

AMMUNITION TRACING PROTOCOLS

A Guide to Safe, Responsible, Evidence-based Ammunition Tracing

1. About these protocols

These protocols are a guide to safe, responsible, evidence-based ammunition tracing. They have been developed by the Small Arms Survey to meet growing demand for reporting on the illicit trade in and misuse of small calibre ammunition.

The protocols are designed to be used together with the Small Arms Survey's Ammunition Tracing Kit, which aims to standardize ammunition data collection and generate comparable information on the distribution of small calibre ammunition.

The protocols are designed for use in a variety of circumstances. They are formulated in this way because access to information differs significantly according to local circumstances—in particular, local security dynamics. Some studies may be able to generate detailed background information on the trade in ammunition and report on patterns of acquisition by specific groups. Other studies may only be in a position to record the types of ammunition found in a particular location or following a violent event. Regardless of circumstances, however, almost all ammunition tracing information is useful. Whether complete or partial, it contributes to the global understanding of ammunition proliferation. But different circumstances of ammunition tracing impose different limits on what can be deduced from the data, and these protocols explain what those limits are.

Ammunition tracing is a relatively young field of research and there is no single, commonly agreed upon approach to tracing. These protocols should there-

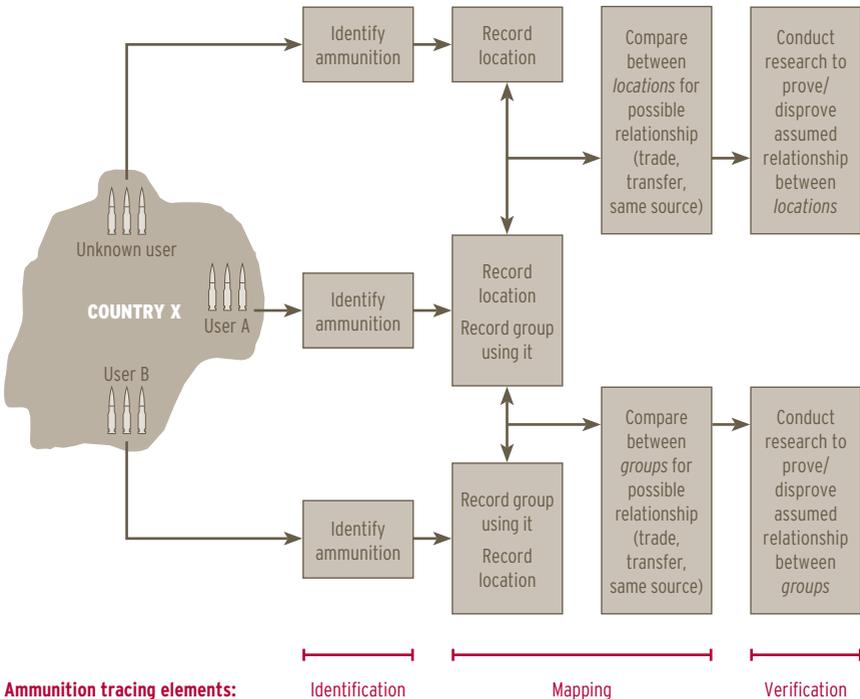
fore be read as a set of guidelines to aid responsible research and help design projects, whichever tracing method is decided upon.

2. The objectives of ammunition tracing

Ammunition tracing is ‘a set of diverse methods that are used to identify ammunition, its origins, and patterns of transfer’.¹ It can be employed in various ways, ranging from identifying the manufacturer of a particular type of ammunition, to more complex studies that use multiple sources of information to establish patterns of ammunition transfer. It can be used to monitor the illicit trade or to establish the origins of ammunition that was legally transferred, but later misused.

It is important to note that the legal and illicit trade are so seamlessly linked in some contexts that ammunition in both markets often needs to be recorded and analysed, comparatively, in order to understand illicit transfer dynamics.

Figure 2.1 The ammunition tracing process and elements within it



3. Elements of ammunition tracing

There are essentially three elements of ammunition tracing: identification, mapping, and verification (see Figure 2.1). Identification uses the physical characteristics of ammunition to determine where and when it was manufactured. Mapping involves recording samples of ammunition from different locations or groups and using this information to develop a detailed picture of the distribution of ammunition. It can provide clues as to where there may be trade in ammunition, either between groups or between different geographical locations. Verification is used to test any assumptions that are made using the trends revealed by mapping. It involves comprehensive field research on the dynamics of ammunition transfers. It also includes additional qualitative methods, such as reviews of defence literature and media reports, and analysis of existing research on the dynamics of armed conflict.

Information on identification, mapping, and verification is summarized in Annexes 1, 2, and 3 to these protocols.

A comprehensive ammunition tracing project necessitates carrying out all three tracing elements in sequence: identification, followed by mapping, followed by verification. The sequence does not have to be followed to its conclusion, as the following sections note. However, partially following the sequence (e.g. carrying out identification, or identification and mapping, without verification) limits the scope of the analysis and reduces the strength of claims that can be made about the distribution and transfer dynamics of the ammunition in question.

Table 3.1 Elements of ammunition tracing

Element	Purpose	Outcome/relevance for illicit transfers
Identification	Determines the type of ammunition (i.e. place and date of manufacture)	Used to monitor the presence of ammunition that may have been unlawfully or illicitly exported, imported, or distributed
Mapping	Plots the distribution of ammunition (by groups or geographically)	Used to narrow down plausible (or implausible) avenues for trade, transfer, or other forms of acquisition
Verification	Generates qualitative information about the security situation and the dynamics of illicit trade	Used to prove or disprove trends in trade or transfers suggested by mapping and to provide explanations for their dynamics

3.1 Identification

Ammunition tracing begins with collecting information on the physical characteristics of ammunition, including:

- markings applied at the time of manufacture;
- the calibre of the ammunition in question; and
- associated information related to its construction.

It may also include any other physical information that can be used to identify ammunition and its origins, including: magazines; machine gun belts; clips or links from machine gun belts; and, often most importantly, ammunition packaging.

The Small Arms Survey's Ammunition Reporting Forms and Cover Sheet provide a systematic method for collecting information that can later be used to identify ammunition. The Manual (the next section of the Tracing Kit) explains the relevance of this information.²

Information recorded from the ammunition in question is used to identify the producer (manufacturing entity), the country of origin, and (usually) the date of production.

