NATIONAL COMMISSION FOR THE FORENSIC USE OF DNA

ACTIVITIES IN 2013

GOBIERNO DE ESPAÑA
MINISTERIO DE JUSTICIA

NATIONAL COMMISSION FOR THE FORENSIC USE OF DNA

ACTIVITIES IN 2013

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FOREWORD

Since the nineteen nineties, the forensic use of DNA has been regarded as a key tool for international cooperation in the struggle against crime and terrorism the world over. The cross-border exchange of information pursued has generated a need to harmonise and regulate the technology involved.

Aware of the substantial contribution that the exchange of the results of DNA profiling may make to criminal investigation, the European Council issued its Resolution of 9 June 1997 on the exchange of DNA analysis results (97/C 193/02).

That resolution acknowledges that the effective exchange of the results of DNA profiling is contingent upon the standardisation of DNA markers. It recognises that further steps toward any such exchange can only be taken when Member States' national databases are operating properly, while stipulating that any such exchange must be limited to the non-coding part of the DNA molecule. The four basic considerations underlying the resolution are as follows.

I. National DNA databases should be structured to common and compatible standards.

II. DNA technology should be standardised via the use of identical DNA markers.

III. Each Member State should establish legal safeguards that define the conditions under which and the offences regarding which DNA analysis results and data may be stored, and that protect the physical integrity of the person concerned.

IV. A network of compatible national DNA databases is to be created to exchange the results of DNA profiling.

Approval of the resolution has fuelled intense national and international efforts to harmonise DNA profiling. Given the significant value of this technology in criminal investigation and the need for further standardisation, two subsequent resolutions were issued. The resolution of 25 June 2001 on the exchange of DNA analysis results (2001/C 187/01) addresses technical issues in connection with DNA-based investigation, such as the use of a minimum of DNA markers, the need to limit DNA profiling to chromosome zones containing no genetic expression, other technical procedures on the exchange of information and additional safeguards. The Council Resolution of 30 November 2009 enlarges on those same issues.

In Spain, one of the primary objectives pursued by the National Commission for the Forensic Use of DNA is to unify the criteria in place in the country's laboratories with a view to meeting the aforementioned requirements and guarantee the safeguards that are imperative for the secure, reliable and effective use of DNA in forensics.

Again this year, I am pleased to report on the activities undertaken by the National Commission for the Forensic Use of DNA, which I trust will be of interest to the reader. I take this opportunity to thank and congratulate the members of all the working groups and experts participating in this endeavour.

22 September 2014

COMMISSION CHAIRMAN

Ricardo Conde Díez

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1. NATIONAL COMMISSION FOR THE FORENSIC USE OF DN

1.1. INTRODUCTION

Yet another year, the Standing Technical Committee conducted and the Plenary approved the accreditation of laboratories compliant with the requirements for performing forensic DNA analyses. This information was uploaded to the Commission's website, accessible on the National Judiciary's portal (https://www.administraciondejusticia.gob.es).

The Standing Technical Committee also drafted recommendations on autosomal STR marker validation and profiling of mixed DNA in forensic genetics, which were raised to the Plenary. In addition, the Committee explored the possibility of cross-matching DNA profiles in the INT-SAIP and INT-FENIX files (genetic databases with criminal significance and of missing persons and unidentified bodies, respectively), and reviewed both laboratory compliance with international standard ISO 17025 and the content and structure of genetics-based expert forensic reports.

The Legal and Bioethics Group, in turn, continued to work in a number of areas, including sample taking in accused and arrested persons, the erasure of DNA profiles and the proposed amendments to Constitutional Act 10/2007 of 8 October on the police database of DNA identifiers.

1.2. MEMBERSHIP

The National Commission for the Forensic Use of DNA conducts its activities through its Plenary or the Standing Technical Committee.

The Plenary consists of a Chair, held by the Director General of Relations with the Judiciary; two Vice-chairs, one filled by the Director of the National Toxicology and Forensic Science Institute and the other by the Secretariat of State for Security's appointed representative; and a number of members. More specifically, the members include representatives of the Judiciary, the State Prosecutor's Office, the National Toxicology and Forensic Science Institute, the National Police Force's Department of Scientific Criminal Investigation, the Civil Guard's Department of Criminal Investigation, the regional police forces in regions with DNA laboratories contributing to the police database of DNA identifiers, and experts in the fields of bioethics and genetics.

The Plenary meets at least once per quarter and whenever required to meet its obligations.

The **Standing Technical Committee** is chaired by the Director of the National Toxicology and Forensic Science Institute; its membership includes representatives of all law enforcement body laboratories and one Institute analyst, who heads its Secretariat.

The 21 July 2009 decision establishing the Commission's Rules of Procedure provides for the creation of working groups dealing with specific areas to enhance the efficiency and effectiveness of its activities. The groups created to date are the Scientific-Technical Group, the Group for DNA Database Organisation and Management and the Legal and Bioethics Group.

In light of the scientific and technical nature of the first two groups, and the inter-relationship of their subject matters, they work jointly under the aegis of the Standing Technical Committee chaired by the Director of the National Toxicology and Forensic Science Institute. The Legal and Bioethics Group, in contrast, performs its duties independently with the support of a Coordinator, its Secretary, who liaises with the Standing Technical Committee and the Plenary.

In addition to the aforementioned members, given the complexity of the scientific and technical domains addressed by the National Commission for the Forensic Use of DNA, it may also enlist the participation of DNA laboratory staff as collaborators and advisors for the purposes of criminal investigation, identification of missing persons or the resolution of DNA database issues.

NATIONAL COMMISSION FOR THE FORENSIC USE OF DNA. PLENARY MEMBERSHIP

CHAIRPERSON
Ricardo G. Conde Díez
Director General of Relations with the Judiciary

VICE CHAIRPERSONS
Gloria Vallejo de Torres
Director, National Toxicology and Forensic Science Institute

Francisco J. Vidal y Delgado Roig
Advisor to the Secretariat of State for Security, Ministry of the Interior

MEMBER AND SECRETARY
Antonio Alonso Alonso
Technician, Biology Service, Madrid Department of the National Toxicology and Forensic Science Institute

MEMBERS

SENIOR JUSTICE, MEMBER
Ignacio Acón Ortego
Senior Justice

SENIOR JUSTICE, SUBSTITUTE MEMBER
Jaime Requena Juliani
Senior Justice

PROSECUTOR, MEMBER
Ana Murillo Tapia
Prosecutor

PROSECUTOR, SUBSTITUTE MEMBER
Mª Paz Ramírez Blanco
Prosecutor

BIOETHICS EXPERT, MEMBER
María Casado González
Tenured professor, Philosophy of Law. University of Barcelona

BIOETHICS EXPERT, SUBSTITUTE MEMBER
Ana Victoria Sánchez Urrutia
Tenured professor, Constitutional Law. University of Barcelona

