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# Modern Information Systems as Technologies for Optimizing the Investigation of Iatrogenic Crimes

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**Abstract**
*The relevance of this article lies in examining the prospects for implementing and utilizing an information system for recording and analyzing cases of improper medical care, with the aim of optimizing the investigation of iatrogenic crimes. The objective of this research is to demonstrate the necessity of developing and implementing such systems and to determine the practical possibilities of using information technologies to enhance the efficiency of investigating iatrogenic crimes. To achieve this goal, the study analyzed 20 judgments of the European Court of Human Rights concerning adverse outcomes in the provision of medical care; the World Health Organization's report on patient safety incident reporting systems; and the national Concept for the Development of a Strategy to Prevent Defects in the Provision of Medical Care. The research methodology includes the dialectical method, comparative legal method, structural-functional method, as well as sociological, analytical, statistical, and other methods. During the study, the key factors prompting the urgent need for effective mechanisms and innovative technological solutions to improve the investigation of iatrogenic crimes were identified and examined. An analysis of the World Health Organization's report on incident reporting systems related to patient safety has been carried out, the results of which indicate the existence of certain organizational problems in the implementation and use of such systems and proposed ways to address them. The results of this article include: proving the necessity of creating and implementing an information system for recording and analyzing cases of improper medical care; substantiating the position that the development and implementation of such a system in Ukraine will contribute to optimizing the investigation of iatrogenic crimes; arguing that the use of an information system for recording and analyzing cases of improper medical care will assist pre-trial investigation bodies in establishing the mechanism of iatrogenic crimes and its constituent elements; establishing a causal relationship between the actions (or inaction) of*

*the person providing medical care and the adverse consequences in the form of harm to the patient's health or their death; ensuring the prompt notification of law enforcement agencies about the occurrence of a case of improper medical care; simplifying the procedure for initiating criminal proceedings based on the facts of iatrogenic crimes; preventing obstruction in identifying cases of improper medical care by interested parties; and developing preventive recommendations for avoiding iatrogenic crimes. The issues discussed and conclusions drawn will also be useful for researchers, practicing lawyers, criminalistics experts, attorneys, and judges.*

***Keywords:*** *iatrogenic crimes; information system; criminalistics support; forensic examination; criminalistic methodics; special knowledge.*

# Сучасні інформаційні системи як технології оптимізації розслідування ятрогенних злочинів

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**Анотація**

*Актуальність даної статті полягає в дослідженні перспектив запровадження та використання інформаційної системи обліку та аналізу випадків неналежного надання медичної допомоги з метою оптимізації розслідування ятрогенних злочинів. Метою цього дослідження є доведення необхідності створення й впровадження та визначення практичних можливостей використання інформаційних систем з метою оптимізації розслідування ятрогенних злочинів. Для досягнення мети дослідження було проаналізовано 20 рішень Європейського суду з прав людини (ЄСПЛ) у справах щодо настання несприятливих наслідків при наданні медичної допомоги; Звіт Всесвітньої організації охорони здоров'я про системи звітування щодо інцидентів, пов'язаних з безпекою пацієнтів та Концепцію формування стратегії запобігання дефектам надання медичної допомоги у вітчизняній системі охорони здоров'я. Серед методів, за допомогою яких здійснюється дослідження цієї теми можна виділити: діалектичний метод, порівняльно-правовий метод, структурно-функціональний метод, соціологічний, аналітичний, статистичний метод та*