For many purposes, ascertaining the identity of the ammunition is, by itself, a valuable exercise. It can generate data on the types, ages, and calibres of ammunition that one would expect to find in a particular region—and, hence, provide a baseline against which to assess whether there are changes in the types of ammunition circulating (i.e. an influx of certain new varieties). For example, identifying one particular type of ammunition on the illicit market can be important, because the item may have been exported or imported illegally, or may be unusual for some other reason in the context in which it was found.

Any identifying information can be used to generate background information, which, even if not useful at the time of recording, contributes to a 'global' dataset and can later be used for comparison with other types of ammunition.

However, pure identification data is also limited in the uses to which it can be put. The trade in ammunition is complex. Many items are legally traded, but

later resold under questionable circumstances. Others are stolen. Given that many types of ammunition on the world's illicit markets are old (sometimes 20 or 30 years), there are limited applications for identifying the origin of ammunition alone.

EXAMPLE: *In 2006, small arms control advocacy organizations reported that cartridges manufactured in Greece, Russia, and the United States had been found in the hands of rebel groups in the eastern Democratic Republic of the Congo. Although the report noted that the manufacturing states could not be directly implicated in illicit trade or transfer to the region, it did not elaborate on the fact that many of the cartridges were old (some approaching two decades).³*

The report highlighted the fact that manufacturers often have little control over ammunition that they may trade entirely legally. Implicitly, the report raises questions regarding the security of ammunition once it has been transferred from the manufacturer to the recipient, or regarding the potential for recipients to retransfer ammunition irresponsibly.

However, the identification data presented in the report remains background information, which may be useful for later comparative analysis, but cannot be used alone to establish the dynamics of trade. Successfully identifying a piece of ammunition cannot explain when, where, or how it entered the illicit market. From the perspective of providing information to help design policies to control (rather than raise awareness of) the illicit trade in ammunition, identification alone is often insufficient.

EXAMPLE: *A single Chinese-manufactured cartridge found in the Sudanese region of Darfur does not imply that China has exported arms to the region in contravention of a United Nations arms embargo. Even if the Sudanese military is known to use Chinese-manufactured cartridges, these cartridges are also used by the armed forces of three or four nearby states in the region. The cartridge found in Darfur could just as easily have been lost or stolen from one of those armed forces as it could have been supplied through Sudan.⁴*

It is also important to note the rare cases in which ammunition has been falsely marked—i.e. marked with one manufacturer's symbols, while having been produced in another factory. This phenomenon is extremely rare, and ammu-

nition tracing practitioners are more likely to encounter unknown markings than false ones.

EXAMPLE: *In the 1970s, one or a number of Chinese manufacturers produced a 7.62×51 mm cartridge whose headstamp was an exact copy of an existing cartridge manufactured by the British company Radway Green. The cartridges are virtually indistinguishable to the untrained eye and can only be differentiated because the Chinese version is manufactured in copper-washed steel. While rare, falsely marked cartridges have the potential to skew ammunition tracing results. The example illustrates the importance of recording as much information about ammunition as possible.⁵*

The Small Arms Survey's 'long' Ammunition Reporting Form ARF(L) allows the recording of cartridge case colour and information regarding the composition of the cartridge case as a means of verifying whether marking information is accurate. This information is used to generate important background information on the types of ammunition circulating in various regions of the world.

3.2 Mapping

The problem with simply identifying ammunition is that the analysis is static, rather than dynamic. A dynamic analysis requires identifying ammunition and organizing the information into samples that can then be compared with one another. The process is still binary, in the sense that types of ammunition in a sample are either 'there' or 'not there'. But, in the case of mapping, the fact that ammunition may be absent in one location can be just as important as its presence in another. In short, mapping can suggest a potential relationship between the presence of ammunition in one locale and another, or in the hands of one group and the next.

Mapping entails identifying ammunition and then either its location or the group of people using it at the time of recording. Mapping can be general, such as indicating the country in which it was recorded, or specific, whereby it identifies the group of people or individuals using the ammunition.

Mapping requires relatively large samples of ammunition, because it depends on being able to ascertain whether the presence or absence of certain items is

significant or not. A small sample, for example, one consisting of two pieces of ammunition in one geographical location and three in another close by, might include five different types of ammunition in use by only two individuals. By contrast, a large sample, such as 50 pieces in one location and 60 in another, if representative of a broader range of users in the location (see Box 1),

Box 1 Representative sampling from groups

Comparing the ammunition stocks of different groups requires 'representative' samples of ammunition. A sample is representative if it contains ammunition that is indicative of the 'actual' distribution of ammunition within a given group. Determining the actual distribution requires knowledge of the group in question and its structure.

The actual distribution could be the result of various factors. For instance, some group members may use different calibres from others. Certain members of the group, or factions within it, may acquire ammunition from different parties or different locations. Differences may also be the result of other factors, including theft or capture of ammunition on the battlefield by some group members (and not others) or individual preferences for using (firing) some types of ammunition before using other types.

Failing to take these factors into account can result in an unrepresentative sample of the types, calibres, and origins of ammunition used by a group as a whole. The following suggestions are illustrative of the measures that can be taken to make a sample more representative:

- If the entire group is the focus of investigation, samples need to be taken from *all* factions within the group.
- Samples need to be taken from a range of group (or faction) members in order to try and cover as many different circumstances of acquisition as possible.

There is no single rule for ensuring a representative sample, with the exception that more background information on the group in question is always better (e.g. the group's internal dynamics, its ammunition preferences, and its acquisition patterns). The more detailed the background information, the better are the chances of establishing from whom to sample (see 'Verification' in Section 3.3, below).

As a rule of thumb, researchers should try to record as broad a sample as possible, given security and access constraints. However, it is imperative that researchers acknowledge sampling limitations when analysing results and drawing conclusions, as a partial sample means that conclusions are valid only for the sampled group or faction (and possibly the individual).

might reveal that over half of the items in the two locations share identical markings.

Findings such as these may indicate a relationship between the two samples—the two locations may have similar sources of ammunition or the actors who reside in each may trade ammunition with one another. When it is carried out extensively, with numerous samples and large sample sizes, mapping can be used to identify trends that *may* suggest transfer patterns.

It is important to stress, however, that the presence of similar types and numbers of ammunition in the hands of two or more groups, or in two or more locations, does not mean that trade or transfer exists. It merely informs the researcher of potential avenues to explore or, conversely, avenues that are implausible or unlikely and that can be excluded from further investigation.

