LAW, ETHICS AND MEDICINE

Spanish public awareness regarding DNA profile databases in forensic genetics: what type of DNA profiles should be included?

Joaquín J Gamero, Jose-Luis Romero, Juan-Luis Peralta, Mónica Carvalho, Francisco Corte-Real

J Med Ethics 2007;**33**:598–604. doi: 10.1136/jme.2006.016998

The importance of non-codifying DNA polymorphism for the administration of justice is now well known. In Spain, however, this type of test has given rise to questions in recent years: (a) Should consent be obtained before biological samples are taken from an individual for DNA analysis? (b) Does society perceive these techniques and methods of analysis as being reliable? (c) There appears to be lack of knowledge concerning the basic norms that regulate databases containing private or personal information and the protection that information of this type must be given. This opinion survey and the subsequent analysis of the results in ethical terms may serve to reveal the criteria and the degree of information that society has with regard to DNA databases. In the study, 73.20% (SE 1.12%) of the population surveyed was in favour of specific legislation for computer files in which DNA analysis results for forensic purposes are stored.

The useful information that genetic information has provided and continues to provide for identification purposes cannot be ignored. The analysis of the polymorphisms of decoded DNA has been found relevant in departments of justice. Such analysis could concern civil trials, as in paternity testing, or criminal trials, where there may be biological traces of the perpetrator of the criminal offence found at the scene of a crime or on the instrument used in a crime. However, the development of this type of test has been significantly influenced by differences between established legal systems.[1]

Regardless of the efficiency of the identification mentioned above, this type of test may present problems or raise questions in Spain and must be carried out with the appropriate respect for basic rights, as well as sufficient technical and legal guarantees. These problems and questions include the following: (a) the extent to which DNA analysis should be obligatory for an individual accused of an offence, when this involves the breach of some of their basic rights; (b) society's perception of the reliability of the techniques and analyses used, as well as the way they are assessed legally; (c) storage of the biological samples of both offenders and victims, the samples obtained in the place of the incident or crime and also the results of the analyses of such samples, thereby creating a database of biological samples, together with DNA profiles.[1–3]

There is general agreement that research into human genetics can affect the community as a whole,[4] and it is therefore necessary for society, and not only scientists, to discuss and decide on what they wish to accept and what they wish to reject.[3] It thus seems clear that there is a need in Spain to examine and define the social and individual interests in question. The International Declaration on Human Genetic Data seems to have included variations in relation to this question.[5] This text points out that data belonging to suspects involved in civil or criminal investigation should be made available during a period of time, unless otherwise stated by the internal legislation of a country (assuming that such internal legislation is compatible with international legislation on human rights). An earlier revised draft of this declaration[11] contains a different version, which states that, in cases relating to forensic genetics, data can be stored only after an individual has been found guilty. This casts doubts over the criteria used for genetic data inclusion in forensic databases currently established in other countries. The text also emphasises the importance, for ethical reasons, of government encouragement to involve society in policy shaping and decision making with regards to the subjects dealt with in The International Declaration on Human Genetic Data (collection, treatment, use and storage of human genetic data as well as management evaluation) (article 6).[5]

This study is an analysis of the opinion of a representative sample of the Spanish population with regard to the circumstances that would justify the inclusion of biological samples and DNA analyses of individuals in a genetic database. The opinion of this population about the need for adequate regulations covering these questions is also taken into account.

Some of the problems that arise due to the lack of specific legislation in Spain are also analysed. Finally, the recent approval by the Spanish Cabinet of Ministers of the Draft Bill for DNA Identifier Databases Managed by the Police (8 September 2006) (http://www.senado.es/legis8/publicaciones/html/textos/A_117-01.html) is taken into account. The differences and similarities between the results obtained and the proposals contained in the text of the draft bill as well as those put forward by other authors are also discussed.

MATERIALS AND METHODS

Once the general aims of the work had been specified and the tasks to be performed had been planned, the following steps were taken: production of an opinion questionnaire and the selection of a homogeneous group of interviewers; selection of a random, cross-sectional sample; purging of non-random errors that do not concern the survey; and analysis and statistical summarisation of the data obtained.

See end of article for authors' affiliations

Correspondence to: Joaquín J Gamero, Dpt Medicina Legal, Faculty of Medicine, University of Cádiz, Plz Fragela s/n, Cádiz 11003, Spain; joaquin.gamero@uca.es

Received 26 April 2006
Revised 22 November 2006
Accepted
28 November 2006

The questionnaire form was chosen to collect the data. This is comfortable for interviewees and is an easy, efficient way of obtaining a great amount of data to be coded and purged. Seven questions were analysed. These were of standard levels of comprehension and, in order to form a homogeneous group of interviewers, the latter were chosen on the basis of a suitable level of education. The sample was chosen using random criteria and by trying to find a cross-section nature in the different sexes and age groups. A stratified survey of the Spanish population was carried out, and 1654 questionnaires were completed. A total of 809 women and 845 men were interviewed, aged 15 years and upwards.

The data collected were stored on a computer and statistically analysed with the Statgraphics Plus 5.1 Version (Manugistics Inc., Rockville, Maryland, USA). We used descriptive statistics initially, classifying and tabulating data in absolute and relative frequency tables, with both simple and double input. Graphic representation provided an efficient means of detecting anomalous data, which were then corrected, as well as being useful for comparing the groups of individuals interviewed. We then calculated the parameters of centralisation, location, dispersion and asymmetry, which allowed us to summarise the information. A χ^2 test was used to analyse the responses by sex, age and professional group, no significant differences having been observed between the type of the answers given when analysed according to age and sex.[6–8]

JUSTIFICATIONS FOR INCLUDING BIOLOGICAL SAMPLES AND DNA PROFILES IN A NATIONAL GENETIC CRIMINAL DATABASE

The European Convention for the Protection of Human Rights and Fundamental Freedoms[9] must be considered in any discussion of the inclusion of biological samples and DNA profile of individuals in a national genetic criminal database. The convention stipulates that the public authorities have no right to interfere in a person's private life except when, in a democratic society, the law itself authorises such actions in the interests of national or public security, crime prevention and public order, among others (article 8). Article 14 prohibits any form of discrimination with regard to the right to benefit from the rights and liberties proclaimed in the convention.[9]

On the other hand, Recommendation No. R (92) 1 of the Council of Europe,[10] concerning the use of DNA analyses and their storage in databases, points out in its fifth principle that any resort to DNA analyses must be authorised in all cases deemed appropriate, no matter how grave the crime may be. However, the eighth principle of the same recommendation is much more restrictive when referring to the incorporation of data obtained from genetic analyses into computerised files: ''[T]he creation and management of all DNA files required by investigation and penal accusation must be regulated by law.''