*інші. У процесі дослідження було визначено та досліджено чинники, які диктують нагальну потребу в пошуку дієвих механізмів, новітніх технологічних рішень для підвищення ефективності розслідування ятрогенних злочинів. Здійснено аналіз звіту Всесвітньої організації охорони здоров'я про системи звітування щодо інцидентів, пов'язаних з безпекою пацієнтів, результати якого свідчать про наявність певних організаційних проблем при запровадженні та використанні таких систем й запропонованих шляхів їх вирішення. Результатами статті являється: доведення необхідності створення й впровадження інформаційної системи обліку та аналізу випадків неналежного надання медичної допомоги; обґрунтування позиції, що розроблення та впровадження на території України системи обліку та аналізу випадків неналежного надання медичної допомоги сприятиме оптимізації розслідування ятрогенних злочинів; аргументування позиції, що використання інформаційної системи обліку та аналізу випадків неналежного надання медичної допомоги сприятиме органам досудового розслідування при встановленні механізму ятрогенних злочинів та його складових елементів; встановленні причинно-наслідкового зв'язку між діями (бездіяльністю) особи, яка надає медичну допомогу, із несприятливими наслідками у вигляді завдання шкоди здоров'ю пацієнта або його смерті; оперативному інформуванні органів правопорядку про наявність випадку неналежного надання медичної допомоги; спрощенні процедури відкриття кримінального провадження за фактами вчинення ятрогенних злочинів; унеможливленні протидії виявленню випадків неналежного надання медичної допомоги з боку заінтересованих осіб; розробленні профілактичних рекомендацій із запобігання ятрогенним злочинам. Розглянуті проблеми та запропоновані висновки будуть також корисні для науковців, практикуючих юристів, експертів, адвокатів та суддів.*

***Ключові слова:*** *ятрогенні злочини; інформаційні системи; криміналістичне забезпечення; судова експертиза; криміналістична методика; спеціальні знання.*

## Introduction

In the context of scientific and technological progress, the issues of optimizing the investigation process through the use of innovative technological solutions are becoming increasingly relevant, with the aim of accelerating the processes of evidence collection, analysis, and evaluation, which, as a result, contributes to improving the efficiency of law enforcement agencies. Optimization of the investigation process in the conditions of digitalization and informatization of society implies enhancing the effectiveness of criminal justice agencies by applying modern information technologies. One type of such technology is information systems, which are understood as a set of software and technical tools that provide information processes for relevant information resources depending on the target and functional purpose of the system [1]. Information systems,

as noted by V. Zhuravel, serve as the basis for supporting decision-making by the investigator conducting criminal proceedings, activating his intellectual activity in planning, forming hypotheses, choosing optimal systems of investigative (search) and covert investigative (search) actions for their verification [2]. However, despite their significant potential for the investigation of criminal offenses, in dissertations and methodological recommendations when developing and improving criminalistics methods for investigating certain categories of criminal offenses, the issues of obtaining and using data from information systems are practically not addressed [3]. This problem has also affected the methodology of investigating iatrogenic crimes.

The main goal of this study is to demonstrate the necessity of creating and implementing, as well as determining the practical possibilities of using, information systems in order to optimize the investigation of iatrogenic crimes.

## Literature review

Recently, issues related to fighting organized crime in its various manifestations have become the subject of scientific research in the works of V.V. Franchuk [4, pp. 9-14], B.M. Gray [5], M.V. Kapustina [6, pp. 208-216], V.M. Shevchuk [7, pp. 320-341], V.A. Zhuravel [8, pp. 2795-2803] et al.

Thus, the issue of combating crime was and remains a pressing one for both scholars and practitioners.

## Materials and Methods

To achieve the goal of this study, 20 judgments of the European Court of Human Rights (ECHR) were analyzed in cases concerning adverse outcomes during the provision of medical care. Access to these decisions was obtained through the official websites of the European Court of Human Rights. Additionally, the report of the World Health Organization on incident reporting systems related to patient safety and the Concept for the Development of a Strategy to Prevent Defects in the Provision of Medical Care in the Domestic Healthcare System were reviewed.

To meet the stated objectives, the study employed general scientific and specialized methods, which serve as tools of scientific inquiry. The theoretical foundation of the work is the dialectical method of scientific cognition of socio-legal phenomena, which is used in researching the problems of investigating iatrogenic crimes and identifying and analyzing factors that point to the need for a technological approach in the investigation of iatrogenic crimes. The use of this method in exploring the

current issue creates the preconditions for substantiating new positions and conclusions that have theoretical and practical value and are aimed at developing and implementing an information system for recording and analyzing cases of improper medical care.