EXAMPLE: *A sample of ammunition circulating among pastoralist communities in the Kenyan, Sudanese, and Ugandan border regions revealed very large numbers of a type of ammunition that could not be attributed to a specific manufacturer. Sampling from both state and non-state actors excluded Uganda as a possible source of the ammunition, because there were only small numbers of examples of this type of ammunition in the hands of Ugandan non-state groups and it did not appear in samples recorded from Ugandan armed forces. The ammunition was also notably scarce on the Sudanese side of the border, but concentrated in Kenya. Even though the ammunition could not be identified, this information was sufficient to direct further research towards one or more Kenyan groups as a potential source of illicit trade.⁶*

Given the complexity of the illicit trade in ammunition, and the fact that reliable accounts are often difficult to obtain, knowing where to carry out further investigations (and where not to investigate) can save time and resources.

3.3 Verification

Mapping may suggest potential relationships between ammunition types found in one sample and those found in another. It can indicate where to look to find evidence of transfers, but it cannot prove beyond reasonable doubt that hypothesized relationships (trade, transfer, or similar sources of ammunition) are responsible for the distribution patterns observed.

As a general rule, if the findings generated by ammunition mapping appear to implicate a party's involvement in illicit trade or transfer, these findings should never be released until the information has been verified by extensive additional research.

Verification methods include interviews conducted in and around the location in which the ammunition in question was recorded; reviews of existing documentation relevant to ammunition trade, transfer, or acquisition; and informal requests to the implicated parties for confirmation, clarification, or denial. Verification may include:

- interviews with people suspected of involvement in illicit trade, whether on the supply or the demand side of the transfer;
- interviews with people who may be unconnected with transfers, but who may have important insights into their workings;
- reviews of existing reports (whether academic or media reports, or government statements) that may have previously acknowledged or investigated illicit trade or transfer in the region;
- investigations into patterns of political or military support to one faction or another, in order to determine plausible supply patterns;
- comprehensive investigations into the dynamics of armed conflict or crime, in order to gain an understanding of demand and acquisition opportunities; and
- sending research findings to parties that may be implicated in the trade, so that they have the opportunity to refute, refine, or corroborate those findings.

***EXAMPLE:** Research conducted in 2006 and in 2007 revealed that Ugandan-manufactured ammunition was circulating in large quantities among warring non-state factions in the north-east of the country. Ammunition mapping suggested that elements within the Ugandan security forces might have illicitly diverted the ammunition in question. The findings were verified by a combination of field interviews with the recipients of the ammunition; an assessment of local trade in all military-related commodities; reviews of the Ugandan press; and the fact that Ugandan government statements had acknowledged illicit diversion from some members of the security forces in the past. The research also eliminated sources of significant transfers other than Ugandan security forces,*

*including trade with neighbouring groups, diversion from neighbouring state forces, and the capture of ammunition.*⁷

There is often a strong temptation to release unverified information, particularly when the findings are newsworthy or of immediate policy relevance. This temptation should always be weighed against the consequences of making false allegations, including the potential for harming future opportunities for research on the trade in ammunition.

4. Recording ammunition in different circumstances

The circumstances in which ammunition is recorded have strong implications for how any information generated is later used. These circumstances fall into two broad categories.

The first allows practitioners to record ammunition that is in the hands of particular users. This can be called *attributed sampling*. The second allows practitioners to record ammunition, but this ammunition cannot be attributed to a particular user. This can be called *unattributed sampling*. These two forms are used under the following circumstances:

- *Attributed sampling*: The person recording the ammunition does so while the ‘user’ of the ammunition is present. The recording party knows that the ammunition in question ‘belongs’ to a particular person or group.
- *Unattributed sampling*: The person recording the ammunition does so without complete knowledge of who the ‘user’ is, and does not know to whom the ammunition in question ‘belongs’.

The term ‘user’ denotes the person who is in possession of the ammunition. The user could be a member of the military, a civilian, or a combatant in a non-state armed group. The user may also be a ‘user group’, whether a military unit, a community, or a rebel force.

As the following sections explain, while it is often more difficult to record samples of ammunition directly from users, the attributed sampling method is always preferable to unattributed sampling, from the perspective of analysing the illicit trade.

4.1 Attributed sampling

Attributed sampling is used to record the types of ammunition used by specific individuals, groups, or states. Attributed sampling can reveal where to look (or not to look) to find evidence of trade.

The basis of comprehensive ammunition tracing is comparison—whether comparing ammunition found in two different countries, or ammunition found in the hands of two different communities, armed groups, or police forces. Comparison requires mapping the distribution of ammunition and, ultimately, inferring possible transfer dynamics. In particular, it requires the labelling of ammunition records according to a unit of analysis (or unit of comparison), which could include any number of the following:

- individual (a person);
- group (military unit, faction, community, etc.); and/or
- location (geo-reference, road intersection, village, town, country, region).

As a general rule, as the units of analysis become smaller or more defined, the potential for finding meaningful information about the trade in ammunition becomes greater. The Small Arms Survey's Ammunition Reporting Cover Sheet (ARCS) ('Forms' tab of the Tracing Kit), for example, is designed to record various types of information, including the group from which the ammunition was sampled, the specific sampling location, the location in relation to the nearest town, and the host country.

Because the illicit transfer of ammunition is a social phenomenon (carried out by people not places), it is sometimes more useful to map ammunition distribution according to the people using it—the 'users'—than simply to map its location.

User-attributed recording can only be conducted when the researcher is absolutely certain of the user or user group, such as in the following cases:

- the researcher asks the users to unload their weapons and records the unloaded ammunition;
- the researcher records ammunition from the user at the exact moment of hand-over during a disarmament or weapons collection programme;

- the researcher records ammunition that is stored in a central storage facility (armoury, arms store, etc.) under a user's control; or
- the researcher records ammunition recovered from the scene of a crime/incident *only when* it has been forensically verified as coming from one user.

Certainty in attributing ammunition to a user/user group is essential in the case of ammunition mapping. If the ammunition is attributed to the wrong user, any assumptions made regarding the ammunition data can be skewed.

Box 2 A note on forensic methods

Cartridges, cartridge cases, and bullets can provide forensic evidence to determine the origin of ammunition, a weapon used in an act of violence, and the circumstances in which the weapon was used. Forensic methods focus on what are often called the 'mechanical fingerprints' that are produced by irregularities in ammunition manufacturing processes or caused by the weapon in which the ammunition has been used. Bullets may also pick up trace evidence from intermediate targets, such as distortions caused by passing through particular types of material. They may also carry genetic material from human users or human targets.

