

# Briefing Paper

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## EXTRACTING EVIDENCE

### Opportunities and Obstacles in Assessing the Gendered Impacts of Diverted Ammunition

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**Front cover photo**

The headstamp of two 7.62 × 54 R cartridge cases.  
Source: confidential



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## Overview

This Briefing Paper examines the role of ammunition profiling in identifying and analysing cases of ammunition diversion from national stockpiles, as well as opportunities and challenges for assessing the gendered impacts of such diversion. It presents the results of a pilot case study aimed at identifying diverted ammunition in Kosovo,<sup>1</sup> where an innovative firearm-related data collection mechanism is in place. Through an analysis of ammunition collected in the period 2019–21, including ballistics, victimization, and crime data, the case study illustrates the challenges authorities face in identifying diverted ammunition recovered in crimes, and highlights policy implications for the through-life management of ammunition. Given that the marking of ammunition destined for national authorities is an essential step in identifying diversion from state stocks, Brazil’s leading-edge practice in this area is highlighted.

## Key findings

- To date, researchers have not adequately explored the role that ammunition diverted from national stockpiles plays in violent crime.
- Ammunition used in violent crime in Kosovo in the period 2019–21 includes examples sourced to stockpiles in the region that have been in circulation since the late 1990s. Perpetrators also used some commercially available ammunition as quickly as one year after it was produced.
- Men were the overwhelming perpetrators and victims of violence in Kosovo. While similar types of handgun ammunition were seized regardless of the victim’s sex, cartridges for AK-pattern rifles were used exclusively against men.
- Law enforcement units that combine several types of crime data, such as the Kosovo Firearms Focal Point (FFP), offer unique opportunities to assess the gendered impacts of diverted ammunition; however, doing so would require these units to more routinely collect ammunition data.
- Marking ammunition destined for state stockpiles would permit its rapid identification at crime scenes. In Brazil, leading-edge marking practices have only been partially implemented and face political opposition.

## Introduction

In recent years the diversion of arms and ammunition from legal to illicit markets has become a central concern for global and regional small arms control regimes.<sup>2</sup> Preventing diversion from legal to illicit markets is considered important because the recipients of diverted arms and ammunition—such as criminals, insurgents, and terrorists—are considered likely to use them to commit some form of violence.<sup>3</sup> While the full scale and scope of diverted ammunition are not known, the Small Arms Survey has documented the diversion of ‘millions of rounds’ from peace operations alone based on a sample of known attacks on deployed forces over a 20-year period (Berman, 2019, pp. 34, 36). Recent large-scale domestic arms and ammunition diversion scandals, including in Europe, indicate that the problem is not limited to conflict zones or deployed forces.<sup>4</sup>

As part of a multi-component research and policy support initiative for the UN Office for Disarmament Affairs, the Small Arms Survey undertook the present study to examine opportunities for assessing the impact of the diversion of state-owned ammunition on armed violence and the challenges facing such an assessment. The project undertook a case study and desk research to answer the following set of specific research questions:

- What can be learned from existing research into the various kinds of ammunition used to commit crimes?
- Where significant forensic and ballistics capabilities are available, are crime laboratories able to identify diverted ammunition recovered in crimes, and does this kind of analysis take place?
- What are the gendered dimensions of violence committed with diverted ammunition?

The paper includes two main sections. The first reviews existing research on illicit ammunition, often described as ‘ammunition-profiling studies’, and considers what this body of work can tell us about the impacts—including the gendered impacts—of diverted ammunition. The second section describes the findings of a pilot case study for identifying diverted ammunition in a selection of criminal ballistics and victimization

“While profiling studies can help detect cases of ammunition diversion, they are generally unable to capture details about the victims or establish whether some of the crimes were gender based.”

data obtained from Kosovo that the Small Arms Survey undertook in partnership with the South Eastern and Eastern Europe Clearinghouse for the Control of Small Arms and Light Weapons (UNDP SEESAC). Following a box reporting relevant lessons on ammunition marking from Brazil (Box 2), the paper concludes with reflections on key issues covered in the research, including the implications of the paper’s findings for the development of global ammunition management and control policy.

## Ammunition profiling studies

### Rationale and benefits

Recent empirical research has made strides in so-called ‘ammunition profiling’; that is, in analysing the types, brands, and calibres of ammunition used in armed violence. Much of this work was developed in the context of conflict zones in the first decade of the 21st century, as researchers and UN monitors started documenting and photographing the weapons and ammunition seized from or abandoned by combatants.<sup>5</sup> By analysing this materiel’s markings to identify the precise model, country of manufacture, and year of production of the recovered equipment, researchers generated datasets that helped to overcome the lack of official and reliable weapons data in such contexts. This work also allowed analysts to establish baselines of common varieties of ammunition in various contexts that could then be monitored to increase our understanding of possible illicit sources

of supply. One of the early studies, for instance, helped conclude that non-state armed groups in Kenya were using diverted government-issued ammunition (Bevan, 2008b). Profiling ammunition in situations of conflict can also help identify linkages and alliances between various armed actors, or detect new and unusual flows of ammunition—including possible violations of arms embargoes (Florquin and Leff, 2014, p. 180).

To a more limited extent, profiling has also been used to analyse ammunition used in different kinds of crimes in countries not considered to be at war, but nevertheless affected by significant levels of gun violence. An early study in Brazil, for instance, showed how gangs had access to and used ‘restricted-use ammunition’ normally reserved for state security services (Bevan and Dreyfus, 2007, pp. 303–4). Profiling can help authorities to analyse new firearm or ammunition types and consider whether they indicate new trafficking patterns (Malaret Baldo and Miralles, 2020). Determining the origins of illicit ammunition may be of particular interest to investigators attempting to identify the support networks of criminals. Some national forensic laboratories already record headstamp<sup>6</sup> data for the crime-related ammunition they examine, but this practice is not the norm.<sup>7</sup> In order to study the origins of illicit ammunition in countries that do not maintain headstamp datasets, researchers therefore need to gain access to the actual recovered cartridges to examine each cartridge case and record the headstamp information retroactively, which requires taking precautionary measures to ensure the researcher’s safety and to prevent the

contamination of the evidence (Malaret Baldo and Miralles, 2020, pp. 32–33).

