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## COMPETENCE OF EXPERTS IN THE FIELD OF RESEARCH GENETICS

### Summary

In the Polish legal system, the institution of an expert witness was established to ensure the proper functioning of law enforcement agencies and the judiciary. However, the practice of the judiciary shows that the lack of competence, experience, and liberal regulations on the selection of experts, moreover, the lack of tools to verify their skills, are the main sources of problems with experts. The aim of the article is to catalogue the key competencies that an expert in forensic genetics should possess in relation to the currently applicable regulations as well as the draft act on expert witnesses. In the final part of the article, conclusions are presented that should be considered during the legislative work on the provisions normalizing the operation of experts during legal proceedings.

**Keywords:** forensic expert, competence, expert ethics, laboratory accreditation expert opinion, expert witness act

### Introduction

In the Polish legal system, the institution of an expert witness was established to ensure the proper functioning of law enforcement agencies and the administration of justice. With the appointment of a person who has special knowledge in a particular field of science, it becomes possible for procedural authorities to fulfil their statutory tasks<sup>1</sup>.

The practice of the judiciary shows that the lack of competence, experience, liberal regulations on the selection of experts and, moreover, the lack of tools to verify their skills are the main sources of problems with experts appointed by the procedural authorities. As a result, it happens that opinions do not meet the conditions

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<sup>1</sup> T. Grzegorzczuk, J. Tylman, *Polskie postępowanie karne*, ed. 7, LexisNexis Publishing House, Warsaw 2009, p. 45.

of admissibility of scientific evidence and, therefore, cannot be useful in making rational procedural decisions<sup>2</sup>. This is especially true in those fields where scientific and technological progress requires a continuous process of improving the expert's competence. An example of such a field is forensic genetics, in which not only the methods and scope of testing performed but also the testing instruments have changed over the past two decades<sup>3</sup>.

The purpose of the article is to characterize the competencies that an expert in forensic genetics should have in the context of future legislative work on the Law on Expert Witnesses. It should be noted that despite repeated attempts to proceed with legislation regulating the activities of experts, the legislature has so far failed to pass such a law. So, the provisions regulating the status of an impartial assistant to the procedural authority are included in a number of normative acts, which have negative consequences for the issue of expert activity for the purposes of the criminal process.

### **Scope of activities of an expert in genetic testing in criminal proceedings**

Genetic testing in criminal cases is commonly used to identify the perpetrator of an act based on biological traces secured during trial activities. It is also one of the most effective methods for determining the identity of unknown corpses<sup>4</sup>. It should also be noted that over the years since the introduction of DNA testing, not only the methods and scope of the tests performed have changed, but also the testing instruments (e.g., successive models of DNA analyzers)<sup>5</sup> and the methodology of the ways of interpreting the test results and making inferences.

In criminal proceedings, the participation of a genetic testing expert is not limited to laboratory activities. From practice, it is known that the participation of an expert in the inspection of the crime scene provides the opportunity to obtain the maximum amount of information (for example, about the type of biological substance or how it was applied), and often eliminates the need to complete this activity. The participation of an expert in the visual inspection of a place, person, thing or corpse of unknown identity makes it possible to secure a sufficient sample of biological material (in qualitative and quantitative terms) for further laboratory testing.

DNA analysis encompasses a range of methods, which are used to varying degrees depending on the type of biological material, the degree of degradation, or the needs of the research commissioner. Often several methods based on different

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<sup>2</sup> T. Grzybowski, U. Rogalla, R. Płoski, M. Konarzewska, P. Krajewski, *Dziwne wpadki biegłych*, "Genetics and Law" 2009, no. 4 (7), pp. 12–15.

<sup>3</sup> M. Szczepaniec, *Badania genetyczne DNA na użytek procesu karnego*, "Legal Journals" 2013, no. 131, p. 171.

<sup>4</sup> Decision No. 85 of the Director of the Central Forensic Laboratory of the Police dated April 21, 2016 on typical scopes of activities of an expert and specialist in forensic specialties.

<sup>5</sup> W. Branicki, E. Pośpiech, T. Kupiec, J. Styrna, *Nowy wymiar ekspertyzy DNA – potrzeba szkoleń ekspertów i odbiorców ekspertyz*, "Archives of Forensic Medicine and Criminology" 2014, no. 64 (3), pp. 175–194.

methodological foundations are used to increase the evidentiary value, and the only limitation is the size of the available research material.

