

Direct-to-Consumer DNA Testing and Nasab in Indonesia: Genetic Privacy and Evidence in Comparative Perspective

Author

Kudrat Abdillah,^{1*} Maylissabet,²
Nasih Burhani³

¹Gadjah Mada University,
Yogyakarta, Indonesia

²Sekolah Tinggi Ilmu Syariah
As-Salafiyah, Pamekasan,
Indonesia

³Yarmouk University, Irbid,
Jordan

Corresponding Author:

*Kudrat Abdillah, Email:
kudratabdillah@mail.ugm.ac.id

Data:

Received: Mar 13, 2026;
Accepted: Oct 13, 2026;
Published: Oct 15, 2026.

Keywords:

Genetic privacy; direct-to-consumer DNA testing; paternity evidence; nasab; personal data protection.

Abstract

Direct-to-consumer (DTC) DNA testing allows individuals to obtain parentage information through online platforms, outside clinical, forensic, and judicial control. When such reports enter Indonesian Religious Court proceedings, three legal regimes intersect: personal data protection, civil and electronic evidence, and the Islamic law of lineage (*nasab*). This article examines how Indonesian law governs genetic data generated by DTC services, under what conditions a commercial DNA report may be admitted and weighed in parentage disputes, and how genetic privacy can be reconciled with the protection of lineage and children's interests. Using statutory, conceptual, and comparative approaches, the study analyses Indonesia's Personal Data Protection Law, electronic evidence and civil procedure rules, Constitutional Court Decision Number 46/PUU-VIII/2010, the Compilation of Islamic Law, and fatwas on DNA evidence, and compares them with Jordan's Personal Data Protection Law of 2023 and Personal Status Law of 2019. The findings show that Indonesia protects genetic and children's data and recognises scientific evidence, but lacks an operational pathway for moving a privately generated report into judicial assessment. Its evidentiary weight depends on specimen identity, chain of custody, scientific interpretation, and document integrity, while biological relatedness does not automatically establish *nasab*. Jordan's codification of court-controlled "definitive scientific means" offers a useful model. The article proposes a Four-Layer Genetic Data Governance Framework linking lawful processing, evidentiary reliability, *maqāṣid*-based assessment of lineage, and digital accountability.

INTRODUCTION

Genetic testing is no longer confined to hospitals, forensic laboratories, or court-appointed experts. Commercial providers now sell ancestry, health, and relationship tests online: a consumer orders a kit through a website or an application, mails a saliva sample, and receives the result through a digital portal, often processed by a laboratory located in another country.¹ This model turns a once institutionally controlled examination into a consumer

¹ Pascal Borry, Martina C. Cornel, and Heidi C. Howard, "Where Are You Going, Where Have You Been: A Recent History of the Direct-to-Consumer Genetic Testing Market," *Journal of Community Genetics* 1, no. 3 (October 8,

service. It becomes legally significant when a report purchased for personal curiosity is later used to contest a child's parentage, to claim maintenance or inheritance, or to support a petition before a Religious Court. A technically informative result does not, by itself, show that the sample was lawfully collected, that the persons concerned consented, or that the report satisfies judicial standards of proof.

Genetic data are also relational. A sample supplied by one person discloses information about children, parents, and other relatives who never contracted with the provider, and genomic data can be re-identified even when names are removed.² The data pass through several operations—collection, laboratory analysis, digital storage, report delivery, disclosure to third parties, and possible reuse for research—each of which raises distinct questions of lawful authority, purpose limitation, and security.³ The risk is greatest when the person tested is a child, because the adult who orders the test may have interests that diverge from the child's own interests in identity, privacy, and civil recognition.

Indonesian law does not ignore these issues, but it addresses them through separate instruments.⁴ Law Number 27 of 2022 on Personal Data Protection (PDP Law) classifies genetic data and children's data as specific personal data; the Electronic Information and Transactions Law (ITE Law) recognises electronic documents as lawful evidence; Constitutional Court Decision Number 46/PUU-VIII/2010 allows a biological relationship between a child and a father to be proven through science and technology for civil purposes; and the Compilation of Islamic Law (KHI), together with the fatwa of the Indonesian Council of Ulama (MUI) on children born outside marriage, governs the attribution of *nasab*.⁵ None of these instruments, however, explains how a privately commissioned DTC report should move from a consumer's smartphone into a courtroom, who is responsible for verifying it, or what happens to the genetic data once the dispute is over.

Existing scholarship approaches the problem from three directions that rarely meet. Studies on genetic privacy emphasise the familial and relational nature of DNA data.⁶ Policy research on DTC services maps the consumer journey from pre-test information to data management and post-test impact, but concentrates on health-oriented testing rather than

2010): 101–6, <https://doi.org/10.1007/S12687-010-0023-Z>; Andelka M. Phillips, “Only a Click Away — DTC Genetics for Ancestry, Health, Love...and More: A View of the Business and Regulatory Landscape,” *Applied & Translational Genomics* 8 (March 1, 2016): 16–22, <https://doi.org/10.1016/J.ATG.2016.01.001>.

² Natalie Ram, “DNA by the Entirety,” *Columbia Law Review* 115, no. 4 (2015): 873–939; Melissa Gymrek et al., “Identifying Personal Genomes by Surname Inference,” *Science* 339, no. 6117 (January 18, 2013): 321–24, <https://doi.org/10.1126/SCIENCE.1229566>.

³ World Health Organization, *Guidance for Human Genome Data Collection, Access, Use and Sharing* (Geneva: World Health Organization, 2024), <https://www.who.int/publications/i/item/9789240102149>.

⁴ Ali Maskur et al., “Optimizing Legal Protection: Addressing the Disparity of Sanctions Regarding Personal Names in Birth Certificates as Population Documents,” *Volksgeist: Jurnal Ilmu Hukum Dan Konstitusi* 7, no. 1 (June 1, 2024): 21–33, <https://doi.org/10.24090/VOLKSGEIST.V7I1.10521>.

⁵ Law Number 27 of 2022 on Personal Data Protection, Article 4(2); Law Number 11 of 2008 on Electronic Information and Transactions, as amended by Law Number 19 of 2016 and Law Number 1 of 2024, Article 5; Constitutional Court of the Republic of Indonesia, Decision Number 46/PUU-VIII/2010, February 17, 2012; Majelis Ulama Indonesia, Fatwa Number 11 of 2012 on Children Born of Zina and Their Treatment (*Anak Hasil Zina dan Perlakuan terhadapnya*), 10 March 2012.

⁶ Ram, “DNA by the Entirety”; Natalie Ram, “Genetic Privacy after Carpenter,” *Virginia Law Review* 105, no. 7 (2019): 1357–1424.

litigation.⁷ Islamic legal scholarship, in turn, debates whether DNA evidence may establish or negate paternity alongside *al-firāsh*, acknowledgment (*iqrār*), and *li'ān*.⁸ In Indonesia, recent studies discuss DNA testing as proof of a child's legitimacy after Decision 46/PUU-VIII/2010 and document how some Religious Court judges already accept DNA results in *li'ān* cases.⁹ What remains missing is an integrated analysis connecting the commercial processing of genetic data, the evidentiary assessment of DTC reports, and the Islamic legal consequences of parentage determination.