The eighth principle recognises that the results of DNA analyses must be stored when the individual concerned has been found guilty of serious crimes—fundamentally, crimes against life or against the integrity or health of persons. The Council of Europe[10] also recommends the inclusion of genetic prints when the security of the state is affected.

The International Declaration on Human Genetic Data seems to have included variations in relation to this question.[5] This text points out that data belonging to suspects involved in civil or penal investigation should be made available during a period of time, unless the internal legislation of a country states otherwise (assuming that such internal legislation is compatible with international legislation regarding human rights). The revised draft of this declaration[11] contains a different version, which states that, in cases relating to forensic genetics, data can be stored only after an individual is declared guilty. This places in doubt the criteria used for genetic data inclusion in forensic databases currently established in other countries. The text also emphasises the importance, for ethical reasons, of government encouragement of the involvement of society in policy shaping and decision making with regard to the subjects dealt with in The International Declaration on Human Genetic Data (collection, treatment, use and storage of human genetic data as well management evaluation) (article 6).[5]

The existence of criminal databases unquestionably benefits the control and investigation of crime. However, certain criticism, supported to a great extent by the particular vision of genetic exceptionalism,[12–14] has been aimed at the ethical and social consequences resulting from the inappropriate use of such databases.

In this sense, because of the possibility of extending the criteria of inclusion of DNA profiles in databases, certain authors have expressed concern that any extension might be understood by the population in general as a form of biovigilance, or excessive control of the state over the population.[14–16] Likewise, it is argued that, with the possibility of the police extending their powers with regard to the collection, analysis and preservation of biological samples, such circumstances might be considered disproportionate.[14 16] On the other hand, some authors[14 16 17] have expressed their worries about the possibility, in the not so distant future, of going beyond the limits of codifying DNA for the collection of information relating to criminal investigations—for instance, the possibility that samples collected by the police (with or without consent) may not always be carried out under appropriate conditions with all the guarantees and rights that any individual is entitled to, the uncertainty created when the agencies and institutions responsible for the custody of genetic information in criminal databases are not subjected to strict criteria of confidentiality when it comes to data transmission, and the absence of reliability and validity criteria for the DNA evidence presented in judicial proceedings.[14 16 18 19] Finally, it was also stated that the support of the population was required for those regulations that propose the extension of the criteria for the inclusion of the DNA profiles in databases, or the extension of police powers in the collection and storage of biological samples, as well as their corresponding DNA analyses.

Without such backing, such measures may cause society to distrust the nature of the protection afforded by the legal system and be interpreted as interference in the civil liberties and human rights of the individual.[14 16 20]

Another aspect of the subject must also be pointed out with the same degree of emphasis that is given to the criticism aimed at the inappropriate use of criminal databases. Personal data are subject to automatic collection and treatment during criminal investigations, and most of the rights that support the process tend to be weakened, at least to a certain extent, because of the possibility of friction between the rights of the affected individual (privacy, dignity of the individual, physical and moral integrity, and liberty[21]) and other interests or general rights such as the investigation and prosecution of lawbreaking as well as the security of the state. So Spanish constitutional jurisprudence considers that certain fundamental rights are not absolute.[22]

However, the complementary guarantees or basic rights that must prevail whenever there is friction between individual rights and those of the community are just as important as the limitations or interferences that may exist as a result of other interests that come into play or during criminal investigations and so forth. These guarantees tend to harmonise conflicting interests and rights, thus avoiding the predominance of one over the other.[22]

With regard to the creation of DNA profile databases and the type of crimes for which corresponding DNA profiles should be included in these databases, it is interesting to note the proposals put forward by both Jeffreys[23] and Guillén.[24] This is

irrespective of the later general mention made of the models adopted by various legislatures of the European Union. Guillén[24] proposed that three criteria should be taken into account when creating DNA profile databases: the gravity of the offence, the degree of recidivism and the possibility that biological traces are left at the scene of an offence or crime.

In accordance with the first criterion (the gravity of the offence), the rights of individuals whose DNA profiles are included in a criminal database would be restricted only when the offences are of a specific nature, in line with the general principle of proportionality.[25] The laws of countries such as the Netherlands, Hungary, Norway and Sweden seem to include similar criteria.[26]

The second criterion mentioned by Guillén,[24] the degree of recidivism, deals with the inclusion of only specific types of DNA profile in a criminal database. This policy is supported by the fact that there is a higher degree of recidivism for certain offences than for others that may be more serious. As a result, the list of offences whose corresponding DNA profiles are to be included in a database does not depend on criteria based simply on the number of years of a prison sentence. These circumstances are also included in the laws of France, Finland, Germany and Norway.[26]

A finally, though obvious, criterion to be taken into account in the creation of an efficient DNA profile database is that according to which the DNA profiles included in the databases should come from the biological traces left behind after the perpetration of a crime. The inclusion of an individual's DNA profile in a database would be of little use for identification purposes if no biological traces that would enable DNA profiling were left at the scene of the offence, no matter how grave this might have been.[24]

Guillén[24] recommended that Spain should take into account the aforementioned criteria and the benefits that may be obtained by avoiding, whenever possible, the problems that are entailed in the interpretation of a general law. It would be convenient to establish a list of specific offences that would dissipate any doubts as to which DNA profiles should be included in a DNA profile database in Spain.

