Rapid DNA technologies at the crime scene
‘CSI’ fiction matching reality
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Chapter 7

Mobile DNA Technologies in Crime Scene Investigation: the Legal Framework

An analysis of the potential use of mobile DNA technologies to analyse DNA traces under the current legislation regarding criminal cases

Abstract

DNA analysis plays an important role in criminal investigation and prosecution today. Legislation regarding DNA technologies has been embedded in the Dutch Code of Criminal Procedure (Wetboek van Strafverordening) for over two decades. However, technological developments in the field of DNA analysis have soared, with the latest advances forecasting a future in which DNA traces can be analysed at the crime scene, using a single device and requiring a simple ‘push of the button’. A potential match between the profile of the traces discovered and a suspect’s profile in the DNA database could be established within a few hours. It is not clear, however, how these mobile DNA identification technologies may affect the criminal justice procedure. This article therefore surveys the possibilities and impossibilities of using mobile DNA technologies for crime scene investigation in the criminal justice system.

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This study was designed and performed in general by both authors. The legal analysis and interviews were performed by the co-author. The article was written by the first author with contributions from the co-author.
7.1 Introduction

Since DNA legislation was enacted on 1 September 1994, DNA analysis has acquired an established role in Dutch criminal procedures (1). DNA analysis is now viewed widely as an effective tool to investigate crimes and serve as evidence for the prosecution. Certainly since the establishment of the DNA database, DNA traces have become an important element in identifying an offender (2-5). The wish to expedite the analysis and interpretation of DNA traces, and to use this technology more frequently, appears to be growing. Nowadays it is feasible to have specific DNA traces analysed by the Netherlands Forensic Institute within just six hours (6).

In recent decades, the analysis of DNA traces has advanced tremendously. DNA profiles suitable for comparative analysis can now be drawn from even highly minimal traces containing just a single cell (7). Thanks to new technological developments in the field of DNA analysis, there are technologies on the market today that can generate a DNA profile from reference (cheek swab) samples within two hours (8-10). It would seem to require just some minor modifications to create a DNA analysis device that is suitable for use at the crime scene itself, where a single push of the button will generate a DNA profile that can perhaps be compared immediately with the DNA database. The picture emerges of future forensic investigation in which it takes just a few hours to obtain a potential match between the profile of a trace obtained at the crime scene and the profile of a person stored in the DNA database, or with the reference profile of for example a suspect.

These developments are proceeding at a very high pace; initial pilot projects to test the use of these technologies in crime scene investigation operated by the Scene of Crime Officers (SoCOs) are already underway in the United States and the United Kingdom (11-14). In the United States, the analysis of DNA traces outside the forensic laboratory appears to concentrate on using the DNA database. There, access to the national DNA database can only be obtained via a forensic laboratory. These laboratories must meet the ‘FBI Quality Assurance Standards’ and the ‘DNA Identification Act’ of 1994 (15, 16). Moreover, comparisons with the DNA databases can only be conducted at specific times. In the United States, it will require an amendment of the law to permit comparing profiles obtained by these technologies to the database. In particular, it is important to safeguard the privacy of the individuals and/or profiles concerned. For the analysis of reference samples and inclusion of the profile in the Combined DNA Index System (CODIS) the progress already led to creating an addendum quality assurance standard by the FBI for DNA databasing laboratories that are performing analysis with mobile DNA technologies (17). Together this shows that, internationally, these technologies are beginning to trickle into the forensic world. No pilots using mobile DNA technologies have yet taken place in the Netherlands, and it is time therefore to outline a legal framework for the use of these systems within the Dutch criminal justice system.
Outside the Netherlands these technologies are also not yet being used for the analysis of crime scene samples. Although this study is based on the Dutch legal framework, it seems that also outside the Netherlands these mobile DNA technologies cannot be used right away on crime scene samples. An important aspect is to get the judicial framework, of integrating the use of mobile DNA technologies by SoCOs, accurate internationally and this study serves as a first step towards that discussion.