This article addresses that gap through three research questions: (1) how do Indonesian personal data protection rules govern genetic information obtained through DTC DNA testing in parentage disputes; (2) under what legal and procedural conditions may a commercial DNA report be admitted and weighed in Religious Court proceedings; and (3) how can genetic privacy, children's interests, and the Islamic protection of lineage be reconciled? Its novelty lies in treating the DTC report as a digital object with a full data lifecycle rather than merely as a piece of scientific evidence, and in grounding genetic privacy within Islamic legal reasoning itself. On this basis, the article proposes a Four-Layer Genetic Data Governance Framework as a normative model for courts, regulators, and testing providers. The analysis is sharpened by a comparison with Jordan, a Muslim-majority jurisdiction whose Personal Status Law of 2019 expressly regulates scientific proof of paternity and whose Personal Data Protection Law of 2023 treats genetic data as sensitive. The discussion proceeds in three parts corresponding to the research questions and a fourth part on the Jordanian comparison, followed by the conclusion.

RESEARCH METHODS

This study is normative legal research that evaluates the coherence of existing legal norms and formulates a reasoned governance proposal.¹⁰ It uses three approaches. The statute approach examines Indonesian legislation on personal data, electronic evidence, civil procedure, marriage, child protection, and Islamic family law. The conceptual approach clarifies key distinctions—biological relatedness and legal *nasab*, admissibility and evidentiary weight, consent and other lawful bases for processing. The comparative approach takes Jordan as its

⁷ Suzanne Maria Onstwedder et al., "Policy Guidance for Direct-to-Consumer Genetic Testing Services: Framework Development Study," *Journal of Medical Internet Research* 26, no. 1 (July 17, 2024): e47389, <https://doi.org/10.2196/47389>.

⁸ Ayman Shabana, "Paternity between Law and Biology: The Reconstruction of the Islamic Law of Paternity in the Wake of DNA Testing," *Zygon* 47, no. 1 (March 1, 2012): 214–39, <https://doi.org/10.1111/j.1467-9744.2011.01246.X>; Ayman Shabana, "Negation of Paternity in Islamic Law between *Li'ān* and DNA Fingerprinting," *Islamic Law and Society* 20, no. 3 (2013): 157–201, <https://doi.org/10.1163/15685195-0008A0001>; Saeed Almazrouei, Siti Aisyah Samudin, and Mahamatayuding Samah, "EXAMINING THE VALIDITY OF GENETIC FINGERPRINTS IN LINEAGE DETERMINATION UNDER ISLAMIC SHARIAH AND MALAYSIAN LAW," *Journal of Shariah Law Research* 10, no. 1 (June 29, 2025): 37–62, <https://doi.org/10.22452/JSLR.VOL10NO1.3>.

⁹ Afifah Afifah and Lilik Andar Yuni, "Penetapan Nasab Anak, Hukum Isla Penetapan Konstitusi Dan Hukum Islam Terkait Tes DNA Sebagai Dalil Keabsahan Anak," *Maqasid: Jurnal Studi Hukum Islam* 13, no. 2 (December 1, 2024): 88–97, <https://doi.org/10.30651/MQS.V13I2.24368>; Diana Azzahra, "Acceptability of DNA as Evidence in Child Denial (*Li'ān*) Cases at Bangil Religious Court," *RIGGS: Journal of Artificial Intelligence and Digital Business* 5, no. 2 (July 22, 2026): 17495–504, <https://doi.org/10.31004/riggs.v5i2.11819>.

¹⁰ Terry Hutchinson, "The Doctrinal Method: Incorporating Interdisciplinary Methods in Reforming the Law," *Erasmus Law Review* 8, no. Issue 3 (February 1, 2016): 130–38, <https://doi.org/10.5553/ELR.000055>; Nurul Qamar et al., *Metode Penelitian Hukum (Legal Research Methods)*, Ed. Abd. Kahar Muzakkir (Makassar: CV. Social Politic Genius (SIGn), 2017).

principal comparator. Like Indonesia, Jordan is a Muslim-majority state in which codified Islamic family law is applied by specialised courts, and it has recently enacted a comprehensive data protection statute; the two systems therefore confront the same tension between genetic privacy and the protection of *nasab* from comparable normative starting points. The General Data Protection Regulation of the European Union, French and German rules restricting private paternity testing, and collective Islamic legal opinions on DNA evidence are used as secondary points of reference. The aim is to identify regulatory options rather than to transplant foreign standards.

Primary legal materials comprise the PDP Law; the ITE Law and Government Regulation Number 71 of 2019; the Marriage Law; the Child Protection Law; the Religious Courts Law; the *Herzien Inlandsch Reglement* (HIR) and the Civil Code on evidence; the KHI; and Constitutional Court Decision Number 46/PUU-VIII/2010. Islamic normative sources include relevant Qur'anic verses and prophetic traditions on lineage and privacy, MUI Fatwa Number 11 of 2012, and the resolution of the Islamic Fiqh Council of the Muslim World League on DNA fingerprinting. Jordanian materials comprise the Personal Data Protection Law Number 24 of 2023, the Personal Status Law Number 15 of 2019 (examined in its official Arabic text), and fatwas of the General Iftaa' Department of Jordan. Secondary materials consist of peer-reviewed scholarship on genetic privacy, DTC testing, forensic genetics, electronic evidence, and the Islamic law of paternity, together with professional standards for relationship testing.

The materials were analysed in three steps that mirror the research questions: identifying the lawful bases and safeguards applicable to genetic data; assessing the conditions for the admission and weighing of DTC reports under Indonesian procedural law; and evaluating the relationship between biological proof and the Islamic principles governing *nasab*. The findings were then synthesised into a governance framework. The study does not analyse a dataset of court decisions or interview judges; where empirical observations are mentioned, they are drawn from published studies. The proposed framework is therefore a normative model whose feasibility requires further empirical testing.

ANALYSIS AND DISCUSSION

Governing Genetic Data from DTC Testing under Indonesia's Personal Data Protection Law

The PDP Law provides the starting point. Article 4(2) classifies health data, biometric data, genetic data, and children's data as specific personal data.¹¹ A commercial paternity test typically involves at least two of these categories at once: the genetic profiles of an alleged father and a child, and data about a minor. Specific classification does not prohibit processing; it raises the level of protection. Article 20 lists the lawful bases for processing, of which explicit consent is only one, while Articles 21 and 22 regulate the information that must accompany consent and the form it must take.¹² The legal assessment must therefore identify, for each operation, the purpose, the responsible party, and the applicable basis, instead of assuming that one consumer's click on an online form legitimises every later use of the result.

¹¹ PDP Law, Article 4(2).

¹² PDP Law, Articles 20–22.

Children's data require particular care.¹³ Article 25 requires special processing of children's personal data and consent from a parent or guardian in accordance with the law.¹⁴ In a contested paternity case, however, the adult who authorises the test may be the very party whose interests conflict with the child's. A mother seeking to prove paternity, or a husband seeking to deny it, does not necessarily act in the child's best interests merely because he or she holds parental authority. The Child Protection Law recognises a child's right to know and be raised by his or her parents, and also the right to an identity.¹⁵ Taken together, these provisions call for an assessment of representation and conflicts of interest whenever a child's genetic data are used in litigation, rather than a mechanical reliance on parental consent.