Laboratory testing includes the following activities: factual inspection and description of the submitted test material, typing of sites and collection of samples for testing, testing including generic and species identification of biological material, isolation of DNA, measurement of the amount of DNA, amplification (multiplication) of DNA, and electrophoresis of amplification products. The final stage of the research process is the analysis of the research results, followed by statistical analysis of the obtained results. The interpretation process is followed by the development of an opinion. In case the DNA profile of the suspect and the DNA profile of the trace secured at the scene match, it is necessary to calculate the probability of repetition of the suspect's profile with respect to the population of origin.

Given the complexity of testing procedures, the sensitivity of the methods used and their rapid development, experts are expected to systematically improve their professional competence, especially since genetic testing evidence is often crucial at both the pre-trial and trial stages due to its limited subjectivity<sup>6</sup>.

An important role of an expert is also to participate in court hearings. This is particularly important in the context of genetic testing evidence, which uses complex testing methods. In the case of genetic analysis, explaining how biological material was applied often becomes necessary to verify the accuracy of the reconstructed course of events on the basis of other evidence. An important task of the expert is also to discuss the results of the statistical analysis in relation to DNA mixtures<sup>7</sup>.

According to the authors, the participation of an expert geneticist in the trial should be active. This attitude is not a direct result of the provisions contained in the Code of Criminal Procedure but rather of the function and purpose of the evidence procedure and the role played by experts in it. A manifestation of a proactive attitude is, for example, asking questions of the interviewed subjects in order to clarify circumstances relevant to the issuance of an opinion. The expert's right to ask questions is set forth in Articles 171 § 2 and 370 § 1 of the Code of Criminal Procedure, so the expert is equipped with a tool through which it becomes possible to obtain source-accurate data. This is important because the information gained through this route can form the basis for arguing the conclusions of the opinion. The literature presents the view that in the practice of evidentiary proceedings, more important than the one described above is the opportunity for the expert to ask questions of another expert directly<sup>8</sup>. In the case of genetic testing opinions, in which the expert uses statistical tests, the possibility of a confrontation between experts who have issued opinions on the individualization of individuals based on at least DNA mixtures is often used.

<sup>6</sup> W. Achrem, I. Soltyszewski, *Wybrane aspekty metodyki badań DNA*, "Prosecutor's Office and Law" 2017, no. 2, pp. 137–155.

<sup>7</sup> A.B. Ivanovic, *Akredytacja jako jeden z czynników gwarantujących jakość pracy laboratoriów kryminalistycznych*, "Problems of Forensic Science" 2019, No. 304 (2), pp. 15–23.

<sup>8</sup> T. Tomaszewski, *Dowód z opinii biegłego w procesie karnym*, Publishing House of the Institute of Forensic Expertise, Cracow 1998, s. 107.

The right of one expert to ask questions of another expert is most often exercised during the evidentiary process in the adjudication of rape cases.

### **Competence and ethical standards of expert witnesses in forensic genetics**

There are many definitions of the concept of competence in the literature. The vast majority of them address issues related to the efficiency of human capital use in the company's organizational structure. It should also be noted that competencies are considered the basis of human resource management in business. With regard to an organization such as a laboratory, one can recall the definition of G. Filipowicz, who proposes a universal understanding of competence as "dispositions in knowledge, skills and attitudes that allow the performance of professional tasks at an appropriate level."<sup>9</sup> The definition thus formulated consists of three components. The first relates to knowledge derived from education and acquired through training and courses. Skills, on the other hand, are the ability to put knowledge into practice, that is, to apply it to specific situations in a smooth and flexible manner that ensures the achievement of the goal. The third component, on the other hand, conditions the maintenance of behaviours derived from knowledge and skills. It should be noted that the relationship between competencies and organizational performance has been emphasized in most works devoted to competency research. This is primarily due to the relationship between the level of employee competence and the efficiency and effectiveness of task performance in the organization<sup>10</sup>. Similar relationships also occur in the laboratory.

According to the rules adopted by forensic laboratories, an expert in genetic testing should have a master's degree in biology or a related field (e.g., biotechnology, medical analytics, environmental protection) and general knowledge of genetics. English language skills are also required. The catalogue of hard (measurable) competencies also includes knowledge of office packages and statistical analysis programs. In terms of soft skills (often referred to as personal and interpersonal skills), an expert is expected to have the following skills: teamwork, perceptiveness, inquisitiveness, accuracy, ability to clearly formulate oral and written statements, ability to argue, make decisions and draw conclusions, long-term concentration, ability to work under pressure under time pressure. It should be emphasized that knowledge of forensic genetics should be systematically improved due to advances in the field. It is also necessary to supplement the knowledge of legal sciences. This knowledge should be systematically improved, given the frequent changes in legislation, even of statutory rank<sup>11</sup>.