On the other hand, Jeffreys' proposal[23] in 2001 referred to the inclusion of all the population of the UK in the country's national DNA profile database (universalisation). Custody of the DNA profiles would be the responsibility of an independent public body and access by the police or other state agencies would be administered by the judiciary. Jeffreys argued that this model might resolve any existing concerns regarding discrimination and privacy which the creation of this type of database tends to cause.

One of the questions that has resulted in discrepancies in different countries at many different levels is the creation of databases containing the resulting information of DNA analyses carried out during criminal investigations, as well as the biological samples used for these analyses.[27–37]

Some European countries have just made, or are drafting, laws to regulate DNA profile databases. In the UK, such databases are made up of samples from all individuals arrested by the police. In countries such as France, Germany and Finland, DNA profiles are stored in a database if individuals are found guilty of committing offences that are included in a specific list. The criterion established in countries such as the Netherlands and Sweden is determined, in the case of convicted offenders, by the potential length of the sentence. However, the criterion used by other countries of the European Union with regard to DNA profile inclusion is based on both the potential length of the sentence and a list of specific offences (Hungary and Norway). Finally, other countries, such as Portugal and Spain, lack specific legislation that includes criteria to determine clearly whose DNA profiles will be included in criminal databases.[1 16 26]

As pointed out previously, the various countries of the European Union differ substantially with regard to the regulations for the collection and storage of the samples and their corresponding analyses in order to obtain DNA profiles.[16] In this respect, as Williams and Johnson[16] pointed out "the important difference between common law and civil law traditions in the European Union, but there is no singular or simple structure to the court systems in jurisdictions which operate either a common law or civil law system" should be mentioned. Therefore, it is often difficult to compare the roles and powers of the court in one state with those of its neighbours, since the various structures and processes have grown and prospered independently of each other.[16 38–40] Such differences both structure and reflect the varying normative and interpretative frameworks within which criminal acts are categorised and responded to across the European Union.[16 40]

However, irrespective of the existing diversity of legislation among the countries of the European Union regarding the collection, analysis and storage of samples and DNA profiles, there is, albeit at different rates, a gradual increase in the incorporation of technology in criminal investigation. The incorporation of technologies has resulted in modified or new regulations in various countries, as well as extensive debate among the executive and members of parliament, the judiciary, advisory bodies, independent commentators and the police about how genetic information should be used in criminal justice processes. The aim is to reach a general agreement on the balance that should exist between public security and the liberty of the individual; such an agreement would then lead to specific laws.[14 16]

In Spain, there is no specific law authorising DNA profile databases. However, Organic Law 15/1999, 13 December (Official State Gazette 14 December 1999:43088–99 http://www.cis.es/cis/export/sites/default/-Archivos/Legislacion/LO_15-1999.pdf), regarding personal data protection, foresees the creation of public administration files that include personal data relating to penal and administrative offences, provided that such aspects are included in the regulations (article 7.5). Likewise, in the restrictions applied to the general data protection rules (Law 15/1999, concerning personal data protection), no reference is made to the principle of proportionality in the case of crime investigation.[25 41] Nevertheless, this principle is included in article 363 of the Criminal procedure rules, modified by Law 15/2003, 25 November (Official Spanish Gazette 283, Wednesday, 26 November; http://www.boe.es/g/es/bases_datos/doc.php?coleccion = iberlex&id = 2003/21538) among others. It has not yet been stipulated anywhere that limitations on self-determination with regard to information or personal data protection should have a legal basis, so that citizens can clearly understand the various aspects and scope of these limitations.

In agreement with the criteria proposed by several authors,[24 42] the aforementioned reform carried out under the auspices of the Organic Law 15/2003 of 25 November should not be defined as a serious and rigorous attempt, from the penal point of view, to plug existing legal loopholes regarding the regulation of the stages involved in the study of DNA profiles. It is, rather, a means of clarifying some specific aspects and was not intended to provide general solutions. A number of questions were left aside.

Despite its complexity, the subject of DNA has not been regulated adequately in Spain.[43] Because of the absence of legislation addressing the specific problems that arise from the use of these tests, decisions have been left to various jurisdictional bodies, with sometimes inconsistent results. No clear and uniform guidelines were produced with regard to this type of biological test, the extraction of samples or body searches when the issue was discussed in the Spanish supreme court or the constitutional tribunal.[44]

The frequent invocation of the Spanish constitution in a decontextualised, ambiguous and disperse way by those whose

intentions are not in keeping with the spirit of the law and justice has caused the loss of certain opportunities regarding evidence and proof during police investigations. It can be claimed that such opportunities have never infringed fundamental rights and have contributed to justice.[45] However, on a few occasions, certain constitutionally relevant questions have been ignored. Outlining the constitutional limits of such proof has resulted in shortcomings and excesses.[42]

In Spain, at least for the time being, there are no regulations which hold the status of law for forensic genetic databases. However, several Ministerial Orders have been drafted in order to regulate the storage and use of DNA profiles and its corresponding samples by National Security Forces. Among them, the Ministerial Order of 26th July 1994 by the Spanish Ministry of the Interior, which regulates the creation and management of electronic DNA files under the responsibility of the National Police Headquarters (Order 1751/2002, 20th June, Spanish Ministry of the Interior; http://noticias.juridicas.com/base_datos/Admin/o1751-2002-int.html). Later, in relation to the above-mentioned regulation of databases, comes the publication of the Order of 18th March 1998 (Official State Gazette of 31st March 1998, p. 10807). This Order regulates the computerized DNA file for the genetic identification of corpses or missing persons, called Fénix, which is kept at the Police Headquarters. (http://www.boe.es/g/es/bases_datos/doc.php?coleccion = iberlex&id = 1998/07417). The appendix to the 1994 Order was newly extended by the Order of 7th March 2000 which regulates the computerized file for the genetic identification of biological traces (ADNIC), kept at the Police Headquarters. Such a file was then used as an aid for the criminal investigations carried out by the Police in the genetic identification of biological traces and the samples determined by the Judicial Authority. The DNA profiles obtained from samples taken from the place of the events or from other related samples (either unknown or anonymous) can then be contrasted with DNA profiles which origin has been established by the Judicial Authority. Likewise the DNA profiles can be contrasted among themselves. (http://www.boe.es/g/es/bases_datos/doc.php?coleccion = indilex&id = 2000/05681&txtlen = 590).