GENETICS EXPERT, MEMBER
Pilar Madero
Managing Director, Centre for Genetic Profiling

GENETICS EXPERT, SUBSTITUTE MEMBER
Rafael Camacho
Fundación Española para la Ciencia y la Tecnología (Spanish foundation for science and technology)

NATIONAL HEALTH SYSTEM EXPERT IN MEDICAL GENETICS AND MOLECULAR PATHOLOGY, MEMBER
José Antonio Lorente Acosta
Genetic Identification Laboratory. University of Granada

NATIONAL HEALTH SYSTEM EXPERT IN MEDICAL GENETICS AND MOLECULAR PATHOLOGY, SUBSTITUTE MEMBER
Ángel Carracedo Álvarez
Director, Institute of Forensic Medicine. University of Santiago de Compostela

FORENSIC PHYSICIAN, MEMBER
Carmen Conejero Guillén
Forensic physician, Toxicology Information Service, National Toxicology and Forensic Science Institute

FORENSIC PHYSICIAN, SUBSTITUTE MEMBER
Natalia Méndez Riera
Toxicology Service, Madrid Department of the National Toxicology and Forensic Science Institute

NATIONAL POLICE FORCE OFFICER, DEPARTMENT OF SCIENTIFIC CRIMINAL INVESTIGATION, MEMBER
María Pilar Allúe Blasco
Chief Officer, Department of Scientific Criminal Investigation

CIVIL GUARD OFFICER, CRIMINAL INVESTIGATION DEPARTMENT
Luis Guijarro Olivares
Chief Officer, Criminal Investigation Service, Criminal Investigation Department
(Through September 2013)

José Antonio Berrocal Anaya
Chief Officer, Criminal Investigation Service, Criminal Investigation Department

ERTZAINTZA REPRESENTATIVE (regional police force, Basque Country)
José María Yurrebaso
Chief Officer, Ertzaintza Scientific Investigation Unit

MOSSOS D´ESQUADRA REPRESENTATIVE (regional police force, Catalunya)
Mª Lourdes Puigbarraca
Chief Officer, Mossos d'Esquadra Scientific Criminal Investigation Division

1.3. DUTIES

The National Commission for the Forensic Use of DNA is assigned executive and advisory duties in the areas of its competence. The former cover responsibilities in connection with laboratories and sample-handling protocols.

Specifically, its duties include:

- accreditation of laboratories authorised to conduct genetic profiling as an aid to criminal investigation and persecution, the identification of bodies and the search for missing persons; and the periodic assessment of laboratory compliance with the official quality controls established by the Commission;
- establishment of criteria for coordinating the aforementioned laboratories and review of the scientific and technical, organisational, ethical and legal factors that ensure that the laboratories contributing to the police database of DNA identifiers follow satisfactory operating procedures;
- drafting and approval of official technical protocols on sample taking, conservation and analysis;
- determination of security requirements for sample custody and the definition of all necessary measures to ensure the strict confidentiality of samples and related analyses and data, further to the existing legislation.

In its advisory capacity, it raises proposals to the Ministries of Justice and the Interior where deemed necessary for the effectiveness of criminal investigation and persecution and the identification of bodies.

Many of the aforementioned tasks are subject to international criteria and standards. Another of the Commission's duties is therefore to cooperate with other countries' authorities responsible for DNA profiling for criminal investigation and persecution, the identification of bodies or body parts and the location of missing persons, without prejudice to the action incumbent upon the Ministries of Justice and the Interior in this connection.

In this same vein, the Commission may also propose the conclusion of agreements with other institutions to conduct accreditation procedures, as well as with laboratories not included in the police database of DNA identifiers.

Lastly, it drafts and submits a yearly report to the Ministries of Justice and the Interior, and drafts and approves the Rules of Procedure to be followed in the exercise of its assigned tasks.

1.4. LOGISTIC SUPPORT

Royal Decree 1977/2008 of 28 November defines its scope as the regulation of CNUFADN structure, composition, organisation and operation. In light of the eminently technical and scientific nature of the Commission's duties and the National Toxicology and Forensic Science Institute's experience, expertise and prestige in forensic genetics, the sole additional provision of that decree stipulates that the Institute is to provide staff and materials as required for the Commission to fulfil its duties. That support is instrumental for holding periodic working group meetings in the Institute's Madrid headquarters, such as the ones held throughout 2013.

The National Toxicology and Forensic Science Institute's website, which hosts the Commission's, is now integrated in the National Judiciary's portal. Hence the documents prepared and

decisions adopted by the Plenary, along with other information on the Commission, can be accessed on https://www.administraciondejusticia.gob.es/.

1.5. PLENARY ACTIVITIES

The National Commission for the Forensic Use of DNA's Plenary adopts decisions and decides on issues submitted to it by the Standing Technical Committee and the Legal and Bioethics Group.

Its Chair maintains relations and communicates with central and regional government bodies and other public and private organisations on subjects within its area of competence.

In 2013 the Commission Plenary held three meetings, in which it debated and adopted the decisions listed below, most of which had been prepared in advance by its working groups.

- Thirteenth session, 7 May 2013, in which the following items were discussed:
  - report on the outstanding issues addressed during the Legal and Bioethics Group's 6/2/2013 meeting (sample-taking standards, erasure of DNA profiles, amendment of Constitutional Act 10/2007, ENAC (national accreditation agency) accreditation of laboratories for civil cases, DNA profile cross-matching between INT-SAIP and INT-FENIX files) and the Standing Technical Committee's (Spanish initials, CTP) 15/03/2003 meeting (compliance with international standard ISO 17025 in civil proceedings, technical working papers (mixed profiles and expert report), analysis of new Y-STR systems, 2013 yearly accreditation survey);
  - content for the CNUFADN 2012 annual report;
  - presentation of the CNUFADN's new website, to be hosted on the National Judiciary's portal.
- Fourteenth session, 17 September 2013, at which the following items were discussed:
  - Legal and Bioethics Group (Spanish initials, GJB) Coordinator's report on the items dealt with in the Group's 11/06/2013 meeting (sample-taking in accused/arrested persons, comparative jurisprudence, profile erasure, proposed amendment of Constitutional Act 10/2007, DNA profile cross-matching between INT-SAIP and INT-FENIX files, CNUFADN report, new CNUFADN website);
  - submission of the Secretary's Report on the results of accreditation and quality assurance assessments in 2013;
  - submission of technical recommendations on autosomal STR marker validation and profiling of mixed DNA in forensic genetics;
  - adoption of the draft CNUFADN Report for 2012;
  - unanimous approval of the Legal and Bioethics Group website content.
- Fifteenth session, 18 November 2013
  - Legal and Bioethics Group Coordinator's report on the items discussed in the Group's 29/10/2013 meeting (information on the most recent CNUFADN Plenary, sample-taking in accused/arrested persons, profile erasure, proposal for amendment of Constitutional Act 10/2007);
  - proposal on genetic profile erasure;

- proposal for amendment of Constitutional Act 10/2007;
- proposal to extend CNUFADN membership to include María Casado;
- Secretary's report on items discussed at the 04/11/2013 meeting.