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<sup>9</sup> G. Filipowicz, *Zarządzanie kompetencjami. Perspektywa firmowa i osobista*, Oficyna a Wolters Kluwer business, Warsaw 2016, p. 46.

<sup>10</sup> J. Rzempała, *Kompetencje indywidualne i organizacyjne w zarządzaniu projektami – ujęcie systemowe*, "Zeszyty Naukowe Politechniki Śląskiej. Series: Organization and Management" 2017, no. 114 (1993), p. 417–430.

<sup>11</sup> Order No. 3 of the Chief of Police dated January 17, 2014 on the authority to issue opinions and perform activities in police forensic laboratories (Dz. Urz. KGP item 7 of 2016, item 24, 2018, item 111) and Order No. 4 of the Chief of Police of January 18, 2021, amending the

### Competence of the laboratory performing genetic expertise

According to Council (European Union) Framework Decision, No. 2009/905/JHA of November 30, 2009, forensic service providers performing laboratory activities are required to be accredited by an independent accreditation organization. The purpose of this decision is to ensure that the results of laboratory tests conducted by accredited forensic service providers are recognized by law enforcement and justice authorities in another EU country. The legislator indicated that “[...] accreditation provides the necessary guarantees that laboratory activities are conducted in accordance with relevant international standards, especially EN ISO/IEC 17025”<sup>12</sup>. According to the requirements of the standard, personnel should maintain impartiality, be competent and act in accordance with the laboratory’s management system. From the contents of the DAB-07 document, it appears that laboratory management should clarify the requirements of the standard with regard to defining the requirements covering the criteria used to authorize personnel to perform certain work<sup>13</sup>. These criteria should be developed for specific activities, such as operating a particular type of equipment, taking samples, performing certain tests, authorizing reports and others<sup>14</sup>. According to these guidelines, each laboratory employee should be qualified for specific tasks on the basis of proper education, training, experience and skills. Detailed guidelines for personnel competency can be found in document DAB-10 issued by the Polish Accreditation Center<sup>15</sup>. According to the document, personnel independently performing genetic testing should have at least a university degree (culminating in a master’s degree or equivalent) in biology, chemistry, medicine or a related field, as well as one year of experience in the application of molecular biology techniques. In turn, personnel who authorize test reports should have at least a university degree (culminating in a master’s degree or equivalent) in biology, medicine or a related field with a convergent profile (e.g., medical analytics), have two years of professional experience in performing tests under the supervision and/or have developed one hundred draft reports of tests performed under supervision, have formal confirmation of competence by a supervisor or institution (in areas where relevant departmental regulations apply). A very important element that confirms the competence of laboratory personnel is participation in internal quality studies and PT/ILC programs. Records with the results of participation in these tests are one of the proofs of competence of personnel, which also translates into confidence in the laboratory<sup>16</sup>.

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Order on authority to issue opinions and perform activities in police forensic laboratories (Dz. Urz. KGP 6 of 2021).

<sup>12</sup> I. Soltyszewski, *Akredytacja laboratoriów sądowych*, “Archives of Forensic Medicine and Criminology” 2010, vol. LX, pp. 308–314.

<sup>13</sup> DAB-07, Accreditation of testing laboratories, Issue 12, dated November 10, 2021.

<sup>14</sup> J. Tabar, *Personel laboratorium w świetle wymagań normy PN-EN ISO/IEC 17025: 2005 oraz dokumentów PCA*, “Lab” Year 21, no. 2, pp. 44–45.

<sup>15</sup> DAB-10, Accreditation of testing laboratories – forensic service providers performing laboratory activities, 2nd edition of December 15, 2020.

<sup>16</sup> K. Nyrek, *Badania biegłości a kompetencje personelu*, “Lab” Year 19, No. 5, pp. 34–35.