The availability of this technology can signal an important change within the criminal justice system. If analyses are performed at the crime scene and comparisons conducted automatically with the DNA database, it will impact the process from the crime scene to the courtroom, and it will likely require legal changes to establish this new working method. The Forensic Science Research Group at the Amsterdam University of Applied Sciences is currently conducting research into the influence of rapid and mobile DNA identification technologies on the work of the SoCO, and into how these technologies can best be used at the crime scene or in a police laboratory.

However, the focus of this article is not on the work of SoCOs or on the optimum use of new technologies, but on the influence of mobile DNA identification technologies on the legal criminal justice procedure. If traces can be analysed more quickly and more easily, this does not necessarily mean that the analysis results can also be legally used for the intelligence process for the identification of perpetrators, and prosecution in criminal cases. As it is, DNA analysis in support of criminal procedure is constrained by various safeguards. The question, therefore, is how the legal system views this development; what are the bottlenecks, and what are the solutions?

These are important questions that must be answered before introducing such technologies in practice. To that end, this study surveys the possibilities and the impossibilities of using mobile DNA technologies in the criminal justice system (18). First we outline the procedure at the police department of forensic investigation, to then indicate how mobile DNA technologies might be incorporated into this process in the future. We then describe the legislation pertaining to DNA analysis, describing the requesting authority to order such research and who needs to perform this research. To further understand this process and the various relevant roles fulfilled by the parties concerned now and in the future, interviews were held with a qualified reporting DNA scientist called the DNA expert, a SoCO, a forensic advisor, a public prosecutor, a lawyer and a judge. The results of this study serve to answer the question whether the current legislation impedes or prohibits the use of mobile DNA technologies by the SoCOs in criminal cases and if so, how these can be eliminated.
7.2 Forensic Investigation

A SoCO from the police department of Forensic Investigation is usually the first person at a crime scene, to collect evidence. He or she can collect biological traces, which are then taken to the police forensics department. Under the authority of a public prosecutor, one or more of these traces can then be submitted to a forensics laboratory for further analysis. Inside the laboratory, the trace is treated according to a strict protocol for DNA profiling and for comparing this profile to DNA profiles of traces and individuals stored in the DNA database or with case reference profiles. To conclude the process, the analysis and comparison results are reported by a DNA expert (5). The report, including the findings, is then sent to the public prosecutor and to the police forensics department. The entire process (Figure 1) can take a fair amount of time. A study into the turnaround time of DNA traces, from the crime scene to the DNA report, shows that this process takes 66 days on average for serious crimes, and 44 days on average for high volume crimes (5). These long turnaround times can significantly slow down the intelligence and prosecution process, certainly if the trace results in a DNA database match, which permits the tracking down of a previously unknown suspect. For certain cases and certain traces, expediting this process would be a welcome improvement for the intelligence and prosecution process. By using mobile DNA technologies that enable the generation of a DNA profile from traces at the crime scene, the DNA analysis process could comprise far fewer process steps. Figure 1 shows what the future might look like for the forensic process of DNA analysis of some traces. However, it is not certain whether such a simplification is legally feasible. It is also unclear what the role of the public prosecutor would be, who may wish to use the research results as part of his evidence.

If the DNA profiles, obtained through mobile DNA technologies, are to be used mainly for intelligence purposes the police might make its own decisions on which traces should and which need not be analysed. Should this still require the authority of the public prosecutor or supervisory judge? It also raises the question whether the intelligence phase, to identify offenders, and the presentation of evidence phase should be treated as two separate phases. After all, traces analysed to support the intelligence of identifying a perpetrator can also serve the prosecution in the courtroom.

7.3 Mobile DNA Technologies

Various companies and scientists are currently working to accelerate DNA analysis processes and to develop mobile DNA identification technologies (8-10, 19-23). All these technologies have in common that a trace sample can be inserted in a specifically designed ‘cartridge’, without requiring complex sample preparations, and that the entire DNA analysis process can be conducted completely with a single push of the button,
with the objective to produce analysis results within two hours that are qualitatively comparable to the analysis results of renowned laboratories. The idea is that the system can also compare these results directly to internally stored profiles such as reference profiles, or with profiles stored in the DNA database. This implies a highly standardised ‘easy-in, easy-out’ system, requiring minimum preparation and dispensing with all technological expertise, so that it can be used by for example a SoCO.