Using the comparative legal method, the study analyzed the current state of countering iatrogenic crimes and identified the features of the use and functioning of information reporting systems on adverse outcomes of medical care in foreign countries.

The structural-functional method was applied to identify the advantages and capabilities of the information system for recording and analyzing cases of improper medical care, as well as to formulate proposals for creating and implementing this system in Ukraine.

The formal-logical method was applied to classify the defects in the provision of medical care. The analytical method was used to generalize certain scholarly positions and to formulate original conclusions. The statistical method was applied to illustrate theoretical provisions and conclusions using processed data from global, national, and departmental statistics.

In researching the subject of this study, the authors used scientific works devoted to the criminalistic support of combating criminal offenses, information systems of criminal justice bodies, and specific issues related to the investigation of iatrogenic crimes. The main works used in the preparation of this article include those of the following scholars: V. Birykov [8], V. Bondar [9, pp. 137-141], Y. Chornous [10], V. Franchuk [4, pp. 9-14], B. Gray [5], M. Kapustina [6, pp. 208-216], V. Khakhanovskyi [8], V.Konovalova [11, pp. 289-300], I. Pyrih [12, pp.179-193], V. Shevchuk [7, pp. 320-341], V. Shepitko [13, pp. 179-186], V. Zhuravel [14, pp. 142-154] et al.

## Results and Discussion

### *Practical Justification for the Implementation and Use of Information Systems for the Purpose of Optimizing the Investigation of Iatrogenic Crimes*

The practice of combating crime clearly demonstrates that without the effective use of information contained in various information systems, and without its proper analysis and synthesis, effective counteraction to any criminal offenses is impossible [9]. One of the directions for improving the effectiveness of information support tools at the stage of pre-trial investigation is the timely and comprehensive use of modern capabilities and achievements of scientific and technological progress [15].

Therefore, the implementation of modern information systems in pre-trial investigations serves as the foundation for optimizing criminal proceedings [11; 14].

However, in order for information systems to truly contribute to the optimization, effectiveness, and efficiency of investigations, they must be practically justified. This practical justification lies in the fact that the implementation of information systems as technologies for investigation optimization is a kind of response to the emergence of new methods, forms, and mechanisms of criminal activity under the influence of current trends in the development of science, technology, and society [16]. Their implementation, as rightly noted by V.M. Shevchuk, must meet the "social demand" of practice [17].

One of the aspects of the practical justification for the implementation of information systems as technologies for optimizing the investigation of iatrogenic crimes is the set of existing factors that dictate the urgent need to find effective mechanisms and modern technological solutions to improve the efficiency of investigations. Among the range of existing factors related to the category of crimes under study, the most significant are:

1. The discrepancy between the number of cases of improper medical care and the number of criminal proceedings brought to court in this category of crimes. Adverse outcomes arising from medical care are among the top 10 causes of death and disability worldwide. Some researchers rank unintentional harm to patients during the provision of medical care as the third leading cause of death globally [18]. Annually, in inpatient medical institutions of low- and middle-income countries, 134 million adverse events related to medical care occur, resulting in 2.6 million deaths each year [19]. In high-income countries, adverse medical outcomes in the form of harm to health occur in one out of every ten patients. Worldwide, harm to health during primary and outpatient medical care affects four out of ten patients. Moreover, in 80% of cases, the harm could have been prevented. The most serious consequences of improper medical care arise during diagnostics, prescription, and use of medicinal products [20].