### **Ethical standards in the work of an expert witness**

A forensic expert is expected to meet not only formal requirements but also high ethical standards<sup>17</sup>. In view of the above, according to the authors, an important addition to the legal regulations should be the development of a code of experts, which would regulate the basic and most important rules of conduct in the course of carrying out statutory tasks. The future law, for obvious reasons, cannot cover all aspects of the work of experts. The code should be a means of fostering the right attitudes in performing the function of an expert. From a practical point of view, it is important to note some fundamental issues that should be included in the draft code of professional ethics for experts. It seems obvious that an expert should be guided in his conduct by principles, among which the most important are conscientiousness, objectivity and impartiality. The concept of conscientiousness should be understood as fulfilling one's tasks in an honest and responsible manner so that the opinion given deserves trust. The duty of objectivity stems from the duty of conscientiousness and means that the expert's result must faithfully relate to reality and be devoid of any subjective judgment. On the other hand, according to the principle of impartiality, an expert must remain neutral in assessing the facts and guard against personal dislike or sympathy for the parties or personal commitments. An important point to note should be the provision that the forensic expert gives opinions personally on the basis of sound knowledge and skill and strives for reliable test results. So, he must not conceal the results, falsify the results, transfer the evidence to third parties or improperly secure it at any stage of the research process. It should also be noted, as it seems obvious, that an expert undertakes to develop an opinion only in the field of his speciality and only if he can base it on his own adequately documented knowledge and experience. Public trust practitioners should also make sure that they constantly improve and supplement their knowledge, competence and professional skills, such as by attending scientific conferences and training courses and studying professional literature. The deepening of professional knowledge should be coupled with attention to the knowledge of applicable laws. The expert is obliged to keep strictly confidential everything he learned about the case in the course of his expertise. He should also not comment publicly on the expertise being implemented. It is worth emphasizing at this point the need to secure the computer or other means of electronic data capture from unauthorized disclosure. It also seems expedient to emphasize that it is unethical to solicit clients in a manner inconsistent with loyalty to other experts. When appearing in public (especially during court hearings), an expert may not evaluate (deprecate) other experts appointed in the same case. It is worth adding that any form of confidentiality with the court, attorneys and police that could raise doubts about the expert's independence, objectivity, impartiality or sense of justice is unacceptable. The appraiser must not suggest the expectations of the principal and allow the pressure of the principal or the environment to influence the substantive content of the expert report. If there is a conflict of interest, the expert is obliged to refuse to provide an expert opinion.

<sup>17</sup> B. Kosiba, *Professional ethics of an expert witness*, "Law and Forensic Science" 2014, vol. 7, s. 78–91.

These provisions should be supplemented by a recommendation obliging experts to provide consultation and collegial assistance within the scope of their competence. The code should also not overlook the issue of criticism, discussion and polemics between experts, which should take place with respect and fairness. In conclusion, it is hoped that the development of a code of professional ethics for experts should have a positive impact on their attitude in the new model of criminal proceedings<sup>18</sup>.

### Draft law on experts in judicial proceedings

The scattered regulations in force in Poland regarding the institution of an expert witness have repeatedly been the subject of critical analyses, which have pointed to the need to introduce regulations of statutory rank into the legal order. In the reports:

- Supreme Audit Office: *The functioning of experts in the administration of justice*<sup>19</sup>,
- Helsinki Foundation for Human Rights: *Forensic experts in Poland*<sup>20</sup>,
- European Center for Initiatives in Forensic Sciences: *Assessing the competence of court experts. Expectations and Recommendations* (carried out as part of the Forensic Watch research project)<sup>21</sup>,

postulated the need to introduce uniform and objective criteria for verifying the competence of candidates to serve as court experts. The need for a catalogue of competence verification tools, the introduction of periodic verification of the knowledge of experts, and mandatory training in legal issues for those seeking to obtain such a function was noted.

In response to the above comments and demands, a draft law on court experts was prepared at the Ministry of Justice in late 2018/2019. This is the fifth attempt to coherently and comprehensively normalize the issue of the appointment of experts, their dismissal from office, and the scope and forms of supervision of their performance of commissioned duties<sup>22</sup>. The project was also intended to create mechanisms to select professional, responsible and impartial persons to perform the duties of experts and scientific and specialized institutions in judicial proceedings, which is fundamental to the proper implementation of the tasks of justice<sup>23</sup>.

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<sup>18</sup> I. Sołtyszewski, B. Kosiba, *Kodeks etyki laboratoriów sądowych*, “Problems of Forensic Science” 2013, no. 280, s. 79–83.

<sup>19</sup> Report of the Supreme Audit Office, *Funkcjonowanie biegłych w wymiarze sprawiedliwości*, Warsaw 2015, p. 7, <https://www.nik.gov.pl/plik/id,9608,vp,11856.pdf> (accessed 15.09.2022).