The scope of the PDP Law also matters.¹⁶ Article 2(2) excludes processing by individuals in the course of purely personal or household activities.¹⁷ A family member who privately reads a test result may fall within this exclusion; the commercial provider that collects, analyses, stores, and transmits the data clearly does not. Article 16 treats processing as a sequence that includes acquisition, analysis, storage, disclosure, and deletion, while Articles 1 and 51 distinguish controllers, which determine the purposes of processing, from processors acting on their behalf.¹⁸ In a DTC arrangement, the online platform, the laboratory, and the cloud service provider may occupy different roles. Identifying those roles is essential for allocating responsibility when a report is disclosed to a litigant, submitted to a court, or retained after the dispute.

The PDP Law further imposes safeguards beyond consent. Article 34 requires a data protection impact assessment for high-risk processing, including the processing of specific personal data; Articles 35 to 37 regulate security, confidentiality, and supervision; Article 46 requires notification of a failure of personal data protection; and Article 56 conditions transfers of personal data outside Indonesia.¹⁹ These provisions are especially relevant to the digital character of DTC services, which are frequently marketed online by foreign companies and analysed abroad. An Indonesian consumer may thus generate a genetic profile that is stored in another jurisdiction, under terms of service that permit research or commercial reuse, long before any court proceeding begins.²⁰

Comparative experience shows that some legal systems regulate private paternity testing directly. The GDPR treats genetic data as a special category whose processing is prohibited unless a specific exception applies.²¹ France goes further by permitting identification through genetic fingerprints in civil matters only in proceedings to establish or contest filiation ordered by a court, and Germany requires the consent of each person whose sample is analysed for a

¹³ Hariyanto Hariyanto, Ahmad Rezy Meidina, and Mabarroh Azizah, "Decentralization and the Fulfilments of Children's Rights: Challenges and Opportunities for Local Government in Indonesia," *Lex Scientia Law Review* 8, no. 2 (November 30, 2024): 677–706, <https://doi.org/10.15294/LSLR.V8I2.14373>.

¹⁴ PDP Law, Article 25.

¹⁵ Law Number 23 of 2002 on Child Protection, as amended by Law Number 35 of 2014, Articles 7(1) and 27.

¹⁶ Siti Mariyam et al., "Safeguarding Personal Data in Indonesian E-Commerce From a Constitutional Rights Perspective," *Jambe Law Journal* 8, no. 2 (December 2025), <https://doi.org/10.22437/X5Q9Y093>.

¹⁷ PDP Law, Article 2(2).

¹⁸ PDP Law, Articles 1, 16, and 51.

¹⁹ PDP Law, Articles 34–37, 46, and 56.

²⁰ Phillips, "Only a Click Away — DTC Genetics for Ancestry, Health, Love...and More: A View of the Business and Regulatory Landscape"; Onstwedder et al., "Policy Guidance for Direct-to-Consumer Genetic Testing Services: Framework Development Study."

²¹ Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 (General Data Protection Regulation), OJ L 119, 4.5.2016, Articles 4(13) and 9.

parentage test.²² Indonesia has adopted neither model. Its framework protects genetic data generally but contains no specific rule on who may commission a paternity test, whose samples may be analysed, or whether a privately obtained result may be used in court. Table 1 summarises the functions of the relevant Indonesian instruments and the gaps that remain.

Table 1: Functional Map of Indonesian Legal Instruments Relevant to DTC DNA Testing

Legal Instrument	Primary Function	Relevance to DTC Testing	Remaining Gap
PDP Law (Law No. 27 of 2022)	Regulates lawful processing of personal data	Genetic and children's data are specific personal data; lifecycle and controller duties	No specific rule on paternity tests or on use of genetic data in litigation
ITE Law and GR 71/2019	Recognises electronic evidence; regulates electronic systems and erasure	Digital DNA reports may qualify as electronic documents	Recognition of the file does not verify the biological specimen
HIR, Civil Code, Religious Courts Law	Govern civil evidence and procedure in Religious Courts	Determine burden of proof, means of evidence, and expert evidence	No guidance on authenticating privately obtained genetic reports
Marriage Law, KHI, Decision 46/PUU-VIII/2010, MUI Fatwa 11/2012	Govern legitimacy, origin of children, and nasab	Allow scientific proof of a biological relationship for civil purposes	Relationship between biological proof and nasab remains contested
Child Protection Law	Protects the child's identity and best interests	Child's right to know his or her parents	No procedure for representing the child's interests in genetic testing

Source: Analysed from primary legal sources.

The first research question can therefore be answered as follows. Indonesian data protection law does govern DTC genetic data: it requires a lawful basis for each operation, special care for children's data, impact assessments, security measures, and restrictions on cross-border transfer. Its weakness is not the absence of protection but the absence of rules tailored to the specific setting in which a genetic report is generated privately and later used to determine family status.

Admissibility and Evidentiary Weight of DTC DNA Reports in Religious Courts

DTC services are not a uniform forensic procedure. Providers differ in how they collect samples, verify identity, and present results, and a growing body of policy guidance stresses that each service must be evaluated according to its actual practice.²³ A privately obtained report should therefore be neither dismissed simply because it is commercial nor presumed

²² French Civil Code (*Code civil*), Article 16-11; German Genetic Diagnostics Act (*Gendiagnostikgesetz*) of 31 July 2009, Section 17.

²³ Onstwedder et al., "Policy Guidance for Direct-to-Consumer Genetic Testing Services: Framework Development Study."

reliable because DNA analysis enjoys a reputation for accuracy. The proper question is how such a report fits within the evidentiary system that Religious Courts already apply.

Article 54 of the Religious Courts Law provides that the procedural law applicable in the general courts also applies in the Religious Courts unless otherwise regulated.²⁴ Under Article 164 of the HIR and Article 1866 of the Civil Code, the means of proof in civil cases are documents, witnesses, presumptions, admissions, and oaths.²⁵ A DNA report does not fit neatly into any single category. Printed or digital reports may be treated as documentary or electronic evidence; the ITE Law recognises electronic information and documents and their printouts as lawful evidence provided they meet the requirements of the Law, including that the information can be accessed, displayed, and its integrity guaranteed.²⁶ The scientific meaning of the report, however, usually requires an expert. Article 154 of the HIR allows the court to appoint experts, whose opinions the judge is not bound to follow.²⁷ In practice, therefore, a DTC report is best understood as documentary or electronic material whose probative value depends on expert explanation, corroboration, and the judge's free evaluation, rather than as an autonomous and conclusive category of proof.

The burden of proof follows the general rule that a party asserting a right or fact must prove it.²⁸ The substantive law determines what must be proven. Article 43(1) of the Marriage Law, as interpreted in Decision 46/PUU-VIII/2010, recognises that a child born outside marriage has a civil relationship with the man proven, through science and technology or other lawful evidence, to be the father.²⁹ The KHI provides that the origin of a child is proven by a birth certificate or other evidence and that, where such evidence is lacking, the Religious Court may determine the child's origin after a careful examination.³⁰ Empirical research in the Bangil Religious Court shows that some judges already request or accept DNA results in *li'ān* cases, while others treat them as secondary evidence.³¹ DNA evidence is thus not foreign to Religious Courts, but the conditions for accepting a report commissioned privately from a commercial provider have not been articulated.