The study and analysis of the Concept for the Development of a Strategy to Prevent Defects in the Provision of Medical Care within Ukraine's Healthcare System indicates that approximately 10 million Ukrainian citizens receive inpatient medical care annually, and over 100,000 of them die during the course of such care. More than one-third of these deceased individuals are under retirement age. In recent years, Ukraine has seen a sharp increase

in inpatient and postoperative mortality rates. In some district hospitals, postoperative mortality has risen tenfold. However, preliminary estimates suggest that more than 10,000 of the deaths occurring during inpatient care could have been prevented [18].

The low rate of investigation and solving of iatrogenic crimes, the submission of criminal proceedings (indictments) to the courts, and the attribution of guilt to a specific medical professional are confirmed by the statistical data of the Prosecutor General's Office of Ukraine. These data concern criminal proceedings initiated for improper performance of professional duties by medical or pharmaceutical workers (Art. 140 of the Criminal Code of Ukraine) during the period 2016-2021. The results of the analysis show that from January 2016 to December 2021, 4042 such criminal offenses were registered. At the same time, only 13 (0.32%) cases resulted in medical workers being officially notified of suspicion, and only 9 (0.22%) proceedings were submitted to court with indictments. Moreover, a significant proportion of criminal proceedings (1577 or 39.01%) were subsequently closed by pre-trial investigation bodies, primarily due to insufficient evidence to prove the suspect's guilt in court.

2. The difficulty of establishing a causal relationship between the actions (or inaction) of the medical provider and the adverse outcomes – such as harm to a patient's health or death – is another significant challenge. These difficulties may arise from the presence of not just one but several contributing factors that led to the adverse result, such as death or serious harm. This is explained by the fact that medical care comprises different types (primary and specialized), each of which has distinct stages. At any of these stages, a breach of standards or technologies may occur, potentially resulting in an adverse outcome such as death or severe harm to health. However, a violation of standards or technologies does not always immediately lead to negative consequences.

Legal and medical practice suggests that in most cases, adverse outcomes (defects in medical care) emerge over time. Moreover, the development of such consequences is often latent. These adverse outcomes are dynamic in both time and space. For example, a violation of medical standards may occur in one facility, but the resulting adverse outcome may manifest later elsewhere and be identified in a third location.

The difficulty of establishing a causal link during the investigation of iatrogenic criminal offenses is also due to the fact that different types of medical care defects result in different outcomes that are not always consistent. This means that outcomes such as health damage or death

depend on the nature of the defect, the reasons for its occurrence, and the point in the treatment process at which it happened.

Medical care defects result from violations of medical standards and technologies. Defects related to violations of standards include injuries, bedsores, development of severe complications due to undiagnosed diseases, incorrect diagnoses, and improper treatment. Defects resulting from breaches of technology include: damage to blood vessels, nerve trunks, internal organs; drug poisoning; infections; and dysfunction of vital systems due to malfunctioning medical equipment.

As previously noted, the causes of these defects are violations of standards and technologies typically occurring during the diagnostic and treatment phases. According to data from the Joint Commission, diagnostic-stage errors result in the death or injury of between 40,000 and 80,000 patients annually [5]. According to one study, 12 million patients in the United States became victims of diagnostic-stage errors, and 33% of these errors led to defects such as patient injury [21].

An analysis conducted by researchers shows that the most common diagnostic-stage violations include: insufficient or incomplete general clinical, laboratory, and instrumental testing; underestimation of the clinical picture; disregard for anamnesis data; unjustified clinical diagnoses; and failure to perform indicated additional research and diagnostic procedures [22].

There are many types of violations that can occur during the treatment stage, such as: incorrectly chosen treatment tactics; inadequate level of therapy; and poor selection of treatment methods.

As part of our research, we analyzed European Court of Human Rights (ECHR) case law. This analysis allowed us to identify the following violations occurring at the treatment stage: failure to check for patient tolerance of prescribed medications (allergic reactions, anaphylactic shock) [23; 24]; failure to observe safety rules during injections or blood transfusions [25]; adoption of unjustified decisions regarding the timing of planned medical interventions [26]; incorrectly chosen treatment tactics, such as selecting a wait-and-see approach instead of immediate surgery [27]; and insufficient monitoring and supervision of the patient [28]. All of these are considered tactical-treatment violations.