<sup>20</sup> B. Grabowska, A. Pietryka, M. Wolny, A. Bodnar, *Biegli sądowi w Polsce*, Report of the Helsinki Foundation for Human Rights, Warsaw 2014.

<sup>21</sup> P. Rybicki, M. Pękała, P. Karasek, M. Tomaszewska-Michalak, M. Betlejewski, *Ocena kompetencji biegłych sądowych. Oczekiwania i rekomendacje*, European Center for Initiatives in Forensic Sciences Foundation, Warsaw 2015.

<sup>22</sup> P. Rybicki, *Kompetencje biegłych sądowych – narzędzia oceny, ocena narzędzi*, “National Council of the Judiciary. Quarterly” 2015, no. 3, pp. 35–44.

<sup>23</sup> Draft Law on Experts in Judicial Proceedings and Other Proceedings Pursuant to Laws, [https://orka.sejm.gov.pl/proc6.nsf/projekty/667\\_p.htm](https://orka.sejm.gov.pl/proc6.nsf/projekty/667_p.htm) (accessed 01.12.2021).

In fact, in the current state of the law, mainly people who apply themselves become experts, hoping for certain benefits that this title can bring them. The only way to verify these people is to consult their workplace or professional organization, and they demonstrate their special knowledge only on the basis of documents. In addition, it is up to the president of the district court to assess whether the special knowledge possessed has been sufficiently demonstrated<sup>24</sup> by reviewing the documents submitted<sup>24</sup>.

According to the draft law, the applications of candidates for expert witnesses are to be reviewed by a qualification commission operating under the Minister of Justice, and its tasks are to review applications for entry into the list of experts, as well as for renewal of entry for another five-year term, review applications for suspension of expert witnesses or removal from the list of experts. The Commission is composed of a chairman and deputy chairman appointed by the Minister of Justice and one representative each from the 17 ministries listed in the bill. Consultants who are representatives of local governments and professional associations, institutions and institutes, as well as other heads of state administration, may be invited to participate in the work of the Commission. The Commission reviews the application on the basis of the documents attached to the application after interviewing the applicant. The above procedure also applies to a scientific or specialized institution. As a condition for admittance to act as an expert, both an individual and a scientific and specialized institution, the police must conduct a background interview (among other things, the requirement of an unblemished reputation and a clean criminal record)<sup>25</sup>. In the opinion of the article's authors, such a formula for evaluating an application should prevent the listing of individuals and laboratories that do not provide a guarantee of the proper performance of tests, especially with regard to genetic expertise.

The Minister of Justice is to announce the current list of experts in the form of a notice in the official gazette maintained by him by March 31 of each year, and the presidents of common courts and the presidents of military courts are to make the list of experts available free of charge for public inspection at a place designated for this purpose, at the seat and working hours of the court in question. The list of experts may also be maintained in electronic form; in this case, it is made available by posting in the "Public Information Bulletin" on the subject pages of the Ministry of Justice. The list is to be maintained by field and speciality without including additional information about the experts.

While analyzing the text of the bill in terms of the issue of the competence of forensic genetics experts discussed in the article, it is important to note the following provisions regarding the issue at hand. First, the entry in the list of experts can be obtained by an individual who has special knowledge in the field in which they can act as an expert and has practised professionally for at least five years. Confirmation of special theoretical knowledge is a diploma of completion of a specific course of

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<sup>24</sup> Ordinance of the Minister of Justice of January 24, 2005 on expert witnesses, Dz. U. 2005, No. 15, item 133.

<sup>25</sup> Law of... on expert witnesses in judicial proceedings and other proceedings conducted under the laws, [http://orka.sejm.gov.pl/proc6.nsf/projekty/667\\_p.htm](http://orka.sejm.gov.pl/proc6.nsf/projekty/667_p.htm) (accessed 15.09.2022).



higher education, postgraduate studies, a diploma of completion of specialized professional training in a particular field or a certificate of passing a specialized exam, and documents confirming the performance of professional practice in the field covered by the application for at least five years.

The second requirement is to have a license to practice in the field in which the candidate can act as an expert, confirmed by the relevant documents. In addition, the draft law stipulates that an application for inclusion in the list of experts must be accompanied by information on previous performance as an expert, together with the opinions of the presidents of the district courts in the districts in which the expert has given opinions for the past five years; and a recommendation from the relevant institution, self-government or professional association or employer with whom the experts are employed in their speciality. The application will also be able to be accompanied by other documents that may affect the assessment of the applicant's qualifications to act as an expert, as well as documents to assess the applicant's professional achievements, in particular, copies of previously prepared opinions.