In a recent study by the Small Arms Survey and partner organizations<sup>8</sup> to attempt to overcome these constraints, researchers examined the headstamp images of more than 3,130 cartridges processed by the laboratories of Denmark, Germany, Sweden, and Switzerland from 2015 to March 2020 and stored in the respective national laboratories’ automated ballistics identification systems (ABISs) (Desmarais et al., 2022, p. 1).<sup>9</sup> ABISs are sophisticated systems that allow forensic examiners to scan cartridges recovered at crime scenes from various angles to detect a range of ‘tool-marks’ left by the firearm that shot it, such as ejector and breech face marks and firing pin impressions (p. 13). These marks enable the system to assess whether a seized firearm was indeed used in the shooting under investigation.

The headstamp images collected in the above study allowed the researchers to retroactively identify the manufacturer and—when available—year of production of the recovered ammunition without physically manipulating the cartridges. They combined this data with basic contextual data exported from the ABIS records, including the type of crime and date of the incident in which the ammunition was used, as well as its calibre. While the study did not exclusively aim to detect possible cases of diversion from national stockpiles, it revealed that domestically produced ammunition was found in all four country case studies, including cases of ammunition that had been produced for use by the national security forces of a particular country. Surplus military ammunition sold legally on the civilian market was also documented (Desmarais et al., 2022, pp. 5, 9, 11–12).

### Challenges and limitations

While profiling studies can help detect cases of ammunition diversion, they are generally unable to capture details about the victims or establish whether some of the crimes were gender based. ABISs, for instance, do not include any information on the victims of the incidents, and the crime categories recorded are those used when the investigation is started, but may not always be updated after the case is closed, even though the category may



change as a result of the investigation. More complete victim and incident data is stored in individual case files, which are generally classified and time consuming to merge with an ammunition dataset. Moreover, ABISs only record spent ammunition and do not include recovered unfired cartridges. Some police departments' centralized laboratory information management systems (LIMSs) combine some elements of the profiles of the suspects, victims, weapons, and ammunition involved in a crime, but it is unclear whether the information recorded is detailed enough to determine whether the ammunition used was diverted.<sup>10</sup> Forensic doctors also collect detailed data on the victims and their gunshot wounds as part of autopsies, but, outside of dedicated studies,<sup>11</sup> it is rare for such data to be aggregated into a usable dataset. Doctors also mainly deal with bullets recovered from the bodies of victims rather than the cartridge cases found at the scene of the shooting—which contain the headstamp markings and are usually processed separately by ballistics departments. Connecting the ammunition data held by ballistics laboratories with information on the profiles of victims and perpetrators assembled by investigator and forensic doctors<sup>12</sup> would therefore make it possible to analyse the precise types of ammunition used in different types of crimes by different categories of perpetrators and against different groups of victims.

Overall, where the data exists that would be necessary to measure the impacts—including the gendered impacts—of diverted ammunition, it tends to be stored in different departments and even different national ministries, and is therefore siloed in ways that limit its accessibility for analysis. In the following case study analysis the Briefing Paper examines opportunities for breaking down such silos in Kosovo and the challenges facing any such efforts.

## Kosovo case study

### The Kosovo FFP

To identify an appropriate context for a pilot study to document the impacts of diverted ammunition on violence, the Small Arms Survey sought a partner with access not only to criminal ballistics data,

### Examples of headstamps documented in Kosovo



**Photos 1 and 2:**

7.62 × 39 mm cartridge cases produced in China

**Photo 3:**

7.62 × 25 mm Tokarev cartridge case produced by Prvi Partizan in Serbia

**Photo 4:**

7.62 × 25 mm Tokarev cartridge case produced in China

Source: Kosovo Police

but also to victim and perpetrator information and legal and court records. Mechanisms that collect and link or combine these different types of data are relatively uncommon. The EU-funded firearms focal points (FFPs) established in a number of EU member states and partners in the Western Balkans provide a strong model for combining violence and firearm data (European Commission, 2020, p. 6). In consultation with UNDP SEESAC, the Kosovo FFP was singled out for its capacity and willingness to participate in a study of this kind. The Kosovo Police initially provided consolidated data to the Small Arms Survey, then from September 2021 to February 2022 Survey researchers posed queries and refined and analysed the dataset. The initial findings of the study were presented to the Kosovo FFP and UNDP SEESAC in early March 2022.

The establishment of FFPs over the last three years in the Western Balkans region and Europe more generally is an innovation that enhances the contribution of forensic and ballistics evidence to firearm violence investigations and prosecutions. Inspired by the UK's National Ballistics Intelligence Service and developed with EU financial support, FFPs are specialized units that aim to 'provide an integrated tactical and strategic intelligence service that informs and supports law enforcement agencies in better

understanding and effectively tackling firearms crime' (Bowen and Poole, 2016, pp. 10–11; UNDP SEESAC, n.d.a, p. 8). The latest 2020–2025 EU Action Plan on Small Arms notes that 20 EU member states and four Western Balkans partners have a form of FFP in place (European Commission, 2020, p. 6).

The main tasks of the FFPs are to analyse and

improve the information flow on the criminal use of firearms and their illicit trafficking into and within the Member States at a strategic and operational level by means of a co-ordinated collection and sharing of information to enhance the intelligence picture and to better inform law enforcement agencies (CoEU, 2021, p. 3).

FFPs are designed to establish repositories for firearm-related intelligence and data on lost, stolen, and recovered firearms, and to generate analysis on the type, make, model, calibre, and country of manufacture of firearms (lost or seized), and statistics, information, assessments, and reports (intelligence products) for use by member states (CoEU, 2021, p. 4). The focus of FFPs is to provide the most complete picture of firearms intelligence possible, drawing on datasets of licit and illicit firearms (but paying less attention to data on ammunition trafficking). While FFPs have access to ballistics data, they use this information primarily as a means of matching recovered ammunition to recovered firearms in databases to assist criminal investigations.

