presence of thousands of loose explosive munitions circulating within the country.⁴¹ The Survey collected and reviewed aggregate data on border seizures compiled by authorities in Ukraine and their counterparts in four neighbouring states,^b as well as summaries of individual seizures published by Ukraine and its neighbours. The data revealed widespread, systematic cross-border trafficking of other types of contraband (such as cigarettes and alcohol) but not arms or ammunition.

Data analysed for this paper appears to support these findings. Of the 352 hand grenades examined by Dutch and Swedish authorities from 2018^c to 2022, only 19 of the grenades were models that were commonly encountered on

the black market in Ukraine prior to the Russian invasion.^d Furthermore, since these models were widely exported, there is no reason to think that the grenades found in the Netherlands and Sweden came from Ukraine. Indeed, Swedish and Dutch officials have no evidence that any of the seized grenades came from Ukraine. The large quantities of arms and ammunition exported to Ukraine since the invasion has revived concerns about widespread cross-border arms trafficking to Europe but, thus far, there are no signs of such trafficking. This is unlikely to change soon given the high consumption rate of munitions in Ukraine and the importance of these munitions to both sides.

Swedish and Dutch officials have no evidence that any of the seized grenades came from Ukraine.

- a In addition, one of the objectives of the EMPACT Firearms Operational Action 1.5 is to raise awareness among operational law enforcement partners of opportunities for marking and tracing ammunition. Written correspondence with European law enforcement official, 27 June 2023.
- b These states are Hungary, Moldova, Poland, and Romania.
- c Data from the Netherlands starts in 2019. Five hand grenades of unknown make and model seized in Sweden were excluded from these calculations.
- d These models are F-1, RGD-5, RGN, and RG-42 grenades.

A more likely scenario is an increase in the use of IEDs made from readily available, commercial off-the-shelf materials—a trend already evident in some countries. In Sweden, which had some of the highest rates of illicit hand grenade use in the 2010s, criminal groups are increasingly using IEDs instead. As Sweden’s police chief explained in 2019, “[While criminals] previously preferred hand grenades and other factory-made explosives, they have recently shifted to home-made and more powerful devices.”⁴² In Sweden, these devices are often made from commercial dynamite and blasting caps, while in other EU states they are made from commercial pyrotechnics. Until European governments strengthen and harmonize controls over the types of explosives, including pyrotechnics, used in IEDs, they will continue to be a viable alternative to factory-produced munitions for many criminals.^a

Conclusion

This paper shows that detailed data on illicit munitions in Europe currently exists but must be accessed through specialized law enforcement agencies—including forensic institutions and investigative units that document, examine, and analyse these items. National seizure statistics often lack the necessary detail for policy-relevant analysis, as do the media reports collected by the Incident Monitor. Media reports also often include incomplete or inaccurate information on the types and calibres of ammunition. These limitations reduce the current utility of machine-learning technology for capturing ammunition data from media reports.

Data contributed by law enforcement sources does, however, shed some light on the proliferation of illicit ammunition and explosive munitions. The data reveals some similarities across

borders in terms of illicit firearm ammunition in Europe. Calibres typically associated with handguns and widely available commercial brands of ammunition usually represent the bulk of the cartridges used in shootings and crime in the countries studied, but the origins of this illicit ammunition tend to be context specific. Firearm ammunition produced in the Western Balkans is commonly used in Sweden, but less so in the other countries studied. Ammunition used in crimes is often sourced domestically or from elsewhere within the EU—the most common types of cartridges analysed for this study were produced in Germany and the Czech Republic. Moreover, cartridges newly produced in the EU have been recovered at crime scenes the same year that they were manufactured.

Available data supports claims that a large percentage of illicit hand grenades and other factory-produced explosive munitions come from the Balkans. At least 90 per cent of the 357 seized and exploded grenades examined by Dutch and Swedish authorities from 2018 to 2022 were Yugoslav models, and all but one of the other illicit factory-built explosive munitions seized in the Netherlands were Yugoslavian designs. The number of illicit grenades documented in the Netherlands and Sweden has decreased significantly in recent years. This decrease is likely the result of Covid-19-related travel and shipping disruptions, counter-trafficking, and other law enforcement efforts, along with a greater use of pyrotechnics and other explosives by criminals. There is currently no evidence of any significant outflows of explosive munitions from Ukraine to the EU.

While useful for identifying broad proliferation trends, even the most detailed data shared by specialized units does not allow for the thorough

Cartridges newly produced in the EU have been recovered at crime scenes the same year that they were manufactured.

^a Europol is addressing the threat of pyrotechnics through EMPACT Firearms Operational Action 1.4 and the LEWP-C Action 11.9.

analysis of trafficking routes and chains of custody of seized munitions. More detailed data on ammunition markings would enhance our understanding of illicit ammunition and its sources of supply. The establishment of a global framework for ammunition management may provide momentum for more systematic marking practices in the future, which in turn would also allow for more in-depth investigation of the patterns of trafficking and diversion.

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Project INSIGHT

Project INSIGHT is an initiative that aims to prevent violence by enhancing the visibility of firearm violence in the European Union. With an online knowledge platform (www.gunviolence.eu) as its primary tool, the project also entails the creation of eight research reports on various themes of firearms violence. Project INSIGHT is funded by the European Union's Internal Security Fund - Police.

Project INSIGHT is coordinated by the Flemish Peace Institute. The Flemish Peace Institute was established in 2004 as a para-parliamentary institution within the Flemish Parliament. It provides thorough analyses, informs and organizes the debate and promotes peace and the prevention of violence. In the past the institute has coordinated other EU-funded projects on firearms such as SAFTE, DIVERT and TARGET.

The publication process of the Project INSIGHT research reports was supervised by the Small Arms Survey. The Small Arms Survey strengthens the capacity of governments and practitioners to reduce illicit arms flows and armed violence through three mutually reinforcing activities: the generation of policy relevant knowledge, the development of authoritative resources and tools, and the provision of training and other services.

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