For obvious reasons, an expert should also have the knowledge, in terms of litigation under the law, necessary to appear in cases in which he can act as an expert.

Third, the expert is obliged to perform with special care and impartiality in accordance with the rules of law. In addition, he is required to improve his qualifications in his speciality and to be familiar with the applicable laws governing expert participation in proceedings in which he may be appointed to act as an expert. Scientific and specialized institutions, on the other hand, must demonstrate that they have the personnel, organizational, technical and laboratory-research facilities to organize opinions commissioned by the body conducting the proceedings independently. The application should also include a list of persons authorized to issue opinions on behalf of the scientific or specialized institution, indicating their specialities and confirming that these persons meet the requirements described in the law.

The indicated guidelines for verifying the competence of expert candidates and experts seem to create a more effective model than the one currently in place. The current regulations, unfortunately, do not provide effective tools to check the competence assessment of those applying to perform this function. It seems problematic to properly verify the possession of the relevant qualifications, which is to be carried out by the president of the district court if one takes into account how extensive the scope of special knowledge is, which includes theoretical and practical knowledge of various detailed disciplines<sup>26</sup>.

In conclusion, it should be noted that the procedure for the draft law on court experts has not been completed, as pointed out by the Ombudsman in his letter to the Minister of Justice dated January 20, 2022. In response to the statement, Secretary of State Marcin Warchol said that the Ministry of Justice "has diagnosed the imperfections of the draft developed and has undertaken work aimed primarily at strengthening the mechanisms for verifying the qualifications of experts, regulating the status of

<sup>26</sup> J. Dzierżanowska, *Kompetencje biegłego w polskim procesie karnym*, "Legal Forum" 2019, no. 1 (51), pp. 66–75.

specialized institutions and creating a legal basis for the operation of a central register of experts. At the same time, work is underway to post lists of expert witnesses from all district courts in a single ICT system.

The next step was the establishment of the following in July 2018. Institute of Economic and Financial Expertise in Lodz, followed in October 2021. Institute of Medical Expertise, also in Lodz. The two institutes are expected to provide important expert support to the judiciary and will play a similar role to that of the Institute of Forensic Expertise Prof. Dr. Jan Sehn in Krakow<sup>27</sup>.

## Summary

An expert in the field of genetics, like an expert in any other speciality, should have adequate competence, which consists of acquired special knowledge combined with practical skills, knowledge of the relevant rules of conduct, the need to control one's own proficiency in a particular area of opinion, and the pursuit of professional development. Verification of an expert's competence in genetics should be done first of all on the basis of submitted documents confirming his formal competence in genetics. Another criterion confirming an expert's competence should be the analysis of opinions prepared under supervision, as well as the results of participation in internal quality studies and PT/ILC programs.

Verification of the competence of laboratories performing genetics expertise should be based on a certified management system that complies with the requirements of PN EN ISO/IEC 17025.

An analysis of past practice indicates that a unified act of general law on experts should include provisions relating directly to compliance with the rules that apply to them:

1) the principle of expert autonomy, which emphasizes the prohibition of the influence of others on the expert's findings during the performance of the expert report and the opinion process. It seems that it would be particularly relevant to relate such a provision to scientific and specialized institutions where there is a service or hierarchical relationship;

2) the principle of individual responsibility of the expert for the findings made; it specifies that the expert who produced the opinion is responsible for it. A clearly worded provision will prevent experts from avoiding or attempting to dilute responsibility for their findings;

3) the principles of reliance when making inferences on the research results obtained. In order to make a correct conclusion, the expert must take into account all the results obtained. The formulation of such a rule in the form of regulation will prevent an expert from selectively presenting research results that are consistent with a single hypothesis;

4) rules for presenting the results of all tests performed. In the reporting part of the opinion, it is the duty of the expert to present all the results of the tests performed. This way of proceeding will enable a fair, free evaluation of the evidence by the trial authority;

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<sup>27</sup> <https://bip.brpo.gov.pl/pl/content/rpo-biegli-sadowi-ms-projekt-interwencja> (accessed 15.09.2022).

5) principles of using state-of-the-art. Practice shows that experts often do not use state-of-the-art, as there is no way to force them to add to the body of information in a particular scientific field. Normalizing this principle in the form of regulations would motivate experts to constantly expand the scope of their knowledge.

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**Conflict of interest**

None

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