UDK 340.66:577.212(497.5)
343.983:342.738
Review article

# ADDRESSING WRONGFUL CONVICTIONS IN CROATIA: A FOCUS ON GENETIC PRIVACY IN CRIMINAL PROCEEDINGS*

**Damir Primorac, PhD, Full Professor**
Attorney at Law and Full-time Professor at the Faculty of Law University of Mostar and Associate Professor at the University Department of Forensic Sciences at the University of Split, Domjanićeva 25, Zagreb, Croatia
damir.primorac@primorac-partners.com

**Andrej Božinovski, LLM, Assistant**
Faculty of Law in Zagreb, Croatia
Gundulićeva 10, Zagreb, Croatia
abozinovski1@pravo.hr

***ABSTRACT***

*This paper addresses the intricate challenges of genetic privacy in criminal investigations, particularly within the Croatian context. Conducted by the Croatian Innocence Project, workshops emphasized key issues like DNA material handling, databasing, and the need for legal framework improvements and further research on this topic. The findings of several cases of the ECtHR underscored the risk of miscarriages of justice when genetic privacy is neglected. The paper explores genetic privacy through three elements: treatment of genetic materials, forensic errors, and DNA databasing. Analyzing European Court of Human Rights cases and trends in the U.K., U.S., and E.U., it provides insights to enhance Croatia's legal framework. The study aims to demonstrate the delicate balance between genetic privacy in handling genetic data and effective criminal prosecutions.*

***Keywords:*** *Croatian Innocence Project, DNA Databases, Genetic Data, Genetic Privacy*

* The research for this publication has been conducted within the framework of the Research Project titled "Innocent Project Croatia" (CROINOP), funded by the Croatian Science Foundation (IP-2019-2104-9893), and Career development project for young researchers - training of new PhDs (DOK-2021-2102-5858), also funded by the Croatian Science Foundation. See: https://croinop.pravo.unizg.hr/.

## 1. INTRODUCTION

Genetic privacy in criminal investigations and miscarriages of justice is a multifaceted and complex topic that raises significant theoretical considerations in the realm of law, ethics, and technology which deserves special consideration when dealing with wrongful convictions. The Croatian Innocence Project conducted workshops that focused on genetic privacy, forensic expertise, and their regulation within the context of Croatian criminal proceedings and the national DNA database. The aim was to illuminate key aspects of this issue, focusing particularly on the handling of DNA materials, DNA databasing, and the necessity for further enhancements to the national legal framework. Specifically, they emphasized the impact of genetic privacy on the management of forensic evidence and the inclusion of DNA profiles and materials in databases. The conclusions of these workshops have indicated that undermining and neglecting genetic privacy in the use of DNA forensic evidence in criminal investigations can lead to miscarriages of justice and result in wrongful convictions. As advancements in DNA analysis techniques have become essential tools in modern law enforcement, the balance between utilizing genetic information for solving crimes while protecting individuals' genetic privacy rights has become a subject of increasing academic scrutiny.

Additionally, the jurisprudence of the European Court of Human Rights (ECtHR or the Court) highlights the tension between removing DNA profiles from databases and the growing focus on databasing for future crimes, as seen in recent legal developments in the U.K. Genetic privacy intersects with forensic sciences and DNA databases, as advancements in technology enable the use of genetic information in criminal investigations. Striking the right balance involves navigating legal and regulatory considerations to ensure that genetic data is used responsibly, safeguarding individual rights, and preventing misuse. In the context of this research, genetic privacy is examined through three elements relevant to wrongful convictions: a) the treatment of genetic materials in criminal proceedings; b) forensic science errors and the handling of forensic evidence, and c) genetic privacy in DNA databasing, which includes the collection, dissemination, and storage of DNA profiles. Forensic DNA evidence is often perceived as incredibly trustworthy by courts and is frequently used as crucial evidence upon which judgments are based. This contrast underscores the complexity of the relationship between scientific principles and real-world challenges in the criminal justice system.

Given the observation from workshops that genetic privacy is an under-researched topic in Croatia, this paper aims to contribute to the evolving field of genetic privacy in criminal proceedings. It seeks to provide insights and recommendations to enhance Croatia's legal framework concerning DNA genetic data and the protec-

tion of genetic privacy. In doing so, the first part of the paper will scrutinize genetic privacy in criminal proceedings, exploring the treatment of forensic evidence in various jurisdictions and the novelties of genetic privacy in DNA profiling. The second part will delve into the genetic privacy context within the European Court of Human Rights jurisprudence, examining key cases of *S and Marper v the United Kingdom, van der Velden v the Netherlands, Gaughran v. the United Kingdom, and Trajkovski and Chipovski v North Macedonia*, emphasizing the standards of safeguarding of genetic privacy rights in handling DNA materials. The third part will concentrate on emerging trends and innovative approaches in DNA data banking, studying legislative and jurisprudential aspects in the U.K., U.S., and E.U. in terms of storing and deleting DNA profiles from DNA databases, and notable differences. The fourth part will scrutinize the Croatian legal framework concerning the protection of genetic privacy rights, exploring national standards for DNA databanks and the treatment of DNA evidence within the Croatian jurisdiction. The concluding segment of the paper will summarize positive experiences and propose various options for the Croatian legislature to address the identified issues. The subsequent goal is to demonstrate the delicate balance between upholding privacy standards in dealing with DNA genetic evidence and facilitating effective criminal prosecutions. The research employs theoretical, case-study, and comparative research methods by examining the current legislations and practices, observances of the standards of the ECtHR cases, and the *Maryland v. King case* of the Supreme Court of the United States (hereinafter SCOTUS).

## 2. GENETIC PRIVACY IN CRIMINAL PROCEEDINGS

Genetic privacy involves safeguarding individuals' control and confidentiality over their genetic information, including DNA sequences and genetic data. In the context of criminal proceedings safeguarding genetic privacy is crucial in preventing unwarranted use, ensuring ethical considerations, and maintaining individuals' authority over who can access their sensitive genetic data. Genetic privacy is most important when it comes to forensic expertise. Genetic privacy in the context of this research refers to genetic data, which is envisaged and protected on international, European, and national levels. The Universal Declaration on the Human Genome and Human Rights[1] is the first intergovernmental instrument focused on safeguarding human rights in genetics which prohibits genetic discrimination,

[1] See Universal Declaration on the Human Genome and Human Rights, adopted on 11 November 1997, by the General Conference of the United Nations Educational, Scientific and Cultural Organization at its twenty-ninth session. Accessible at: [https://www.ohchr.org/en/instruments-mechanisms/instruments/universal-declaration-human-genome-and-human-rights], Accessed 25 November 2023.

recognizes the right to know one's genetic characteristics, and emphasizes the confidentiality of private genetic information. Further, the International Declaration on Human Genetic Data[2] extends the principles outlined in the Universal Declaration, providing detailed rules for the collection, use, and storage of genetic data in criminal proceedings and in non-criminal law-related purposes. It legitimizes the notion that genetic data is more complex than biometric data, more special, and emphasizes strong protection of individual rights, such as informed consent and confidentiality while advocating international solidarity in genetic research. Similarly, the Council of Europe Convention on Human Rights and Biomedicine (Oviedo Convention)[3] addresses genetic data rights with a focus on individual consent and the protection of human dignity. Contrastingly, the European Union's General Data Protection Regulation (GDPR)[4] takes a predominantly individualistic approach to privacy, categorizing genetic data as personal data subject to strict processing conditions. While the GDPR acknowledges genetic data as a special category, it lacks explicit recognition of the collective impacts of genetic data processing on groups beyond the consenting individual. However, there is room for interpretation within the GDPR to consider genetic data's potential harm to non-consenting members of a biological group. However, the prevailing indicator of all these documents is that genetic data is a different kind of data, which is very much dependent on individual rights and consent in processing that data, posing challenges in reconciling individual privacy with broader collective concerns in the context of genetic data.[5]

### 2.1. Genetic Privacy and Miscarriages of Justice

The implications of genetic privacy in miscarriages of justice can be observed through forensic science's involvement in wrongful convictions. Forensic sciences are multifaceted, encompassing both its potential to expose and contribute

---

2 See International Declaration on Human Genetic Data. Adopted unanimously and by acclamation at UNESCO's 32nd General Conference on 16 October 2003. Accessible at: [https://www.unesco.org/en/ethics-science-technology/human-genetic-data], Accessed 25 November 2023.

3 See Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine (The Oviedo Convention): Convention on Human Rights and Biomedicine ETS No 164. 1997. Accessible at: [https://www.coe.int/en/web/bioethics/oviedo-convention], Accessed 25 November 2023.

4 See Regulation (EU) 2016/679 of the European Parliament and of the Council. 2016, April 27. Official Journal of the European Union, L 119/1. Accessible at: [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0679], Accessed 25 November 2023.