Personal information databases managed by the police and associated with DNA profiles (National Police Headquarters, Order 1751/2002, 20 June, Spanish Ministry of the Interior), are specifically included in two files: ADN—Humanitas and ADN—Veritas (DNA—Humanitas and DNA—Veritas).

The objective of the first file (DNA—Humanitas) is the identification of human remains of victims of crimes and natural catastrophes as well as the identification of missing corpses by means of the analysis of the DNA extracted from those remains.

The function of the DNA—Veritas file is to aid justice administration in the persecution of crime by the genetic identification of biological remains collected during the investigation of alleged crimes.

However, reading of the ministerial orders that regulate the storage and use of DNA profile files and their corresponding samples by the state security forces show that any expectations that such norms might be raised to the rank of law have not been satisfied. Neither the principle of juridical security nor that of proportionality has been preserved by the regulation of such matters.

Finally, the recent approval of the Draft Bill for DNA Identifier Databases Managed by the Police is directly related to the need for a regulatory framework holding the status of law for criminal DNA databases. http://www.senado.es/legis8/publicaciones/html/textos/A_117-01.html). This bill depends on the report of the General Council of the Judiciary as well as the National Data Protection Agency, whose fundamental objective, according to the reasons given for the bill, is none other than to rectify the deficiencies observed in the Criminal Prosecution Law, modified by Law 15/2003, 25 November (Official State Bulletin 283). Rectification is to be carried out by means of the creation of a database in which are stored files managed by the state security forces, containing DNA analysis identification data obtained during the identification of a corpse or the search for a missing person.

Should the draft bill come into force, the structure of the DNA profile databases managed by the state security agencies would be modified. The problems generated by the application of the current ministerial orders that regulate the use and storage of DNA profile files and their corresponding samples by such security agencies may also be minimised.

Regarding the DNA profiles that are to be included in a criminal DNA database, article 3 of the draft bill stipulates that the following data shall be included in the police databases:

- the identity data extracted from the DNA taken from samples or fluids which, in the context of criminal investigation, are found or obtained from suspects, detainees or accused when grave crimes affecting the life, freedom, sexual freedom, or property (with violence) are involved, as well as in cases of organised delinquency;
- The identity data extracted from the DNA obtained during the identification of corpses or the search for missing persons;
- identity data obtained from DNA when the individuals affected give their consent.

RESULTS

With regard to the creation of databases for the DNA analyses of samples of biological material, one of the models that might be used to achieve maximum efficiency in criminal investigation[3 23] is determined by the general analysis of the population, albeit without consent, as well as the preservation of all biological remains taken from the scene of a crime. When the interviewees were asked about the necessity for a national database to include forensic DNA analyses and samples of all citizens without obtaining their consent, 57.4% disagreed (42.6% agreed) with the need for such a database. Differences by professional group were significant ($p<0.05$). Only 26.0% of the interviewees working in the field of law showed support for a national DNA databank for all citizens without their consent, followed by ''other'' professions (32.1%), professions involved in the health sector (38.2%) and those involved in local and national security and law enforcement (41.4%).

On the other hand, opposition decreased to 47.6% (versus 42.3% who considered such a measure acceptable) when the surveyed population was consulted about the need to create a national database, for forensic use, of *specific groups of non-consenting individuals who repeat the same offence, of whatever nature or gravity*. When this question was analysed according to professional group, the differences were again significant ($p<0.001$).

The great majority (79.9%) of the surveyed population agreed with the possibility of storing the DNA profiles of recidivist offenders found guilty of committing crimes against the lives, integrity and safety of citizens. The differences observed between professions were again quite evident. Great differences were observed between the replies given by local or state security forces and by those involved in the law. While 24.1% of legal professionals opposed the inclusion of genetic data of recidivist offenders found guilty of committing serious crimes against the life, integrity or security of citizens, only 0.7% of professionals working in local or state security opposed inclusion. Figures for opposition among other professions included 8.1% in the health sciences and 10.2% in other professions.

When the interviewees were questioned about the source of DNA profiles that should be included in the databases, the highest approval was for biological samples found at the scene of an unsolved crime (75.8%), from persons condemned in court for having intentionally committed a crime (72.0%), from unidentified corpses (71.7%) and from persons who voluntarily supply such samples (65.0%). When the answers were analysed according to professional group, homogeneity in the answers was observed in the cases of biological samples being taken from the scene of an unsolved crime ($p = 0.700$), from an unidentified corpse ($p = 0.202$), from victims of unsolved crimes ($p = 0.057$), and from citizens who voluntarily give samples ($p = 0.066$). The highest percentages indicating support for the inclusion of all the different proposed groups in databases were found for those professions involved in local or state security. Professions involved in the legal system expressed greater doubts about such a proposal than the other professional groups (except in three circumstances: biological samples found at the scene of an unsolved crime and samples taken from unidentified corpses or from persons who voluntarily give samples).

When asked about the need in Spain for specific regulations for databases that store DNA analysis results pertaining to citizens, 73.2% of those interviewed agreed with the proposal for such regulation. However, there were significant differences according to professional group ($p<0.001$), due to the small number of interviewees in legal professions and to the high percentage of interviewees of other professions who did not answer or did not know how to answer this particular question.