2. LEGAL AND BIOETHICS GROUP

2.1. CREATION BY THE PLENARY

The 27 March 2009 constitutional Plenary adopted a proposal to create three working groups within the Commission, in addition to the Plenary and the Technical Committee envisaged in RD 1977/2008. These three working groups would deal with technical-scientific, DNA database organisation and management, and legal and bioethical questions. The former two would work under the aegis of the Technical Committee and the third would have its own legal personality and be subject to specific regulations set out in the Commission's Rules of Procedure envisaged in Article 3.i of RD 1977/2008.

The following Plenary, held on 21 July 2009, adopted the Rules of Procedure for the Commission and its working groups. Article 1 of that text structures the Commission around the three aforementioned working groups, with the first two forming part of the Technical Committee. Legal and Bioethics Group membership includes the senior justice, prosecutor and bioethics expert who sit on the Plenary as permanent members (Article 2), along with any other Plenary members expressing an interest in participating or whose presence is requested by the Technical Committee or the Legal and Bioethics Group Coordinator. The foregoing is without prejudice to DNA laboratory staff collaboration and counsel in connection with criminal investigation, the identification of missing persons or DNA databases, as per Article 7 of the Royal Decree.

2.2. REGULATIONS

The most prominent provisions of the regulations governing the Legal and Bioethics Group, which are laid down in the aforementioned Rules of Procedure adopted by the Plenary on 21 July 2009, are listed below.

Article 2, item 4 provides that members may appoint outside advisors in the exercise of their duties, who will nonetheless acquire no rights vis-à-vis the Commission. The names of such advisors must be notified and recorded.

The Legal and Bioethics Group's duties established in Article 3.2 of the Rules of Procedure include the evaluation of the ethical and legal criteria to be borne in mind in connection with the duties described in the preceding item, particularly as regards sample taking, the subject, the type of offence, the use of DNA profiles in databases and data storage and erasure.

Article 4 provides that the Legal and Bioethics Group must designate a Coordinator who will act as Group secretary and liaise with the Standing Technical Committee and the Plenary. The Coordinator is also vested with the power to establish preparatory relations with the authorities in other countries entrusted with these duties.

The Group's operating procedures are set out in Article 5.1, paragraph two, which provides that each working group is to meet with the periodicity determined by its members, as needed to fulfil its duties. The Group Coordinator must send meeting notices, along with the agenda, no less than 10 days in advance, except where he/she identifies a need to convene an urgent meeting. The Coordinator also makes a record of Group decisions, which are adopted by a majority of its members. The Rules of Procedure further specify that any issues not regulated thereby are subject to the provisions of Chapter II, Title II of Act 30/1992 of 26 November on the Regulations Governing Public Administrations and Common Administrative Procedures.

Lastly, Article 6 stipulates that working groups will receive support from the National Toxicology and Forensic Science Institute, which will provide the staff and material resources required to perform their duties. The decision on the Rules of Procedure entered into effect on 22 July 2009.

2.3. MEMBERSHIP (COORDINATOR, MEMBERS AND COLLABORATORS)

In 2013 Group membership included the following persons.

COORDINATOR AND MEMBER - GROUP SECRETARY
Ignacio Acón Ortego
Senior Justice

MEMBERS
Ana Murillo Tapia
Prosecutor

María Casado González
Tenured professor, Philosophy of Law. University of Barcelona

Carmen Conejero Guillén
Forensic physician, National Toxicology and Forensic Science Institute

MEMBER, COMMISSION SECRETARY
Antonio Alonso Alonso
Technician, Biology Service, Madrid Department of the National Toxicology and Forensic Science Institute

SUBSTITUTE MEMBERS
Jaime Requena Juliani
Senior Justice

María Paz Ramírez Blanco
Prosecutor

Ana Victoria Sánchez Urrutia
Tenured professor, Constitutional Law. University of Barcelona

ADVISORS AND COLLABORATORS

SECRETARIAT OF STATE FOR SECURITY, MINISTRY OF THE INTERIOR
José Andradas Herranz
DNA Database Administrator

NATIONAL POLICE FORCE FORENSIC LABORATORIES
Carmen Solís Ortega
Department of Scientific Criminal Investigation, National Police Force

Antonio del Amo
Department of Scientific Criminal Investigation, National Police Force

Pedro Sogo Sánchez
Department of Scientific Criminal Investigation, National Police Force

CIVIL GUARD FORENSIC LABORATORIES
José Mª de las Cuevas Carretero
Criminal Investigation Department, Civil Guard

MOSSOS D'ESQUADRA LABORATORIES
Silvia Planet Robles
Chief Officer, Criminal Affairs, Legal Advisory Service, Directorate General of Police Affairs

ERTZAINTZA LABORATORIES
Pascual Gallego Melero
Scientific Criminal Investigation, Ertzaintza

NOMINATION PROPOSED BY MEMBER MARÍA CASADO GONZÁLEZ
Margarita Guillén Vázquez
Senior Justice and professor with the University of Santiago de Compostela

2.4. GROUP ACTIVITIES: DEBATES AND CONCLUSIONS

The Legal and Bioethics Group held three meetings in 2013, followed by the approval of the respective minutes:

- Minutes of the 06/02/2013 meeting
- Minutes of the 11/06/2013 meeting
- Minutes of the 29/10/2013 meeting

The most significant issues discussed by the group are listed below.

1. **Proposals for reform of the Criminal Procedure Rules: DNA sample-taking in accused/ arrested persons**
2. **Proposals for amendment of Constitutional Act 10/2007/ of 8 October on the police database of DNA identifiers**
3. **Erasure of DNA profiles**
4. **Allowable searches**
5. **CNUFADN and Legal and Bioethics Group membership**
6. **Legal and Bioethics Group content on new CNUFADN website**

2.4.1. PROPOSALS FOR REFORM OF THE CRIMINAL PROCEDURE RULES: DNA SAMPLE-TAKING IN ACCUSED/ARRESTED PERSONS

In 2012 the Council of Ministers created an Institutional Commission entrusted with drafting a proposal to reform the existing Criminal Procedure Rules. Aware of the importance of this legislative reform, the CNUFADN prepared proposals to amend the provisions on DNA profiling in criminal investigations for submission to the Institutional Commission on Reform of the Criminal Procedure Rules. The proposals, drafted by the Legal and Bioethics Group, were adopted by the Commission Plenary on 11 December 2012 (and included in the CNUFADN yearly report for 2012).