5 See Costello, Á., *Genetic Data and the Right to Privacy: Towards a Relational Theory of Privacy?* Human Rights Law Review, Vol. 22, No. 1, 2022, p. 31.

to such injustices. According to Derenčinović, Primorac and Becker[6], The way forward involves shifting the focus from simply determining forensic science's contribution to evaluating its effectiveness in supporting accurate investigative conclusions and preventing erroneous ones. This understanding challenges the simplistic narrative that forensic science is solely responsible for exposing and correcting wrongful convictions. Several studies and cases of injustice, out of which the most prominent case was the Amanda Knox case in Italy[7] of forensic science's contributions to wrongful convictions indicate that it is a complex endeavor, with many challenges, including incomplete exposure of wrongful convictions, faulty mechanisms of discovery, and differing definitions of what constitutes a wrongful conviction. Various approaches have been used to assess forensic science's role, primarily through the examination of data sets of wrongful convictions. These analyses revealed forensic science as a significant contributor to wrongful convictions, especially in cases involving faulty forensic expertise. The contribution of forensic science to wrongful convictions has an impact on a number of procedural institutes, such as the reopening of criminal proceedings, establishing a *novum*[8] for reopening the criminal procedure, and reaching the threshold of a new evidence criterion. The mechanisms that lead to the discovery of wrongful convictions are different, depending on the legal system, and the proceedings of reopening such cases, especially in Europe are different and more stringent than those in the U.S.[9] Moreover, discrepancies exist in determining how forensic science contributes to wrongful convictions. According to Scheck and Gianelli[10], Some wrongful convic-

---

6 See Becker, S. W.; Derenčinović, D.; Primorac, D. *DNA as Evidence in the Courtroom.* Forensic DNA Applications: An Interdisciplinary Perspective, 2023, p. 433.

7 The Amanda Knox case, a notorious instance of wrongful conviction, revolves around the 2007 murder of Meredith Kercher in Italy. Accused alongside her boyfriend Raffaele Sollecito, Knox faced a flawed legal process marked by questionable forensic evidence, coercive interrogations, media sensationalism, and cultural and legal disparities. The reliance on contested DNA evidence and the use of dubious interrogation tactics raised doubts about the validity of the convictions. Intense media scrutiny further complicated the case, potentially influencing public opinion. The foreign legal setting added complexity, with cultural differences and tunnel vision in the investigation contributing to a perceived miscarriage of justice. The eventual acquittal of Knox and Sollecito in 2015 underscored the challenges in ensuring a fair trial and avoiding wrongful convictions in cases with international dimensions. The Amanda Knox case serves as a cautionary tale about the importance of meticulous legal procedures, unbiased investigations, and public awareness in upholding the principles of justice.

8 *Novum* in criminal proceedings refers to newly discovered evidence that was not available during the original trial. This evidence can be grounds for reopening a case, potentially leading to a new trial or altering the verdict if it significantly impacts the case's outcome.

9 See Bozhinovski, A. *Addressing Wrongful Convictions in Croatia through Revision of the Novum Criterion: Identifying Best Practices and Standards*; Mali, J (eds.), Human Rights in Contemporary Society – Challenges From an International Perspective, Vol. 1, 2023, pp. 57-77.

10 See Giannelli, P. C. *Wrongful convictions and forensic science: The need to regulate crime labs*. Netherlands Criminal Law Review., Vol. 86, 2007 p. 163.

tions have been caused by forensic experts who appeared to be either incompetent, corrupt, or both, leading to falsified test results or tests that were never conducted. Additionally, it is argued that some forensic errors may have been motivated by a desire for vengeance, with forensic experts seeing their role as assisting investigators whom they believed had correctly identified the suspect. On the other hand, Cole and Thomson suggest the economic factors of forensic errors, such as poorly trained, overworked, and overwhelmed staff in laboratories, are leading to faulty forensic examinations.[11] However, modern forensic science can be seen as a solution to the problem of wrongful convictions. In most post-conviction cases, especially those involving DNA exoneration, forensic science offers an accurate account of the crime that often contradicts the false accounts provided by conventional investigative tools such as eyewitness evidence, interrogations, and informants. Furthermore, Puff and Killias highlight that forensic science can lead to wrongful convictions by inaccurate or misleading (faulty) forensic evidence, exaggeration or overclaiming of evidence strength by forensic experts, biased interpretations, and courts' assessment and interpretation of forensic evidence.[12] The further argue that all categories can lead to an incorrect determination of the facts of a case and result in a wrongful conviction. Misunderstanding applied science can sometimes mislead investigators. Whether the Court renders a valid judgment or correctly evaluates expert evidence depends heavily on the role and testimony of forensic experts, making their role in criminal proceedings crucial. The sensitivity of genetic data, which may reveal personal health information or familial relationships, adds complexity and necessitates heightened privacy protections in criminal procedures. In both adversarial and inquisitorial legal systems, genetic privacy is considered within the context of legal proceedings where the burden of establishing facts lies with the parties involved. Courts in both systems recognize the potential for bias, particularly in expert testimony, and therefore subject such evidence to rigorous scrutiny to ensure its credibility and accuracy. Evaluating genetic privacy involves assessing the scientific methods used for genetic testing, the accuracy of the results, the margin of error, and the potential for DNA sample contamination. This ensures that the evidence presented is reliable and that individuals' genetic information is protected from misuse.[13]

In adversarial jurisdictions, where the burden of establishing facts rests with the parties involved, expert witnesses are commissioned by those parties. This arrange-

---

11 See Cole, S. A.; W. C. Thompson. *Wrongful Convictions.*, Wrongful Convictions and Miscarriages of Justice: Causes and Remedies in North American and European Criminal Justice Systems, 2013, p. 111.

12 See *op. cit.,* note 3, p. 45.

13 See Becker, S.W.; Derenčinović, D.; Primorac, D.,, *op. cit.,* note 6, p. 12.

ment can sometimes raise concerns about potential bias, as the financial interests of these experts are tied to their hirers. Courts are aware of this issue and subject such evidence to rigorous scrutiny. In contrast, in inquisitorial jurisdictions, the duty of establishing facts falls upon the investigating judge and, later, the trial court, with experts commissioned by the authorities. In these cases, the investigative magistrate decides upon the admissibility of the evidence. While this approach may be perceived as a measure to ensure impartiality, it introduces questions about the relationship and trust between these experts and the mandating authority. In such systems, the validity of scientific evidence is often presumed, and fact-finders tend to accept expert conclusions as definitive, potentially without a rigorous discussion of their accuracy.[14] However, in both systems, forensic experts are commissioned to establish or assess certain scientific facts, and it is left to the legal actors, who have no knowledge of these facts to determine their admissibility and ramifications in the trial. According to Vuille and Champod**,** this creates a paradoxical situation that further relies on the trappings of science and the formal authority of experts on the real merits of the work carried out in the case.[15] They further argue that forensic expertise is often deemed in practice as idealistic, devoid of any possibility of error or flawed interpretation, and it establishes the objective truth of what happened. Vuille in this regard stipulates that there are two problems with this assertion, the scientific methods and the human capacities that are carrying out these examinations which, given their human nature, are prone to errors or bias.[16]

## 2.2. DNA Profiling and Genetic Privacy

Concerning genetic privacy in DNA profiling, Primorac and Schafield give an illustrative description of the entire process, giving thorough explanation of the DNA gene. The gene consists of two sets of 23 chromosomes each containing various genes inherited by each parent. Each chromosome contains both coding and non-coding regions. Coding regions contain the individual's profile (medical predispositions, physical characteristics, racial indicators, etc.) the non-coding regions, are generally considered to not contain any of this genetic or personal information. So, the human genome is 99.9 percent identical for all individuals with the 0,1 percent difference coming from the variance in the Short Tandem Repeats

[14] See *ibid.,* p. 15.

[15] See Vuille, J.; Champod, C., *Forensic Science and Wrongful Convictions.*, The Routledge International Handbook of Forensic Intelligence and Criminology, Routledge, 2017, pp. 125-135.

[16] See *ibid.,* p. 130.

between the genes.[17] These variants between the genes are known as alleles and can be specifically identified with a DNA test by examining the markers at certain locations or *loci* in a gene. When two profiles have pearls of the same size (i.e., the same number) at the same loci, the two profiles are said to "match" at these loci. That characterizes a DNA profile in fact summarizes a complex process that encompasses biological, physical, and chemical dimensions. To address privacy concerns, no names or specimens is uploaded, nor assigned to the profile. Instead of this, a Specimen Identification Number is assigned to the profile, and once in the database, the profile can be compared to DNA collected at the crime scene to search for a match, and the letters at the end are gender identifiers. Brants argues that determining two DNA profiles as "indistinguishable" depends on the measuring system used in the case. Therefore, reporting a match involves the observer's subjective judgment and always includes some uncertainty.[18] Conventional forensic DNA profiling analyses can be performed satisfactorily and reliably only if certain conditions are met, notably in terms of the amount and quality of the available DNA template. Several factors and circumstances can render analyses more complicated or can induce variations in the results.

When dealing with DNA evidence in criminal proceedings, it is crucial to consider its vulnerabilities at various stages and the impact of forensic evidence on the process. Both adversarial and inquisitorial systems have unique characteristics and safeguards to address potential forensic errors. Despite their differences, both systems enforce stringent rules for the admissibility and treatment of forensic DNA materials. When deciding the admissibility of genetic evidence in a trial, the primary consideration is whether the DNA material was collected according to ECtHR standards and if there was any blanket or indiscriminate retention of DNA profiles. Any irregularities in storing DNA profiles unrelated to the case would violate Article 8 of the European Convention on Human Rights. Brants defines relevance as anything that has a direct or indirect impact on the likelihood of a key fact in the proceeding, further arguing that the presentation of forensic DNA evidence in court involves assessing whether introducing this evidence would compromise the fairness of the proceedings or result in unfair prejudice.[19] Concerning the admissibility of genetic information and whether genetic privacy protocols were respected, a notable concern arises: the defense's argument that genetics played a role in impeding impulse control might be exploited by the pros-

---

17 See Primorac, D.; Schanfield, M., (eds.), *Forensic DNA Applications: An Interdisciplinary Perspective*. CRC Press, 2023, p. 1-17.