In the field of ammunition tracing, forensics first focuses on the physical evidence (marks, irregularities, and distortions) particular to ammunition and its components. When cartridges are unmarked, falsely marked, or have unidentifiable headstamps, cartridge case composition, manufacturing tool marks, and the various types of steel cores/penetrators within bullets can be used to narrow down the range of possible manufacturers.

In the case of ammunition that has been used in an act of violence, both bullets and cartridge cases can be used to match ammunition to specific weapons and their users. The rifling, or twisted grooves, inside a weapon's barrel, for instance, leaves marks on bullets and ejected cartridge cases. Different twist rates, different numbers and widths of grooves and lands (raised areas between grooves), and the direction of twist (whether turning clockwise or counter-clockwise) inside the barrel can be used to identify the weapon or the type of weapon from which a bullet was fired.

Furthermore, firing pins, extractors, ejectors (if any), the breech block, the chamber, and the magazine may leave distinctive patterns on the cartridge case. These 'class characteristics' can be used to identify the weapon used, and include the calibre; the shape of the firing chamber; the location, size, and shape of the firing pin; the size and shape of the extractors and ejectors; the geometrical relationship of the extractor, ejector, and breech face marks; and any chamber marks that may be left on the cartridge case.

Source: Khaldoun Kabbani, firearms examiner³

4.2 Unattributed sampling

Unattributed sampling occurs when a practitioner records ammunition but is unable to ascertain precisely who its users are or were. It may occur under the following conditions:

- Spent (used) ammunition is recovered and recorded from the scene of a battle, human rights abuse, or crime. It is unclear (a) which protagonists fired the ammunition and (b) whether it may have been fired during a previous act of aggression that took place at the same place (i.e. unconnected with the current investigation).
- Ammunition is recorded after having been assembled during a disarmament or weapons collection programme. It is unclear (a) to which faction the ammunition belonged and (b) whether the ammunition has been transported from several different locations to its current location.
- Ammunition is found in an abandoned cache or other storage facility. Even though the cache may apparently belong to one group, without supporting evidence, using this information can risk drawing wrong conclusions about the user of the ammunition in question.
- Records are compiled from photographs or physical samples collected by a third party. It is unclear (a) where the person photographed or collected them, or (b) whether the person may have an interest in providing false information about their origin.

Identifying ammunition alone can be a useful exercise, as noted above. There are, however, quite severe limitations on what can be deduced from ammunition that cannot be attributed to a particular user or user group. The Small Arms Survey's Ammunition Reporting Cover Sheet (ARCS), for example, makes an important distinction between ammunition that is verifiably attributable to one user and ammunition that cannot be attributed. This is because unattributed ammunition data cannot be used in the following circumstances:

- to indicate the type of ammunition in use by a particular group (and, by extension, any subsequent inferences made about illicit trade involving the group and that ammunition); or
- to implicate any actor or group in an act of violence or a case of human rights abuse (without corroborating forensic evidence).

In particular, spent (used) ammunition found on the ground may have been tampered with in some way, simply because the investigating party is not in a position to verify who fired it.

EXAMPLE: *In 2004 an armed group massacred 160 people in the Burundian Gatumba refugee camp. Subsequent eyewitness testimony suggested that the group who carried out the attack retrieved their spent ammunition cartridge cases and scattered cases of a different type to conceal their involvement in the attack. These reports have never been confirmed, but clearly illustrate the difficulties of attributing ammunition found on the ground to particular users—and notably the potential for tampering with evidence.⁹*

Despite the limitations of unattributed sampling, it can still be very useful. Even if the exact user or user group cannot be identified, the information can sometimes be used in a different type of analysis. For instance:

- ammunition that is known to belong to non-state armed groups, but cannot be attributed to one faction, may be labelled ‘non-state’ and compared with ammunition in the hands of state forces in the country in question or with groups in neighbouring countries; or
- ammunition that has been collected from several unidentified groups during a disarmament exercise, but from *one area only*, can be labelled according to the location in which it was collected. It can then be compared with ammunition recorded in neighbouring areas.

Even though they are less specific than particular user groups, broader group attributions (such as state or non-state) or geographic attributions (such as district, region, or country) can provide useful, comparable data.

EXAMPLE: *Ammunition recovered from police seizures made in the Brazilian city of Rio de Janeiro was stored in one place, and had not been labelled according to which particular criminal faction it had been recovered from. However, because the vast majority of this ammunition had been recovered from the city’s drug factions (and not from other criminals), the sample was a good representation of the types of ammunition used by these drug factions. The sample was used, as a whole, to compare the recovered ammunition with the types of ammunition used by Brazilian security forces and to test for possible cases of illicit diversion from those forces to the city’s factions.¹⁰*

5. Safety, security, and protocol before sampling

Practitioners of ammunition tracing are likely to carry out their research in an environment that may suffer high levels of armed violence, whether crime- or conflict-related. Even when ammunition has been collected by a third party, comprehensive ammunition tracing requires follow-up research to verify the information provided. It is important to note that even asking questions and conducting interviews in some environments can present a risk to the researcher and to interviewees.

The next sections outline important aspects of safety, security, and protocol that must be considered before entering into potentially hazardous situations.

5.1 Assessing the security situation in the sampling location

In the interests of minimizing risk, the Small Arms Survey recommends that field-based personnel restrict their tracing activities to ammunition that they may encounter during the normal course of their work.

In addition, the Survey recommends that ammunition tracing practitioners do not to visit a location unless:

- they are already based in the area and have detailed knowledge of the security situation there; or
- they can partner with an individual or organization that is based in the area and has detailed knowledge of the security situation there.

5.2 Locating the appropriate research partner

Ammunition tracing can be carried out ‘cold’, without lengthy attempts to reassure interviewees or ammunition users of the aims, objectives, and usefulness of the research, but only when there are clear lines of authority and the relevant authorities agree to the tracing work being carried out.

In most other cases, reaching the point where people are prepared to answer potentially sensitive questions about ammunition requires patience and extensive efforts to reassure potential interviewees. The most effective way to reassure a group or community is to locate a partner that is:

- locally based (preferably of the same ethnic/linguistic/political group);
- known and respected by the community or group; and
- fully briefed on the research activities (and in agreement with them).

The support of a local partner is necessary for a variety of reasons, including:

- *access*: approaching prospective interviewees and ammunition users;
- *reassurance*: explaining the research objectives in the local context;
- *safety*: advising on security risks or potentially sensitive situations; and
- *communication*: interpreting languages and interpreting how people respond to the research.