### Dataset characteristics

The Kosovo FFP provided the Small Arms Survey and UNDP SEESAC with a dataset of 513 criminal incidents involving 507 firearms and 4,451 rounds of ammunition—both fired and unfired—seized by the Kosovo Police. Figure 1 presents the distribution by incident category<sup>13</sup> of the 513 criminal incidents that occurred from January 2019 to July 2021.<sup>14</sup> The largest category by far is 'endangering public safety' (214 incidents)—which mainly includes cases of celebratory shootings (see below)—followed by 'violations of firearms legislation' (109 incidents), 'homicides or attempted homicides' (86 incidents), and 'assaults' (35 incidents).<sup>15</sup>

## Ammunition characteristics

The dataset comprised a total of 4,451 cartridges, 73 per cent of which were unfired (3,241 units) and 27 per cent (1,210 units) discharged cartridge cases (see Table 1). This ammunition is of 12 different calibres, with 9 mm Luger being the most prominent by far. Table 1 shows the disaggregation of calibres linked to types of firearms, with no relationship to specific crimes or incidents. For example, in one incident 170 cartridges were seized, while the majority of cases (65 per cent) involved the seizure of fewer than three cartridges.

The main calibres<sup>16</sup> of the documented ammunition are presented in Figure 2, which indicates that 9 mm Luger (used in pistols and sub-machine guns) dominates the total sample with almost 30 per cent of recorded cartridges, followed by 9 mm PAK (22 per cent) (used in blank-firing alarm pistols), and 7.62 × 39 mm (16 per cent) (used primarily with AK-pattern rifles such as the M70 AB2). When considering only spent cartridges, 9 mm PAK was recorded most frequently, constituting more than 40 per cent of the sample, followed by 7.62 × 39 mm and 9 mm Luger, constituting about 20 per cent each (see Figures 2 and 3).

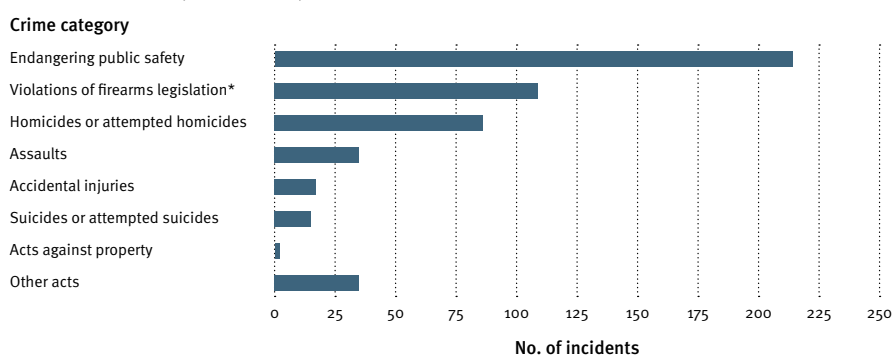
## Ammunition used in selected crime categories

The following analysis focuses on firearms and ammunition used in two crime categories (see Table 1): firstly, ‘endangering public safety’, because it is by far the largest category; and secondly, what this paper calls ‘violent crime’, that is, ‘homicides or attempted homicides’ and ‘assaults’, because they are the most serious in terms of violence and may allow for an exploration of some gendered impacts of the use of diverted ammunition (see Box 1).

### ‘Endangering public safety’

The category ‘endangering public safety’, constituting 42 per cent of the dataset, consists mainly of celebratory gunfire. Despite being prohibited, celebratory shooting is a long-standing traditional activity in Kosovo, which is often performed using particularly dangerous weapons, such as ‘automatic/military-grade weapons’, and can generate injuries.<sup>17</sup>

**Figure 1** Distribution of incidents by incident categories in the Kosovo FPP dataset, January 2019–July 2021



Note: \* A catch-all category for a variety of types of firearm-related violations.

Source: Kosovo Police (n.d.)

Offences that endanger public safety are heavily gendered: men perpetrated 205 of the 214 cases in the dataset. Women were involved in only two cases, while the gender of the perpetrators in the remaining cases was unknown. Blank ammunition is the main calibre used in such incidents: among the 214 incidents,

84, or 39 per cent, involved alarm pistols (77 using 9 mm PAK and 7 using 8 mm PAK), plus 18 converted gas pistols (of which 12 chambered 7.65 mm Browning and 2 chambered 6.35 Browning). In total this category includes 559 9 mm PAK cartridges, both fired and unfired, and only four 8 mm PAK cartridges.

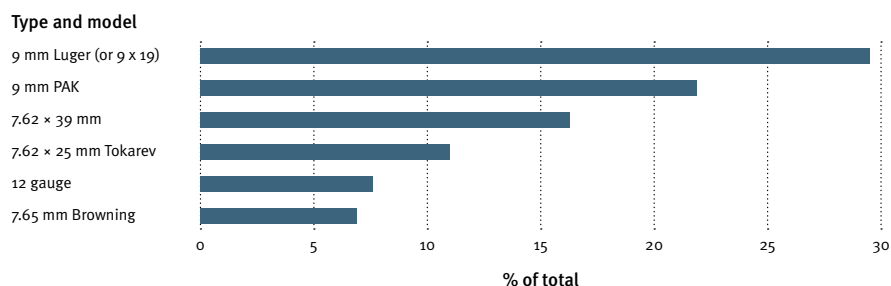
**Table 1** Disaggregation of firearm types and associated ammunition

Type of firearm	Calibre	Unfired cartridges	Discharged cartridge cases	Total number of unfired and discharged cartridge cases
Pistols	6.35 Browning*	57	7	64
	7.65 mm Browning**	247	60	307
	7.62 × 25 mm Tokarev	412	76	488
	380 ACP (or 9 mm Browning Court)***	38	–	38
	9 mm Luger (or 9 × 19)	1,082	229	1,311
AK- and SKS-pattern and M70 AB2 rifles	7.62 × 39 mm	479	245	724
Rifles (former military patterns)	30-06 Springfield	3	–	3
	7.92 × 57 mm	–	2	2
Shotguns	12 gauge	320	19	339
	16 gauge	82	–	82
Gas pistols	8 mm PAK	12	1	13
	9 mm PAK	452	523	975
Unknown		57	48	105
<b>Total</b>		<b>3,241</b>	<b>1,210</b>	<b>4,451</b>

Notes: \* While 6.35 Browning calibre is intended for use in pistols (and potentially revolvers), some of these cartridges were seized together with converted gas pistols. \*\* While 7.65 mm Browning calibre is intended for use in pistols (and potentially revolvers), some of these cartridges were seized together with converted gas pistols. \*\*\* While 380 ACP calibre is intended for use in pistols (and sub-machine guns), these cartridges were seized together with converted gas pistols.