18 See Brants, C. *Criminal Procedure to Wrongful Convictions.* Wrongful Convictions, 2010, p. 157.

19 See Brants, C. *Tunnel Vision, Belief Perseverance and Bias Confirmation: Only Human?*, Wrongful Convictions and Miscarriages of Justice, Routledge, 2013, pp. 161-192.

ecution to argue for a lengthier sentence, citing the need to safeguard society from potential reoffending. Vuille, Biedermann, and Taroni deliberate on the general rules that forensic experts must adhere to when providing expert opinions to the court regarding forensic DNA expertise. These rules relate to *assistance, relevant expertise, impartiality,* and *evidentiary reliability*.[20] *Assistance* is understood as that the expert evidence must be of substantial help to the fact finder in ascertaining any fact that is of consequence to the determination of the proceedings. *Relevant expertise* obligates the expert to provide an opinion rooted in a fact derived from the cumulative knowledge that defines the expert's expertise or is predominantly and significantly reliant on such knowledge. This means that the expert should possess specialized knowledge or skills acquired through experience, training, or study. A good example of this is the United States, Rule 702 of the Federal Rules of Evidence envisages that an expert witness must be deemed qualified by knowledge, skill, experience, training, or education, and their testimony must assist the fact-finding in understanding the evidence or determining a factual issue.[21] Further, *impartiality* obligates the expert to be able to give impartial evidence on the matters within his or her field of expertise, and *evidentiary reliability* requires that the forensic expertise be of an acceptable standard. This means that to determine whether the opinion is accepted, the court must apply the general "reliability" test. This test is best described in the case of R v Atkins where the English Court of Appeal highlighted the importance of cautiously approaching new areas of expertise. While acknowledging the potential for issues when experts exaggerate their claims, the court asserted that the remedy isn't to restrict experts from providing informed opinions. Instead, the suggested approach involves: (i) Having the evidence scrutinized and critiqued by an expert with equal experience and skill, (ii) Subjecting the evidence to thorough testing through cross-examination, and (iii) Ensuring a meticulous explanation by the judge to the jury regarding the distinction between objective, measurable data and subjective, yet informed, judgments.[22] Further, in the U.S. jurisprudence, the Frye v. United States case is important for establishing the first framework of rules for admitting scientific evidence in the safeguarding of genetic privacy. Frye case deemed that established evidence would be considered evidence that had 'gained general acceptance' in its field. However, this approach

---

20 See *supra* note 7.

21 See Federal Rule of Evidence 702. (n.d.). In *United States Code, Title 28, Appendix*., accessible at: [https://uscode.house.gov/view.xhtml?req=granuleid:USC-1999-title28a-node246-article7-rule702&num=0&edition=1999], Accessed 25 November 2023.

22 See Judgment *R v Atkins*, [2009] EWCA Crim 1876, Case No: 200801604 D4 200801607 D4, *Dean Atkins and Michael Atkins, Appellants, v The Queen, Respondent*. Retrieved from: [https://vlex.co.uk/vid/r-v-atkins-793896693], Accessed 25 November 2023.

faced criticism for causing a delay before evidence met the acceptance standard.[23] As seen the implication these types of evidence have in practice, Gianelli notes that the remedies for forensic laboratories and forensic experts, working on the collected genetic materials are very much obvious: the accreditation of laboratories, the certification of experts, standardization, quality assurance programs, proficiency tests and external audits of the laboratories.[24]

## 3. THE ECtHR STANDARDS AND GENETIC PRIVACY

Genetic privacy in DNA profiles in Europe is shaped by the jurisprudence of the ECtHR which plays a major role in regulating the collection, ramification, and storage of genetic materials in criminal proceedings. The Court establishes that forensic evidence is not standard piece of evidence. As a genetic material, DNA is considered a more sensitive, specific type of personal data, and therefore it is subject to more stringent legal protection than biometric data. Derencinovic, Roksandic, and Prtenjaca further stipulate that in criminal proceedings, including the trial phase, certain provisions govern the collection, ramification, and storage of DNA materials, and they are subject to detailed and precise provisions of the various laws on criminal procedure, influenced by the jurisprudence of the ECtHR.[25] The ECtHR standards, as opposed to the U.S. standards, are established on determining cases of removal of DNA materials from national databases as well as are all adjudged through the lens of the right to privacy (Article 8) of the Convention.

The case of *Van Der Velden v the Netherlands*[26] illustrates the Court's position about the legality and necessity in a democratic society when it comes to collecting genetic materials. The applicant committed five bank robberies and stole four cars on various dates. During the criminal investigation, he underwent psychological and psychiatric examinations. The reports suggested that he was suffering from inadequate development or a pathological disorder, most likely a schizoid personality disorder. Further, the applicant alleged that his confinement in a custodial clinic was extended contrary to domestic law. Given the fact that the applicant had previously been convicted of multiple bank theft offenses, under Dutch law, it was obligatory to provide genetic material for a DNA profile in a national police

---

23 See Judgment *Frye v United States*, 293 F. 1013 (D.C. Cir. 1923), accessible at: [https://casetext.com/case/frye-v-united-states-7.], Accessed 25 November 2023.

24 See, Becker, S.W.; Derenčinović, D.; Primorac, D, *loc. cit.,* note 6.

25 See Derenčinovic, D.; Vidlička, S. R.; Dragičević Prtenjača, M. *Innocence Projects and Subsequent DNA Testing in Croatia: A Possible Reality or an Unattainable Desire.* Zbornik PFZ, Vol. 67, 2017, p. 373.

26 See Judgment *Van Der Velden v. The Netherlands*, Application no. 21203/10, Strasbourg, Accessible at: [https://hudoc.echr.coe.int/eng#{%22itemid%22:[%22001-112547%22]}], Accessed 25 November 2023.

database. The applicant contested this obligation, arguing that his genetic data was irrelevant to his crimes and could not serve a practical purpose in preventing, detecting, prosecuting, and trying criminal offenses under Article 8(2) of the European Convention of Human Rights. He claimed that the collection violated his rights to privacy and data protection under Article 8 of the ECHR. In its assessment, the Court acknowledged that the retention of genetic material and the data derived from it was intrusive under Article 8, but it recognized that this measure was in accordance with national law. The Court also acknowledged the legitimacy of compiling and retaining a DNA profile for the purposes of preventing crime and protecting the rights and freedoms of others. Further, the Court did not find any breach of the appellant's rights sufficient to support an appeal to the ECtHR. However, in reaching this decision, the Court explicitly stressed that the measures in question were deemed necessary for a democratic society, emphasizing the significant contribution DNA records make to law enforcement. However more recent practice of the court, when it comes to the application of the ECtHR standards in the ramifications of genetic materials in criminal proceedings, national jurisdictions need to adhere to the principles of legality, proportionality, and necessity in a democratic society, or the famous *Marper* test, derived from the case of *S. and Marper v The United Kingdom*.[27] The legality standard concerns the legality of the collected DNA genetic profiles for various categories of persons targeted by the criminal investigation. The jurisprudence of the ECtHR leaves a greater margin of appreciation to restrict the right of privacy of the convicted persons in comparison to those who have just been arrested or acquitted. This standard envisages a clear, accessible, and foreseeable legal framework as an imperative in governing the collection of genetic materials.

Furthermore, the ECtHR reiterates the significance of informed consent of individuals understanding the circumstances under which their DNA may be collected and the legal foundation for the collection of their DNA. The proportionality standard requires that the period of DNA retention should depend on the gravity of the crime. Derencinovic, Primorac and Becker, elaborate that the proportionality of any intrusion on an individual's privacy, such as the collection of DNA samples must be justified by a compelling rationale, and the measures taken should be strictly essential for the stated purpose.[28] The Court urges the authorities to

[27] See Judgment *S. and Marper v. United Kingdom* (2008), Application no. 30562/04 and no. 30566/04, 4 December 2008, paras 3-25. This judgment is a landmark European Court of Human Rights case. It challenged the indefinite retention of DNA and fingerprint data of individuals not convicted of a crime. The court ruled that the UK's policy violated the right to respect for private life under Article 8 of the European Convention on Human Rights, emphasizing the need for a balance between law enforcement interests and individual privacy rights.

[28] See, Derenčinović *et al., op. cit.*, note 6. p. 376.

carefully weighing of the benefits of DNA sample collection against the potential infringement on an individual's right to respect for private life. Furthermore, Derencinovic explains that this principle demands a clear and compelling justification for the collection and ramifications of DNA samples. It necessitates that the means chosen for this purpose should not go beyond what is strictly required and should avoid unnecessary or excessive intrusion into an individual's private sphere.[29] The third principle is necessary in a democratic society which is applied to determine whether the intrusion of the right to a private life is needed at all. Usually, the ECtHR jurisprudence stipulates that any interference with human rights must meet a pressing social need or be proportionate to the legitimate aim pursued. In the case of forensic DNA sample collection, the ECtHR considers whether such intrusion is necessary to achieve a specific legitimate aim, such as crime prevention, public safety, or any other aim within the context of a democratic society.