Sample-taking in accused/arrested persons was not addressed in the aforementioned legislative proposal. The question was debated in depth by the Legal and Bioethics Group. On the one hand, the legal and bioethics experts stressed the need to comply with Supreme Court case law requiring the presence of legal counsel when accused or arrested persons consent to sample-taking, which is supported by ECHR case law on the subject and legislative trends in other European countries. On the other, the national and regional police force representatives on the CNUFADN and the DNA identifier database Administrator expressed concern over the significant decline in genetic profiling of accused and arrested persons as a result of the application of the criteria laid down in Supreme Court sentence 827/2011 regarding legal counsel.

The Plenary failed to reach a consensus on the matter. That notwithstanding, it unanimously agreed that if the imperative presence of legal counsel is maintained, a distinction must be drawn between the two phases of the process: the arrested persons' consent to sampling, which would call for such presence, and "physical" sample-taking, which would not. In other words, once the person under arrest consents to the sample in the presence of his/her counsel, such counsel need not be present during sample-taking by the respective staff.

2.4.2. PROPOSALS FOR AMENDMENT OF CONSTITUTIONAL ACT 10/2007 OF 8 OCTOBER ON THE POLICE DATABASE OF DNA IDENTIFIERS

Further to a decision adopted by the CNUFADN Plenary, the Legal and Bioethics Group drafted a proposal to amend Constitutional Act 10/2007. The first version proposed the following, among others, as the possible objects of reform:

1. amendment of Article 4 to avoid future limitations;
2. INTCF (Spanish initials for National Toxicology and Forensic Science Institute) and regional police access to the police DNA database (CODIS);
3. profile erasure;
4. "multiple" entries: several entries in the database for the same person, in connection with different offences;
5. CNUFADN operating procedures: strengthening the Commission's role as a benchmark in the use of DNA in both criminal and civil proceedings;
6. inclusion of the catalogue of serious offences drawn up by the CNUFADN;
7. establishment of a specific deadline for effectively informing the person concerned of his/her rights in connection with the inclusion of his/her genetic profile in the database: Article 3.1, last paragraph;
8. amendment of Additional provision 3, for clarification;
9. regulation of allowable searches;
10. access to and erasure of minors' genetic profiles;
11. access to the database containing the genetic profiles of persons for whom a final sentence has been delivered.

The CNUFADN Plenary agreed to continue to review these and other issues for inclusion in a legislative proposal to amend Constitutional Act 10/2007.

2.4.3. ERASURE OF DNA PROFILES

The Legal and Bioethics Group prepared a paper in which it analysed European Council and European Union legislation and compared jurisprudence on the erasure of DNA profiles. The conclusion drawn from this review was that the specific characteristics of the Spanish system, in terms of data access and erasure both, hinder its development. Legislative reform is therefore advisable to harmonise the country's regulations with the legislation in place in other European nations.

The Legal and Bioethics Group outlined the main features of possible reform as follows.

1) To make provision for the entry of the genetic profiles of convicted persons.

- This is an essential objective. The primary problem affecting the Spanish system is that it is based on a record of suspects' profiles, which gives rise to absolute legal uncertainty as regards both access to such records and data erasure.
- Priority should therefore be accorded to the entry of convicted persons' profiles.
- Convict entry would not depend on voluntary consent (as is presently the case for suspects), but would be imposed as an ancillary consequence of their sentence. In other words, convicted persons' profiles would be mandatorily recorded. This would enlarge the database and solve the problems currently arising around the entry of suspects' profiles.
- Such an arrangement would also guarantee that the parties concerned would be fully aware of the inclusion of their profiles in the database and of their rights of access and erasure. When the sentence is delivered, they would be duly notified and hence aware of profile entry.
- It would, furthermore, dispel any doubts about obtaining DNA profiles and ensure the inclusion of conclusive profiles.
- Nonetheless, entry might also be required for serious offences only and only where related to future investigations (such as serious offences against the national heritage or sexual freedom).
- A convict's profile entered when the person was a suspect would be changed to "final" upon sentencing.
- The exact timing of data entry merits some consideration, however, the options being the date of initial delivery of the sentence or the date it becomes final.

2) To maintain DNA profiling for suspects

Initially, profiling would be subject to the suspect's consent, although the possibility of profiling mandated by a court order in the event of serious offences should be studied. The possibility of obtaining "inconclusive" profiles from samples left at the crime scene should also be studied.

The question at issue is the entry of the suspect's genetic profile in the database. Initially, in a "convict" database, entry would be subject to delivery of a sentence. Suspects' profiles would only be subject to comparison to the DNA database for a specific investigation. Another exceptional possibility that might be studied would be entering profiles in the database prior to delivery of the sentence, subject to court authorisation and in certain offences only

3) To establish entry arrangements (priority for convicts and possibility for suspects) that ensure objective and reliable erasure

A number of solutions may be envisaged, such as listed below.

- Convicts' profiles would be erased *ex officio* upon the decease of the suspect or after a certain time lapses after the entry is posted or after a final sentence is delivered. While this would enable the database controller to erase the profile from the database directly after the established period (10, 20, 30 years), it may pose practical difficulties respecting ascertainment of the date of convicts' death or of delivery of final sentences. For that reason, decreeing erasure 40/50 years after entry, irrespective of other circumstances, would constitute a wholly reliable system.

- That notwithstanding, the possibility of erasure at the instance of the party concerned may be considered when the record in the database is deemed unnecessary or unsuitable (e.g., convict decease, erasure of criminal record or pardon). The request would be submitted to the judge or prosecutor, whose resolution would enable the database controller to proceed to erasure.

- Where the entry of suspects' profiles is to be allowed, such profiles must be erased *ex officio* or *ex parte* in the event of absolution or dismissal (for whatsoever reason). That would call for insurance of immediate and effective communication between the judicial authority and the database controller, inclusion in the court proceedings of a record of the entry of the suspect's profile (who must be made fully aware of his/her rights of access and erasure), and immediate and *ex officio* service of notice of absolution or dismissal upon the database.

Where the suspect's profile was entered by court order in the understanding that it is necessary for other investigations, court-ordered erasure must also be allowed when the entry is no longer deemed to be necessary.

Without prejudice to these proposals, the Group deemed that proceedings to establish system interconnection and thereby facilitate profile erasure must be ongoing. In addition, it maintained its proposed reform of the Criminal Procedure Rules whereby the competent judicial authority would be explicitly required to serve notice of court resolutions or other circumstances provided by law that call for the erasure of genetic profiles. The Group further stressed the importance of establishing relations with the General Council of the Judiciary to raise judicial authority awareness of the need to communicate absolutions and case dismissals for the intents and purposes of erasure of DNA profiles.

2.4.4. ALLOWABLE SEARCHES

The Legal and Bioethics Group analysed the doubts arising around the possibility of matching DNA profiles in the INT-SAIP and INT-FENIX files. Despite the separation between the purposes of criminal investigation (INT-SAIP file) and the search for genetic profiles in connection with unidentified bodies and missing persons (INT-FENIX file), the CNUFADN Plenary, acting on a Group proposal, adopted the following decisions.