Four conditions are decisive. The first is specimen identity. Accurate analysis is meaningless if it cannot be shown whose sample was tested. Many DTC kits rely on home collection without identity verification, whereas relationship-testing standards distinguish tests for personal information from legal tests with documented identification, witnessed collection, and chain-of-custody controls.³² The second is chain of custody: a record of how the specimen was handled from collection through transport, analysis, and reporting. An incomplete record does not prove manipulation, but it weakens the link between the result and

²⁴ Law Number 7 of 1989 on Religious Courts, as amended by Law Number 3 of 2006 and Law Number 50 of 2009, Article 54.

²⁵ *Herzien Inlandsch Reglement* (HIR), Article 164; Indonesian Civil Code (*Burgerlijk Wetboek*), Article 1866.

²⁶ Disriani Latifah Soroinda and Anandri Annisa Rininta Soroinda Nasution, "Kekuatan Pembuktian Alat Bukti Elektronik Dalam Hukum Acara Perdata," *Jurnal Hukum & Pembangunan* 52, no. 2 (June 30, 2022): 384–405, <https://doi.org/10.21143/jhp.vol52.no2.1474>.

²⁷ HIR, Article 154.

²⁸ HIR, Article 163; Civil Code, Article 1865.

²⁹ Law Number 1 of 1974 on Marriage, as amended by Law Number 16 of 2019, Article 43(1); Constitutional Court Decision 46/PUU-VIII/2010.

³⁰ Compilation of Islamic Law (*Kompilasi Hukum Islam*), disseminated by Presidential Instruction Number 1 of 1991, Article 103.

³¹ Azzahra, "Acceptability of DNA as Evidence in Child Denial (Li'ān) Cases at Bangil Religious Court."

³² AABB, *Standards for Relationship Testing Laboratories* (Bethesda, MD: AABB, n.d.), <https://www.aabb.org/standards-accreditation/standards/relationship-testing-laboratories>.

the litigant. In the Indonesian context, an appropriate response to such weaknesses is a court-ordered examination at a laboratory accredited for forensic DNA testing, for example under ISO/IEC 17025 through the National Accreditation Committee (KAN), rather than reliance on foreign accreditation as if it were a legal requirement.

The third condition is scientific interpretation. Paternity indices and probabilities depend on stated hypotheses, reference population data, and statistical assumptions; the International Society for Forensic Genetics recommends that these be transparent.³³ Forensic scholarship also distinguishes the validity of a method from the reliability of its application in a particular case.³⁴ A report that presents only a percentage, without explaining the method and its limitations, should carry less weight than a report accompanied by expert testimony. The fourth condition is document integrity. Customers usually receive results as downloadable files or screenshots that can be altered. Confirmation from the provider, integrity checks, and consistent laboratory records may establish authenticity, but even a perfectly authentic file proves nothing about the origin of the specimen. Each condition must therefore be assessed separately.

On this basis, a graded approach is proposed. A DTC report without verified identity or chain of custody may serve as an initial indication that justifies further examination—for example, an order for supervised testing—but should not by itself support a finding of paternity. A report supported by verified identity, documented custody, transparent methodology, and expert explanation may carry substantial weight. Neither category has statutory force; both are tools for structuring judicial reasoning. When the evidence is contested, proportionate verification preserves the child's opportunity to prove a biological relationship while protecting the rights of the other persons involved. Tables 2 and 3 summarise the assessment dimensions and the corresponding safeguards.

Table 2: Proposed Evidentiary Assessment Matrix for DTC DNA Reports

Assessment Dimension	Legal or Technical Reference	Key Question	Evidentiary Implication
Legal recognition	ITE Law, Articles 5–6; HIR, Article 164	Can the report qualify as documentary or electronic evidence?	Opens a route for consideration, subject to the requirements of the law
Identity verification	Relationship-testing standards	Are the specimens reliably linked to the named persons?	Weak verification reduces confidence in the biological inference
Chain of custody	Laboratory documentation	Is handling traceable from collection to reporting?	Gaps may require corroboration or court-ordered retesting
Scientific interpretation	ISFG recommendations; expert evidence (HIR, Article 154)	Are the method, hypotheses, and statistics transparent?	Determines the scientific significance of the result

³³ David W. Gjertson et al., “ISFG: Recommendations on Biostatistics in Paternity Testing,” *Forensic Science International: Genetics* 1, no. 3–4 (December 1, 2007): 223–31, <https://doi.org/10.1016/J.FSIGEN.2007.06.006>.

³⁴ Hal S. Stern, Maria Cuellar, and David Kaye, “Reliability and Validity of Forensic Science Evidence,” *Significance* 16, no. 2 (April 1, 2019): 21–24, <https://doi.org/10.1111/J.1740-9713.2019.01250>.

Assessment Dimension	Legal or Technical Reference	Key Question	Evidentiary Implication
Document integrity	ITE Law, Article 6	Can the file be authenticated and shown to be unaltered?	Supports authenticity of the document, not of the specimen
Data protection	PDP Law, Articles 4, 20, 25	Were lawful bases and safeguards observed?	Requires separate examination of processing legality
Legal parentage	Marriage Law; KHI; Decision 46/PUU-VIII/2010	Which legal relationship is claimed?	Biological evidence must be linked to the specific legal consequence

Source: *Analysed from primary legal sources and forensic standards.*

Table 3: Legal and Procedural Risks of DTC DNA Testing and Proposed Safeguards

Risk Category	Source of Uncertainty	Potential Legal Consequence	Proposed Safeguard
Identity uncertainty	Unverified identity of sample provider	Uncertain link between specimen and litigant	Supervised identification and collection
Chain-of-custody gaps	Incomplete collection and transfer records	Reduced confidence in specimen provenance	Documented handling and court-ordered retesting
Misinterpretation	Unclear method or statistical assumptions	Overstatement of genetic probability	Qualified expert explanation
Digital alteration	Unverified or edited report file	Dispute over document authenticity	Source confirmation and integrity checks
Privacy violation	Unlawful collection or disclosure	Data protection liability	Lawful basis, minimisation, restricted disclosure
Conflict with child's interests	Adult representative with divergent interests	Harm to the child's identity and privacy	Child-sensitive assessment and independent representation

Source: *Analysed from primary legal sources and forensic standards.*

The answer to the second research question is that DTC DNA reports should be treated as potentially relevant documentary or electronic material—neither automatically inadmissible nor conclusive proof of paternity. Their weight depends on verified specimen identity, documented custody, transparent interpretation, authenticated documents, and lawful data handling. Where one dimension is deficient, the court may require additional records, expert testimony, corroboration, or supervised testing. What Indonesia lacks is not a legal basis for scientific evidence but practical guidance that tells judges and litigants how to apply these conditions consistently.