In addition to these violations, our analysis of ECHR decisions also revealed organizational and deontological violations in the provision of medical care.

Organizational violations identified include: lack of continuity in medical care [29]; lack of coordination between emergency physicians and hospital

administration [27]; inappropriate hospitalization of patients [27]; failure to follow aseptic and antiseptic protocols, disinfection and sterilization procedures [28]; and lack of coordination between emergency physicians and physicians of other departments [28].

Deontological violations identified from ECHR cases include: failure to collect patient medical history and disease details (not interviewing the patient and/or their relatives) [24]; failure to inform the patient (or relatives) about potential treatment risks [24]; failure to obtain informed consent from the patient [24]; violations of patient rights – including the right to information, to choose a doctor, and to choose a medical facility [30]; and violations of donor rights – including the right to information and prior consent (without any exceptions) for organ or tissue removal (from a paired organ, part of an organ, or other anatomical material) [31; 32].

The analysis of ECHR decisions shows that a single medical care defect may be preceded by multiple violations.

For example, in the case of Altug and others v. Turkey [24], the following violations were established: failure to check for tolerance to the prescribed drug; failure to collect patient history and disease information (not interviewing the patient and/or relatives); failure to inform the patient (or relatives) about treatment risks; and failure to obtain the patient's informed consent. As a result of these violations, the defect in medical care was an acute allergic reaction to the administered drug, and the adverse outcome was the patient's death.

The difficulty in establishing a causal link between the actions (or inaction) of medical personnel and adverse outcomes, such as harm to a patient's health or death, is also aggravated by active resistance from medical staff – including those not directly involved in the incident under investigation.

This position is illustrated by excerpts from the ECHR judgment in the case Eugenia Lazăr v. Romania (No. 32146/05). The Court noted two significant deficiencies in the investigation: first, the lack of cooperation between forensic experts and investigative authorities, and second, the insufficient justification provided in the expert conclusions. The prosecution encountered resistance from forensic medical institutions, which refused to respond to their questions, citing a government resolution that, in their view, prevented a repeat forensic examination if a conclusion had already been provided by the highest national forensic authority and/or no new data had emerged [26].

Thus, the cited ECHR decision confirms that during the investigation of iatrogenic crimes, pre-trial investigative authorities encounter problems of corporatism and collusion.

3. The Latency of Cases of Improper Medical Care (Defects in Medical Care). This factor is both subjective and objective in nature. The subjective aspect lies in the fact that medical personnel often attempt to conceal cases of improper medical care (care defects). Moreover, such cases are concealed not only by individuals (medical professionals) whose actions or inactions directly caused the adverse outcomes, but also by those medical personnel who became aware of them. The motivation of the first group is simple: to avoid legal liability (particularly criminal liability). The second group – those indirectly associated with the incident – are motivated by concerns such as damage to professional reputation in case of "reporting", harm to the professional image of the entire department or institution where the defect occurred, a drop in institutional ratings, so-called "moral-ethical" considerations, or strong corporate ties within the medical community [28].

The concealment of a medical care defect may involve not only passive actions (e.g., silence or omission), but also active measures. These active efforts may include open resistance by medical staff to legal (criminal) prosecution of colleagues whose actions or omissions resulted in an adverse outcome (a defect in medical care).

Legal practice shows that investigations into iatrogenic crimes are often preceded by an internal audit conducted by healthcare authorities to review the circumstances and consequences of medical care violations. These audits are typically carried out by individuals who are not impartial and who possess the necessary expertise for such assessments. However, due to professional corporatism, the findings of these audits are often biased and lack objectivity. In most cases, hospital control commissions limit themselves to confirming a causal link between treatment and adverse outcomes without analyzing the quality of care or the relationship between the improper medical care and its consequences. The conclusions submitted to law enforcement agencies typically explain the adverse outcomes as the result of the severity of the disease, classifying them as accidents.