In the ECtHR jurisprudence, a notable difference between the *Van der Velden* case and the *Marper* case hinges on whether the person whose privacy rights were violated was found guilty or not. Both cases agreed that collecting and analyzing genetic material initially goes against the right to privacy. The *Aycaguer v France* case further supported this idea, stating that storing genetic data interferes with privacy, regardless of how the data is later used. So, the key point is that dealing with genetic information raises privacy concerns, no matter if the person is guilty or innocent.[30] The perspectives of the vagueness of the national law can be noted from the case of *Trajkovski and Chipovski v North Macedonia*[31], where the requirement for the authorities to envisage in their respective legislation, an adequate mechanism to enable the deletion of their genetic material from the DNA database is evident.[32] In this case, the applicants alleged that the domestic regulatory framework based on which the authorities had collected, processed, and stored their DNA material was incompatible with the requirements under Article 8 of the European Convention on Human Rights and the *Marper* test of the European

---

29 See, *ibid.* pp. 373–404.

30 See Judgment *Aycaguer v France* (2017), Application no. 8806/12, 22 June 2017, paras. 15-25.

31 See Judgment *Trajkovski and Chipovski v North Macedonia* (2020), Applications nos. 53205/13 and 63320/13, paras 1-13 Accessible at: [https://hudoc.echr.coe.int/eng#{%22itemid%22:[%22001-200816%22]}], Accessed 25 November 2023.

32 The ECtHR ruled against North Macedonia, finding their indefinite retention of DNA profiles from convicted individuals, exemplified by the case of Trajkovski and Chipovski, to violate the right to privacy. The court deemed the broad and indiscriminate nature of the retention system disproportionate to its crime prevention goal, lacking the necessary safeguards established with the Marper test. The judgment has broader implications, emphasizing the need for a balanced approach in jurisdictions with similar DNA retention policies, stressing that perpetual retention exceeds what is essential for crime prevention, constituting a violation of the European Convention on Human Rights.

Court of Human Rights. the domestic legislation in North Macedonia did not set a specific time limit for the retention of DNA data as the genetic material of the applicants as convicted persons, stating that DNA profiles were to be recorded in the relevant registers and "retained for a certain time, but not indefinitely (засекогаш)". Such data, under the amendments of the Law on Police of North Macedonia[33] "may be retained until it has fulfilled the purpose for which it has been taken". This provision, such as it is very vague and open to misinterpretation. It implies that taking of DNA samples from the applicants provides that DNA data is stored in the relevant register permanently. In the absence of anything to suggest that such retention may be linked to any fixed point in time, the Court considers that the respondent State permits an indefinite retention period of DNA profiles. Furthermore, it has not been argued that the nature or gravity of the offense for which a person was convicted, or received a penalty, or any other defined criteria, such as previous arrests, and any other special circumstances, have any bearing on the collection, storage, and retention of DNA records.[34] Moreover, whereas the police are vested with the power to delete personal data from the registers, the law is silent on the conditions under which it can be done and the procedure to be followed. Whereas the law provides, in general terms, for the possibility of judicial review coupled with a prior administrative review, there is no provision allowing for a specific review of the necessity of data retention. Similarly, there is no provision under which a person concerned can apply to have the data concerning him or her deleted if conserving the data no longer appears necessary in view of the nature of the offense, the age of the person concerned, the length of time that has elapsed and the person's current personality, which goes against the requirements stated in the case of *Gaughran v the United Kingdom*. The Court found that the blanket and indiscriminate nature of the powers of retention of the DNA profiles fails to strike a fair balance between the competing public and private interests. The Court ruled that there was a violation of the Convention's Article 8 of the Convention.

In the context of genetic privacy, another significant case that reiterates the importance of balance between the need for law enforcement to retain genetic data for the purpose of prevention of crime and the individuals' right to privacy is *Gaughran v. the United Kingdom*.[35] In this case, ECtHR ruled that the blanket and

---

[33] See Law on Police., Official Gazette of the Republic of North Macedonia, nos. 114/2006, 6/2009, 145/2012, 41/2014, 33/2015, 31/2016, 106/2016, 120/2016, 21/2018, 64/2018., Accessed 25 November 2023.

[34] See Judgment *Trajkovski and Chipovski v. North Macedonia* (2020), Applications nos. 53205/13 and 63320/13 paras. 16-21.

[35] See Judgment *Gaughran v the United Kingdom* (2020), Application no. 45245/15, 13 February 2020, paras. 13-18

indiscriminate nature of the powers of retention, coupled with the absence of sufficient safeguards available to the individual, fails to strike a fair balance between the competing public and private interests. The applicant alleged under Article 8 of the Convention that the indefinite retention of his DNA profile, fingerprints, and photograph in accordance with the blanket policy of retention of personal data of any individual convicted of a recordable offense, amounted to a disproportionate interference with the right to respect for his private and family life. In this case, similar to *Marper*, the Court found that the indefinite retention of biometric and genetic data of persons convicted of an offense punishable by imprisonment was a breach of a person's right to respect for their private life under Article 8. Derenčinović further explains that although both instances concluded that such retention violated Article 8 of the Convention, which protects the right to respect for private and family life, there are several similarities and differences between the two cases. The similarities of the cases include the nature of the violation and the Court's reiteration on the necessity of having clear, proportionate, and necessary regulations when handling of genetic sensitive materials. The differences between these cases lie in the fact that the judgment in the Gaughran case also drew attention to the absence of a review mechanism for the necessity of data retention, which was not a prominent issue in the *S and Marper* case.[36]

The baseline principle in the ECtHR approach of genetic data and privacy is through the lens of fundamental human rights principles, more precisely Article 8 and Article 6 of the European Convention of Human Rights. Apart from the principle of legality, are the principles of proportionality and necessity in a democratic society which scrutinizes whether the intrusion into an individual's right to privacy, particularly within the context of DNA sample collection, is justified by a compelling societal need and is proportionate to the legitimate aims pursued, such as law enforcement or public safety. The court emphasizes the importance of clear legal frameworks, safeguards against abuse, and respect for individual autonomy through informed consent. Also, the ECtHR recognizes the sensitivity of genetic information, the ECtHR underscores the need to shield genetic data from misuse. The Court acknowledges that certain groups, such as minors or individuals with diminished mental capacity, may require additional protection, and urges respective national jurisdictions to enact provisions that would consider the vulnerability of these groups and integrate suitable safeguards and judicial overwatch. Also, the authors here emphasize the delicate balance required to harness the potential of forensic evidence while upholding individual rights and ensuring a just and reliable legal process.

[36] See. Derenčinović, D. *Preispitivanje prakse država glede zadržavanja DNK profila u svjetlu nedavnih presuda Europskog suda za ljudska prava protiv Ujedinjenog Kraljevstva i Sjeverne Makedonije,*" in: Lazetić, G.; Kurtović Mišić, A. (eds.), Ogledi o pravu i pravdi u dvije Europe, 2021, p. 191.

## 4. GENETIC PRIVACY IN DNA DATABASES

To address the question of whether DNA databasing infringes on privacy rights: it does not necessarily do so. The ECtHR, in the cases of *Van Velden v the Netherlands, Trajkovski and Chipovski v North Macedonia, and S.M. Marper v the United Kingdom*, recognized that DNA databases are valuable for identifying criminals and preventing crime. However, collecting excessive genetic information and retaining it indefinitely may breach privacy. The ECtHR emphasized the need for a balance between the necessity of collecting DNA, the duration of retention, and the purpose of retaining such genetic material. Without this balance, serious violations of privacy rights could occur. With the rise of affordable DNA testing kits from companies like Ancestry DNA[37], the need to safeguard this intimate information has become more important. To better explain the DNA databases, imagine them as virtual libraries storing all the genetic materials for commercial and law enforcement purposes. Commercial purposes are when genetic data is sent to a private company to determine our ancestry, genetic predispositions, or other attributes for fun. On the other hand, law enforcement databases, store genetic profiles from crime scenes, suspects, and perpetrators with an aim to be more effective in solving future crimes by matching the DNA material from the scene of the crime to a known match in the database.[38] DNA databases are an integral component of criminal justice systems that contain profiles of convicted felons and/or suspects depending on the jurisdiction. When they include the entire population of a given country, they are called 'universal' forensic databases. The use of this type of databases allows investigators to match collected samples against previous records to determine if matches are present and helps to deter crime because of the high levels of certainty that an accurate match is able to provide.[39] Police use DNA databases in severe crime cases for identification purposes. In the United States, the FBI established the Combined DNA Index System (CODIS), which collects and assists with the analysis of DNA samples. CODIS regulates the use of DNA samples in the federal database by requiring compliance with quality assurance standards, external audits, and accreditation of laboratories submitting DNA records through a non-profit, nationally recognized forensic science association. Importantly, DNA databases can handle large quantities of data for specific purposes within the context of criminal investigations. According to Ledic, Makar, and Oblescuk, the de-

---

37 AncestryDNA is a commercial DNA testing service provided by Ancestry.com, a popular genealogy and family history research platform. AncestryDNA allows individuals to uncover information about their genetic heritage and ancestry by analyzing their DNA. Accessible at: [www.Ancestry.com].