- The DNA profiles of unidentified bodies can be cross-matched with the profiles of accused and arrested persons, as well as with the DNA profiles from samples of biological evidence obtained at crime scenes, with a view to identifying the bodies of persons involved in offences (cross-matching with suspects), as well as to identifying possible murder scenes in which the body was subsequently hidden elsewhere (cross-matching with biological evidence).

- The cross-matching of DNA from ante-mortem samples (such as a toothbrush furnished by a missing person's family) with the DNA profiles of suspects or accused persons or

the DNA profiles from samples of biological evidence obtained at the scene of a crime must be subject to family members' duly informed and written consent.

2.4.5. CNUFADN AND LEGAL AND BIOETHICS GROUP MEMBERSHIP

Acting on a Legal and Bioethics Group proposal, the CNUFADN Plenary agreed, at its 18 November 2013 meeting, to "*submit a proposal for reform of Royal Decree 1977/2008 of 28 November to the Ministries of Justice and the Interior to include representatives of the National Prosecution Service and the General Council of the Judiciary as Plenary and Legal and Bioethics Group members; and to include a General Council of Advocates representative as advisory member of the Legal and Bioethics Group only. The inclusion of a Spanish Data Protection Agency representative is deemed inappropriate, without prejudice to requests for reports from that institution where relevant. Until such time as the Royal Decree is amended, the aforementioned representatives may be invited to take part in Plenary or Legal and Bioethics Group activities.*"

The rationale behind this agreement is the increase in the number of eminently legal issues to be addressed by the Commission, whose resolution involves the State's highest judicial institutions. These institutions' cooperation is likewise indispensable, primarily to inform the judicial and prosecuting authorities of the issues addressed by the Commission.

2.4.6. LEGAL AND BIOETHICS GROUP CONTENT ON NEW CNUFADN WEBSITE

The CNUFADN's new website, hosted on the National Judiciary's portal (www.administracionde-justicia.gob.es), was presented at the 3 May 2013 meeting of the CNUFADN Plenary.

This website was updated with information on the Legal and Bioethics Group and extended to include further information: the catalogue of offences in which DNA samples may be taken and entered in the database; the data sheet on sample-takin in persons arrested or accused in criminal proceedings; and a compilation of Spanish and European legislation on forensic DNA.

3. STANDING TECHNICAL COMMITTEE

The National Commission for the Forensic Use of DNA's Standing Technical Committee was created to propose scientific and technological research criteria, as well as to raise proposals to the Commission on the criteria for laboratory accreditation further to Article 3.a) of RD 1977/2008. More specifically, it designs accreditation systems and the official quality controls required of DNA laboratories contributing profiles to the police database of DNA identifiers.

The Standing Technical Committee is chaired by the Director of the National Toxicology and Forensic Science Institute. Its membership includes representatives of law enforcement body laboratories and an analyst appointed by the National Toxicology and Forensic Science Institute, who also assumes the role of secretary.

Moreover, at its 21/07/2009 meeting, the National Commission for the Forensic Use of DNA Plenary approved the Rules of Procedure for and created three working groups that reflect the Commission's three lines of action: science-technology, DNA database organisation and management, and legal and bioethics issues.

The scientific and technical nature of the first two groups and their overlapping areas of action informed their joint operation under the aegis of the Standing Technical Committee.

The Scientific-Technical Working Group and the Working Group on DNA database organisation and management are entrusted with the duties assigned to the National Commission for the Forensic Use of DNA in Article 3 items a), b), c), d) and e) of the Royal Decree on its composition and *modus operandi*. The areas covered include the taking of biological samples; laboratory accreditation; genetic markers and profiling; DNA database organisation, management, security and effectiveness criteria; and cooperation with the authorities in other countries responsible for DNA profiling geared to criminal investigation and persecution, the identification of body parts or the ascertainment of the whereabouts of missing persons.

3.1. MEMBERSHIP AND ACTIVITIES

DEPARTMENT OF SCIENTIFIC CRIMINAL INVESTIGATION, NATIONAL POLICE FORCE
Lourdes Prieto Solla
DNA Laboratory, Department of Scientific Criminal Investigation

Carmen Solís Ortega
Chief Inspector and Chief Analytical Coordination Officer, Department of Scientific Criminal Investigation

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In 2013, the representatives of the official laboratories with seats on the Standing Technical Committee (Spanish initials, CTP) held four face-to-face working meetings at the National Toxicology and Forensic Science Institute's Rozas headquarters, as recorded in the minutes listed below:

- Minutes of the 15/03/2013 meeting
- Minutes of the 17/06/2013 meeting
- Minutes of the 08/07/2013 meeting
- Minutes of the 04/11/2013 meeting

The most significant matters addressed by the CTP in 2013 were as follows:

1. **laboratory accreditation**, with the fourth national quality assurance and accreditation assessment of forensic genetics laboratories, involving a review of the certificates earned in the official (Spanish- and Portuguese-Speaking Working Group of the International Society for Forensic Genetics, GHE-ISFG, and German DNA Profiling, GEDNAP) proficiency trials and the scope and status of each laboratory's ISO 17025 certification
2. **recommendations on the validation and interpretation of mixed DNA profiles**
3. **report on the possibility of requiring mandatory compliance with international standard ISO 17025 of all laboratories rendering services to criminal and civil courts of justice, in response to a CNUFADN Plenary request**
4. **recommendations on the content and structure of forensic genetics expert reports**
5. **award of two European projects, Improving DNA Data Exchange (IDNADEX) and National Network for Exchange & Management of DNA Match Information (NETDNAMATCH)** to improve the discrimination power of DNA profiling and DNA database match handling

3.2. FOURTH YEARLY ASSESSMENT OF FORENSIC GENETICS LABORATORY QUALITY ASSURANCE AND ACCREDITATION

Further to:

- Article 8 of Royal Decree 1977/2008 on the regulation of DNA laboratory assessment procedures

- the 21/07/2009 decision adopted by the CNUFADN on laboratory accreditation and quality control
- Council Framework Decision 2009/905/JHA of 30 November 2009 on Accreditation of forensic service providers carrying out laboratory activities

(http://eur-lex.europa.eu/LexUriServ/LexUriServ.douri=OJ:L:2009:322:0014:0016:ES:PDF)

In 2013, the Standing Technical Committee conducted its fourth yearly campaign to collect quality assurance and accreditation documents of forensic genetics laboratories servicing the Central Administration. Laboratory were requested to furnish identification details, areas of application, certificates of participation in quality controls and status of their accreditation. The purpose of this campaign was to determine the degree of laboratory compliance with the CNUFADN Plenary's 21/07/2009 decision on accreditation and quality control.

The documents received from 15 public and 4 private laboratories were reviewed in two monographic CTP meetings, in which each laboratory's external quality audit results for 2012 were analysed, along with certificates attesting to the status and scope of their ENAC accreditation.

The findings for the public laboratories showed that:

- fifteen laboratories were CNUFADN-decision compliant.