With regard to this last question, public opinion was obtained on the need to create clear and specific regulations that specify the various types of crimes that justify the storing of genetic material in DNA profile databases without the consent of the offenders. The DNA profiles would then be used in penal or criminal processes. Most (87.6%) of the surveyed population agreed that there was such a need, although significant differences were observed ($p<0.001$) when it was put to the different professional groups (professions relating to the law, 94.0%; professions relating to public security, 93.5%; professions relating to health sciences, 91.4% and other professions, 85.2%).

Public opinion was surveyed regarding the need for regulations that, as in the case of DNA profiles, would clearly specify in what circumstances genetic samples and tissue from individuals involved in penal cases should be stored. Such material could then be analysed using state-of-the-art techniques. Of those surveyed, 87.4% considered such regulations necessary. Significant differences were observed ($p<0.001$) between professional groups. However, the similarity of the replies given by those involved in law, state security and health sciences stand out, with 94.0%, 93.5% and 90.9%, respectively, considering such regulations necessary.

CONCLUSIONS

It is necessary to examine and define the conflicting social and individual interests in order to provide clear legislation that would regulate the inclusion of the DNA profiles in national databases in Spain and also the biological samples from which these profiles are obtained, given the enormous quantity of information that they can reveal (a fact that on occasion is overlooked). Any future laws must necessarily be drawn up in accordance with the attitude of society towards this subject, no doubt influenced by the prevailing ethical tendencies, the law, social conceptions and the existing scientific knowledge of this area of science (forensic genetics).[3 45 46] Many authors have expressed themselves in similar terms.[32–34 36 47–51]

On the other hand, in the light of the answers given by the surveyed population and taking into account only the circumstances that would justify the inclusion of biological samples and DNA profiles of individuals in a genetic database and avoiding criticism proceeding from exceptionalist attitudes as much as possible,[12–14] there should exist no opposition to the creation of DNA data banks, nor to the storage of biological material taken from the victims of crimes in order to clarify the offence in which they have been involved and harmed, or from alleged offenders whose names are not disclosed, as this would not violate any of the public liberties or fundamental rights stated in the constitution (at least in principle). There does not seem to be great opposition to the creation of databases of DNA profiles of individuals found guilty of violent crimes against the life, integrity or security of others and characterised by recidivism (fig 1), the purpose of these databases being the clarification of those penal offences of definite importance with regard to social repercussion, as well as the use that such data may have during the investigations that are carried out.

If only the percentage (79.9%) of the population that agreed with the creation of DNA profile databanks of recividist individuals found guilty of crimes against the life, integrity or safety of others is taken into account, our results do not fit with the model (universalisation of the DNA profile database) suggested by Jeffreys[23] in 2001. When only the replies concerning DNA databank creation given by the surveyed population are considered, the results approach the recommendations established by the European Convention for the Protection of Human Rights and Fundamental Freedoms,[9] the International Declaration on Human Genetic Data[5] and Recommendation No R (92) 1 of the Council of Europe, concerning the use of DNA analyses and their storage in databases.[10] The results also approach the model proposed by Guillen,[24] among others.

However, it would be a mistake to take into account only the 79.9% of the surveyed population who agreed with the creation of DNA profile databanks for recidivist individuals found guilty of violent crimes against the life, integrity or safety of others, given the high percentage of replies mentioning other reasons for including DNA profiles in a database. Of the surveyed population, 42.3% agreed to the creation of DNA profile databanks for specific groups of non-consenting individuals who repeated an offence, of unclassified nature or gravity; and 42.6% agreed to the creation of DNA profile databanks of all citizens without obtaining their consent.

On the other hand, given the wide-ranging criteria for the inclusion of DNA profiles in databases expressed in article 3 of the recently approved Draft Bill for DNA Identifier Databases Managed by the Police, it is possible to interpret the support given to these inclusion criteria for DNA profiles in criminal databases on the basis of the circumstances discussed in previous paragraphs and broadly evaluating the backing of the surveyed population for the various models of DNA databases proposed. These models were the creation of databases of DNA profiles of individuals found guilty of more than once of violent crimes against the life, integrity or safety of persons and the creation of databases of DNA profiles of specific groups of non-consenting individuals who repeated an offence of unclassified nature or gravity.

To be efficient, databases must be used for offences or crimes in which biological traces are found and successfully analysed; otherwise profiles of no real utility might be included in the database and the rights of individuals would be restricted unnecessarily. These latter circumstances may occur in specific types of offence included in article 3 of the draft bill. We therefore consider that the inclusion criteria mentioned in that article should be as objective and clear as possible for those responsible for deciding whether a DNA profile is to be included in a database or not. If possible, article 3 should include a list of offences that would entail the inclusion of DNA profiles in a database.

On the other hand, it cannot be concluded from section 1a, article 3 of the draft bill (concerning the identity data extracted