5.3 The role of national and sub-national authorities

National or sub-national authorities in some countries are likely to view arms and ammunition as a national security issue. This view may be adopted regardless of who is in possession of the arms and ammunition (including civilians), or the nature and objectives of the research.

Handling or recording information on weapons and ammunition may therefore risk breaking national laws or locally accepted prohibitions. A practitioner's failure to declare the nature of the research in advance and obtain official approval for it could result in his/her arrest or imprisonment. Relevant authorities to approach in advance include, but are not limited to:

At the national level:

- the Office of the President or Prime Minister;
- the Ministry of Internal Affairs (or its equivalent);
- national/federal police authorities;
- the national firearms registrar; or
- the National Focal Point on small arms and light weapons.

At the sub-national level:

- a military force commander;
- a police commander;

- the internal intelligence services;
- the civil administration;
- the armed civil authorities (customs, wildlife protection, etc.); or
- community or religious leaders.

In certain contexts (particularly where there are high levels of armed violence or ongoing military operations), civil administrations may be subordinate to military or paramilitary institutions.

As a general rule, it is better to approach the authority that is best able to guarantee that the research can be carried out safely and efficiently (i.e. an individual or institution that will not be overruled or contravened by competing authorities).

5.4 Notifying appropriate authorities in advance

All ammunition tracing practitioners need to notify relevant national or local authorities in advance that they intend to carry out research. Ideally, this should involve:

- making the necessary enquiries before carrying out the research to determine which are the relevant and effective authorities in the region;
- drafting a general written statement that explains the nature of the work and the reasons for it before carrying out the research;
- making a formal visit to the relevant authorities in order to present the general written statement about the research and answer any questions; and
- obtaining, if possible, a letter of accreditation from those authorities that explains the scope of the research activities, and has been officially signed and stamped.

In some cases, it may be best to prepare a standard, printed letter in advance. The letter can then be signed and stamped by the relevant authorities. In countries where local authorities do not have access to typewriters or computers, a signed, printed document may carry more authority than a handwritten note. The pre-prepared document should explain:

- the nature of the work;
- any relevant institutional affiliations that have authorized the work;
- the reasons for the work (i.e. to better understand illicit trade);
- some local/regional context related to the problem of illicit trade;
- a request 'to whom it may concern' to offer safe passage and assistance; and
- contact information (preferably the telephone number) of the authorizing authority.

6. Safety, security, and protocol when sampling

Sampling ammunition and carrying out verification interviews present dangers to ammunition tracing practitioners and to the people they sample from or interview. Ammunition is a sensitive subject area and one that may result in ammunition users:

- becoming hostile when approached about whether they might be willing to discuss issues related to illicit trade;
- becoming hostile during the course of ammunition sampling or during an interview related to illicit trade; or
- becoming hostile after the event, particularly if they realize that they may have provided information that may harm them in some way.

Ammunition tracing practitioners need to be aware of these risks before, during, and after sampling or interviewing. The following sections outline some of the methods that can be adopted to minimize potential problems caused by ammunition tracing.

6.1 Respecting interviewee/ammunition user concerns

The users of illicit ammunition often fear (for good reasons) that ammunition tracing may lead to policies or outcomes that can interrupt the supply of ammunition or negatively affect their security. This may include fears that:

- the research is designed to compile information in advance of a disarmament exercise that could negatively affect the security of the group or community concerned;

- the research may result in effective policies to restrict the supply of ammunition, which will reduce the group's or community's chances of replenishing ammunition;
- the group or community, by revealing its particular stocks of ammunition, is likely to suffer a decrease in supply, while its adversaries will not;
- adversaries may use information generated by the research to assess the strength of the group or community in question and to devise new ways to attack them; or
- the findings of the research will be released to authorities, who may then punish the group or community in question.

Fears differ from group to group or community to community, and the above list is by no means complete. In general, however, interviewees usually concentrate on the potential for the research to negatively impact on their own security, whether from an offensive perspective (i.e. an armed group or faction wishing to maintain military parity with an adversary) or a defensive perspective (i.e. a community seeking protection from armed violence and criminality).

For these reasons, there is always a chance that an ammunition user or interviewee may decide that the information they have provided to an ammunition tracing practitioner may threaten or jeopardize their security. Practitioners should be aware that a situation could develop in which their own safety may be placed at risk and should:

- be prepared to abandon an interview at any time should this occur;
- be prepared to 'return' data to the interviewee and promise not to use it; and
- indicate, in advance, to the interviewee that he/she is prepared do either of these things should the interviewee request it.

6.2 Reassuring interviewees/ammunition users

Honesty is always the best policy. People have a right to know the objectives of ammunition tracing, particularly when the data that is generated has the potential to affect their lives. However, the way the project is explained to ammunition users or interviewees should always be sensitive to local security

concerns and ‘in tune’ with local views on the legitimacy of using weapons and ammunition, such as:

- there may be legitimate reasons for using illicit weapons in the region, owing to the absence of state-provided security;
- groups or communities may be locked into a security situation in which arms reduction and disarmament could prove disastrous if it is done inequitably; or
- the individuals or groups concerned may be legitimate users of the ammunition in question and may object to being linked to the illicit trade.

Reassuring ammunition users or interviewees (a) that the ammunition tracing practitioner is aware of these views and (b) that these views will be firmly reflected in any research report is an essential part of building trust. This is very important, because illicit ammunition users, in particular, may be highly sensitive to the fact that ammunition is a strategic resource and very aware that they are likely to be the first ‘casualties’ if its supply is controlled.

Despite these concerns, however, many people in conflict or high crime situations have an ambivalent relationship with illicit weapons and ammunition—on the one hand, they may wish to retain them for security reasons, while on the other, they may be very aware of the damage caused to their families and communities by armed violence.

For these reasons, people may well agree to talk about ammunition, even though this could later result in its restricted supply. They are, however, likely to be concerned that the research (and any resulting policies) should be:

- *equitable*: the sample does not include them and their ammunition alone;
- *anonymous*: the sample does not record personal information; and
- *beneficial*: the project has the potential to affect them positively.

It is important to note that many ammunition users (particular non-state, illicit users) will generally (and justifiably) be sceptical about the potential benefits of ammunition tracing, but may choose to provide information in good faith, when they see that the intentions of the person carrying out ammunition tracing are sincere.