We shall not address the current output and quality of these systems here. This study assumes that these systems produce the same results as the standard analysis processes conducted in laboratories. The device will automatically perform any subsequent profile comparisons and present the results with an indication of the reliability margin. The SoCO will not have access to the profiles. Results that fall outside the reliability margin will be blocked, and the system will indicate that a DNA expert is required to perform the profile comparison. The SoCO could then decide to submit the profile result and/or the trace to a forensic laboratory.

**Figure 1.** Modification of the Forensic Identification Process with Mobile DNA Technologies
7.4 The Law

That technological developments are enabling an ever faster means of generating DNA profiles does not mean that these results can simply be used for intelligence and prosecution purposes in criminal cases. DNA analysis as part of criminal procedure is attended by a number of safeguards. These safeguards are detailed in e.g. the Criminal Procedure Code and the DNA (Criminal Cases) Tests Decree. With regard to DNA analysis, Articles 138a, 151a and 195a of the Criminal Procedure Code are particularly pertinent. Article 138a gives a definition of DNA analysis. This definition includes the analysis of cellular material with the sole purpose of comparing DNA profiles. The public prosecutor is the authority to order this type of DNA analysis in the interest of a criminal investigation on the basis of Article 151a paragraph 1. The supervising judge has the same authority on the grounds of Article 195a paragraph 1. The second paragraph of both Article 151a and 195a stipulates that the public prosecution officer, respectively the supervising judge, must appoint an expert to perform the DNA analysis who is affiliated with a laboratory that has been designated for the purpose by a general administrative order. For this purpose, Article 7 paragraph 1 of the DNA (Criminal Cases) Tests Decree designates the Netherlands Forensic Institute. Articles 151a paragraph 11 and 195a paragraph 6 of the Criminal Procedure Code stipulate that further regulations regarding the implementation of the articles pertaining to DNA analysis, Articles 151a and 195a, will be issued through or pursuant to general administrative orders. These further regulations regarding the implementation of these articles are contained in the aforementioned DNA (Criminal Cases) Tests Decree. The third paragraph of this decree stipulates how DNA analysis is to be performed. Article 9 paragraph 2 determines that the appointed expert shall perform the DNA analysis according to methods that have been approved upon accrediting the laboratory with which the expert is affiliated. Article 10 paragraph 1 of the Decree stipulates that the expert must draw up a report detailing the results of the performed DNA analysis. This report must fulfill certain criteria, listed in Article 10 paragraph 2, under C and D of the Decree. For example, the report must describe the method used to obtain the DNA profile. The report must also contain the results and the conclusions of the DNA analysis. The question now is whether all the safeguards contained in the detailed DNA legislation are also relevant when deploying mobile DNA technologies and if so, how this will impact the use of a mobile DNA technology in a crime scene investigation.

7.4.1 The Legal Possibilities and Impossibilities

As described in the previous paragraph, DNA analysis is defined by Article 138a of the Criminal Procedure Code as the investigation of cellular material with the sole purpose of comparing DNA profiles. If mobile DNA technologies are to be deployed at the crime scene, then this will entail performing a DNA analysis on any cellular material that may
have been found and comparing the DNA profile results, if possible, with a DNA
database. The use of a mobile DNA technology thus falls within the definition of DNA
analysis as given by the Criminal Procedure Code. This therefore raises the question
whether the use of mobile DNA technologies is permissible under current legislation.
After all, as the previous paragraph has shown, DNA analysis must comply with a series
of safeguards. The use of a mobile DNA technology does not comply with two
safeguards prescribed by law with regard to DNA analysis. First, contrary to the
provisions of Articles 151a paragraph 2 and 195a paragraph 2 of the Criminal Procedure
Code, it is not strictly necessary to appoint an expert to perform the DNA analysis by
means of the mobile DNA technology. After all, a SoCO can easily insert traces found
at the crime scene in the mobile DNA analysis device. Second, the use of mobile DNA
technology does not comply with the requirement stipulated in Article 9 paragraph 2 of
the DNA (Criminal Cases) Tests Decree. A mobile DNA technology is not a method of
analysis that was approved upon accrediting the laboratory with which the expert is
affiliated. We may thus conclude that the use of mobile DNA technologies as described
above is not explicitly permitted by the DNA legislation. The use of such technologies
can thus not be based on the Criminal Procedure Code articles that specifically address
DNA analysis. However, this need not mean that the use of mobile DNA technologies
is by definition unlawful, as elaborated below.