Furthermore, such active resistance from medical professionals is often accompanied by, or leads to, other criminal offenses, such as: abuse of power or official position (Art. 364 of the Criminal Code); official forgery (Art. 366); acceptance of an offer, promise, or receipt of unlawful benefits by an official (Art. 368); and offering or giving unlawful benefits to an official (Art. 369), among others.

The Latency of Improper Medical Care Cases (Medical Care Defects). This factor has both subjective and objective aspects. The subjective nature of this latency is due to attempts by medical workers to conceal such cases.

However, the objective nature of this problem actually gives rise to the subjective one. This is because many countries still lack national systems for reporting medical care defects (incidents).

This issue is also present in Ukraine. For example, in hospitals with similar treatment and diagnostic workloads, postoperative mortality rates differ by a factor of three or more, and regional differences are up to 2.5 times. This indicates problems with the registration of medical care defects. Cases of healthcare-associated infections are also frequently underreported. In Ukrainian hospitals, the best-case scenario is that patient deaths are reviewed and analyzed [18].

This situation is explained by the fact that, to date, there is no nationwide information system in Ukraine for recording medical care defects. Its creation and implementation are still in the planning stage.

The Essence and Advantages of Information Systems for Recording Medical Care Defects: Assessment of International Experience

An analysis of the experience of European Union countries in ensuring the quality and safety of medical care reveals the following advantages and capabilities of systems for registering medical care defects [33; 34].

For example, Denmark has operated a medical incident reporting system since 2004. This system is based on the following principles: all medical personnel are required to report any errors, serious events, or adverse consequences of medical interventions; the reports are confidential; and no punitive measures are applied.

All reports are reviewed first at the local, then at the national level. Experts working with these reports perform the following tasks: they generalize the outcomes of all reports; identify repeated errors and their sources; develop conclusions on best practices; and prepare national methodological guidelines for the prevention and elimination of medical errors.

The benefits of this incident reporting system include: a positive influence on staff attitudes and work practices, and improved vigilance among healthcare professionals regarding patient safety.

In April 2005, the National Association of Accredited Physicians of the Medical Insurance System in Germany launched a medical incident reporting system, marking a significant milestone in the country's healthcare sector. This event gave strong impetus to a shift in attitudes toward medical care defects and significantly improved communication between stakeholders. For example, thanks to this system, any patient can appeal to an arbitration body (court) under the medical chamber, consult with lawyers and doctors, and receive advice.

In the United Kingdom, the National Patient Safety Agency is responsible for operating the national reporting system, which includes the collection, quantitative assessment, and comparative analysis of reports on medical care incidents. In parallel, a Commission for Therapeutic and Preventive Care operates, acting as a form of "policing" body to monitor adherence to medical care standards. Members of this commission are authorized to visit and inspect any healthcare institution.

The advantages of the national incident reporting system for medical care defects include: strengthening patient trust; acknowledgment that medical professionals do indeed make mistakes that lead to adverse outcomes; creating an environment for open discussion of improper or low-quality medical care; and ensuring timely communication of all errors that result in adverse medical outcomes to higher authorities.

In France, several systems exist for reporting defects (incidents) in medical interventions. Some types of reporting are mandatory, such as for defective medical products or severe complications like hospital-acquired infections. These reports are sent to national-level institutions, which then develop recommendations and conclusions regarding optimal prevention and control strategies. Other types of reporting are voluntary but strongly encouraged, as they may be taken into account during the certification of physicians and medical teams.

In addition to the countries mentioned above, incident reporting systems for medical care also operate in Belgium, Finland, Austria, Switzerland, and Norway.