Genetic Privacy, the Right to Erasure, and the Protection of Nasab

Islamic family law adds a normative dimension that neither data protection law nor procedural law can supply. Lineage is attributed primarily through a valid marriage, expressed

in the prophetic tradition that “the child belongs to the marriage bed” (*al-walad li al-firāsh*).³⁵ The Qur’an commands that children be called by their fathers’ names and provides the procedure of *li’ān* for a husband who accuses his wife and denies paternity.³⁶ Indonesian law reflects this structure: the Marriage Law and the KHI define a legitimate child as one born in or as a result of a valid marriage, attribute a child born outside marriage to the mother and her family, and regulate the husband’s denial of paternity through *li’ān*.³⁷ Classical jurists also recognised physiognomy (*qiyāfa*) as a means of resolving doubtful lineage, which modern scholars frequently cite as an analogy for DNA evidence.³⁸

Contemporary Islamic legal opinion generally accepts DNA testing as a strong means of proof while limiting its role. The Islamic Fiqh Council of the Muslim World League, at its sixteenth session in Mecca in January 2002, recognised genetic fingerprinting as more effective than physiognomy but restricted its use to supporting the recognised *shar’i* means of proof in contested cases, not to re-examining lineage that has already been established.³⁹ Studies of fatwa bodies and of Malaysian and Indonesian practice similarly show that DNA is widely treated as corroborative evidence rather than as a substitute for *li’ān* or the presumption of *firāsh*.⁴⁰

Indonesia’s legal response to Decision 46/PUU-VIII/2010 illustrates how biological truth and legal lineage can be separated without leaving the child unprotected. MUI Fatwa Number 11 of 2012 maintains that a child born of *zina* has no *nasab*, guardianship, inheritance, or maintenance relationship with the biological father, yet authorises the government to impose *ta’zīr* requiring that man to provide for the child and to leave property to the child through a mandatory bequest (*waṣiyya wājiba*).⁴¹ The fatwa thus accepts that biological paternity may generate civil obligations without generating *nasab*. This distinction is central for DTC testing: a commercial report may help establish a biological fact, but the legal consequences—*nasab*, guardianship in marriage, inheritance, or maintenance—must be determined by the applicable rules, not by a laboratory probability.⁴²

Islamic law also offers its own grounds for protecting genetic privacy. The Qur’an prohibits spying on others (*tajassus*),⁴³ and the juristic tradition values concealing the faults of others (*satr*) and protecting honour (*ḥifẓ al-‘ird*). Genetic data can expose infidelity, misattributed paternity, and family secrets. Secretly collecting a relative’s sample—for example, a toothbrush or a strand of hair—and sending it to a commercial laboratory resembles *tajassus* in its digital form. From the perspective of the objectives of Islamic law (*maqāṣid al-*

³⁵ *Ṣaḥīḥ al-Bukhārī*, ḥadīth no. 6749; *Ṣaḥīḥ Muslim*, ḥadīth no. 1457.

³⁶ Q. 33:5; Q. 24:6–9.

³⁷ Marriage Law, Articles 42–44; KHI, Articles 99–102.

³⁸ Shabana, “Paternity between Law and Biology: The Reconstruction of the Islamic Law of Paternity in the Wake of DNA Testing.”

³⁹ Islamic Fiqh Council of the Muslim World League, Resolution on DNA Fingerprinting, 16th Session, Mecca, January 2002, as discussed in Ayman Shabana, “Islamic Law of Paternity and DNA Evidence – Islamic Law Blog,” Islamic Law Blog, 2021, <https://islamiclaw.blog/2021/06/28/islamic-law-of-paternity-and-dna-evidence/>.

⁴⁰ Shabana, “Negation of Paternity in Islamic Law between Li’ān and DNA Fingerprinting”; Almazrouei, Samudin, and Samah, “EXAMINING THE VALIDITY OF GENETIC FINGERPRINTS IN LINEAGE DETERMINATION UNDER ISLAMIC SHARIAH AND MALAYSIAN LAW”; Azzahra, “Acceptability of DNA as Evidence in Child Denial (Li’ān) Cases at Bangil Religious Court.”

⁴¹ MUI Fatwa Number 11 of 2012.

⁴² Afifah and Yuni, “Penetapan Nasab Anak, Hukum Isla Penetapan Konstitusi Dan Hukum Islam Terkait Tes DNA Sebagai Dalil Keabsahan Anak.”

⁴³ Q. 49:12.

sharī'a), the protection of lineage (*ḥifẓ al-nasl*) must therefore be balanced against the protection of honour and privacy, with the child's welfare (*maṣlaḥa*) as the decisive consideration. The legal maxim that preventing harm takes precedence over securing benefits (*dar' al-mafāsid muqaddam 'alā jalb al-maṣāliḥ*) supports restricting unauthorised testing, while the obligation to protect the child supports allowing properly supervised testing when the child's civil rights depend on it.

This balance becomes concrete when a party asks for genetic data to be erased. The PDP Law grants data subjects the right to end processing and to delete or destroy their personal data, and obliges controllers to do so in specified circumstances, subject to statutory exceptions, including for law enforcement processes.⁴⁴ Separately, the ITE Law and its implementing regulation provide a right to have irrelevant electronic information erased or delisted, often described as Indonesia's "right to be forgotten."⁴⁵ The GDPR's right to erasure offers a comparable model and likewise yields where processing is necessary for legal claims.⁴⁶ Erasure does not make a biological relationship disappear, and it cannot by itself defeat a child's claim; conversely, a pending or possible parentage claim does not justify a commercial provider's indefinite retention of genetic data.

The appropriate response depends on timing. Before litigation, the provider's retention must be justified by the original purpose and lawful basis. During proceedings, specific records may be retained or disclosed to the extent necessary for a legitimate evidentiary purpose. After a final judgment, continued storage by the provider requires separate justification, whereas court records are governed by judicial archiving rules. At each stage, the question is which party holds the data, on what basis, for what purpose, and for how long. Framing the problem in this way allows the protection of lineage and the protection of privacy to coexist instead of competing as absolute claims.

These findings support a Four-Layer Genetic Data Governance Framework, summarised in Table 4. The label emphasises governance rather than consent alone, because consent is only one of several lawful bases for processing. The four layers are complementary evaluations, not four signatures or four new laws. The first layer, lawful processing, requires DTC providers to identify the controller and processor for each operation, the lawful basis under Article 20 of the PDP Law, child-specific safeguards, and separate authorisation for research, marketing, or data sharing. The second layer, evidentiary reliability, requires courts to assess specimen identity, chain of custody, scientific interpretation, and document integrity, with an opportunity for the opposing party to challenge the evidence. The third layer, *maqāṣid*-based assessment of lineage, requires judges to determine which legal consequence is claimed and to apply the rules on *nasab*, *firāsh*, and *li'ān*, the civil relationship recognised in Decision 46/PUU-VIII/2010, and the child's best interests.

The fourth layer, digital accountability, is the dimension that links the framework most directly to the digital environment in which DTC services operate. It covers platform accountability for providers that market tests online to Indonesian consumers, conditions for cross-border transfer, breach notification, secondary use of genetic data for research or the

⁴⁴ PDP Law, Articles 8, 15, and 42–45.

⁴⁵ ITE Law, Article 26; Government Regulation Number 71 of 2019 on the Implementation of Electronic Systems and Transactions, Articles 15–18.