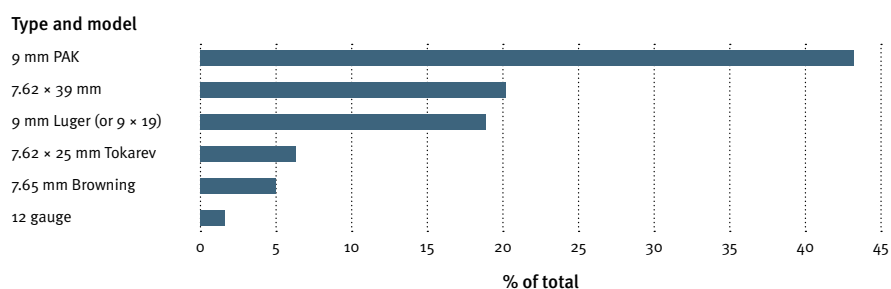
Source: Kosovo Police (n.d.)

**Figure 2** Primary types of unfired and discharged ammunition (% of total; n = 4,451)



Source: Kosovo Police (n.d.)

**Figure 3** Primary types of discharged ammunition (% of total; n = 1,210)



Source: Kosovo Police (n.d.)

Blank cartridges are usually sourced from the civilian market or trafficking rather than diverted from state stocks. Other calibres used in celebratory shootings include 9 mm Luger (46 cases), 7.62 x 39 mm (27 cases), 7.62 x 25 mm (27 cases), 12 gauge (18 cases), and 7.65 (8 cases), plus two additional marginal calibres: 30-06 Springfield and 7.92 x 57 mm.

## Violent crime

The dataset recorded a total of 34 victims of assault,<sup>18</sup> of which 28 were males and 6 were females. There were also 70 victims<sup>19</sup> of homicides or attempted homicides recorded over the period January 2019–July 2021, of which 63 were males and 7 were females.

Both the victims and perpetrators were identified in 93 cases of assaults and homicides (and attempted homicides). These were associated with 114 offenders (113 males and 1 female) and 101 victims (91 males and 10 females). There was a single case involving a female perpetrator and a male victim, whereas there were nine cases involving male perpetrators and ten female victims, which are summarized in Table 2.<sup>20</sup>

Of the violent crime cases—that is, assaults, attempted homicides, and homicides—the most prevalent situation involved men as both offenders and victims. Unfortunately, information regarding the brand of the ammunition seized (both fired and unfired) was included in the dataset in only a few of these cases. This group represents broadly 36 criminal cases comprising 41 offenders and 42 victims, in all cases male victims and male perpetrators. Table 3 focuses on the most notable ammunition in these cases and provides some observations. It is, however, important to note that many incidents lack information on ammunition.

In addition to these ammunition types, other less prevalent ammunition was seized: 12 gauge shotgun ammunition (produced by Fiocchi and Cheddite) was seized in one incident; 9 mm PAK ammunition produced by Pobjeda Technology (BiH) was seized in one incident; and 6.35 Browning ammunition (produced

**Table 2** Violations involving male perpetrators and female victims, January 2019–July 2021

Age of female victim (years)	Age of male perpetrator (years)	Crime	Calibre	Make	Comments
30–34	Unknown	Assault	7.62 x 25 Tokarev	Prvi Partizan	Associated with illicit TT M57 pistol
35–39	85–89	Assault	8 mm PAK	Ozkursan	Gas pistol containing a cartridge
55–59	45–49	Assault	7.65 mm Browning	Sellier & Bellot Prvi Partizan	Two different types of ammunition for the same illicit pistol
25–29	25–29	Homicide or attempted homicide	7.65 mm Browning	Unknown	Converted Zoraki pistol
15–19	55–59	Homicide or attempted homicide	9 mm Luger	Unknown	Canik pistol TP9V2
40–44	40–44	Homicide or attempted homicide	Unknown	Unknown	Unknown pistol
Unknown	60–64	Homicide or attempted homicide	12 gauge	Unknown	Shotgun
25–29 (2 victims)	30–34	Assault	6.35 Browning	Unknown	Converted Ekol Tuna pistol
20–24	20–24	Assault	6.35 Browning	Unknown	Astra pistol mod. Falcon

Source: Kosovo Police (n.d.)

**Table 3** Notable ammunition associated with violent crime involving male perpetrators and victims where the country of manufacture could be identified, Kosovo dataset, January 2019–July 2021

Calibre	Manufacturer	Number of incidents, perpetrators, victims	Comments
7.62 x 39 mm	Chinese or produced by Igman Zavod (now in Bosnia and Herzegovina (BiH))	5 incidents, 5 perpetrators, 6 victims	In one incident (attempted homicide) one of these cartridge cases was produced in China, factory no. 9141 in 1974. In another incident a young (15–20 years) offender fired at another man (25–30) using ammunition produced in China, factory no. 71 in 1967.
7.62 x 25 mm Tokarev	Chinese or produced by Prvi Partizan (now in Serbia)	10 incidents, 12 perpetrators, 12 victims	Firearms involved are illicit TT pistols, mainly M57 model.
9 mm Luger	Sumbro X-Force produced in the Suvenir Metal Products Enterprise factory (North Macedonia) (2 incidents) Prvi Partizan (1 incident) Sellier & Bellot (now in Czech Republic) (4 incidents) Geco (Germany) (1 incident) Fiocchi (Italy) (2 incidents)	8 incidents, 8 perpetrators, 10 victims	Seven incidents linked to homicides or attempted homicides and one identified as an assault.
7.65 mm Browning	Mainly Sellier & Bellot, Prvi Partizan, and Geco, plus Makina ve Kimya Endüstrisi (MKE) (Turkey)	10 incidents, 13 perpetrators, 10 victims	Seven incidents linked to homicides or attempted homicides and three assaults. Frequently seized with converted Zoraki M906 gas pistols made by the Turkish company Atak-Arms.*
8 mm PAK	Pobjeda Technology (BiH) and Ozkursan (Turkey)	1 assault, 1 perpetrator, 1 victim	Seized with a converted Blow pistol and a non-converted Perfecta pistol.