However, our analysis of the World Health Organization (WHO) report on patient safety incident reporting systems reveals that certain organizational challenges hinder the implementation and use of such systems, along with proposed solutions. Researchers and patient safety experts have found that very few healthcare systems worldwide come close to an ideal level of effectiveness in detecting medical care defects (incidents). The majority of experience with incident-based reporting and learning systems has been gathered in hospitals in high-income countries (as demonstrated in the above international examples). Significantly less experience exists in low- and middle-income countries, as well as in primary care and mental health sectors. Most of the data in many medical care defect reporting systems (incident systems) consists of superficial reports. As a result, the root cause of a medical defect (incident) and the learning potential it offers often remain subject to localized, subjective interpretation [35].

To this day, even with over 20 years of research in the field of patient safety, the role of reporting medical care defects (incidents) and adverse

outcomes remains an evolving area. In 2005, the World Alliance for Patient Safety published the WHO Draft Guidelines on Adverse Event Reporting and Learning Systems: From Information to Action [36]. The primary value of this document was that it set out guiding principles. These included: a definition of the purpose and role of incident reporting; descriptions of the system components in use at the time; evaluations of alternative sources of information for patient safety; examples of national reporting systems then in operation; requirements for a national system for reporting and learning from adverse events; and a list of the key features of successful reporting systems – such as confidentiality, independence, expert analysis, timeliness, a focus on systemic causes, and responsiveness. The guidelines also offered specific recommendations for WHO member states on how to develop such systems, including a checklist for system implementation. Since the publication of the draft WHO reporting and learning guidelines, awareness in the field of patient safety has grown steadily over the past 15 years, accompanied by progress in the implementation and use of reporting systems. As a result, reporting systems for medical care defects (incidents) have been established and implemented in various parts of the world. However, some of these systems operate at the level of individual healthcare institutions or organizations, others at the level of national healthcare systems, while some were developed by professional specialist groups (e.g., anesthesiologists) or are limited to specific medical care sectors (e.g., blood transfusion). These systems differ significantly in various aspects, including: whether reporting is mandatory or voluntary; the nature of the data collected; the type of organization collecting and analyzing the data; the level of objectivity and thoroughness of internal investigations; and the extent to which patient safety improvements have been achieved [35].

An analysis of functioning medical care defect registration systems shows that information processes (collection, registration, accumulation, storage, processing, etc.) are carried out in three directions: 1) Event description – patient characteristics; characteristics of the medical care defect (incident) (type, severity, etc.); place where the defect (incident) occurred; 2) Explanation – assumptions about the causes of the medical care defect (incident); contributing factors; mitigating factors that may have reduced the impact of the adverse outcomes; 3) Corrective actions – preventive measures taken in the given situation (review of procedures, organizational changes, etc.).

Opportunities and prospects for taking into account the European experience of using information systems in optimizing the investigation of iatrogenic crimes

The study and analysis of the functioning of incident reporting systems in EU countries, Switzerland, and Norway, as well as the WHO report on patient safety incident systems, support the conclusion that the development and implementation of a system for recording and analyzing cases of improper medical care in Ukraine would facilitate the optimization of iatrogenic crime investigations.

Accordingly, the introduction and use of such an information system would contribute to:

1. Establishing the mechanism of iatrogenic crimes and its components, including: the treatment process conducted by medical staff; violations of medical care standards and technologies; the medical care defect; adverse outcomes such as harm to health or death of a patient; the identity of the medical worker (offender); and the identity of the patient (victim). This is possible because the system would contain information about the patient; the location where the defect was detected; the nature of the defect and its likely causes; the contributing factors; and the actions taken to prevent adverse outcomes. This data would allow for a clear definition of the circumstances requiring proof and enable the formulation of investigative hypotheses. It would also support the planning of investigative (search) and covert investigative actions and other procedural steps aimed at establishing the outlined circumstances and verifying those hypotheses.
2. Establishing a causal link between the actions (or inaction) of the medical professional and the adverse outcomes in the form of harm to the patient or death. Since the system would contain information about the nature and probable causes of the defect (i.e., which violations occurred), it would help pre-trial investigation bodies focus on verifying that information. Based on verification results, forensic medical expertise regarding the quality of care could be initiated.
3. Ensuring timely notification of the appropriate authorities (in this case, law enforcement) about instances of improper or low-quality care that result in death, disability, or other serious consequences. This would relate to the identification of committed iatrogenic criminal offenses.
4. Simplifying, in some cases, the initiation of criminal proceedings for committed iatrogenic crimes. This is because the registered information (facts) about improper or poor-quality care resulting in death, disability, or other serious outcomes could serve as a basis for entering information into the Unified Register of Pre-Trial Investigations.