Practitioners of ammunition tracing should therefore be careful not to ‘over-sell’ the project and make claims that it will directly benefit the person, group, or community in question. The interviewee is likely to be sceptical of any benefit from the start, and frankness regarding the project’s limitations on the part of the researcher can help promote openness and trust in the researcher–interviewee relationship.

There may be very little success to be had when approaching state armed forces for information on ammunition. Most state security forces believe that arms and ammunition are items of national security and out of bounds to anyone but members of the security services. However, when provided with the appropriate authorization from national or sub-national authorities, some forces may be willing to provide researchers with information.

6.3 Maintaining a discreet presence

Even if some people are willing to share information on their ammunition stocks or to provide information related to illicit trade, others may be suspicious—particularly if they do not understand the nature of the work or have incomplete information about its objectives.

Weapons and ammunition naturally attract attention and are likely to arouse suspicion in many circumstances. Practitioners of ammunition tracing should therefore:

- ensure that anyone who is likely to observe or take serious interest in the research is informed of the objectives of the work;
- select locations where ammunition can be recorded, or where interviews can be conducted, away from casual, uninformed observers; and
- avoid carrying out tracing activities near roads or other routes where people who are unconnected with the project are likely to pass by.

As a general rule, ammunition users and interviewees are likely to be aware of local sensitivities regarding arms and ammunition. It is worthwhile consulting them about finding a suitable place to carry out the research before sampling or interviewing.

6.4 Weapons and ammunition safety in groups

Being in the presence of armed individuals presents dangers, of which the danger of someone accidentally or unintentionally firing a weapon is probably the most important. This most commonly occurs when:

- a person accidentally pulls the trigger while a round is chambered (loaded into the breach of a weapon); or
- a person accidentally chambers and fires a shot while clearing or reloading a weapon.

Sampling ammunition, or possibly carrying out verification interviews, is very likely to involve contact with loaded weapons. The Small Arms Survey recommends that ammunition tracing practitioners do not touch or handle weapons unless they have received proper and adequate training in firearms safety.¹¹ Furthermore, even persons who are qualified in firearms safety should not approach or touch explosive light weapons (such as grenades, missiles, and rockets, or their launchers) unless permitted to do so by a qualified ammunition technical officer (see the Tracing Kit Manual).

When recording ammunition in a group setting, practitioners should avoid situations in which many weapons are passed around at a time; where people load and unload weapons very close to one another; and where untrained people crowd around the venue. The following precautions can help to minimize risks, but people carrying out ammunition tracing should always be on the look-out for potential dangers:

- choose a location that encourages order (preferably people should be seated);
- encourage people to remain still and quiet;
- try to dissuade people from passing weapons around among themselves;
- dissuade people from inappropriately handling or pointing weapons; and
- leave if any of these conditions cannot be controlled.

6.5 Weapons and ammunition safety in storage facilities

Certain types of ammunition are inherently unstable when poorly stored or maintained. Weapons and ammunition storage facilities present a significant hazard in this regard. Particular danger of explosions may be presented by:

- permanent and semi-permanent weapons storage facilities, such as ammunition depots, armouries within barracks, or arms caches; and
- temporary stores of weapons and ammunition collected during disarmament or weapons collection programmes.

Ammunition tracing practitioners should never enter a weapons storage facility unless permitted to do so, and supervised throughout the time they are in the facility, by a qualified ammunition technical officer. They should also be aware that ammunition technical standards in many parts of the world are not very high, and should never assume that the personnel in charge of storage facilities (including international peacekeeping forces) have the required expertise to ensure that the facility is safe to enter.

In particular, the Small Arms Survey strongly advises practitioners to avoid sampling in the following circumstances:

- when it concerns any item of explosive light weapons ammunition, unless permitted to do so by a qualified ammunition technical officer (see the Tracing Kit Manual);
- when the physical appearance of a depot or other storage facility suggests that the facility and munitions inside it have not been well maintained;
- if the physical condition of ammunition shows signs of corrosion or damage, which suggest that the item may have deteriorated;
- where weapons or ammunition have been piled up together rather than stored on racks or otherwise neatly ordered; or
- when small calibre cartridge-based ammunition is stored alongside larger calibre explosive ammunition, such as rockets or artillery shells (see the Tracing Kit Manual).

7. Data handling and review

As with all sensitive research projects, informants, interviewees, and, in this case, ammunition users should be protected to the greatest extent possible from potential negative results of ammunition tracing. These may include the following situations:

- individuals or groups that supply information are later harmed (physically or in other ways) by people who have been implicated in illicit trade;
- local or national authorities punish informants, interviewees, or ammunition users for providing information that runs contrary to policy or practice;
- individuals, groups, commercial entities, or national governments are wrongly implicated in illicit trade; and
- other loosely associated or unconnected research or international assistance programmes are negatively affected by the findings.

No research can guarantee that it will do no harm. However, ammunition tracing is in the fairly unique position of directly sampling from and interviewing individuals and groups who, first, may be involved in illicit trade and, second, may suffer a decrease in security, status, or wealth if measures are taken to control the activity.

The following sections outline some basic precautions that need to be taken to ensure responsible data handling and analysis, and distribution of findings.

7.1 Handling unattributed, 'raw' ammunition data

Unattributed, 'raw' ammunition data consists only of lists of the types (factory of origin, date of manufacture, etc.) of ammunition recorded in a given location. This information is rarely harmful to any party, provided that it is distributed with the appropriate warnings.

For example, information that identifies a certain type of ammunition as having been produced in one country does not *usually* implicate the country of origin in illicit activity, regardless of the circumstances in which the ammunition was found. Research findings should, where appropriate, reflect this, and always include a warning along the lines of: 'no conclusions regarding illicit trade can be drawn from finding ammunition manufactured by this company'.

Moreover, the findings should also be careful not to refer, in any way, to possible manufacturer involvement in illicit trade without clear corroborating evidence. Manufacturers are often a valuable source of information for practitioners of ammunition tracing. Unverified references to potential manufacturer

complicity are not only unscrupulous, but could ultimately prove damaging to the success of future tracing projects.

7.2 Handling attributed ammunition data

Attributed ammunition data may include very specific information that links ammunition to particular user groups—and possibly even to individuals. This data can never be released unless it has been carefully reviewed.

As a general rule, the attributed part of data (i.e. the names of groups or individuals or information associated with them) should be stored separately from raw, unattributed ammunition data, and access should be limited only to a core group of analysts and reviewers from the time of sampling onwards.