The findings for the private laboratories showed that:

- three laboratories were CNUFADN-decision compliant (limited to certain applications in some cases)
- one laboratory was not compliant with the CNUFADN decision, inasmuch as it had not been accredited to international standard ISO 17025.

The list of laboratories meeting the CNUFADN requirements on accreditation and quality control in 2013 was drawn up and the respective certificates were issued for each of the 18 compliant service providers.

The laboratories accredited in 2013 are listed in Annex I and on the CNUFADN website:

http://tinyurl.com/ngkrcwo

3.3. RECOMMENDATIONS ON THE VALIDATION AND INTERPRETATION OF MIXED DNA PROFILES

In 2013 the CTP also furthered preparation of a document containing general recommendations on autosomal STR validation and profiling of mixed DNA for forensic use. The areas addressed include:

- accreditation and quality assurance criteria
- recommendations for intra-laboratory validation studies
- negative controls for contamination and characterisation of drop-in
- criteria for profiling and interpreting mixed DNA samples
- statistical assessment
- expert report.

The document was adopted at the 08/07/2013 CTP meeting and by the CNUFADN Plenary at its meeting held on 17/09/2013.

The text is reproduced in ANNEX II and on the CNUFADN website:

http://tinyurl.com/lztbh5l

3.4. REPORT ON THE POSSIBILITY OF REQUIRING MANDATORY COMPLIANCE WITH INTERNATIONAL STANDARD ISO 17025 OF ALL LABORATORIES RENDERING SERVICES TO CRIMINAL AND CIVIL COURTS OF JUSTICE

The CTP, acting on a CNUFADN Plenary proposal and in response to a query lodged by the University of the Basque Country (UPV) on whether or not accreditation to ISO 17025 is mandatory for laboratories analysing DNA for civil proceedings, explored the issue from a technical perspective. It concluded that technologically and scientifically speaking, forensic DNA services, be they for civil or criminal proceedings, should meet the highest quality assurance standards and hence be rendered by EN ISO/IEC 17025-compliant laboratories.

The CNUFADN recently endorsed that opinion, with its approval of the "Recommendations on genetic identification studies in cases of illegal adoptions and abduction of new-born babies", which states that genetic material should be analysed by forensic genetics laboratories whose procedures have been validated and accredited to European and international standard EN ISO/IEC 17025.

3.5. RECOMMENDATIONS ON THE CONTENT AND STRUCTURE OF EXPERT FORENSIC REPORTS

In 2013 recommendations were also drafted for reporting forensic genetics results, covering the following items:

- international recommendations and standards issued by accreditation bodies and international forensic genetics associations
- structure and format of the expert report
- reporting results (preliminary and genetic analyses)
- assessment of results (preliminary analyses, assessment of matches for criminal investigations, assessment of DNA database matches, inclusion/exclusion assessment in family relationship studies).

A discussion document on these questions is planned for 2014 to be raised to the GJB and subsequently to the CNUFADN for adoption by the Plenary.

3.6. AWARD OF TWO EUROPEAN PROJECTS TO IMPROVE THE DISCRIMINATION POWER OF DNA PROFILING AND DNA DATABASE MATCH HANDLING

In 2013 the laboratories represented on the CTP were awarded two projects by the European Commission's DG Home Affairs under "Prevention of and Fight Against Crime", a subsidy subprogramme that forms part of the "Security and Safeguarding Liberties" programme.

http://tinyurl.com/pgj3kju

These two projects and the activities conducted in 2013 are summarised below.

- **IDNADEX: Validation of a 21 STR-DNA system covering ESS and CODIS loci to improve DNA data exchange compatibility among national DNA Databases** (HOME/2011/ISEC/AG/PRUM/4000002125)

A validation system was proposed for profiling with 21 STR markers, including the loci in the new European ESS and the U.S. CODIS standards. This technological development would improve data exchange among Member States' national DNA databases (10 million profiles in Europe in 2011, 200 000 of which in Spain's DNA database) and with the United States.

The activities carried out in 2013 are summarised below.

- Studies (analytical threshold, sensitivity studies, stochastic threshold, stutter threshold, peak height ratio/heterozygote balance, DNA concordance, mixture and specificity studies) were conducted to validate prototypes for two kits covering the STRs in the European and U.S. CODIS standards. More specifically, one of the prototypes, developed by Life Technologies, is designed to simultaneously analyse 24 loci (21 STRs, AMEL and two Y-chromosome loci, Y Indel and DYS391). The other, a Promega prototype, accommodates the simultaneous profiling of 27 STRs (23 autosomal, 3 Y-chromosome and the AMEL locus).

- Madrid Department Biology Service analysts were trained to used the following software applications: 3500 Data Collection v 2 Instrument and GeneMapper IDX 1.4 Analysis.

- Scripts were developed for the automatic export of DNA profiles edited with GeneMapper IDX software to the LIMS system using the Labstation module.

- A specific LIMS module was developed to generate consensus profiles and automatically exchange DNA profiles between LIMS and the CODIS system using a tool designed to generate CMF 3.2 files.

- **NETDNAMATCH: National Network for Exchange & Management of DNA Match Information** (HOME/ISEC/2011/AG/4000002574)

This inter-operability project would automate national DNA database profile match communication and management via the import and export of standardised CODIS and LIMS (Laboratory Information Management System) files and reports among the LIMSs of the five institutions participating in the project (National Toxicology and Forensic Science Institute; Department of Scientific Criminal Investigation, National Police Force; Criminal Investigation Service, Civil Guard; Scientific Criminal Investigation Unit, Ertzaintza; and the Regional Government of Catalonia's Directorate General of Police, Mossos d'Esquadra). In compliance with Constitutional Act 15/1999 of 13 December on Protection of Personal Data, the system uses a high security network.

Although the contract for ICT services was concluded in 2013, an extension on the start date had to be requested due to bureaucratic difficulties around the distribution of the budgetary items among the institutions concerned. The official project start date was ultimately established at 15 October 2013.

- SmartRank: a likelihood ratio software for searching national DNA databases with complex DNA profiles

Moreover, in 2013 a Monopoly Programme research project was also awarded under the title: "SmartRank: a likelihood ratio software for searching national DNA databases with complex DNA profiles".