According to the legality principle of criminal procedure, such procedure can only be
conducted in the manner stipulated by law\(^1\). This principle holds that every criminal
procedural act must be based on the law. This legal basis does not in all cases need to
be a specific legal basis. In certain instances, for instance for intelligence purposes,
criminal procedural action can be based on the general investigative authority of the
SoCO, referred to in Articles 141 and 142 of the Criminal Procedure Code and in Article
3 of the Police Act 2012. The pertinent question here, therefore, is when the general
investigative authority offers sufficient legitimacy for intelligence investigative acts for
identification purposes, and when such acts require a more specific legal basis. It can be
deduced from legislative history that investigative actions for identification purposes
that do not violate any fundamental rights can be based on the general investigative
authority described in Articles 141 and 142 of the Criminal Procedure Code and in
Article 3 of the Police Act 2012.\(^2\) However, this does not mean that investigative acts
for intelligence identification purpose that do violate a fundamental right cannot be
based on the general investigative authority of SoCOs, by definition. The Dutch
Supreme Court has attempted to clarify in a number of rulings when the general
investigative authority for intelligence identification purposes provides sufficient
legitimacy for criminal procedural actions. According to the Supreme Court, briefly put,
Articles 141 and 142 of the Criminal Procedure Code and in Article 3 of the Police Act

\(^1\) Article 1 Criminal Procedure Code. (In Dutch: Artikel 1 van het Wetboek van Strafvordering.)
DNA technologies as an identification tool for intelligence purposes. However, the pertaining to DNA analysis in the Criminal Procedure Code do not prohibit using mobile be used for? Can the results be used as evidence in criminal cases? The articles The subsequent question is: what can the results of using the mobile DNA technology of applying a mobile DNA technology is a match between a detected DNA trace and a profile of a person in the database, then this is just an indication that the individual concerned was possibly present at the crime scene. Using mobile DNA technologies in the intelligence phase can therefore be based on Articles 141 and 142 of the Criminal Procedure Code and on Article 3 of the Police Act 2012. The subsequent question is: what can the results of using the mobile DNA technology be used for? Can the results be used as evidence in criminal cases? The articles pertaining to DNA analysis in the Criminal Procedure Code do not prohibit using mobile DNA technologies as an identification tool for intelligence purposes. However, the legislative history does suggest that the legislator has wanted to embed DNA analysis within firm safeguards. It seems improbable that the legislator drew up a detailed regulation stipulating the safeguards attending to DNA analysis on the one hand, and on the other would permit DNA analysis that does not comply with this regulation. When

2012 can sufficiently legitimise limited violations of personal privacy. To determine whether any given instance amounts to a limited violation of personal privacy, the Supreme Court will examine the actual circumstances. This includes the duration, the intensity, the place, the goal and the manner of the investigative identification action. If it concerns a manner of identification that violates the privacy, the Supreme Court will also consider whether the method is suited to obtaining a more or less comprehensive picture of the personal life of the individual concerned. If so, then the investigative identification method for intelligence purposes cannot be based on the general investigative authority of SoCOs, and a more specific legal basis is required. However, the question remains, can mobile DNA technologies be deployed on the basis of the general investigative authority for identification purposes? Using such technologies to analyse traces left at the crime scene represents a limited violation of people’s privacy. For example, it does not entail a violation of bodily integrity. No cellular material is taken from the individual concerned. It only entails examining whether traces already present at the crime scene match the profile of a person already contained in the database. Using a mobile DNA technology also does not produce a more or less complete picture of the various aspects of one’s personal life. If the result of applying a mobile DNA technology is a match between a detected DNA trace and a profile of a person in the database, then this is just an indication that the individual concerned was possibly present at the crime scene. Using mobile DNA technologies in the intelligence phase can therefore be based on Articles 141 and 142 of the Criminal Procedure Code and on Article 3 of the Police Act 2012. The subsequent question is: what can the results of using the mobile DNA technology be used for? Can the results be used as evidence in criminal cases? The articles pertaining to DNA analysis in the Criminal Procedure Code do not prohibit using mobile DNA technologies as an identification tool for intelligence purposes. However, the legislative history does suggest that the legislator has wanted to embed DNA analysis within firm safeguards. It seems improbable that the legislator drew up a detailed regulation stipulating the safeguards attending to DNA analysis on the one hand, and on the other would permit DNA analysis that does not comply with this regulation. When