Note: \* According to research published in 2018, this model of pistol and, more broadly, alarm pistols sold under the brand Zoraki were among the most commonly converted weapons in Europe (Florquin and King, 2018, pp. 20, 28).

Source: Kosovo Police (n.d.)

by Prvi Partizan and associated with an Ekol Tuna gas pistol) was documented in another (the only case that involved two female victims—see Table 2).

Although not fully documented, it is worth noting additional seizures of 9 mm PAK ammunition associated with assaults (two cases) and attempted homicides (two cases). While the police seized 523 fired cartridge cases of this calibre, data on the victim and the crime category was only provided for 41 of the unfired cartridges and 4 of the fired cartridge cases.<sup>21</sup>

## Challenges to identifying diverted ammunition in the sample

While the FFP in Kosovo collects headstamp images of all spent ammunition recovered from crime scenes and some unfired recovered ammunition, this information was not made available to researchers in the vast majority of cases because of the data privacy concerns of the office

of the prosecutor. This made identifying possible diverted ammunition more difficult. As discussed above, headstamp information typically encodes the manufacturer and year of manufacture, which can help to identify the ammunition's source and origin, including possible diversion scenarios. A very small set of headstamp images were provided for Chinese and Prvi Partizan shells associated with assaults, homicides, and attempted homicides, as noted in Table 3, although the date of manufacture was not included on the Prvi Partizan headstamp.

The year of manufacture is particularly important in the case of Prvi Partizan ammunition, because this manufacturer in Užice, Serbia, has produced ammunition since 1928—that is, long before the conflict in the region in the 1990s—and continues to do so today. Older samples of this ammunition would tend to be associated with conflict-era weapons (for example, Zastava M70 assault rifles, TT-33 and M57 handguns, and Vz. 61 Škorpion sub-machine guns) and regional

state stockpiles, and this might be flagged by changes in headstamp marking that the company implemented in the late 1990s.<sup>22</sup> Conversely, newer samples showing up in crimes would indicate commercially sold ammunition in Serbia. In the latter cases, some illicit trafficking may have occurred.

Chinese 7.62 mm ammunition was ubiquitous in the region during the cold war; the handful of samples for which headstamp data was obtained in the current research project indicate a very old vintage, suggesting cold-war-era materiel originating in barracks and national stockpiles in Albania during the looting and subsequent civil unrest in 1997 (during which hundreds of millions of rounds of small arms ammunition are estimated to have been distributed to or looted by civilians<sup>23</sup>).

While the Chinese examples are quite old, one calibre type that exhibits a very short 'time-to-crime'<sup>24</sup> is Sellier & Bellot 7.65 mm Browning ammunition. For three cases recorded in the dataset it could be



**Table 4** Three criminal cases involving Sellier & Bellot 7.65 mm Browning, Kosovo dataset

Date	Crime category	Year of manufacture	Amount of ammunition	Time-to-crime	Associated firearm
May 2019	Violation of firearms legislation	2015	18 cartridges	4 years	Vzor 50
February 2020	Attempted homicide	2014 and 2017	2 cartridges	3–6 years	Walther
June 2021	Other acts*	2020	4 cartridges, 1 shell	1 year	Vzor 50

Note: \* This paper defines ‘other acts’ as ‘the use of a weapon or dangerous means, unauthorized possession, control, or possession of weapons’.

Source: Kosovo Police (n.d.)

determined that the cartridges were used in crime between one and six years after they were produced (see Table 4). Another Small Arms Survey analysis carried out in 2020 observed that the average time-to-crime for fired Sellier & Bellot cartridges was four years. The analysis found that ‘Sellier & Bellot cartridges accounted for 95 per cent of the ammunition featuring a time-to-crime of one year’ (Desmarais et al., 2022, p. 11).

Finally, the presence of relatively new Sellier & Bellot 7.65 mm Browning ammunition suggests very recent diversion, likely from civilian stocks, since the Kosovan authorities do not use this calibre.<sup>25</sup> This ammunition may be smuggled from a neighbouring country; if it is diverted locally, the source of diversion could be gun shops or shooting clubs.

The North Macedonian Sumbro X-Force ammunition (9 mm Luger) in the sample is atypical and may suggest a link to state stockpiles.<sup>26</sup> This cartridge falls under the Kosovo arms and ammunition law’s provision for equipment for special purposes (ESP), and should therefore be sold only to state-authorized institutions such as police, customs, wildlife conservation, and border guards. ESP is required to be specially marked when it is imported and is not available to the general civilian population (Assembly of the Republic of Kosovo, 2010, art. 20).<sup>27</sup> In the case of ammunition, this means the marking of packaging rather than individual units of ammunition. The only country that requires ammunition cartridges destined for security forces to be individually marked is Brazil (see Box 2).

There are no known significant cases of looting or theft of these rounds; however, a significant number of raids against organized crime and corruption had recently occurred in Kosovo, some of which implicated police officers, and these raids have included seizures of weapons. From March to May 2021 several large-scale operations led to the

arrest of 30 suspects for, among other things, trading in illicit weapons (UNSC, 2021, p. 9). This followed previous opera-

tions in 2020 that led to the arrest of, among others, Kosovo police officers (UNSC, 2020, p. 8).

### Box 1 Getting closer to gender

Assessing the gendered dimensions of violence committed with diverted ammunition was one of the three primary research questions that motivated this research study (see ‘Introduction’). This is a ‘second order’ research question in the sense that it assumes that it is first possible to readily and systematically identify diverted ammunition when it appears in crime scenes, and then to associate those cases with specific types of crimes and violence. Only then can a profile of violence committed with diverted ammunition be constructed about which gender-related observations can be made.

Because researchers were not able to access the full dataset of ammunition headstamp images associated with violent crime in Kosovo, it was not possible to establish a full ammunition and victim profile set. A number of gender-related observations are, however, possible, keeping in mind the size of the sample. The first observation is that the types of ammunition used in violent crime in Kosovo over the period studied seem to largely overlap: pistols, including converted alarm handguns, are frequently used, regardless of the gender of the victim. This would appear to indicate that there is no particular relationship between weapon and ammunition type and crime category. It may, however, simply suggest that the weapons pool in Kosovo is limited and the same types of firearms are available for most types of crimes and perpetrators.