38 See Ledić, A.; Makar, A.; Obleščuk, I., *DNA Databases* in Forensic DNA Applications, 2nd ed., CRC Press, 2023, p. 16.

39 See *ibid.*

velopment of DNA technology and the establishment of a corresponding DNA database on national and transnational levels is one of the most efficient ways to detect and prevent crime.[40]

### 4.1. DNA Databanks in the United States and the United Kingdom

The science of DNA databases originated in the U.K. and was perfected in the U.S., leading to a unified system for handling DNA profiles. The initial legislation in the U.K. was primarily aimed at identifying individuals involved in a limited number of serious crimes, such as homicide and violent sex offenses. The U.K. has the oldest DNA database in the world, with the retention and use of DNA data governed by several key laws, including the Police and Criminal Evidence Act (PACE)[41], which introduced the requirement of consent before taking DNA samples; the Criminal Justice and Public Order Act[42], enabled collecting DNA swabs of any person charged with a crime, without consent by the law enforcement authorities; the Criminal Procedure and Investigations Act, which expanded the profile of persons from whom a DNA sample can be taken without consent, which included mandatory retention of DNA data by prisoners for violent crimes, as well as suspects of a crime, not yet charged with a crime. The most notable piece of legislation is the Criminal Justice and Police Act[43], which was reformed constantly under the influence of the jurisprudence of the ECtHR in the *S. and Marper and Gaughran v the United Kingdom* cases regarding indefinite retention of DNA data and materials, as well as taking DNA samples from suspects in terrorism cases and organized crime cases. Interestingly, in the Marper case, the ECtHR criticized this law for its blanket and indiscriminate retention of DNA data. The Court noted that it fails to strike a fair balance between competing public and private interests, and the state's response has overstepped any acceptable margin of appreciation. The newly enacted Protection of Freedoms Act[44], addressed partially

---

40 *Ibid.*

41 See Police and Criminal Evidence Act 1984 (PACE). (c. 60). London: Her Majesty's Stationery Office. Accessible at: [https://www.legislation.gov.uk/ukpga/1984/60/contents], Accessed 25 November 2023.

42 See Criminal Justice and Public Order Act 1994 (CJPOA). (c. 33). London: Her Majesty's Stationery Office. Accessible at: [https://www.legislation.gov.uk/ukpga/1994/33/contents], Accessed 25 November 2023.

43 See Criminal Justice and Police Act 2001 (CJPA). (c. 34). London: Her Majesty's Stationery Office. Accessible at: [https://www.legislation.gov.uk/ukpga/2001/34/contents], Accessed 25 November 2023.

44 See Protection of Freedoms Act 1994 (PFA). (c. 84). London: Her Majesty's Stationery Office. Accessible at: [https://www.legislation.gov.uk/ukpga/1994/84/contents], Accessed 25 November 2023.

the concerns of the Court concerning the indefinite retention and destruction of DNA materials and samples, striking a difference between the destruction of DNA materials (fingerprints and DNA profiles) from the database, stipulating that the destruction should be *as soon as reasonably applicable*. As to the destruction of DNA samples, the law addresses them separately and the destruction is envisaged as soon as the DNA profile has been derived, but no longer than six months after the sample is taken. It is the authors' opinion that these changes only partially implement the spirit of the Gaughran and Marper decisions and the current legal focus is collecting profiles for future crimes.

On the other hand, the U.S. experience provides the modern tools and know-how for establishing and shaping DNA databases around the world. The U.S. established the CODIS system (Combined DNA Index System) at the federal, state, and local levels, where each state is free to determine its own DNA database, with the obligation to upload every material to the federal database. Furthermore, the CODIS incorporates four separate indexes: the Convicted Offenders Index, the Forensic Index, the Unidentified Human Remains Index, and the Relatives of Missing Persons Index. The retention and use of DNA data on a federal level is governed by several laws. The DNA Identification Act[45], enabled the establishment of a forensic laboratory under the auspices of the FBI, for persons convicted for violent crimes. The DNA Analysis Backlog Elimination Act[46] allowed DNA profiles to be retained and stored for persons incarcerated, and on parole, after being convicted for federal offences. The PATRIOT ACT[47] extended the retention of DNA samples and profiles to people charged and convicted for terrorism offenses under the FISA warrant. Furthermore, the Justice for All Act[48] expanded the retention of DNA profiles to persons charged with violent offenses, and the DNA Collection Act[49] mandated from law enforcement authorities, mandatory fingerprinting and DNA retention for persons charged and convicted of violent crimes. According to Norris, Weintraub and Acker, the issue of this legislation is

---

45 See The DNA Identification Act., 1994. Pub. L. No. 103-322, 108 Stat. 1796. Accessible at: [https://oig.justice.gov/reports/FBI/a0632/laws.htm], Accessed 25 November 2023.

46 See The DNA Analysis Backlog Elimination Act, 42 U.S.C. § 14135a (2008). Accessible at: [https://www.govinfo.gov/app/details/PLAW-110publ234], Accessed 25 November 2023.

47 See USA PATRIOT Act. 2001. Section 215, Access to Records and Other Items Under FISA, 115 Stat. 272, 50 U.S.C. § 1861. Accessed at: [https://www.congress.gov/107/plaws/publ56/PLAW-107publ56.htm], Accessed 25 November 2023.

48 See Justice for All Act, 18 U.S.C. §§ 3771 et seq. (2004). Accessible at: [https://ovc.ojp.gov/sites/g/files/xyckuh226/files/publications/factshts/justforall/welcome.html], Accessed 25 November 2023.

49 See Collection and use of DNA identification information from certain Federal offenders. (n.d.)., 34 U.S. Code § 40702 - Accessible at: [https://www.law.cornell.edu/uscode/text/34/40702], Accessed 25 November 2023.

that it failed to consider automatic removal or destruction of DNA profiles after the serving of the prison sentence. Furthermore, there are no provisions relating to the automatic removal of the DNA materials in cases where the persons were exonerated.[50] The Justice for All Act, envisages individual removal by mandating a court order, proving that the individual was indeed exonerated or charges against him were dropped. Similar to the Maprer case, in the U.S. a landmark decision in protecting privacy from unreasonable searches is the case of *Maryland v. King* of the U.S. Supreme Court (hereinafter SCOTUS).[51] The case decided the constitutional implications of the Fourth Amendment[52] against the Maryland DNA Collection Act, which envisaged collection from individuals under arrest before their convictions. King was arrested and convicted of rape after his DNA profile matched a DNA sample found at the crime scene. He challenged the conviction, arguing that collecting his DNA without a warrant or suspicion constituted an unreasonable and unconstitutional search. The Maryland Court of Appeals accepted his appeal, applying a balancing test to weigh the degree of intrusion on privacy against the legitimate government interest. The Appeals Court made two key points: first, that arrested individuals have a greater expectation of privacy than convicted criminals but less than the general public; and second, that collecting DNA is not the same as collecting fingerprints, as they are fundamentally different in nature. The court found that while the government's interest in solving cold cases was legitimate, it did not justify warrantless DNA collection from a suspect. Consequently, the Appeals Court ruled that King's Fourth Amendment rights had been breached. However, the Supreme Court of the United States, in a narrow 5-4 decision, reversed this ruling. The Supreme Court acknowledged that the DNA testing was performed without a warrant but deemed it a reasonable search with a legitimate government aim. Additionally, the Supreme Court disagreed with the Appeals Court's distinction between fingerprinting and DNA testing, viewing them as equivalent methods. This decision set a controversial precedent, influencing the development of DNA retention and collection laws, including provisions for reversing convictions based on wrongful DNA matches.

---

50 See Norris, R. J.; Weintraub, J. N.; Acker, J. R.; Redlich, A. D.; C. L. Bonventre. *The Criminal Costs of Wrongful Convictions: Can We Reduce Crime by Protecting the Innocent?* Criminology & Public Policy, Vol. 19, No. 2, 2020, pp. 367-388.

51 See Judgment *Maryland v. King*, 425 Md. 550, 42 A. 3d 549, reversed., Accessible at: [https://www.law.cornell.edu/supremecourt/text/12-207], Accessed 25 November 2023.

52 See the Fourth Amendment safeguards individuals against unreasonable searches and seizures. The question before the Court was whether the collection of DNA without a warrant from individuals merely under arrest constituted a violation of this constitutional protection.