drawing up the detailed regulation, the legislator could of course not have foreseen all the developments in the field of DNA analysis. Nevertheless, it may be said that the aspects described by the legislator in the proposed law, which centres mainly on the thorough regulation of the research method, will continue to apply in full. It can therefore be assumed that the results of a DNA analysis will only be admitted as evidence in a criminal case, if the research complies with the demands imposed on such research by the Criminal Procedure Code. Mobile DNA technology does not meet these demands on two counts. As described earlier, this concerns the fact that the use of mobile DNA technology does not necessarily require the involvement of an expert, and the fact that a mobile DNA technology is not a method that has been approved upon accrediting a laboratory. It is for these reasons that the results of a mobile DNA analysis cannot be used as evidence in criminal cases. The conclusion is therefore that mobile DNA technologies lack a basis in the law. As they form a limited violation of people’s privacy, mobile DNA technologies can, in our opinion, be based on the general investigative authority set out in Articles 141 and 142 of the Criminal Procedure Code and Article 3 of the Police Act 2012. However, this will not produce results that can be admitted as evidence. The results of a DNA analysis can only be admitted as evidence, if the DNA analysis complied with the demands as imposed by the law.

### 7.5 The Opinion of Professionals from the Criminal Justice System and Safeguards

Aside from the question whether mobile DNA technologies can be used under the current legislation, it is important to examine the safeguards that should surround this type of DNA analysis. To elucidate this matter, a number of interviews were held with professionals within the criminal justice system. Through the authors’ own networks and the snowballing method, interviews were held with a forensic expert, a SoCO, a forensic advisor, a public prosecutor, a lawyer and a judge. The interviews do not produce a representative picture of how a certain occupational group views the use of mobile DNA technologies in a criminal investigation. The interviews have however yielded a number of interesting insights with respect to the relevant aspects of using mobile DNA technologies. In combination with the legal analysis, this has resulted in six safeguards that are important to observe when using mobile DNA technologies.

A first safeguard to observe is that the public prosecutor must be the requesting authority to decide on using the technology. Under current law, the public prosecutor is the authority that decides in most cases, and certainly during the intelligence investigation, on the use of DNA analysis on the basis of (amongst other sources) Article 151a
paragraph 1 of the Criminal Procedure Code. It is desirable to keep it this way when using mobile DNA technologies. The interviewed public prosecutor formulated this as follows:

“I imagine that when I arrive at the crime scene and a SoCO explains to me what they found and where, and why this is potentially a perpetrator trace, that I will still have some say in the matter as well.”

The public prosecutor will have to decide in each individual case whether the use of mobile DNA technology is lawful. This does not mean that the public prosecutor must always visit the crime scene concerned; consultation by telephone is also possible. The public prosecutor will need to account for his decisions on this point, should the case come to trial.

A second important safeguard when using mobile DNA technologies is that a regulation must be in place containing prescriptions regarding the device used. This regulation could for instance contain technical specifications, the definition of a maximum error margin, and instructions on how to clean the device. Such a regulation would be comparable to a Breath Analysis Regulation or the DNA Sampling in Criminal Cases Regulation. When asked whether it would be useful to implement such a regulation, the interviewed SoCO replied:

“Yes, absolutely. But this will also prove tricky. Many of the people who are deliberating the issue have no understanding of a crime scene investigation, but only think from a policy angle. They don’t look at the optimum way of putting something into practice.”