⁴⁶ GDPR, Article 17.

training of analytical models, and lawful retention and deletion.⁴⁷⁴⁸ Technical tools such as cryptographic hashes can help detect alterations to a report but cannot verify the origin of a specimen. Recording raw genetic data on immutable systems such as public blockchains would conflict with data minimisation and erasure obligations and should be avoided; protected records with limited verification metadata are preferable.⁴⁹

Table 4: Four-Layer Genetic Data Governance Framework for Parentage Disputes

Layer	Legal or Normative Foundation	Responsible Actors	Core Safeguards
1. Lawful processing	PDP Law, Articles 4, 16, 20–25, 34–37	DTC providers, controllers, processors	Lawful basis, child-specific authorisation, purpose limitation, impact assessment
2. Evidentiary reliability	HIR, Articles 154, 163–164; ITE Law, Articles 5–6; Religious Courts Law, Article 54	Judges, litigants, experts, laboratories	Identity verification, chain of custody, expert interpretation, authentication
3. Maqāṣid-based assessment of lineage	Marriage Law; KHI, Articles 99–103; Decision 46/PUU-VIII/2010; MUI Fatwa 11/2012	Judges, Islamic legal experts	Distinguishing biological fact from <i>nasab</i> ; protecting the child's welfare and family honour
4. Digital accountability	PDP Law, Articles 8, 42–46, 56; ITE Law, Article 26; GR 71/2019	Platforms, laboratories, court information administrators	Restricted access, breach notification, cross-border safeguards, retention and erasure review

Source: Formulated by the authors from the analysis of primary legal sources.

A hypothetical case illustrates how the framework operates. A mother orders an online DTC paternity kit, collects the child's sample at home, obtains a hair sample from the alleged father without his knowledge, and files a petition for recognition of the child's origin, attaching the downloaded report. Under the first layer, the court notes that the alleged father's data were obtained without any lawful basis and that the provider failed to verify identities, matters relevant to data protection liability but not automatically fatal to the petition. Under the second layer, the report has no verified identity or chain of custody and is therefore treated only as an initial indication; the court orders supervised testing at an accredited laboratory. Under the third layer, if the supervised test confirms a biological relationship, the court determines which consequences follow—a civil relationship and maintenance obligations, or *nasab* if the child was born within a valid marriage—rather than equating biology with lineage. Under the fourth layer, the court limits disclosure of the genetic data to the parties, and the provider is required to review its retention after the case is closed.

The answer to the third research question is therefore that genetic privacy and the

⁴⁷ PDP Law, Articles 46 and 56; World Health Organization, *Guidance for Human Genome Data Collection, Access, Use and Sharing*.

⁴⁸ PDP Law, Articles 46 and 56; WHO, *Guidance for Human Genome Data*.

⁴⁹ Karen Yeung, "Algorithmic Regulation: A Critical Interrogation," *Regulation and Governance* 12, no. 4 (December 1, 2018): 505–23, <https://doi.org/10.1111/REGO.12158>; PAGE:STRING:ARTICLE/CHAPTER.

protection of lineage can be reconciled when each is assigned its proper function: privacy rules govern how genetic data are obtained and kept, evidentiary rules govern how far a report can be trusted, and Islamic family law governs which legal consequences follow from a proven biological fact. The framework remains a normative proposal and has not been tested through case data or institutional pilots; its contribution lies in coordinating these functions conceptually.

Comparative Perspective: Lessons from Jordan

Jordan offers a particularly instructive comparison. Its family law is codified and applied by sharia courts, much as Indonesian Muslims bring family disputes before Religious Courts, and it adopted a comprehensive data protection statute only shortly after Indonesia did. Both states therefore face the same question: how to admit the scientific power of DNA without unsettling the rules that protect lineage and family privacy.

At the level of data protection, the two systems are broadly aligned. Jordan's Personal Data Protection Law Number 24 of 2023 was published on 17 September 2023 and entered into force on 17 March 2024. It treats genetic and biometric data, together with health data, as sensitive data; processing generally requires the data subject's prior consent, given in writing and specifying the purpose and duration, unless another legal ground applies; transfers abroad are prohibited where the recipient's protection is weaker than Jordanian standards; and serious breaches must be notified to data subjects within twenty-four hours and to the supervisory unit within seventy-two hours.⁵⁰ Supervision is entrusted to a Personal Data Protection Unit within the Ministry of Digital Economy and Entrepreneurship and a Personal Data Protection Council.⁵¹ Compared with Indonesia, Jordan's consent model is more formal, whereas Indonesia's PDP Law expressly classifies children's data as specific personal data and requires parental or guardian consent; Jordan does not list children's data as a separate category and addresses persons lacking legal capacity mainly through the obligation to appoint a data protection officer.⁵² Neither statute, in the materials examined, contains a specific rule on private paternity testing or on the use of commercially generated genetic results in court.

The decisive difference lies in family law. Jordan's Personal Status Law Number 15 of 2019 provides that lineage to the father is established by the marriage bed (*firāsh*), acknowledgment (*iqrār*), or evidence (*bayyina*), and that "the court may establish the lineage of a child to his father by definitive scientific means" (*al-wasā'il al-ʿilmiyya al-qaṭʿiyya*).⁵³ The same Law bars a husband from denying paternity through *liʿān* more than sixty days after learning of the birth, after he has acknowledged the child, or where definitive scientific means prove that the child is his.⁵⁴ DNA thus enters Jordanian law expressly, but within the structure of *firāsh* and under the court's control: scientific proof can confirm lineage and block an unfounded denial, while adoption cannot create lineage.⁵⁵ Jordanian commentators read the open-ended phrase

⁵⁰ Hashemite Kingdom of Jordan, Personal Data Protection Law Number 24 of 2023, Official Gazette, September 17, 2023, Articles 15 and 20; Clyde & Co, "Jordan Issues First Personal Data Protection Law," 2023, <https://www.clydeco.com/en/insights/2023/10/jordan-issues-first-personal-data-protection-law>.

⁵¹ Clyde & Co.

⁵² PDP Law, Articles 4(2), 20, 25, and 46; DLA PIPER, "Data Protection Laws in Jordan," Data Protection Laws of the World, 2026, <https://www.dlapiperdataprotection.com/?t=law&c=JO>.

⁵³ Hashemite Kingdom of Jordan, Personal Status Law Number 15 of 2019 (*Qānūn al-Aḥwāl al-Shakhṣiyya*), Official Gazette No. 5578, June 2, 2019, Article 157.

⁵⁴ Jordanian Personal Status Law, Articles 163–165.

⁵⁵ Jordanian Personal Status Law, Article 162.