The second observation is that while 7.62 × 39 mm ammunition (used with automatic AK-pattern rifles, among others) were used in five incidents of male-on-male violence, this calibre was not documented in any case of male-on-female violence. More contextual information on the incidents in which this type of ammunition was used would be needed to fully interpret what this means. Establishing whether the incidents are connected to organized crime groups, for example, would help to distinguish these cases from domestic violence.

In general, more information would be needed to unpack the gendered dimensions more fully, including, most importantly, the relationship between the perpetrator and the victim—for example, whether they are intimate partners or have common involvement in a criminal enterprise—as well as the location of the incidents and other data points. The more law enforcement intelligence units such as FFPs continue to add new data sources to their intelligence platforms, the more they will be able to provide gender-specific analyses.

Finally, given that the ultimate aim of studying the role of diverted ammunition used in crime is to identify diversion dynamics in order to prevent state-owned ammunition from entering criminal markets—and thereby reduce its contribution to violence—it will ultimately be valuable to understand which types of ammunition diversion are most associated with particular kinds of violence, as well as the gendered dimensions of actors involved in such diversion. Is stolen ammunition more susceptible to being used in gender-based violence than diversion as a result of theft from government storage facilities or corruption-related diversion?

In the case of Kosovo, where ammunition diverted through looting and during civil conflict more than 20 years ago appears to play a role in various kinds of crimes, it may be more difficult than in some other contexts to distinguish specific diversion pathways. Future case studies focusing on gendered roles and impacts may be more successful in contexts that do not have a recent history of widespread civil conflict. More research is also needed to understand the secondary gendered impacts of diverted ammunition, such as its effects on mobility, caregiving, loss of income, and public perceptions of security.

**Box 2** Lessons from Brazil:  
marking security forces ammunition

**Lost, stolen, or misplaced ammunition used in violence**

Almost uniquely in the world, Brazil has taken steps since 2004 to mark ammunition destined for law enforcement agencies, military police, and the country's armed forces. This effort is in response to the fact that official ammunition diverted from security forces has been documented in various types of crimes. According to surveys conducted by the Instituto Sou da Paz, over the period 2015–20 some 18,098 ammunition cartridges (Langeani and Pollachi, 2021, Table 10) and 508 weapons (Tables 8 and 9) were reported lost, stolen, or misplaced by the armed forces and federal police agencies in the states of Bahia, São Paulo, and Pernambuco (see Table 5 in this paper). Because some survey responses were incomplete, this is likely to be a significant undercount.

A number of high-profile cases of assassinations and homicides involving diverted state ammunition have been noted in Brazil. These include the March 2018 assassination of Rio de Janeiro city councillor Marielle Franco, in which Brazilian and Colombian ammunition originating from the Brazilian Federal Police was used, and the assault on the Messejana and Curió neighbourhoods of Fortaleza in November 2015 that left 11 people dead, in which ammunition from the Ceará state security services was used (Djoughri, 2021). In January 2019, 114 cartridges from 11 lots belonging to the Air Force, the Military Police, and the Federal Police were found at the home of Carlos Luciano Soares da Silva, a member of the Queimados militia, the largest militia in Rio de Janeiro state (Soares, 2021). Earlier, in 2011, masked men on motorbikes murdered judge Patrícia Acioli using ammunition originally bought by the Military Police (BBC, 2011; de Moura, 2011).



Cartridge case from the lot used in the assassination of Marielle Franco.  
Source: Rosilene Miliotti/The Intercept Brazil



Brazilian politician and human rights activist Marielle Franco, August 2016. Source: Mídia Ninja



**Table 5** Lost, stolen, or misplaced ammunition, Brazil, January 2015–March 2020

Institution	Quantity	Predominant types
Army	8,978	9 mm and 7.62 mm
Navy	1,515	7.62 mm and 5.56 mm
Air Force	410	5.56 and 9 mm
Federal Police	1,209	9 mm
Federal Highway Police	5,682	.40 calibre and 9 mm
National Public Security Forces	304	.40 calibre and .223 calibre
<b>Total</b>	<b>18,098</b>	

Source: Langeani and Pollachi (2021, p. 79, Table 10)

### → Evolving ammunition marking requirements

The modern arms and ammunition legal framework in Brazil is the Disarmament Statute of 2003 (Brazil, 2003). Chapter V, Article 23, paragraphs 1 and 2 of this wide-ranging law specify that all ammunition manufactured in the country must be marked and packaged in boxes in a way that makes it possible to identify the manufacturer, purchaser, and batch number. National authorities may only purchase such identifiable ammunition (Brazil, 2003, pp. 10–11). Ordinance 16-DLOG (Brazil, 2004) refined these provisions. Thus, since 2005 all ammunition manufactured in or imported into Brazil must be marked according to criteria defined in Articles 3 and 4 of Ordinance 16-DLOG.<sup>28</sup>

A bar code ‘identifying the producer, commercial buyer, product and production batch number must be engraved (or printed) on the box (container) in which the ammunition is delivered so as to permit its unequivocal identification’ (Brazil, 2004, art. 3). All national ammunition ‘must contain an engraving on the base of the casing guaranteeing the unequivocal identification of the batch from which the ammunition originated, as well as the buyer’ (art. 4). The number of cartridges in a batch destined for sale to individual and legal entities is limited to 10,000 (art. 2). From the point of view of a researcher attempting to trace diverted ammunition, the smaller the batch of cartridges with the same identification marks, the more refined and precise the tracing that can occur.

The only current ammunition producer in the country, Companhia Brasileira de Cartuchos (CBC), which is also the main supplier to Brazilian security agencies, uses laser technology to mark ammunition. CBC has pioneered the application of this technology, implementing it even before it became a legal requirement. It uses a five-digit alphanumeric code composed of three letters and two numbers (for example, ABC11). But in the period since the 2004 regulations were established CBC did not consistently apply the regulations. During the investigation into Marielle Franco’s assassination the Federal Prosecutor’s Office discovered that CBC had been manufacturing and marking batches of ammunition of more than 30 million cartridges, far exceeding the 10,000-batch limit (Conectas, 2020; Ministerio Public Federal, 2018). One specific batch produced by CBC (UZZ18), which was linked to several crimes in Brazil, contained 2.4 million rounds.