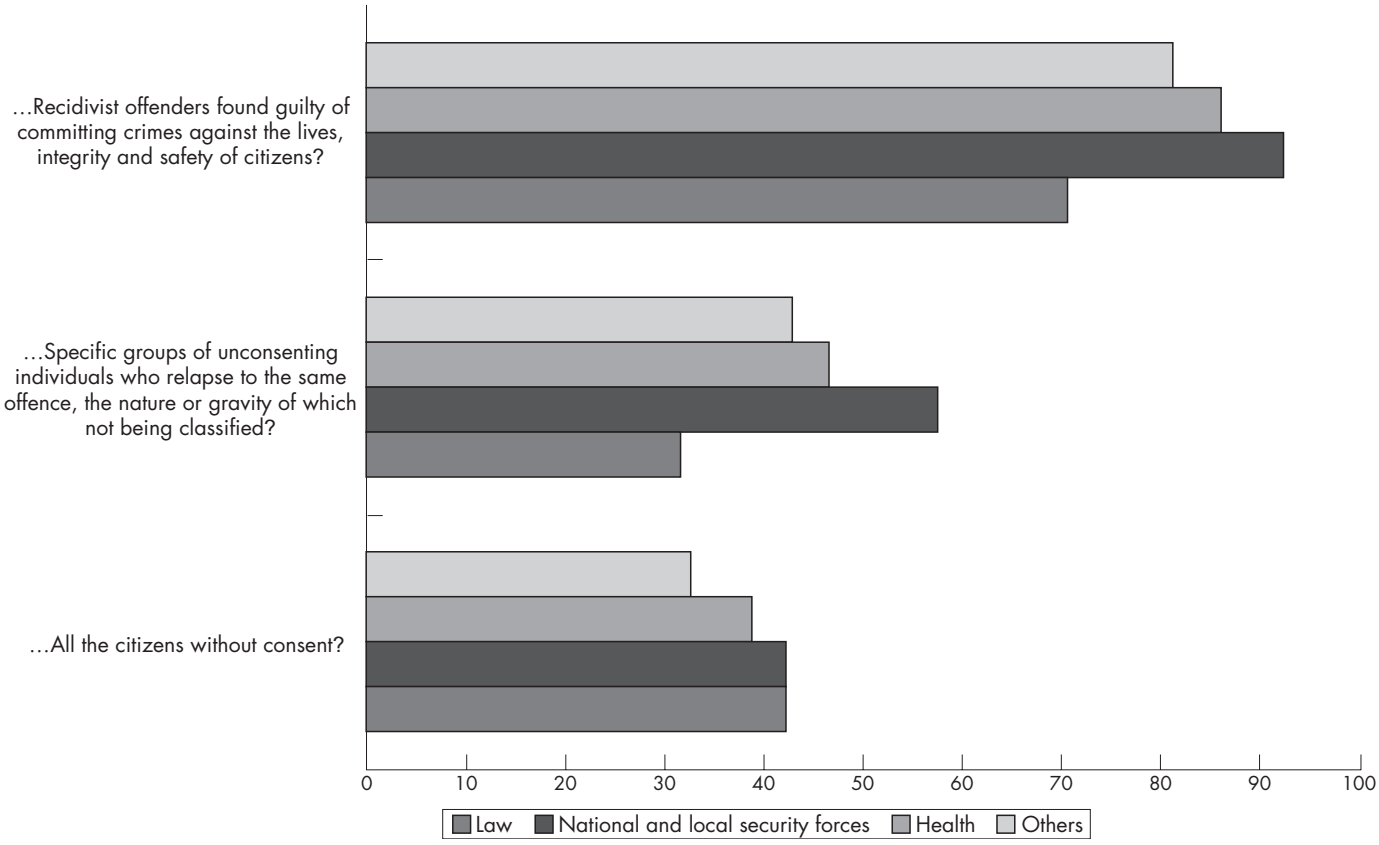

Figure 1 ''Yes'' answers (analysed according to profession) to questionnaire items, all beginning, ''Do you believe that a National DNA databank should be established for …''

from DNA samples obtained from a suspect or detainee in the course of investigations into cases of organised delinquency and grave offences or crimes affecting the life, freedom, sexual freedom and the property of persons) that such profiles should be included routinely, whether the DNA analysis is carried out during the course of legal proceedings or not. The objective of such a procedure is justified by the possibility of ascertaining whether the suspect or accused has committed any offences previously, by comparing the recently included DNA profile with already stored DNA profiles taken from biological traces collected at scenes of unsolved crimes.[24]

The draft bill does not make clear whether the DNA profiles of the victims of offences, relatives of missing persons or volunteers who contribute identifying data in order to help resolve offences would be included in the same DNA profile databases used to store the profiles of suspects and detainees.

Neither is reference made to the possibility of including the profiles of third parties who, in the course of their professional duties, may leave traces at the scene of a crime or contaminate samples to be studied.

The majority of the surveyed population is in favour of specific regulations for the storage of DNA profiles and their corresponding samples; in relation to this we note that the Organic Law 15/2003 (Official State Bulletin 283) has recently been approved. This entails some modifications to the criminal prosecution law (Royal Decree, 14 September 1982, and later modifications: 1925, 1949, 1955, 1967, 1984, 1985, 1988) as included in the third additional resolution: ''In line with the proposals of the Ministries of Interior and Justice and after the drawing up of the legally required reports, the government shall regulate by means of a royal decree the structure, organization and the working of the National Commission for the forensic use of DNA.'' This resolution mentions the likely regulations regarding conservation, sample custody and guarantee of confidentiality of the DNA analyses carried out on these samples. However, no such national commission for the forensic use of DNA has yet been set up.

The reference made to the DNA profiles to be stored in a police database in article 3 of the DNA profile database draft bill must be welcomed, despite the evident weaknesses, as it is open to future modifications. Nevertheless, there is a notable absence of the regulations that were expected for samples and biological traces from which DNA profiles are obtained, which may be considered an even greater source of information than the profiles themselves.

There is no doubt that the recently enacted modifications and initiatives should be encouraged, as long as they are supported by prudent and practical ethicolegal analysis of the consequences that these regulations might have for the rights of affected citizens. Any legal process expected to take place should not be the result of a hasty legislative reaction brought about, for instance, by the alarm caused in society by a succession of crimes or as a consequence of the disproportionate urgency due to acquired international commitments, but of a global, rigorous, clarifying and prudent reply that would enable the creation of legislation that does not depend on the interpretive criteria for each case (with all the problems that this implies for the principle of juridical security). Such a legal process must analyse implied rights, the regulations in force that are affected, social demands, the viability of the system adopted, the economic analysis, the safeguarding of the fundamental rights of the citizen, and the utility such DNA profile analyses may have in investigations being carried out.