## 5. DNA DATABASING PRACTICES IN EUROPE

The relevant legislation governing the principles of retention, storage, and utilization of DNA data in Europe is shaped by the Council of Europe (CoE) and the European Union (E.U.). The mutual trait of these legislations is the treatment of DNA data as a special, sensitive type of data. The CoE's, ETS No. 108 Convention established in 1981[53], places a profound emphasis on safeguarding individuals' fundamental rights and freedoms in the context of automated data processing by outlining the principles governing data collection, storage, and usage, with a keen focus on ensuring data quality, and security, and respecting individual rights. Notably, it acknowledges the unique sensitivity of DNA data, designating it as a special category while allowing processing under appropriate safeguards. Expanding on this commitment, The CoE introduced Convention 108+ in 2018[54], aligning its data protection provisions with the General Data Protection Regulation (GDPR). This expansion further bolsters and fosters international cooperation in recognizing the global nature of genetic information sharing. Recommendation No. R(92)1, offering crucial guidance on DNA analysis in criminal investigations, where the principles of human rights, legal frameworks, and cross-border cooperation are in focus.[55] The principle of Equality of Arms, central to this Recommendation, ensures that DNA analyses as evidence are equally accessible to both the defense and the prosecution, reinforcing a fair and balanced legal process. From a jurisprudence perspective, while the Marper and Gaughran cases emphasize the significance of privacy safeguards and proportionality in the European context, *Maryland v King* prioritizes law enforcement objectives. In *Marper v the United Kingdom*, the ECtHR addressed the issue of indefinite retention of DNA samples and profiles from individuals arrested but not convicted, including minors. Emphasizing the right to respect for private life, the court ruled against the UK's policy, highlighting the necessity of proportionality and safeguards. This landmark decision set the stage for *Gaughran v the United Kingdom*, which dealt with the

---

53 See The Council of Europe's Convention for the Protection of Individuals Regarding the Automatic Processing of Individual Data and Protocols, ETS. No. 108 +, available at: [https://www.coe.int/en/web/data-protection/convention108-and-protocol], Accessed 25 November 2023.

54 See The Council of Europe's Convention 108 + Convention for the protection of individuals with regard to the processing of personal data, available at: [https://www.europarl.europa.eu/meetdocs/2014_2019/plmrep/COMMITTEES/LIBE/DV/2018/09-10/Convention_108_EN.pdf.], Accessed 25 November 2023.

55 See Council of Europe Committee of Ministers. Recommendation No. R (92) 1 of the Committee of Ministers to Member States on the use of analysis of deoxyribonucleic acid (DNA) within the framework of the criminal justice system. Adopted by the Committee of Ministers on 10 February 1992 at the 470th meeting of the Ministers' Deputies. Available at: [https://rm.coe.int/09000016804e54f7], Accessed 25 November 2023.

retrospective application of the Marper ruling. Gaughran underscored that legal advancements protecting individual rights should extend retroactively, ensuring equitable treatment for those affected by changes in the law. In contrast, *Maryland v King* presented a different narrative within the U.S. constitutional framework. The U.S. Supreme Court examined the constitutionality of collecting DNA samples from individuals arrested for serious offenses, even before conviction. The majority decision, unlike the European cases, upheld the practice, citing the government's compelling interest in identifying individuals and solving cold cases.

The European Union has a robust framework for DNA analysis in criminal investigations, focusing on efficient information exchange among member states. Key EU Resolutions emphasize the importance of sharing DNA analysis results for successful criminal investigations, with a strategic emphasis on privacy by limiting information exchange to the non-coding part of the DNA molecule.[56] The 2005 Prum Convention underscores the EU's commitment to cross-border collaboration against terrorism, transnational crime, and illegal migration. Ledic and Makar argue that the Convention places a specific focus on the non-coding part of the DNA molecule, aligning with the EU's broader strategy to bolster security measures and foster information sharing among member states.[57] Council Decision 2008/615/JHA, integrated into the EU's acquis, facilitates direct access to national DNA databases, and makes crucial distinction between direct access to a DNA database and access to all stored data, ensuring member states retain control over information associated with DNA profiles.[58] The most prominent EU instrument in safeguarding genetic and biometric data is the General Data Protection Regulation (GDPR), enacted in 2016.[59] GDPR governs the processing of personal data, including biometric and DNA data, with a focus on protecting individual privacy and ensuring responsible data handling. It imposes strict requirements for lawful processing, emphasizing explicit consent, enhanced security measures, and upholding individual rights.

Both the Council of Europe and the European Union's commitment is visible to fostering cooperative, secure, and ethically sound practices in the realm of DNA

---

56 See Notable is the Resolution on the Exchange of DNA analysis results between the member states. Council of the European Union. "Council Resolution of 9 June 1997 on the Exchange of DNA Analysis Results." Official Journal of the European Communities L193 (1997).

57 See Ledić, A.; Makar, A.; Obleščuk, I., *op. cit.*, note 38, p. 32.

58 See Council of the European Union. "Council Resolution of 30 November 2009 on the exchange of DNA analysis results (2009/C 296/01)." Official Journal of the European Union, Vol. 52, No. C 296, 1 Dec. 2009.

59 See General Data Protection Regulation, Official Journal of the European Union, No. L119/1, available at: [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0679], Accessed 25 November 2023.

analysis and criminal investigations. The difference in the treatment of DNA materials is noticeable. While the former focuses on collection and processing the latter is more focused on the automatic removal of the DNA profiles from the national database and safeguarding the right to privacy. Evident from Maryland v King, in the U.S. practice is more focused on unlawful searches, rather than the protection of the right to privacy, as is the case in the jurisprudence of the ECtHR. Authors agree with the evolving landscape surrounding DNA data, privacy, and law enforcement practices. Much can be learned by combining the positive practices on emphasis on safeguards and proportionality and the unique role of DNA in criminal investigations.

### 5.1. Genetic Privacy and DNA Databanks in Croatia

In Croatia, the handling of DNA materials in criminal proceedings is regulated by the Law on Criminal Procedure, the Law on Sanctions Enforcement, the GDPR, and relevant bylaws. These laws govern the collection, distribution, sharing, and storage of DNA materials, as well as the protocols at the Center for Forensic Expertise and Research Ivan Vucetic in Zagreb. A crucial decision by the Croatian Constitutional Court in 2012 highlighted issues with the Law on Criminal Procedure regarding the handling of DNA materials. The court argued that the law's definitions were too broad and vague, granting excessive powers to the police, state prosecution, and courts to collect, store, and process personal data, including DNA, without clear limitations based on the severity of the criminal offense. This decision emphasized the need for more precise legal boundaries to protect individuals' privacy rights.[60] Furthermore, Derencinovic, Primorac and Becker argue that the Constitutional Court noted the departure from the *Marper* standards and also highlighted that this provision deviated from EU guidelines on personal data protection, emphasizing the lack of specified purposes for data collection and processing, absence of rules for periodic assessments of data, and insufficient restrictions on access, especially concerning sensitive information like racial or ethnic origin, political beliefs, religious beliefs, and sexual life.[61] Considering genetic privacy, it becomes crucial to examine the positive experiences and practices in Croatia concerning legislation that governs genetic privacy in criminal proceedings. This includes the regulation of genetic samples and material storage, collection, and usage stipulated in the Law on Criminal Procedure, along with the privacy protections provided by the GDPR and the Law on Protection of Privacy.

---

60 See Constitution of the Republic of Croatia, Official Gazette No. 56/1990, 135/1997, 8/1998, 113/2000, 124/2000, 28/2001, 41/2001, 55/2001, 76/2010, 85/2010, 5/2014., U-I-448/2012.

61 See Becker, S.W.; Derenčinović, D., Primorac, D., *op. cit.,* note 6, p. 16.

Subsequently, delving into Croatian experiences with the DNA databank housed at the Ivan Vučetić Center for Forensic Research in Zagreb is essential for a comprehensive understanding.

### 5.2. The Croatian DNA Database – An Overview

DNA databasing in the Western Balkans has been the subject of extensive research, with notable contributions from Professor Dragan Primorac on its efficacy. Despite advancements in DNA technology, legislative progress and the establishment of DNA databases in the region have lagged. Many countries have not prioritized the development of efficient national forensic DNA databases and robust expert networks within their forensic scientific communities. Croatia was the first country in the region to establish a fully operational, independent, and successful DNA database in 2001, located at the Forensic Laboratory of the Ministry of the Interior within the Forensic Science Center "Ivan Vučetić." To ensure international compliance, all DNA profiles within the database are stored according to the recommendations set forth by the European Network of Forensic Science Institutes (ENFSI) and INTERPOL.[62] The Croatian DNA database is structured into distinct categories, including suspect profiles, forensic sample profiles, forensic mixture profiles, staff profiles, and others. Since its inception, the database has facilitated over 1,000 matches, contributing to the resolution of criminal cases through DNA evidence. DNA samples and profiles undergo storage, utilization, and deletion processes based on valid court orders or prosecutorial notifications, particularly when investigations are halted by the public prosecutor. To prevent potential illegal practices related to genetic data, the Commission for Supervision of Storing, Processing, and Safekeeping of the Data Obtained from Molecular Genetic Analysis, consisting of five members appointed by the Minister of Interior in collaboration with the Minister of Justice, oversees these procedures for a four-year term. The Ordinance on Organization and Managing of Collections with Automatic Data Processing Related to Identification of Suspects outlines the structure, content, and procedures for handling collections involving the automatic processing of data related to the identification of accused individuals.[63] The Ministry of Interior oversees two specific collections: the Papillary Line Collection and the Collection of Data Obtained from Molecular Genetic Analysis. The Ivan Vučetić Forensic Centre manages these collections according to specified regulations. The Collection of Data Obtained from Molecular Genetic Analysis

---

62 Marjanović, D., *et al. Forensic DNA databases in Western Balkan region: retrospectives, perspectives, and initiatives,* Croatian Medical Journal, Vol. 52, No. 3, 2011, pp. 235-244.