To improve diversion reduction efforts, the Brazilian Army<sup>29</sup> issued three ordinances in 2020 (nos. 46, 60, and 61; respectively Brazil, 2020a; 2020b; 2020c) aimed at reaffirming and strengthening the prerogatives defined in the 2004 ordinance. Ordinance 61 of 15 April 2020 specified that a single lot should only contain ammunition of the same model and calibre, and recommended limiting

maximum lot quantities to between 1,000 and 10,000 rounds. Before they could enter into force, however, President Bolsonaro revoked all three ordinances without explanation. In September 2021 the Brazilian Army, determined to strengthen legislation to reduce crime in the country, issued a new ordinance, COLOG 214, effective as of March 2022 (Brazil, 2021b). According to this new ordinance all ammunition destined for public institutions, such as the armed forces and law enforcement agencies, must be marked with a unique code on the body of the case and marketed only to a specific body. The current guidelines call for lots of no more than 10,000 units to be marked with the same identifier code, which corresponds to one of the weaker requirements of the previous recommendations, but prevents effective tracing.

### New tools: the National Ballistics Analysis System

In June 2021 President Bolsonaro signed Decree 10,711 (Brazil, 2021a) creating a National Ballistics Analysis System (SINAB), for which the Ministry of Justice and Public Safety is responsible (Agência Brazil, 2021). The purpose of this new system is defined in Article 2 of Decree 10,711 as a new tool to support criminal investigations at the federal, state, and district levels through (1) the registration of firearms, and (2) the storage of the identification elements of ammunition used in crimes. This innovative platform could increase and accelerate the solving of crimes by linking crimes committed across Brazil. Thanks to SINAB, the country’s state police agencies, Federal District Police and Federal Police will be equipped with a ballistics identification system to register information on ammunition used in crimes. This information will be recorded in the National Bank of Ballistics Profiles managed by the Technical and Scientific Directorate of the Federal Police (Brazil, 2021a, art. 2, para. 2).

The Canadian company Ultra Forensic Technology won the contract for the implementation of this system and established six of its Integrated Ballistics Identification System (IBIS) sites in 2021 (in Espírito Santo, Goiás, Pará, Paraná, and Pernambuco states, and one in the Federal District). The company expects to increase its deployment in 2022 and to establish 37 more IBIS sites in Brazil, at a cost of more than USD 26 million (Governo Federal, 2021; Ultra, 2021).

“Without enhancements to current laboratory practices, identifying diverted ammunition will remain a time-consuming exercise involving the manual review and coding of ammunition headstamp data.”

## Conclusion

In Kosovo an analysis of recent ballistics, victimization, and crime data has provided rich insights into the use of different types of ammunition in serious crimes.

The advantage of working with the Kosovo FFP for this study was the ready availability of interlinked data on weapon type, ammunition calibre, victim, perpetrator, and crime category. But while headstamp images are routinely collected in Kosovo, they are not integrated into the FFP dataset in a way that would have allowed them to be readily shared with researchers. Moreover, the FFP itself does not process headstamp data and cannot identify patterns of potentially diverted ammunition. While accessible in principle via the police's ABIS, researchers were not given access to this data.<sup>30</sup> But even if such headstamp images were made available, they would have to be processed manually. This presented significant challenges to achieving the objectives of the study, including an assessment of the gendered dimensions of the use of diverted ammunition in violence in Kosovo.

As a result of these factors, and the lack of access to open case files, the diversion-related findings of the Kosovo case study remain general. In the context of recent civil wars in the region, the presence of some cartridges consistent with military stockpiles, such as 7.62 × 25 mm Tokarev and 7.62 × 39 mm, is not surprising. There is not enough information to indicate whether some ammunition consistent with ESP and destined for state authorities is in fact drawn from state stocks.

Given that the Kosovo FFP represents a leading-edge system to link crime and ballistics data, its lack of an automated system or procedure for identifying diverted ammunition suggests this capacity is not available in other national systems, either. Without enhancements to current laboratory practices, identifying diverted ammunition will remain a time-consuming exercise involving the manual review and coding of ammunition headstamp data. A lack of human and financial resources makes such exercises generally beyond the reach of crime laboratories and units such as FFPs. While donor-supported independent studies can perform individual retrospective reviews as a stopgap measure, this work would ideally be done routinely in the laboratories themselves using an automated system that is able to identify diverted ammunition. Discussions with technology professionals involved in developing ballistics systems used by crime laboratories indicate that these systems do not yet support the kind of analysis that would be needed to implement this functionality.<sup>31</sup> Additional information-sharing protocols and standardized reporting templates would likely also need to be developed and implemented.

These findings have implications for international ammunition control policy development and the through-life management of ammunition.<sup>32</sup> Detecting and preventing diversion requires tools and capacities across the entire ammunition life cycle: both 'upstream' actions such as marking ammunition destined for national authorities and 'downstream' tools that allow crime laboratories to

easily analyse those markings on cartridges recovered from crime scenes. Brazil is leading the way in putting the upstream approach into practice, but it appears that even some of the most sophisticated units capable of linking various types of crime-related data, such as the one in Kosovo, are not yet able to implement the downstream approach. The provision of new technological and capacity support to authorities could improve current practices.

Another potential incentive for integrating headstamp data into law enforcement analysis is that it would allow states to finally provide robust data to support the implementation of UN Sustainable Development Goal Indicator 16.4.2, which has so far lagged behind because of the lack of state capacities to generate relevant data. This indicator, which calls for states to report on the 'proportion of seized, found or surrendered arms whose illicit origin or context has been traced or established by a competent authority in line with international instruments' (SDG 16 Hub, n.d.), is understood to include ammunition. Although it is not currently linked to any international instrument, this indicator could be of particular relevance to the political framework for conventional ammunition management and control that is planned for the near future. ●

## Abbreviations and acronyms

- ABIS** Automated ballistics identification system
- BiH** Bosnia and Herzegovina
- CBC** Companhia Brasileira de Cartuchos
- ESP** Equipment for special purposes
- EU** European Union
- FFP** Firearms focal point/Firearms Focal Point
- IBIS** Integrated Ballistics Identification System
- LIMS** Laboratory information management system
- PoA** Programme of Action to Prevent, Combat and Eradicate the Illicit Trade in Small Arms and Light Weapons in All Its Aspects
- SEESAC** South Eastern and Eastern Europe Clearinghouse for the Control of Small Arms and Light Weapons