“definitive scientific means” as allowing judges to follow scientific developments while keeping the results subject to judicial evaluation, and they report appellate decisions in which DNA testing was ordered in paternity disputes.⁵⁶ The scope of the provision for children born outside a valid marriage remains contested: the Jordanian government has reported that genetic testing may establish descent without being restricted to a valid marriage contract, whereas civil-society organisations maintain that a marriage contract is still required.⁵⁷

Jordanian religious guidance mirrors the cautious position described in the previous section. The General Iftaa’ Department of Jordan, following the 2002 resolution of the Islamic Fiqh Council, regards DNA as more reliable than *qiyāfa* and permits its use for children of unknown parentage, hospital mix-ups, and lost children, but holds that it may not be used to re-examine paternity established by a valid marriage or to attribute a child born of *zina* to the biological father.⁵⁸ Another fatwa stresses that DNA must be handled “with extreme caution and confidentiality” and that laboratory errors must be corrected immediately.⁵⁹ This emphasis on confidentiality supplies an Islamic articulation of genetic privacy that supports the argument made above. On *nasab*, Jordan and MUI Fatwa Number 11 of 2012 converge; Indonesia, however, goes further in protecting the child’s material welfare by allowing a proven biological father to bear civil obligations—maintenance and a mandatory bequest—without creating *nasab*.⁶⁰

The comparison yields lessons in both directions. For Indonesia, Jordan shows that family legislation can name scientific proof explicitly while placing it under judicial control. A provision modelled on Article 157 of the Jordanian Law—whether in a revised Compilation of Islamic Law or in Supreme Court guidance—would give Religious Courts a clear mandate to treat a DTC report as a trigger for court-ordered definitive testing rather than as proof in itself, which is precisely the function of the second layer of the proposed framework. Jordan’s time limit for *li‘ān* and its rule that scientific proof bars an unfounded denial also protect the stability of the child’s status. For Jordan, Indonesia’s explicit protection of children’s data and its model of civil obligations without *nasab* offer ways to protect children without altering classical lineage rules. Both systems share the same gap: neither regulates DTC providers specifically, so the fourth layer of the framework, digital accountability, is equally relevant to both. Table 5 summarises the comparison.

⁵⁶ Tariq M. Abu Tayeh and Faisal S. Al-Abadi, “Genetic Fingerprinting and Its Role in Proving Paternity in the Jordanian Personal Status Law No. (15) of 2019: DNA as a Model,” *IUG Journal of Sharia and Law Studies* 31, no. 1 (2023): 64–85, <https://doi.org/10.33976/IUGJLS.31.1/2023/4>.

⁵⁷ Hind Farahat and Kristen E. Cheney, “Anfragebeantwortung Zu Jordanien: Behandlung von Unehelichen Kindern [a-12230],” *Global Studies of Childhood* 5, no. 2 (September 5, 2023): 146–57, <https://doi.org/10.1177/2043610615586101>.

⁵⁸ Fatwa Number 2794 General Iftaa’ Department of Jordan, “Ruling on Proving or Disproving Paternity through DNA Testing,” Iftaa’ Department, 2013, <https://www.aliftaa.jo/research-fatwa-english/2794/Ruling-on-Proving-or-Disproving-Paternity-through-DNA-Testing>.

⁵⁹ General Iftaa’ Department of Jordan, Fatwa Number 2795, “Correcting Mistake in DNA and Rulings Caused by It,” 2013, <https://aliftaa.jo/en-fatwas/2795/rss.aspx>.

⁶⁰ MUI Fatwa Number 11 of 2012; Constitutional Court Decision 46/PUU-VIII/2010.

Table 5: Comparison of Indonesian and Jordanian Law on Genetic Data and DNA Paternity Evidence

Aspect	Indonesia	Jordan	Comparative Implication
Data protection statute	Law No. 27 of 2022 (PDP Law)	Law No. 24 of 2023, in force since 17 March 2024	Both recent and both applicable to DTC providers
Status of genetic data	Specific personal data (Art. 4(2))	Sensitive data, together with biometric and health data	Heightened protection in both systems
Children's data	Expressly specific; parental or guardian consent (Art. 25)	Not a separate category; data protection officer required for persons lacking capacity	Indonesia is more explicit
Basis for processing	Several lawful bases, including explicit consent (Art. 20)	Prior written consent specifying purpose and duration, subject to exceptions	Jordan's consent is more formal
Breach notification	Within 3 × 24 hours (Art. 46)	24 hours to data subjects; 72 hours to the supervisory unit	Jordan imposes shorter deadlines
DNA in lineage law	Not regulated in the KHI; civil relationship via Decision 46/PUU-VIII/2010	Court may establish paternity by definitive scientific means (Art. 157); DNA bars denial by li'ān (Art. 163)	Jordan codifies court-controlled DNA evidence
Child born outside marriage	No nasab to the father (MUI 2012); civil obligations possible	No nasab to the biological father (Iftaa' Fatwa 2794); scope of Art. 157 contested	Indonesia offers broader material protection
Specific rule on DTC paternity tests	None	None identified	Shared regulatory gap

Source: *Analysed from primary legal sources of Indonesia and Jordan.*

CONCLUSION

This study concludes that Indonesian law already provides a foundation for governing DTC DNA testing in parentage disputes but lacks the coordination needed to apply it. The PDP Law protects genetic and children's data as specific personal data, yet contains no rule on private paternity testing; civil procedure and the ITE Law allow DNA reports to be considered, yet do not specify how commercially obtained reports should be verified; and Constitutional Court Decision 46/PUU-VIII/2010, the KHI, and MUI Fatwa Number 11 of 2012 show that biological relatedness and legal *nasab* must be distinguished. The proposed Four-Layer Genetic Data Governance Framework links lawful processing, evidentiary reliability, *maqāṣid*-based assessment of lineage, and digital accountability. The comparison with Jordan shows that codifying court-controlled “definitive scientific means” in family law, as Articles 157 and 163 of Jordan's Personal Status Law do, can channel DTC results into judicial verification, while

Indonesia's protection of children's data and its recognition of civil obligations without *nasab* offer lessons in return. To implement the framework, the Supreme Court could issue guidance for Religious Courts on assessing scientific and electronic evidence in cases concerning the origin of children; the implementing regulations of the PDP Law and the future data protection authority could set specific rules for DTC providers on identity verification, child data, cross-border storage, and retention; and religious authorities could develop guidance on the ethical limits of private genetic testing. Because this study is doctrinal, future research should test the framework against Religious Court decisions, laboratory practices, and the experiences of families affected by DTC testing.