The friction that may result from the inter-relationship between the judicial system and the field of genetics is quite evident, as well as the conflict of values, rights and interests that cannot be resolved by reliance on only the principles of privacy,

non-discrimination and liberty. Personal responsibility and proportionality must also be taken into account; balancing and harmonising values is more difficult than ignoring or subordinating them a priori, but also much more just and realistic.[52]

However, we are certain that the weaknesses detected in the police database Draft Law will be corrected with the reports issued by the general council of the judiciary, the National Agency for Data Protection, the norms that the government may dictate in the third final resolution of the Draft Law and the measures prepared by the National Commission for the Forensic Use of DNA, whose creation is contemplated in the third additional resolution of the Criminal Prosecution Law modified by Law 15/2003, 25 November 2003 (Official State Bulletin 283).

Finally, taking into account the differences of opinion between professional groups (fig 1) in our study, it appears to be necessary that membership of the National Commission for the Forensic use of DNA (Organic law 15/2003) should be drawn from a variety of academic disciplines, from different institutions, or people who are involved in all areas of the use, application or analysis of DNA work, such as social representatives, scientific societies, state security organizations and laboratories working for them, laboratories working for the Ministry of Justice, and laboratories authorised to carry out this type of specialist report.

Authors' affiliations

Joaquín J Gamero, Jose-Luis Romero, Department of Legal Medicine, Faculty of Medicine, University of Cádiz, Cádiz, Spain
Juan-Luis Peralta, Dpt of Statistical and Operational Research, University of Cádiz, Cádiz, Spain
Mónica Carvalho, Francisco Corte-Real, Institute of Legal Medicine of Portugal, Coimbra, Portugal

Competing interests: None declared.