63 See *infra* note 65, p. 480.

is maintained digitally by the CODIS system (Combined DNA Index System) and contains the DNA profile of suspects, the type of biological sample (blood or oral mucous membrane swab), and information on the individual from whom the sample was taken (full name, birth date, register number, and national identification number).

The head of the Ivan Vučetić Forensic Centre appoints a single police officer to be the sole person authorized to enter, delete, or update the data. All data must be entered immediately after the molecular genetic analysis. Special attention is given to protecting the data in both the Papillary Line Collection and the Collection of Data Obtained from Molecular Genetic Analysis. Every access to these collections is logged, ensuring subsequent verification of the legality of data usage.[64]

### 5.3. Genetic Privacy in the Croatian Legal Framework

The General Data Protection Regulation (GDPR) governs genetic data processing, imposing obligations such as explicit consent, data security, and minimizing data collected for intended purposes. Croatia's Law on Sanction Enforcement[65], outlines the collection and storage of biological samples from convicted prisoners for crime prevention and investigation. These samples are stored in a national database to prevent future offenses by the same individuals and aid in criminal investigations. Importantly, the use of these samples is restricted to identifying or verifying the identity of a convicted prisoner or for use in criminal proceedings.

Genetic privacy in DNA data is regulated by the Law on Criminal Procedure, which governs the treatment of biometric and DNA data in criminal proceedings in Croatia. Although the law establishes detailed and current conditions for collecting and processing personal data, there are concerns regarding the handling of DNA data in terms of genetic privacy. Article 327-a stipulates that DNA data obtained from a legally convicted person are retained for 20 years after the final judgment. For offenses carrying a prison sentence of ten years or more, or for criminal offenses against sexual freedom with a prison sentence exceeding five years, the data can be retained for up to 40 years. In the event of a final acquittal, suspension of criminal proceedings, or dismissal of charges, the data is kept for 10 years after the conclusion of the proceedings, after which it must be deleted by the competent authority. The law clearly distinguishes criminal offenses by severity,

---

64 *Ibid*. For further read see also Becker; Derenčinović; Primorac, *op. cit.,* note 6, p. 16.

65 See Act on the execution of the prison sentence, Official Gazette No. 14/21, available at: [https://www. zakon.hr/z/179/Zakon-o-izvr%C5%A1avanju-kazne-zatvora], Accessed 25 November 2023.

affecting the retention period of DNA profiles. For severe offenses, such as those against sexual freedom with imprisonment of more than five years, retention is longer. However, Derencinovic argues that it is not entirely justified to treat less severe criminal offenses (e.g., punishable by up to one year of imprisonment, such as serious bodily harm due to negligence under Article 127, paragraph 1, of the Criminal Code) in the same category as more severe offenses (e.g., punishable by up to ten years of imprisonment, such as slavery under Article 105, paragraph 1, of the Criminal Code).[66]

A further analysis of the provisions will show that improvements are needed to align with the standards established by the European Court of Human Rights (ECtHR). Unlike biometric data, DNA remains in databases until the expiration of the prescribed periods without the possibility of periodic reassessment of the need for further retention. According to the ECtHR's position in the Gaughran case, this practice is unjustified given the sensitive nature of the data and the implications for genetic privacy. The legislator should revise this stance and introduce control mechanisms for DNA data, including differentiation between adult and minor perpetrators of criminal acts. The age of the perpetrator is crucial, as evident in the Marper case and the laws regulating minor offenders. Additionally, there is an issue with the inability to request deletion of genetic data from the database after the rehabilitation period for a committed crime. The purpose of rehabilitation is the reintegration of the offender into society, making the retention of DNA data long after the rehabilitation period problematic. This is another issue that the legislator should address. Moreover, the retention of DNA data after a person is found innocent by the court does not meet the criteria of a pressing social need. Current national legislation lacks mechanisms to reassess the need for retaining such data once a person is acquitted. Derencinovic further highlights that the retention of DNA profiles of victims is particularly contentious, as these are kept for the same duration as for individuals who have not been convicted—ten years (Article 327a, paragraph 3, of the Criminal Procedure Act). According to Article 327, paragraph 2, points 3 and 4, of the Criminal Procedure Act, biological material samples are taken from both victims and other individuals. Paragraph 6 specifies that the collection of biological material from these individuals requires their written consent, and the molecular-genetic analysis of these samples is mandated by the public prosecutor. If individuals refuse consent, the court can order DNA analysis upon the prosecutor's proposal. All the arguments regarding the retention of DNA profiles for non-convicted individuals are even more applicable to victims of criminal offenses, as it is challenging to establish constitutionally convincing reasons for such a significant intrusion into their privacy.

[66] See *supra* note 33, p. 195.

## 5. CONCLUSION

Thanks to the Croatian Innocence Project, the authors managed to get into practical dialogues with legal practitioners on safeguarding genetic privacy, compare several experiences as well, and do a retrospective on our practices to determine what can be improved in the national legal framework. As presented in this paper, genetic privacy is about the delicate balance between leveraging genetic information for crime-solving and safeguarding individual privacy rights to avoid wrongful convictions. Neglecting genetic privacy in DNA forensic practices can lead to miscarriages of justice and serious human rights implications. The jurisprudence of the ECtHR reflects the evolving landscape where the removal of DNA profiles from databases grapples with a shifting focus toward databasing for future crimes. This position plays a pivotal role in shaping the comprehension and safeguarding of genetic privacy, especially within the realm of criminal proceedings. As evident from the case studies presented in this paper, the Court underscores the importance of ensuring that the retention, utilization, and storage of DNA data adhere to the criteria of legality, proportionality, necessity in a democratic society, and the existence of a pressing social need in managing such data. It emphasizes that while such data is vital for solving crimes and should be employed for law enforcement purposes, it should be retained only until its intended purpose is fulfilled. Further, the ECtHR stresses the need for a clear differentiation, including whether the data is obtained from an adult or a minor, the purpose of data collection, the duration of data storage, and the national control mechanisms governing such data, among other considerations.

DNA databases play a crucial role in the criminal justice system, storing DNA profiles of individuals who have been convicted or are suspected, depending on the jurisdiction. These databases enable investigators to compare collected samples with existing records, ensuring the identification of matches and contributing to crime deterrence due to the high certainty levels associated with accurate matches. In the context of genetic privacy, experiences from the UK, US, and Europe underscore the paramount importance of prioritizing the protection of privacy rights and handling of genetic data. Concerning human rights implications to privacy, control mechanisms for the deletion of DNA data within these databases are necessary, along with the automatic removal of such data. This approach ensures a proactive stance in safeguarding the right to privacy, as seen from the Marper standards of the ECtHR.

Croatian legislation demonstrates a forward-looking approach and adherence to contemporary standards in safeguarding genetic data within the realm of DNA databasing. Croatia holds the distinction of being the first country in the region to

successfully establish a DNA database, certified in accordance with international standards and conventions. The Croatian experience in databasing has significantly contributed to the establishment of DNA databases in other Western Balkan countries. However, there is an immediate imperative to focus on the provisions governing the treatment of DNA data. As evident from the jurisprudence of the Court, distinctions should be made concerning the age of the perpetrator, the gravity of the crimes committed, and the permissibility of databasing DNA data from crime victims. The retention of DNA profiles of victims for the same duration as those of non-convicted individuals, i.e., ten years is particularly controversial. According to Article 327, paragraph 2, points 3 and 4 of the Criminal Procedure Act, biological material samples are collected from both victims and other individuals. If these individuals refuse consent, a court may order DNA analysis upon the proposal of the public prosecutor. All arguments raised concerning the retention of DNA profiles of non-convicted individuals equally, if not more so, apply to victims of criminal offenses. It is challenging to identify constitutionally convincing reasons for such extensive intrusion into their privacy.

Although the cases mentioned in this paper do not create any legal obligations for the Republic of Croatia, it is undisputed that the interpretative dimension of the Convention as a living instrument allows all states that have ratified it to adapt their policies, practices, and legislative frameworks to the standards established in the Court's practice before being sued on that basis.