REFERENCES

- AABB. *Standards for Relationship Testing Laboratories*. Bethesda, MD: AABB, n.d. <https://www.aabb.org/standards-accreditation/standards/relationship-testing-laboratories>.
- Afifah, Afifah, and Lilik Andar Yuni. "Penetapan Nasab Anak, Hukum Isla Penetapan Konstitusi Dan Hukum Islam Terkait Tes DNA Sebagai Dalil Keabsahan Anak." *Maqasid: Jurnal Studi Hukum Islam* 13, no. 2 (December 1, 2024): 88–97. <https://doi.org/10.30651/MQS.V13I2.24368>.
- Almazrouei, Saeed, Siti Aisyah Samudin, and Mahamatayuding Samah. "EXAMINING THE VALIDITY OF GENETIC FINGERPRINTS IN LINEAGE DETERMINATION UNDER ISLAMIC SHARIAH AND MALAYSIAN LAW." *Journal of Shariah Law Research* 10, no. 1 (June 29, 2025): 37–62. <https://doi.org/10.22452/JSLR.VOL10NO1.3>.
- Azzahra, Diana. "Acceptability of DNA as Evidence in Child Denial (Li'ān) Cases at Bangil Religious Court." *RIGGS: Journal of Artificial Intelligence and Digital Business* 5, no. 2 (July 22, 2026): 17495–504. <https://doi.org/10.31004/riggs.v5i2.11819>.
- Borrry, Pascal, Martina C. Cornel, and Heidi C. Howard. "Where Are You Going, Where Have You Been: A Recent History of the Direct-to-Consumer Genetic Testing Market." *Journal of Community Genetics* 1, no. 3 (October 8, 2010): 101–6. <https://doi.org/10.1007/S12687-010-0023-Z>.
- Clyde & Co. "Jordan Issues First Personal Data Protection Law ," 2023. <https://www.clydeco.com/en/insights/2023/10/jordan-issues-first-personal-data-protection-law>.
- DLA PIPER. "Data Protection Laws in Jordan ." Data Protection Laws of the World, 2026. <https://www.dlapiperdataprotection.com/?t=law&c=JO>.
- Farahat, Hind, and Kristen E. Cheney. "Anfragebeantwortung Zu Jordanien: Behandlung von Unehelichen Kindern [a-12230]." *Global Studies of Childhood* 5, no. 2 (September 5, 2023): 146–57. <https://doi.org/10.1177/2043610615586101>.
- General Iftaa' Department of Jordan, Fatwa Number 2794. "Ruling on Proving or Disproving Paternity through DNA Testing." Iftaa' Department, 2013. <https://www.aliftaa.jo/research-fatwa-english/2794/Ruling-on-Proving-or-Disproving-Paternity-through-DNA-Testing>.
- Gjertson, David W., Charles H. Brenner, Max P. Baur, Angel Carracedo, Francois Guidet, Juan A. Luque, Rüdiger Lessig, et al. "ISFG: Recommendations on Biostatistics in Paternity

- Testing." *Forensic Science International: Genetics* 1, no. 3–4 (December 1, 2007): 223–31. <https://doi.org/10.1016/J.FSIGEN.2007.06.006>.
- Gymrek, Melissa, Amy L. McGuire, David Golan, Eran Halperin, and Yaniv Erlich. "Identifying Personal Genomes by Surname Inference." *Science* 339, no. 6117 (January 18, 2013): 321–24. <https://doi.org/10.1126/SCIENCE.1229566>.
- Hariyanto, Hariyanto, Ahmad Rezy Meidina, and Mabarroh Azizah. "Decentralization and the Fulfilments of Children's Rights: Challenges and Opportunities for Local Government in Indonesia." *Lex Scientia Law Review* 8, no. 2 (November 30, 2024): 677–706. <https://doi.org/10.15294/LSLR.V8I2.14373>.
- Hutchinson, Terry. "The Doctrinal Method: Incorporating Interdisciplinary Methods in Reforming the Law ." *Erasmus Law Review* 8, no. Issue 3 (February 1, 2016): 130–38. <https://doi.org/10.5553/ELR.000055>.
- Latifah Soroinda, Disriani, and Anandri Annisa Rininta Soroinda Nasution. "Kekuatan Pembuktian Alat Bukti Elektronik Dalam Hukum Acara Perdata." *Jurnal Hukum & Pembangunan* 52, no. 2 (June 30, 2022): 384–405. <https://doi.org/10.21143/jhp.vol52.no2.1474>.
- Mariyam, Siti, Adhi Putra Satria, Hariyanto Hariyanto, and Ahmad Masum. "Safeguarding Personal Data in Indonesian E-Commerce From a Constitutional Rights Perspective." *Jambe Law Journal* 8, no. 2 (December 2025). <https://doi.org/10.22437/X5Q9Y093>.
- Maskur, Ali, Muslich Shabir, Abu Hapsin, Daud Rismana, and Joko Purwanto. "Optimizing Legal Protection: Addressing the Disparity of Sanctions Regarding Personal Names in Birth Certificates as Population Documents." *Volksgeist: Jurnal Ilmu Hukum Dan Konstitusi* 7, no. 1 (June 1, 2024): 21–33. <https://doi.org/10.24090/VOLKSGEIST.V7I1.10521>.
- Onstwedder, Suzanne Maria, Marleen Elizabeth Jansen, Martina Cornelia Cornel, and Tessel Rigger. "Policy Guidance for Direct-to-Consumer Genetic Testing Services: Framework Development Study." *Journal of Medical Internet Research* 26, no. 1 (July 17, 2024): e47389. <https://doi.org/10.2196/47389>.
- Phillips, Andelka M. "'Only a Click Away — DTC Genetics for Ancestry, Health, Love...and More: A View of the Business and Regulatory Landscape.'" *Applied & Translational Genomics* 8 (March 1, 2016): 16–22. <https://doi.org/10.1016/J.ATG.2016.01.001>.
- Qamar, Nurul, H. Muhammad Syarif, Dachran S. Busthami, M. Kamal Hidjaz, Aan Aswari, Hardianto Djanggih, and Farah Syah Rezah. *Metode Penelitian Hukum (Legal Research Methods)*, Ed. Abd. Kahar Muzakkir. Makassar: CV. Social Politic Genius (SIGN), 2017.
- Ram, Natalie. "DNA by the Entirety." *Columbia Law Review* 115, no. 4 (2015): 873–939.
- . "Genetic Privacy after Carpenter." *Virginia Law Review* 105, no. 7 (2019): 1357–1424.
- Shabana, Ayman. "Islamic Law of Paternity and DNA Evidence – Islamic Law Blog." Islamic Law Blog, 2021. <https://islamiclaw.blog/2021/06/28/islamic-law-of-paternity-and-dna-evidence/>.
- . "Negation of Paternity in Islamic Law between LiĒġān and DNA Fingerprinting." *Islamic Law and Society* 20, no. 3 (2013): 157–201. <https://doi.org/10.1163/15685195-0008A0001>.
- . "Paternity between Law and Biology: The Reconstruction of the Islamic Law of

- Paternity in the Wake of DNA Testing.” *Zygon* 47, no. 1 (March 1, 2012): 214–39. <https://doi.org/10.1111/J.1467-9744.2011.01246.X>;
- Stern, Hal S., Maria Cuellar, and David Kaye. “Reliability and Validity of Forensic Science Evidence.” *Significance* 16, no. 2 (April 1, 2019): 21–24. <https://doi.org/10.1111/J.1740-9713.2019.01250>.
- Tayeh, Tariq M. Abu, and Faisal S. Al-Abadi. “Genetic Fingerprinting and Its Role in Proving Paternity in the Jordanian Personal Status Law No. (15) of 2019: DNA as a Model.” *IUG Journal of Sharia and Law Studies* 31, no. 1 (2023): 64–85. <https://doi.org/10.33976/IUGJSLS.31.1/2023/4>.
- World Health Organization. *Guidance for Human Genome Data Collection, Access, Use and Sharing*. Geneva: World Health Organization, 2024. <https://www.who.int/publications/i/item/9789240102149>.
- Yeung, Karen. “Algorithmic Regulation: A Critical Interrogation.” *Regulation and Governance* 12, no. 4 (December 1, 2018): 505–23. <https://doi.org/10.1111/REGO.12158;PAGE:STRING:ARTICLE/CHAPTER>.