5. Reducing the possibility of concealing instances of improper or poor-quality medical care that led to serious outcomes. This benefit lies in the fact that, if implemented, such a system would make it mandatory to register all defects in care that result in severe or extremely severe outcomes. Moreover, both passive concealment and active falsification of such information would carry legal consequences for the responsible staff or institutions.
6. Enabling continuous analysis of registered cases of improper or poor-quality medical care, not only at the regional level but also nationally (and, in cases of severe or especially severe consequences, exclusively at the national level), with the aim of developing preventive guidelines and measures to combat iatrogenic crimes.

**Conclusions**

In the course of this study, the necessity of creating and implementing an information system for recording and analyzing cases of improper medical care was substantiated. The factors underlying this necessity were identified and examined. One such factor is the discrepancy between the number of cases of improper medical care and the number of criminal proceedings submitted to court in this category of crimes. In analyzing this factor, the authors relied on processed data from global, national, and departmental statistics. The results of the statistical analysis demonstrated that there is a significant and growing number of cases of improper medical care (defects in medical care), both globally and within Ukraine, which indicates the presence and rise of iatrogenic crimes. The analysis of statistical data from the Prosecutor General's Office of Ukraine on criminal proceedings concerning iatrogenic crimes revealed a low level of investigation and disclosure of such crimes, the submission of cases to court, and the establishment of guilt of specific medical professionals.

Another factor justifying the practical need for the introduction of such a system is the difficulty in establishing a causal relationship between the actions (or inaction) of a medical professional and adverse outcomes such as harm to the patient's health or death. In studying this factor, the authors analyzed 20 rulings of the European Court of Human Rights related to iatrogenic crimes. The analysis made it possible to group the violations (causes of medical care defects) into categories, namely, violations of a treatment-tactical, deontological, and organizational nature.

A third factor underlying the need to create and implement the proposed information system is the latency of cases of improper medical care. This factor has both subjective and objective elements. The subjective element lies in the fact that medical workers resist the identification of such cases.

This resistance may consist of passive actions – concealing or suppressing the case of improper care (medical care defect) – or of active measures – interfering with the results of internal audits that precede the investigation of iatrogenic offenses. The objective element lies in the fact that defects in medical care are either not recorded at all or are poorly recorded, and that an information system for registering improper care does not function.

During the course of this study, the authors summarized the experiences of EU countries, Switzerland, and Norway regarding the use and functioning of incident reporting systems related to adverse medical outcomes and demonstrated the necessity and feasibility of applying this positive experience in Ukraine. In addition, the analysis of the World Health Organization report on incident reporting systems related to patient safety revealed certain organizational challenges in the implementation and use of such systems and presented proposed solutions. It was substantiated that the development and implementation of a system in Ukraine for recording and analyzing cases of improper medical care would support the optimization of investigations into iatrogenic crimes. It was demonstrated that such support would include the establishment of the mechanism of iatrogenic crimes and their constituent elements, the determination of causal links between the actions (or inaction) of the medical provider and the adverse outcomes, the timely notification of law enforcement bodies regarding cases of improper or low-quality medical care that result in death, disability, or other serious consequences, the simplification of procedures for initiating criminal proceedings regarding iatrogenic crimes, the prevention of obstruction by interested parties in the detection of such cases, and the development of preventive recommendations aimed at preventing iatrogenic crimes.

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