## Endnotes

- 1 The designation of Kosovo is without prejudice to positions on status and is in line with UN Security Council Resolution 1244 and the International Court of Justice Opinion on the Kosovo declaration of independence.
- 2 The Third Review Conference of the UN Programme of Action (PoA) on small arms in 2018 designated (arms) diversion as the theme of the seventh PoA Biennial Meeting of States held in 2021. Diversion was a central focus of the 2021 *Final Report of the Group of Governmental Experts on Problems Arising from the Accumulation of Conventional Ammunition Stockpiles in Surplus* (UNGA, 2021).
- 3 For background and analysis on the different types of diversion taking place in the European context, see the reports of the Flemish Peace Institute's DIVERT project (FPI, n.d.). Assessing which types of diversion might be particularly associated with violent crime is an important future research question.
- 4 See, for example, Bennhold (2020) on 48,000 rounds of small arms ammunition stolen from armed forces stocks in Germany.
- 5 The Small Arms Survey was a key actor in these early efforts, and has continued to regularly integrate ammunition profiling as a source of data in a range of field-based studies on conflict dynamics, armed actors, and illicit arms and ammunition. See, for instance, Anders (2014; 2015); Bevan (2008a; 2008b); Debelle and Florquin (2015); Diehl and Jenzen-Jones (2014); Florquin and Leff (2014); Jenzen-Jones (2013a; 2013b; 2014); Leff and LeBrun (2014); de Tessières (2017); Tubiana and Gramizzi (2018).
- 6 Headstamps are 'alphanumeric characters and/or symbols applied to the base of cartridge cases'. They can provide information on the 'country of origin, producer, year of production, calibre, or type of cartridge' (Jenzen-Jones and Schroeder, 2018, p. 153).
- 7 Known exceptions that do record headstamp data—in different degrees of detail—include the laboratories of German, Jamaican, and UK forensic institutions.
- 8 The University of Lausanne's École des sciences criminelles and Arquebus Solutions Ltd.
- 9 The Small Arms Survey has initiated similar research in the Caribbean region, in support of the regional CARICOM Firearms Roadmap.
- 10 Some LIMSS on the market appear to combine data on victims, suspects, and weapons and ammunition, but in practice it is unclear how systematically the ammunition fields are filled in. See JusticeTrax (2015, p. 189).
- 11 See, for instance, Reynoard et al. (2021).
- 12 This could include, for instance, ensuring that ballistics experts also participate in autopsies (author correspondence with forensic institution, 11 April 2022).
- 13 The police initially assigned the categories, which do not necessarily reflect the final outcome of the investigations.
- 14 For analysis on the types and prevalence of firearms-related violence in Kosovo, see UNDP SEESAC (2019, pp. 33–52).
- 15 In total, 37 references to the Kosovan penal code are listed in the database submitted for analysis, corresponding to crimes and offences. In order to disaggregate the data by type of incident, it was necessary to create broader crime categories by interpreting both the context and the reference to the penal code.
- 16 Calibre designations were standardized under a nominal 'calibre' designation, mainly based on the typology developed by the Commission Internationale Permanente (CIP) pour l'épreuve des armes à feu portatives (Permanent International Commission for the Proof of Small Arms) (CIP, n.d.).
- 17 See UNDP SEESAC (n.d.a, p. 10; n.d.b; n.d.c); Khakee and Florquin (2003, p. 33).
- 18 The number of victims is not reported for six cases (for example, in case number 2020/71 a three-year-old is reported to be among the victims, but the total number of victims is not known) (Kosovo Police, n.d.).
- 19 Because no information on the victims was provided for some homicides, the reported number of homicides and attempted homicides presented in Figure 1 does not total 70.
- 20 Certain acts (identified as 'other acts'; see Figure 1) were excluded, including one case listed as domestic violence, because they did not include enough information on ammunition characteristics.
- 21 Similar to the 8 mm PAK cartridges, these cartridge cases were seized with Turkish-made pistols (in three of the four incidents; the last was not clearly described).
- 22 Among other changes, the company stopped using Cyrillic language codes and symbols.
- 23 See IWPR and Saferworld (2003).
- 24 The US Bureau of Alcohol, Tobacco, Firearms and Explosives defines time-to-crime as 'the period of time (measured in days) between the first retail sale of a firearm and a law enforcement recovery of that firearm during a use, or suspected use, in a crime' (ATF, 2011, p. 6).
- 25 Author correspondence with international ammunition expert, 11 April 2022.
- 26 The company also sells some types of ammunition on the civilian market (author correspondence with international ammunition expert, 11 April 2022).
- 27 Prior to the 2010 weapons and ammunition law, ammunition imports into Kosovo were not permitted.
- 28 Article 3 of Ordinance 16-DLOG (Brazil, 2004) does not specify which institutions are covered; Article 4 provisions specifically cover institutions listed in Article 6, and also limit the types of ammunition used in 'rifled barrel firearms of calibre .380, .38, .357, 9mm, .40, .45, 5.56mm, .30, 7.62mm and .50, and smooth barreled calibre 12'.
- 29 In Brazil, the federal law on arms and ammunition authorizes the army to regulate technical matters (author communication with Instituto Sou da Paz, February 2022).
- 30 Author communication with UNDP SEESAC, 30 November 2021.
- 31 Author written communications with Arquebus Solutions Ltd, December 2021, and the National Ballistics Intelligence Service, January 2022.
- 32 See UNGA (2021).

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The Small Arms Survey is a global centre of excellence whose mandate is to generate impartial, evidence-based, and policy-relevant knowledge on all aspects of small arms and armed violence. It is the principal international source of expertise, information, and analysis on small arms and armed violence issues, and acts as a resource for governments, policymakers, researchers, and civil society. It is located in Geneva, Switzerland, and is an associated programme of the Graduate Institute of International and Development Studies. The Survey has an international staff with expertise in security studies, political science, law, economics, development studies, sociology, and criminology, and collaborates with a network of researchers, partner institutions, non-governmental organizations, and governments in more than 50 countries.

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