The start date for the project, with participating laboratories in The Netherlands, Belgium, Norway, France, Italy and Spain, is scheduled for January 2015. Further information on the project can be obtained on the following web page:

http://tinyurl.com/k27266f

4. ANNEXES: DECISIONS ADOPTED AND DOCUMENTS APPROVED

4.1. ANNEX I: LIST OF LABORATORIES COMPLIANT WITH THE CNUFADN DECISION ON ACCREDITATION AND QUALITY CONTROL

- **Laboratorio de ADN de la Comisaría General de Policía Científica (Madrid)**
- **Laboratorio Territorial de Biología / ADN de la Jefatura Superior de Policía de Andalucía Occidental (Seville)**
- **Laboratorio Territorial de Biología / ADN de la Jefatura Superior de Policía de Andalucía Oriental (Granada)**
- **Laboratorio Territorial de Biología / ADN de la Jefatura Superior de Policía de Cataluña (Barcelona)**
- **Laboratorio Territorial de ADN de la Jefatura Superior de Policía de la Comunidad Valenciana (Valencia)**
- **Laboratorio Territorial de ADN de la Jefatura Superior de Policía de Galicia (A Coruña)**
- **Servicio de Criminalística de la Guardia Civil. Departamento de Biología (Madrid)**
- **Laboratorio de Genética Forense. Unidad de Policía Científica de la Ertzaintza. (Erandio, Vizcaya)**
- **Laboratorio de Análisis de la División de Policía Científica. Mossos de Esquadra (Sabadell, Barcelona)**
- **Instituto Nacional de Toxicología y Ciencias Forenses. Servicio de Biología. Departamento de Madrid**
- **Instituto Nacional de Toxicología y Ciencias Forenses. Servicio de Biología. Departamento de Barcelona**
- **Instituto Nacional de Toxicología y Ciencias Forenses. Servicio de Biología. Departamento de Sevilla.**
- **Instituto Nacional de Toxicología y Ciencias Forenses. . Sección de Biología. Delegación de La Laguna.**
- **Instituto Universitario de Medicina Legal. Servicio de Genética Forense. Universidad de Santiago de Compostela (A Coruña)**
- **Navarra de Servicios y Tecnologías, S.A. (NASERTIC) (Villaba, Navarra)**
- **Citogen S.L. (Zaragoza)**
- **Genomica S.A.U. (Madrid)**
- **Neodiagnostica S.L. (Lleida)**

National Commission for the Forensic Use of DNA
Approved in Madrid on 18 November 2013

4.2. ANNEX II: RECOMMENDATIONS FOR AUTOSOMAL STR VALIDATION AND PROFILING OF MIXED DNA IN THE FIELD OF FORENSIC GENETICS

The analysis and interpretation of DNA based on STR profiling has undergone significant technical standardisation. A number of international institutions and bodies are working toward this goal, issuing recommendations and guidelines that play an essential role in forensic laboratories' routine work. Many of the technical standards in question have been compiled by the CNUFADN's Standing Technical Committee.

http://tinyurl.com/mdaacz5

Nonetheless, even today certain features of genetic profiling for forensic purposes constitute a genuine challenge for the forensic community. One such area is indisputably the interpretation and evaluation of autosomal STR profiling in mixtures. Scientific and standardisation working groups have published recommendations and guidelines addressing the analysis and assessment of such profiles. A short list of such publications follows.

– *International Society for Forensic Genetics (ISFG)*

  http://tinyurl.com/l2etnfz

  http://tinyurl.com/p34dxpk

– *Scientific Working Group DNA Analysis Methods (SWGDAM)*

  http://www.swgdam.org/Interpretation_Guidelines_January_2010.pdf

– *Technical UK DNA Working Group*

  http://www.fsigenetics.com/article/S1872-4973(07)00115-9/abstract

– German Stain Commission

  http://www.gednap.forensischegenetik.de/GEDNAP_en/Information/MixedStainsSCrec.pdf

– *National Institute of Standards and Technology (NIST)*

  http://www.cstl.nist.gov/strbase/mixture.htm

Establishing a single guide for interpreting mixed profiles is not easy. Laboratory methodology, the apparatus, kit and software used, as well as the decision-making reflected in each laboratory's operating procedures may result in different interpretations of a given mixed profile. Exercises organised by the Spanish- and Portuguese-Speaking Group of the ISFG (GHEP-ISFG) have revealed variability in different laboratories' findings for the same mixtures.

http://www.gep-isfg.org/es/comisiones-trabajo/ejercicio-colaborativo-ghepmix-2009/

http://www.gep-isfg.org/es/comisiones-trabajo/ejercicio-colaborativo-ghepmix-2010/

http://www.gep-isfg.org/es/comisiones-trabajo/ejercicio-colaborativo-ghepmix-2011/

Despite that difficulty, the establishment of certain minimum interpretation criteria is believed possible and stressed in the guides and recommendations in place. Their implementation would delimit acceptable quality in mixed profiles and define unique and objective intra-laboratory criteria that would contribute to standardisation.

In keeping with the lines laid down by other European scientific groups, the present document aims to establish certain basic and general recommendations for interpreting mixed profiles delivered by autosomal STR markers. This is not a static document, for the ongoing change and progress that characterises this field will indisputably call for subsequent updating. The information set out hereunder is supplemented by two annexes: Annex I contains a detailed bibliography

on the analysis, evaluation, validation and interpretation of mixed DNA, while Annex II describes some of the terms that constitute a necessary complement to the text.

Recommendation 1: accreditation and quality assurance

Laboratories that interpret mixed genetic profiles should ensure that both the method for analysing the DNA fragments used to detect the existence of a mixture and the procedure deployed to interpret such profiles are accredited by the National Accreditation Agency (ENAC) to Spanish, European and international standard UNE-EN-ISO/IEC 17025.

As part of the activities geared to establishing the quality assurance described in that standard, laboratories should participate in comparison exercises to verify their working procedures and systems when processing and evaluating mixed profiles. The exercises organised by GHEP-ISFG and GEDNAP include mixtures. Laboratories that routinely analyse mixed profiles should attain satisfactory results in exercises involving this type of samples.

Moreover, the analysts responsible for evaluating and interpreting mixed genetic profiles must be duly qualified, able to identify artefacts and have a full command of the procedures, analytical strategies, guides and recommendations to be used. They must also be conversant with the statistical evaluation of the results.

Recommendation 2: intra-laboratory validation

Laboratories should validate their own allele assignment methods to establish the reference threshold values for a series of parameters that can then be used to define objective criteria for drawing final conclusions on mixed profiles.

The general guidelines on method validation in genetic profiling published by the scientific groups listed below address some of the requirements in this area that may serve as grounds for laboratories when performing their own validations.

– *European Network Forensic Science Institutes* (ENFSI)

  http://tinyurl.com/mx6v8cb

– *SWGDAM*

  http://swgdam.org/SWGDAM_Validation_Guidelines_APPROVED_Dec_2012.pdf

– *DNA Advisory Board* (DAB)

  http://tinyurl.com/koks6k4

The recommendations laid down by the NIST specifically for validating the methods used for analysing mixed profiles may prove to be particularly helpful.

http://www.cstl.nist.gov/strbase/validation.htm

At least the following parameters must be included.

- **Analytical threshold, AT**

This is the value (in relative fluorescent units, rfu) defined by the laboratory as a reliable cut-off for noise: any peak exceeding the threshold is deemed to be attributable, not to noise, but to the existence of real alleles (after ruling out other types of artefacts).