## REFERENCES

### BOOKS AND ARTICLES


1. Becker, S. W.; Derenčinović, D.; Primorac, D., *DNA as Evidence in the Courtroom,* Forensic DNA Applications: An Interdisciplinary Perspective, Primorac, D.; Schafeld, M. (eds.), 2023
2. Bozhinovski, A. *Addressing Wrongful Convictions in Croatia through Revision of the Novum Criterion: Identifying Best Practices and Standards*; Mali, J (ed.), Human Rights in Contemporary Society – Challenges From an International Perspective, Vol. 1, 2023, p. 57-77
3. Brants, C. *Criminal Procedure to Wrongful Convictions*, Wrongful Convictions, 2010
4. Brants, C. *Tunnel Vision, Belief Perseverance and Bias Confirmation: Only Human?*, Wrongful Convictions and Miscarriages of Justice, Routledge, 2013, pp. 161-192.
5. Cole, S. A.; W. C. Thompson. *Wrongful Convictions*, Wrongful Convictions and Miscarriages of Justice: Causes and Remedies in North American and European Criminal Justice Systems, 2013
6. Costello, Á. *Genetic Data and the Right to Privacy: Towards a Relational Theory of Privacy?* Human Rights Law Review, Vol. 22, No. 1, 2022

7. Derenčinović, D. *Preispitivanje prakse država glede zadržavanja DNK profila u svjetlu nedavnih presuda Europskog suda za ljudska prava protiv Ujedinjenog Kraljevstva i Sjeverne Makedonije*, in Ogledi o pravu i pravdi u dvije Europe. (eds) Lazetic. G., Kurtović Mišić A., 2021, p. 191.
8. Derenčinović, D.; Vidlička, S. R.; Dragičević Prtenjača, M. *Innocence Projects and Subsequent DNA Testing in Croatia: A Possible Reality or an Unattainable Desire.* Zbornik PFZ, Vol. 67, 2017
9. Giannelli, P. C. *Wrongful convictions and forensic science: The need to regulate crime labs.* Netherlands Criminal Law Review, Vol. 86, 2007
10. Marjanović, D.; Konjhodžić, R.; Butorac, S. S.; Drobnič, K.; Merkaš, S.; Lauc, G.; Primorac, D. *et al.*, *Forensic DNA databases in Western Balkan region: retrospectives, perspectives, and initiatives*. Croatian Medical Journal, Vol. 52, No. 3, 2011, pp. 235-244
11. Norris, R. J.; Weintraub, J. N.; Acker, J. R.; Redlich, A. D.; Bonventre, C. L., *The Criminal Costs of Wrongful Convictions: Can We Reduce Crime by Protecting the Innocent?* Criminology & Public Policy, Vol. 19, No. 2, 2020, pp. 367-388.
12. Primorac, D.; M. Schanfield,. *Forensic DNA Applications: An Interdisciplinary Perspective.* CRC Press, 2023, pp. 1-17.
13. Ledić, A.; Makar, A.; I. Obleščuk. *DNA Databases* in Forensic DNA Applications, 2nd Primorac, D., Schanfield, M. (eds.), CRC Press, 2023
14. Vuille, J.; C. Champod, *Forensic Science and Wrongful Convictions.*, The Routledge International Handbook of Forensic Intelligence and Criminology, Routledge, 2017, pp. 125-135.

## LEGAL DOCUMENTS

1. Act on the execution of the prison sentence, Official Gazette No. 14/21, available at: [https://www.zakon.hr/z/179/Zakon-o-izvr%C5%A1avanju-kazne-zatvora], Accessed 25 November 2023.
2. Collection and use of DNA identification information from certain Federal offenders. (n.d.)., 34 U.S. Code § 40702 - Accessible at: [https://www.law.cornell.edu/uscode/text/34/40702], Accessed 25 November 2023.
3. Constitution of the Republic of Croatia, Official Gazette No. 56/1990, 135/1997, 8/1998, 113/2000, 124/2000, 28/2001, 41/2001, 55/2001, 76/2010, 85/2010, 5/2014., U-I-448/2012
4. Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine (The Oviedo Convention): Convention on Human Rights and Biomedicine ETS No 164. 1997. Accessible at: [https://www.coe.int/en/web/bioethics/oviedo-convention], Accessed 25 November 2023
5. Council of Europe Committee of Ministers. Recommendation No. R (92) 1 of the Committee of Ministers to Member States on the use of analysis of deoxyribonucleic acid (DNA) within the framework of the criminal justice system. Adopted by the Committee of Ministers on 10 February 1992 at the 470th meeting of the Ministers' Deputies, Available at: [https://rm.coe.int/09000016804e54f7], Accessed 25 November 2023

6. Council of the European Union. "Council Resolution of 30 November 2009 on the exchange of DNA analysis results (2009/C 296/01)." Official Journal of the European Union, Vol. 52, No. C 296, 1 Dec. 2009
7. Criminal Justice and Police Act 2001 (CJPA). (c. 34). London: Her Majesty's Stationery Office. Accessible at: [https://www.legislation.gov.uk/ukpga/2001/34/contents], Accessed 25 November 2023.
8. Criminal Justice and Public Order Act 1994 (CJPOA). (c. 33). London: Her Majesty's Stationery Office. Accessible at: [https://www.legislation.gov.uk/ukpga/1994/33/contents], Accessed 25 November 2023.
9. Federal Rule of Evidence 702. (n.d.). In United States Code, Title 28, Appendix., accessible at: [https://uscode.house.gov/view.xhtml?req=granuleid:USC-1999-title28a-node246-article7-rule702&num=0&edition=1999], Accessed 25 November 2023.
10. General Data Protection Regulation, Official Journal of the European Union, No. L119/1, available at: [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0679], Accessed 25 November 2023
11. International Declaration on Human Genetic Data. Adopted unanimously and by acclamation at UNESCO's 32nd General Conference on 16 October 2003. Accessible at: [https://www.unesco.org/en/ethics-science-technology/human-genetic-data], Accessed 25 November 2023.
12. Justice for All Act, 18 U.S.C. §§ 3771 et seq. (2004). Accessible at [https://ovc.ojp.gov/sites/g/files/xyckuh226/files/publications/factshts/justforall/welcome.html], Accessed 25 November 2023.
13. Law on Police., Official Gazette of the Republic of North Macedonia, nos. 114/2006, 6/2009, 145/2012, 41/2014, 33/2015, 31/2016, 106/2016, 120/2016, 21/2018, 64/2018
14. Police and Criminal Evidence Act 1984 (PACE). (c. 60). London: Her Majesty's Stationery Office. Accessible at: [https://www.legislation.gov.uk/ukpga/1984/60/contents], Accessed 25 November 2023.
15. Protection of Freedoms Act 1994 (PFA). (c. 84). London: Her Majesty's Stationery Office. Accessible at: [https://www.legislation.gov.uk/ukpga/1994/84/contents], Accessed 25 November 2023
16. Regulation (EU) 2016/679 of the European Parliament and of the Council. 2016, April 27. Official Journal of the European Union, L 119/1. Accessible at: [https://eur-ex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0679], Accessed 25 November 2023
17. Resolution on the Exchange of DNA analysis results between the member states. Council of the European Union. "Council Resolution of 9 June 1997 on the Exchange of DNA Analysis Results." Official Journal of the European Communities L193 (1997)
18. The Council of Europe's Convention 108 + Convention for the protection of individuals with regard to the processing of personal data, available at: [https://www.europarl.europa.eu/meetdocs/2014_2019/plmrep/COMMITTEES/LIBE/DV/2018/09-10/Convention_108_EN.pdf.], Accessed 25 November 2023

19. The Council of Europe's Convention for the Protection of Individuals Regarding the Automatic Processing of Individual Data and Protocols, ETS. No. 108 +, available at: [https://www.coe.int/en/web/data-protection/convention108-and-protocol], Accessed 25 November 2023
20. The DNA Analysis Backlog Elimination Act, 42 U.S.C. § 14135a (2008). Accessible at: [https://www.govinfo.gov/app/details/PLAW-110publ234], Accessed 25 November 2023
21. The DNA Identification Act., 1994. Pub. L. No. 103-322, 108 Stat. 1796. Accessible at: [https://oig.justice.gov/reports/FBI/a0632/laws.htm], Accessed 25 November 2023
22. Universal Declaration on the Human Genome and Human Rights, adopted on 11 November 1997, by the General Conference of the United Nations Educational, Scientific and Cultural Organization at its twenty-ninth session. Accessible at: [https://www.ohchr.org/en/instruments-mechanisms/instruments/universal-declaration-human-genome-and-human-rights], Accessed 25 November 2023
23. USA PATRIOT Act. 2001. Section 215, Access to Records and Other Items Under FISA, 115 Stat. 272, 50 U.S.C. § 1861. Accessed at: [https://www.congress.gov/107/plaws/publ56/PLAW-107publ56.htm]. Accessed 25 November 2023

**CASE LAW**

1. Judgment *R v Atkins*, EWCA Crim 1876, (2009) Case No: 200801604 D4 200801607 D4, Dean Atkins and Michael Atkins, Appellants, v. The Queen, Respondent. Retrieved from [https://vlex.co.uk/vid/r-v-atkins-793896693], Accessed 25 November 2023
2. Judgment *Frye v United States*, 293 F. 1013 (D.C. Cir. 1923), accessible at: [https://casetext.com/case/frye-v-united-states-7], Accessed 25 November 2023
3. Judgment *Van Der Velden v The Netherlands* (2010)(Application no. 21203/10): Accessible at: [https://hudoc.echr.coe.int/eng#{%22itemid%22:[%22001-112547%22]}], Accessed 25 November 2023
4. Judgment *S. and Marper v United Kingdom,* (2008) Application no. 30562/04 and no. 30566/04, 4 December 2008, Accessed 25 November 2023
5. Judgment *Aycaguer v France* (2017), Application no. 8806/12, 22 June 2017, Accessed 25 November 2023.
6. Judgment *Trajkovski and Chipovski v. North Macedonia* (2020) Applications nos. 53205/13 and 63320/13), Accessible at: [https://hudoc.echr.coe.int/eng#{%22itemid%22:[%22001-200816%22]}]. Accessed 25 November 2023.
7. Judgment *Gaughran v the United Kingdom* (2020) Application no. 45245/15,
8. Judgment *Maryland v King*, 425 Md. 550, 42 A. 3d 549, reversed., Accessible at: [https://www.law.cornell.edu/supremecourt/text/12-207], Accessed 25 November 2023