In certain circumstances, the loss or seizure of data could result in sensitive information falling into the hands of people who could misuse it. The Small Arms Survey recommends that, where loss or seizure could prove damaging, practitioners do not compile records related to individuals or groups using plain language, until they are in a position to ensure data security.

For example, when sampling from several groups, a predefined (and entirely non-suggestive) letter code can be used to distinguish the groups in question. This information can later be converted into plain language when the information can be stored in a more secure location.

The Small Arms Survey's ARCS cover sheet (see the Tracing Kit Forms), for instance, is designed to record sensitive information and is therefore separate from the ARF(L) and ARF(S) reporting forms. The ARCS cover sheet should preferably be left blank until it can be completed in a secure environment (i.e. it should not be completed while recording ammunition from a user).

7.3 Review processes

Review processes are designed to check data for factual inaccuracies and compilation errors and to assess the credibility of any assumptions or allegations that may have been made.

Ideally, a review process should be a ‘rolling’ one, whereby information is continually questioned, weighed, and verified throughout an ammunition tracing project. A rolling process ensures that each step of the project is based on credible evidence and that major questions are less likely to be raised at the end of the project when deadlines may be close and there may be strong demands to produce answers quickly.

The Small Arms Survey recommends that practitioners of ammunition tracing should have their information reviewed externally—i.e. by people from outside their organizations (rather than conducting reviews themselves or within their own organizations). External review provides impartiality and also specific expertise that most organizations do not have available. In particular, external reviewers should include various people with knowledge of:

- the field of ammunition identification or tracing;
- the local dynamics of conflict or crime in the region;
- the legal and illicit trade in arms and ammunition; and
- the political and legal framework of the country or region in question.

Ideally, the consultative process should be confined to a small group, and access to data should be carefully limited. Inevitably, review processes (and verification more generally) involve the release of information, but information should only be released to people when their credentials have been fully assessed and on a ‘need to know’ basis.

7.4 Release of findings

Ammunition tracing is carried out in order to understand the illicit transfer of ammunition. The rationale behind most studies is that understanding particular aspects of transfers can promote targeted policies to control them, or else stimulate interest in arms control/armed violence reduction more generally. Evidence released in support of these objectives should not include unnecessary information that could prove unduly damaging. Ammunition tracing findings should always be:

- *targeted*: If the findings have the potential to cause harm (whether to a group, manufacturer, or state), they should implicate only those parties that hold

key positions, where controlling their actions could yield significant reductions in armed violence; and involve

- *minimal attribution*: If parties are implicated in illicit trade, research findings should aim to attribute illicit activities, or illicit possession of ammunition, in the broadest way that does not reduce the significance of the findings (e.g. implicating a group rather than an individual).

Any allegations made in the findings should be assessed against a ‘beyond reasonable doubt’ criterion before release.

8. The Small Arms Survey Ammunition Tracing Project

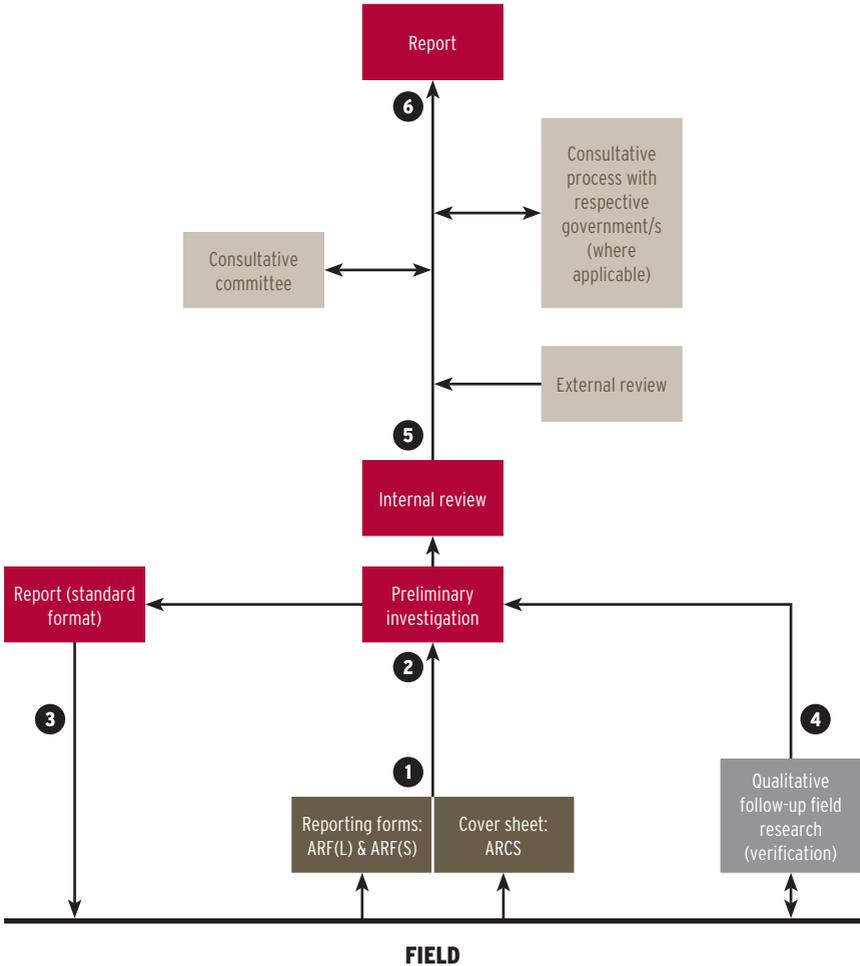
The Small Arms Survey Ammunition Tracing Project began in 2006. Since then, the project has evolved into a central repository for information on ammunition recorded throughout the world. The Survey provides an ammunition tracing service to all practitioners in the field of arms violence reduction and to anyone with a stake in restricting the trade in illicit ammunition.

The Small Arms Survey has the in-house capacity, assisted by a growing network of international experts, to identify ammunition and analyse ammunition tracing data. This involves a process (see Figure 8.1) whereby partners—‘reporting parties’—working on any number of field-based activities ❶ submit data to the Survey. This information consists of raw ammunition data recorded in the ARF(L) and ARF(S) reporting forms and separate, more sensitive, actor- or group-attributed information submitted using the ARCS cover sheet (see the Tracing Kit Forms).

This information is then investigated, preliminarily, ❷ by the Small Arms Survey, with technical assistance from a number of partners. The Survey prepares a report on initial findings and returns it ❸ to the reporting party. The report details the types and origins of the ammunition in the sample; suggests potential avenues for further investigation or requests verification; and includes important warnings regarding the reporting party’s future use of the information.