This ties into a third relevant safeguard, namely to implement a protocol regulating the use of different types of traces for mobile DNA analysis by the SoCO. After all, one type of trace will offer a better chance of successfully obtaining a DNA profile than another trace. It will depend on the minimum amount of DNA that the device requires to generate a profile to determine which types of traces can and which cannot be analysed by mobile technology, and which types of traces may need to be submitted to a forensic laboratory. It is therefore essential to develop an evidence-based decision-making protocol for the mobile analysis of DNA traces.

A fourth important safeguard is that SoCOs should receive additional training in how to use the device in practice. The interviewed judge, when asked whether he believed that a SoCO should be permitted to use the device, replied:

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7 In some cases, this can be the supervising judge, on the basis of Article 195a paragraph 1 of the Criminal Procedure Code. (In Dutch: In sommige gevallen kan dit ook de rechter-commissaris zijn op basis van artikel 195a, eerste lid, van het Wetboek van Strafvordering.)

8 See Article 148 of the Criminal Procedure Code. (In Dutch: Zie hiervoor artikel 148 van het Wetboek van Strafvordering.)
“I think that it should be a SoCO. Or at least someone who is thoroughly aware of all the things that can go wrong.”

Additional training can make the SoCO (more) aware of the potential risks.

In this regard, the interviewed public prosecutor remarked:

“I think that it’s important that the person who inserts the material in the device does so in a proper and reliable manner.”

On the subject of this safeguard, the interviewed forensic advisor made another suggestion:

“There are plenty of SoCOs who also have ancillary tasks. For example, one will concentrate on fire investigations and another examines cars, and so you could have a number of SoCOs who have DNA as their special domain.”

Providing SoCOs with additional training does not mean that they need to follow the full education programme to become a DNA expert, however. The additional training would serve to ensure that they are better equipped to deal with the device and with the results it produces.

A further relevant safeguard is to be able to have recourse to contra-expertise. The interviewed criminal lawyer saw this as an important safeguard:

“That should also really be part of those safeguards. That it can only be done if you know for sure that you’ll have enough material left to also run a second, more extensive test.”

The suspect should not be worse off when mobile DNA technology is used in the investigation. With regard to regular DNA analysis, the suspect – if he is the only known suspect and there is not enough cellular material for a contra-test – is entitled to designate the expert who will perform the DNA analysis. The suspect may not be deprived of this right, only because a mobile DNA technology was used.

Finally, it is important that the situation at the crime scene and the subsequent process are recorded meticulously. It should be possible for all people involved to reconstruct exactly what happened at the crime scene. The reason is that the defence lawyer will...
generally not be involved in the case yet, at the time that the crime scene is investigated. The interviewed criminal lawyer commented on this as follows:

“I insist that, as a lawyer, you need to know what happens at the crime scene with regard to securing forensic traces, and all the decisions that may be made in the process by the SoCOs or experts of the Netherlands Forensic Institute, for instance to secure a trace.”

7.6 Conclusions and Discussion

Under the current legislation, the conclusion regarding the use of mobile DNA technologies by a SoCO is two-fold. On the one hand we can conclude that mobile DNA technologies can be used for identification intelligence purposes without a specific basis in the law. On the other hand, the result of a mobile DNA technology cannot be used as evidence in criminal cases. For the latter purpose, the trace must be handled by a DNA expert and analysed at a designated, accredited laboratory. This impediment could be dispensed by adapting mobile DNA technologies to the current legislation, for example by involving a DNA expert in the DNA analysis at the crime site who is affiliated with a laboratory designated by a general administrative order, and to accredit the mobile DNA technology and its usage procedure. Another option would be to amend the law.

If it were decided to not amend the law with a view to using mobile DNA technologies, and to only use the technology for intelligence purposes, then this would imply duplicate research work if the analysis results are to be used as part of the evidence. After all, in order to use the analysis result as evidence, the trace must be analysed by a forensic laboratory. It should however be noted that the intelligence phase, to identify a perpetrator, and the evidence phase are inextricably linked, to the effect that if a DNA trace turns out to be important for intelligence and results in the identification of a suspect, then this same DNA trace can be equally important for the evidence phase.