- **Stochastic threshold**

This threshold defines the non-existence of stochastic effects that may be generated by insufficient quantities or quality of the genetic material furnished by any of the mixture donors, due to the presence of inhibitors, the degeneration of samples or the paucity of DNA. It provides laboratories with guidance on the value above which it is reasonable to assume no allele drop-out. In mixture interpretation, the additional effect of allele overlapping should be borne in mind.

- **Stutter threshold**

While stutter peaks do not usually pose interpretation problems in single profiles, their presence renders the interpretation of mixtures more complex. This threshold, estimated as a percentage (%) of the main allele, defines the peak height value (in rfu) above which a peak can be reasonably classified as an allele and not stutter. Peak height values below the established stutter threshold should be ruled out as alleles or not, depending on the overall evaluation of the genetic profile, as well as any case precedents.

- **Peak height ratio**

Via in-house validation of their analytical and DNA fragment detection methods, laboratories should estimate the ratio of the peak height of the lowest quantity allele to the peak height of the highest quantity allele at heterozygous STR loci. Based on these data, the threshold below which the presence of a mixture is deemed possible should be established, depending on the rest of the genetic markers analysed and the evaluation of other parameters.

Laboratories may on occasion modify their operating procedures, changing instrumental analysis or detection parameters, using new markers or kits, replacing analytical software or modifying amplification strategies. In light of the complexities involved in interpreting some types of mixed profiles, when implementing such new procedures, laboratories should consider the need to validate the parameters that may be affected or altered by the changes.

Recommendation 3: negative controls for contamination and characterisation of drop-in

Some mixed profiles, such as those with low level or low template DNA (i.e., with components very near the LDT or limit of detection threshold), exhibit particular complexity. Such profiles are often subject to stochastic effects that result in allele drop-out or drop-in. Analytical effectiveness declines in these cases and the variability of results attributable to chance rises.

The use of negative controls is especially necessary in mixture profiling where some DNA component is suspected to be present in sub-optimal amounts. Certain types of contamination can be detected with that procedure, thereby precluding unreliable results.

The use of a database with the genetic profiles of the persons involved in the various phases of the process is also very helpful for comparing the genetic profiles obtained in mixtures and ruling out the possibility of artificial generation of mixed DNA in the laboratory itself.

The quality of the consumables used in the laboratory is another critical factor, for this material may be a source of contamination. The use of DNA-free fungibles is recommended.

Lastly, laboratories should estimate the drop-in levels in their analyses. This calculation may be based on the frequency with which false alleles appear in negative extraction controls [Gill et al., 2000].

The foregoing is dealt with in detail in a paper published by ENFSI and available on:

http://tinyurl.com/kkt28et

Recommendation 4: analysis and interpretation of genetic profiles

Decision-making in connection with a given mixture initially calls for defining the profile analysed, as far as possible. Laboratories should establish ways t classify mixed profiles that can be applied to the profile at issue. Further to the thresholds established for the parameters validated (Recommendation 2), laboratories should design a standardised operating procedure with the steps to be followed to define profile categories for subsequent interpretation. The ISFG guidelines in this respect, available on the following URL, are highly recommended:

http://tinyurl.com/l2etnfz

In the context of forensic casuistry and for the purposes of confirmation, laboratories should evaluate the reproducibility and repeatability of their results whenever possible, the complexity of the mixture permitting.

The findings and information deriving from other analyses conducted on the sample, such as preliminary tests that may provide guidance on the nature of the constituent fluids, microscopic analysis or DNA quantification, should be used to interpret and evaluate genetic profiles, particularly where mixtures are involved. Evaluations of this nature are of particular importance when the mixed profile is the result of sexual assault, for in such situations new variables (such as vasectomised or azoospermic individuals) appear that may have a heavy impact on the final evaluation and interpretation of the mixture.

Autosomal STR markers are recommended in mixture profiling, while the use of mitochondrial DNA (mtDNA) is not, for errors may be generated in the final interpretation of the results by factors such as donor proportions, type of fluids constituting the mixture or the methodology applied.

The use of Y-STR markers is highly recommended for mixtures in which the presence of both male and female components is expected.

Recommendation 5: independent assessment

Laboratories should ensure the objectivity of the final evaluation of a genetic profile, and specifically a mixed profile. Mixtures should, then, be evaluated independently and the analysts involved uninfluenced by the knowledge of the genetic profiles of the reference samples to which the profile analysed is to be compared.

Laboratories should establish operating procedures able to ensure that mixture profiles are evaluated independently of any information on or evaluation of the genetic profile obtained from other samples involved in the case or any reference samples used for comparison. Therefore, knowledge of the genetic profile of other questioned or reference samples should have no effect on problem mixture profiling.

Similarly, as far as possible, profile evaluation should not be influenced by analysts' knowledge of data that are not relevant to the assessment (such as witnesses' accounts or the suspect's motives, history or statement).

Recommendation 6: Statistical evaluation of mixed profiles

When, further to laboratory criteria, the reference and (mixed) problem samples are found to (wholly or partially) match, that match must be statistically tested and the results included in

the experts' report. The two parameters that forensic laboratories tend to apply are RMNE (random man not excluded) and the likelihood ratio (LR).

The International Society for Forensic Genetics (ISFG) recommends the use of the latter (LR), calculated from the formulas proposed by Evett et al. (1991) and Weir et al. (1997). This statistical approach jointly assesses the hypotheses put forward by the parties concerned in the judicial proceeding (prosecution and defence). The report issued must specify the hypotheses adopted to calculate the LR. Laboratories should bear in mind that on occasion, upon the request of any of the parties and depending on the circumstances, more than one LR may have to be calculated based on different sets of alternative hypotheses.

In mixed profiles where the presence of stochastic effects is suspected, that may give rise to allele drop-out or drop-in, laboratories should consider the use of LR calculations that include estimates of drop-out (Pr(D)) and drop-in (Pr(C)) probability, further to ISFG (Gill et al., 2012) recommendations.

Software tools that can be accessed on the ISFG website (http://www.isfg.org/Software) have been developed to aid in the implementation of these probabilistic models. Moreover, training initiatives are underway in the framework of the Euroforgen project, subsidised by the European Union's Seventh Framework Programme (http://www.euroforgen.eu/).

The numerical value obtained for the LR must be explained simply and accurately in the body of the expert report to enable the court to clearly understand the significance of that statistic.

The report should also indicate the population database, as well as the formulas and software used for the statistical calculations. Where the aim is to evaluate evidence in the context of the Spanish population as a whole with a view to standardising the LR value, the use of updated allele frequencies for the Spanish population contained in the CNUFADN's reference scientific publications is recommended.

http://tinyurl.com/lztbh5l

Recommendation 7: Reporting results

Both the results and the conclusions drawn must be discussed in the body of the expert report.

When laboratory procedures so stipulate, mixed profiles must be tabled in the report, specifying (as appropriate) the genetic marker or markers for which no allele could be assigned by laboratory procedures.