The Small Arms Survey carries out further investigations ❹ *only* if the data (and communication with the reporting party) reveals reasonable grounds to

Figure 8.1 Data handling by the Small Arms Survey Ammunition Tracing Project



Key: ■ Collecting partner activities; ■ Collecting partner and SAS activities; ■ SAS activities

believe that illicit trade in ammunition is taking place. If these investigations reveal strong evidence of trade, the Survey undertakes an extensive review and consultative process ⑤ to ensure the veracity of the findings, and may release a research report ⑥.

Ammunition tracing practitioners are invited to submit information to the Small Arms Survey, or to use the process described above as a guide to carrying out their own comprehensive ammunition tracing project.

Annexe 1

Identification

Objective:

Identification aims to identify types of ammunition found in a particular locality.

Method:

Ammunition markings can be used to identify the manufacturer (factory, state) of the ammunition in question. This method can be used for both live (unfired) ammunition or spent (used) cartridges found on the ground, because it aims *only to report what kind of ammunition is (or has been) circulating in a locality.*

Utility:

Identification can be used to outline very broad trends in ammunition supply, such as possible defence cooperation between states (e.g. a very high prevalence of Chinese- or US-manufactured ammunition in certain regions). In addition, it can be used to establish:

- most common calibres in a region; and
- average ages of the ammunition circulating there.

Limitations:

The data cannot be used to make a dynamic assessment of trade unless it is used to make a crude time series analysis (e.g. Russian Federation ammunition is most prevalent in a sample from 2008; German ammunition is most prevalent in a sample taken in 2010).

Because the ammunition in question is not attributed to any one user group (i.e. military, police, non-state group), no assessment can be made of similarities (or differences) in the types of ammunition stocked by different groups. As a result, it becomes impossible to hypothesize which groups might trade with one another.

Claims cannot be made that a manufacturing country supplies ammunition to a particular faction, because the ammunition in question may have changed hands many times.

Annexe 2

Mapping

Objective:

Mapping aims to generate reports on the types of ammunition in circulation among specific groups (i.e. military, police, non-state group).

Method:

Mapping records types of ammunition according to the group or specific location from which they were recorded.

Utility:

Mapping can be used to ascertain plausible (or implausible) ammunition trading patterns. For instance, it may reveal that Group A stocks the same types of ammunition as Groups B and C, whereas Group D uses entirely different types. In this scenario, Group D may be an unlikely supplier or recipient of the ammunition used by Group B.

Mapping may specifically establish the preferences of groups for certain types of ammunition (for instance, the military may prefer one type and the police another). This information may be useful when considering possible cases of diversion (i.e. which security force units to study for possible lax controls or ineffective stockpile management). In addition, the mapping may reveal:

- which groups use newer ammunition (i.e. which may have been recently resupplied); and
- a group's dependence on certain calibres (important when assessing the demand for specific types of weapon).

Limitations:

The data cannot be used alone to conclude that one group trades with another. In particular, data of this kind is susceptible to the phenomenon of 'sampling on the dependent variable', whereby two groups may never trade ammunition with each other, but may have both been supplied by a third group that is not in the sample.

Mapping needs a large sample of ammunition from each of the groups to enable inter-group comparison. In addition, the research needs to sample from as many groups as possible in a particular region if it is not to leave out potentially significant sources of trade.

The method cannot be used when recording information from spent (used) cartridges, because of the difficulty of attributing these to a specific group of users (i.e. if a cartridge is found on the ground, it is very difficult to identify who fired it).

Annexe 3

Verification

Objective:

Verification aims to verify whether potential trends revealed by the mapping component of ammunition tracing are credible. It can be used to determine whether trends suggest:

- trade between groups; and
- possible cases of loss or diversion (from legal users to the illicit market).

Method:

Verification involves qualitative research into the trade in ammunition, including the following activities:

- reviews of national defence agreements and trade in military materiel;
- interviews with state and non-state parties to the trade in ammunition;
- assessments of conflict dynamics (i.e. allies and adversaries);
- demand and supply assessments based on field interviews; and
- supporting documentation, including legal investigations as well as media coverage.

This information is used to narrow down possible sources of illicit ammunition through a continually refined process of elimination.

Utility:

Because it relies on extensive research, verification can generate a relatively nuanced appraisal of the trade in illicit ammunition—notably by including vital contextual information in the study, such as:

- the dynamics of crime or conflict in the region;
- resulting supply and demand dynamics; and
- recipients of arms and ammunition.

Because the method relies on multiple sources of information, given sufficient time, most data can be cross-checked (triangulated) with other relevant sources.

For this reason, verification is a preferred part of any tracing study and necessary for most projects that aim to publicize research findings.

Limitations:

Verification activities are limited only by the constraints of incomplete or inaccessible information. These barriers can usually be overcome if enough time and resources are available.

Practitioners should be aware of the need for in-depth background knowledge of a particular region before attempting to carry out a study of this kind, including an extensive knowledge of both conflict dynamics and the orientation of particular factions in a conflict or crime environment.

Endnotes

- 1 See Bevan (2008, p. 42) for an introduction to various forms of ammunition tracing.
- 2 Various reference sources help identify small calibre, cartridge-based ammunition. Among the more comprehensive sources are: CartWin (2008), a computerized database of headstamp and manufacturer information; and Jorion and Regenstreif (1995a; 1995b), two printed volumes detailing the markings and manufacturers of civilian and military small calibre ammunition.
- 3 Information published in an Oxfam (2006) press report.
- 4 This example is based on a number of requests made to the Small Arms Survey by journalists regarding assault rifle cartridges (and larger munitions) photographed in the Darfur region of Sudan.
- 5 See Jorion and Regenstreif (1995a, p. 238) for information on the cartridge in question.
- 6 Ammunition records compiled by James Bevan in Kenya, Sudan, and Uganda, 2006–08.
- 7 These findings are presented in Bevan and Dreyfus (2007).
- 8 This box summarizes parts of Kabbani (2008).
- 9 Information supplied by a confidential source, February 2007.
- 10 These findings are presented in Bevan and Dreyfus (2007).
- 11 Firearms safety courses can be arranged by most national security forces or dedicated firearms resource centres, such as the National Firearms Centre, United Kingdom (see <http://www.royalarmouries.org>). Ammunition tracing practitioners should be aware, however, that training on firearms safety provided by some organizations may not prepare them for conditions that they may encounter in a field research environment.

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