Thus, what matters is not so much the specific actions performed in a certain phase; regarding the intelligence phase, what mainly matters is the extent to which the DNA analysis violates a person’s fundamental rights, and regarding the evidence phase, what matters is the thorough regulation of the analysis method. One could argue that the two aspects are important to both the identification and the evidence phase, so that this distinction is actually a bit odd. Therefore, the somewhat more flexible rules that apply for the intelligence phase do not seem practicable for the use of mobile DNA technology, when the result is also required for the evidence phase. In practice, it might therefore be advisable for the criminal justice system to drop this distinction between the two phases, particularly where DNA traces are concerned. Analysing DNA traces is not only important to tracking down a suspect, but also to including or excluding other suspects or people connected to the crime. Both to track down a suspect and to reconstruct the crime, the rapid analysis of a DNA trace may be essential.
Our legal analysis shows that the use of mobile devices for DNA analysis by the police must be attended by the following safeguards: 1) the public prosecutor is the requesting authority, 2) the implementation of a regulation detailing the prescriptions that the device must comply with, 3) implementation of a protocol to regulate the type of DNA traces to be used, 4) SoCOs receive additional training, 5) contra-expertise must remain possible, and 6) the situation at the crime scene and the subsequent process must be recorded meticulously. Naturally, the quality of the technology will always determine which traces can be followed in this process, and it should always remain possible to apply contra-expertise to the secured trace. Another important question pertains to the role of the DNA expert in using these technologies. At present, the DNA expert designates the analyst who will perform a DNA analysis in the laboratory. When using a mobile DNA analysis device, the role of the analyst is actually fulfilled by the device, as the analysis is performed automatically by the device at just a push of the button. The device can also perform part of the profile comparisons, so that, in the future, the DNA expert will not necessarily need to be involved in all profile comparisons.

The device could be calibrated in such a way that it only reports the results of very clear and straightforward comparisons of single profiles, and that it indicates that the obtained profile is not suitable for comparison purposes if the analysis yields an incomplete DNA profile, or a mixed profile without a clear main profile. In that case the results could be submitted to a DNA expert.

In this way, the introduction of mobile DNA technologies could result in assigning ‘simple’ DNA analysis tasks to the police. The SoCO who operates the device will need to learn the relevant new skills, and it might no longer be necessary to involve a DNA expert in this type of DNA analysis. Using the mobile DNA analysis device, and the concomitant interpretation and reporting of results, could become a new specialism within the police forensic department. If the analysis of ‘simple’ traces can be assigned to the police, then it would free up time and capacity at the forensic laboratories for the complex, more challenging DNA analyses and profile comparisons. Another option is to have DNA experts and laboratory scientists work decentrally at police forensic departments, under the auspices of an accredited forensic laboratory. In that case the SoCO of the police could work directly alongside the laboratory scientist and/or expert who can rapidly perform the analysis on the spot and in accordance with the legal standards. This would likely do away with many of the legal constraints.

It is clearly necessary to create a clear regulation for the use of mobile DNA technologies, attending both to the manner in which the research should be conducted and to how the evidence and the acquired results can be stored safely. The use of such technologies in practice furthermore depends on the ability to formulate an evidence-based decision-making model with guidelines for subjecting DNA traces to analysis by
a mobile DNA analysis device or by a forensic laboratory. Such a model is under development in a study that is currently underway.

It seems inevitable that mobile DNA technologies will eventually come into use and that they will permanently change the field of forensic investigation. How these technologies will be introduced, and how they will fit into the process of identification for intelligence and prosecution, is still an open question for politicians to consider. Irrespective of the decisions that will be taken, however, it is advisable to create a specific legal basis and to formulate practical guidelines for the use of mobile DNA technologies in the process of identification for intelligence and prosecution.\footnote{On 6 June 2014, the project group ‘Local DNA’ was established to accomplish this. This is a co-creation project by the Police, the Public Prosecution Service, the Netherlands Forensic Institute and the Forensic Science Research Group of the Amsterdam University of Applied Sciences. The goal is to formulate, in consultation with the various system partners, legal and practical guidelines to ensure the safe use of mobile DNA technologies.}

### 7.7 References