REFERENCES

1 **Schneider PM**, Martin PD. Criminal DNA databases: the European situation. *Forensic Sci Int* 2001;**119**:232–8.
2 **Pardo JB**. Person identification by mean of genetic testing and its legal implications. In: Pullman B, Romeo Casaboba C, eds. *The legal and ethical aspects related to the project of the human genome*. Vaticano-Bilbao: Pontificia Academia Scientarum, Fundación BBV, 1995:58.
3 **Guillén M**, Lareu MV, Pestoni C, *et al*. Ethical-legal problems of DNA databases in criminal investigation. *J Med Ethics* 2000;**26**:266–71.
4 **Romeo-Casabona CM**. Introduction. *J Law Hum Genet* 1994;**1**:16–20.
5 **Unesco**. International Declaration on Human Genetic Data. In : Records of the 32nd session of the General Conference, Paris, 29 Sep–17 Oct 2003. Paris: Unesco, 2004:39–46. http://unesdoc.unesco.org/images/0013/001331/133171e.pdf#page=45.
6 **Azorín F**, Sánchez-Crespo JL. *Métodos y aplicaciones del muestreo*. Madrid: AUT, 1986.
7 **Cochran WG**. *Técnicas de muestreo*. México: CECSA, 1971.
8 Kish L, ed. *Muestreo de encuestas*. Madrid: Trillas, 1972.
9 **Council of Europe**. Convention for the Protection of Human Rights and Fundamental Freedoms, as amended by protocol no. 11. Rome, 4 Nov 1950. http://conventions.coe.int/Treaty/en/Treaties/Html/005.htm.
10 **Council of Europe**. The use of analysis of deoxyribonucleic acid (DNA) within the framework of the criminal justice system: recommendation no. R (92) 1 adopted by the Committee of Ministers of the Council of Europe on 10 February 1992 and explanatory memorandum. Strasbourg: Council of Europe, 1993.
11 **International Bioethics Committee**. Provisional Preliminary Draft of the International Declaration on Human Genetic Data, Paris, UNESCO, 2003.
12 **Murray T**. Genetic exceptionalism and future diaries: is genetic information different from other medical information? In: Rothstein MA, eds. *Genetic secrets: protecting privacy and confidentiality*. New Haven: Yale University Press, 1997.
13 **Williams R**, Johnson P. Wonderment and dread: representations of DNA in ethical disputes about forensic DNA databases. *New Genet Soc* 2004;**23**:205–23.
14 **Williams R**, Johnson P. Inclusiveness, effectiveness and intrusiveness: issues in the developing uses of DNA profiling in support of criminal investigations. *J Law Med Ethics* 2005;**33**:545–58.
15 **Latour B**. *Science in action*. Milton Keynes: Open University Press, 1987.
16 **Williams R**, Johnson P. *Forensic DNA databasing: a European perspective (interim report)*. Durham: University of Durham, UK, June 2005.
17 **O'Neil O**. *Autonomy and trust in bioethics*. Cambridge: Cambridge University Press, 2002.
18 **Gerlach N**. The genetic imaginary: DNA in the Canadian criminal justice system. Toronto: University of Toronto Press, 2004.
19 **Holmes HB**. DNA fingerprints and rape: a feminist assessment. *Policy Sci* 1994;**27**:221–45.
20 **Kellie DL**. Justice in the age of technology: DNA and the criminal law. *Altern Law J* 2001;**26**:173–6.
21 **Gil-Hernández A**. *Intervenciones corporales y derechos fundamentales*. Madrid: Colex, 1995:44–60.
22 **Etxebarría JF**. *Los análisis de ADN y su aplicación al proceso penal*. Granada: Editorial Comares, 2000.
23 **Anon**. Pioneering scientist supports ''DNA bank''. *University of Leicester Newsletter*. http://www.le.ac.uk/bulletin/bulletinmarch2001.pdf (accessed 4 Aug 2007) The scientist referred to is Prof Sir Alec Jeffreys.
24 **Guillén M**. Bases de datos de ADN con fines de investigación penal. Especial Referencia al derecho comparado. In: Nuevas técnicas de investigación del delito, intervenciones corporales y ADN. Ministerio de Justicia, Centro de Estudios Jurídicos; Publicaciones, Fiscales, 2004. http://www.cej.justicia.es/pdf/publicaciones/fiscales/FISCAL40.pdf (accessed 24 Aug 2007).
25 Spanish Constitutional Tribunal Sentence 207/96 (16 Dec 1996). http://www.boe.es/g/es/bases_datos_tc/doc.php?coleccion=tc&id=SENTENCIA-1996-0207 (accessed 20 Aug 2007).
26 **Smith Alling Lane, for European Network of Forensic Sciences Institutes, DNA Working Group**. Report on ENFSI member countries' DNA database: legislation survey. http://www.enfsi.org/ewg/dnawg/db (accessed 4 Aug 2007).
27 **Bar W**. Ethical and legal issues of DNA typing in forensic medicine: the situation in Switzerland. *Forensic Sci Int* 1997;**88**:91–3.
28 **O'Donnell G**. Legal situation of forensic DNA analysis in the Republic of Ireland. *Forensic Sci Int* 1997;**88**:63–5.
29 **Fanardjian P**. Ethical and legal issues related to forensic DNA typing: the legal situation in France. *Forensic Sci Int* 1997;**88**:71–3.
30 **Skitsa I**. Report on the legal situation of forensic DNA analysis in Greece. *Forensic Sci Int* 1997;**88**:79–80.
31 **Mangin P**. Ethical and legal issues raised by DNA finger-printing in France. *Forensic Sci Int* 1997;**88**:67–9.
32 **Scheithauser R**. Report on the legal situation of forensic DNA analysis in Austria. *Forensic Sci Int* 1997;**88**:89–90.
33 **Schmitter H**, Schneider M. Legal aspects of forensic DNA analysis in Germany. *Forensic Sci Int*, 1997;**88**;95–8..
34 **D'Aloja E**. Ethical and legal issues of DNA typing in forensic medicine: a brief survey on the Italian situation. *Forensic Sci Int* 1997;**88**:75–7.
35 **Morling N**. DNA in forensic genetics in Denmark. *Forensic Sci Int* 1997;**88**:43–6.
36 **Olaisen B**. The legal situation of forensic DNA analysis in Norway. *Forensic Sci Int* 1997;**88**:47–9.
37 **McEwen JE**, Reilly PR. A review of state legislation on DNA forensic data banking. *Am J Hum Genet* 1994;**54**:941–58.
38 **Mitsilegas V**, Monar J, Rees W. *The European Union and internal security: guardian of the people?* Basingstoke: Palgrave Macmillan, 2003.
39 **Weigend T**. Continental cures for American ailments: European criminal procedure as a model for law reform. In: Morris N, Tonry M, eds. *Crime and justice*, Vol.2. Chicago: Chicago University Press, 1980.
40 **Zedner L**. Comparative research in criminal justice. In: Noak L, Levi M, Maguire M, eds. *Contemporary issues in criminology*. Cardiff: University of Wales Press, 1995:8–25.
41 The Bilbao declaration: international meeting on the law concerning the human genome project. *Rev Med Chil* 1994 Jun;**122**:705–8.
42 **Moreno J**. ADN y proceso penal: análisis de la reforma operada por la ley orgánica 15/2003, De 25 De Noviembre. Ministerio de Justicia, Centro de Estudios Jurídicos; Publicaciones, Fiscales, 2004. http://www.cej.justicia.es/pdf/publicaciones/fiscales/FISCAL33.pdf (accessed 24 Aug 2007).
43 **Moreno J**, Guillén M. ADN y proceso jurisdiccional: excesos y defectos. Necesidad de superar la actual situación de anomia. In: *Práctica penal*, SEPIN editorial jurídica, no. 1, Jan–Feb 2003:45–74. http://www.sepin.es/cursosyconferencias/default_pe.asp (accessed 24 Aug 2007).
44 **Gil A**. *Intervenciones corporales y derechos fundamentales*. Madrid: Colex, 1995.
45 **Gamero JJ**, Romero JL, Peralta JL, *et al*. DNA technology application procedures in forensic practice: social and ethical conditioning (I). *Int Congr Ser* 2004;**1261**:568–70.
46 **Carracedo A**. La identificación de la persona mediante pruebas genéticas: aspectos médicos-legales. en: *El Derecho ante el Proyecto Genoma Humano*, Fundación BBV, Volumen IV, Madrid, 1994:117–129.
47 **Carracedo A**, Pestoni C, Guillén M. The situation of forensic DNA analysis in Spain. *Forensic Sci Int* 1997;**88**:81–3.
48 **Kutukdjian GK**. El representante del organismo Internacional propone que la genética se convierta en anónima, almacenándose a través de sistemas informáticos mediante una numeración personal y privada. *El Médico Interactivo, Diario Electrónico de la Sanidad* 2001; 459: 25 enero. http://www.medynet.com/elmedico/noticias/1999/10/22/n10.htm (accessed 28th Aug. 2007).
49 **Begleveld D**. Ethical issues in the forensic application of DNA analysis. *Forensic Sci Int* 1997;**88**:3–15.
50 **Michaud J**. **Consejo de Europa**. *Informe explicativo del ''Convenio para la protección de los derechos humanos y la dignidad del ser humano con respecto a las aplicaciones de la biología y la medicina''*. 1997. http://www.bioeticaweb.com/content/view/871/lang,es/ (accessed 24 Aug 2007).
51 **Council of Europe**. Convention for the Protection of Human Rights and Dignity of the Human Being with Regard to the Application of Biology and Medicine: Convention on Human Rights and Biomedicine. Oviedo, 4 Apr 1997. http://www.filosofia.org/cod/c1997ast.htm (accessed 24 Aug 2007).
52 **Bello F**. *ADN y Relaciones Jurídicas No Penales: Una Panorámica*. en: nuevas técnicas de investigación del delito, intervenciones corporales y ADN. Ministerio de Justicia, Centro de Estudios Jurídicos: Publicaciones, Fiscales, 2004, http://www.cej.justicia.es/pdf/publicaciones/fiscales/FISCAL38.pdf (accessed 24 Aug 2007).