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# Medical Errors: Types, Causes, and Prevention Strategies

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Review

# Medical Errors: Types, Causes, and Prevention Strategies

## A Comprehensive Analysis

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### Abstract

Medical errors are acts or omissions committed by healthcare professionals that lead to adverse events, defined as injuries or conditions caused by medical treatments rather than the underlying disease. These errors represent one of the leading causes of death in the United States and constitute a serious, complex problem affecting healthcare systems globally. This paper provides a comprehensive examination of medical errors, exploring their types, underlying causes, consequences, and evidence-based prevention strategies. Key strategies discussed include enhanced patient-provider communication, continuous professional education, implementation of advanced technology systems, and development of robust reporting mechanisms. The analysis emphasizes a multidisciplinary approach to creating safe healthcare environments where professionals feel secure in reporting errors without fear of retribution. This work highlights the critical importance of fostering a patient safety-centered culture and underscores the fundamental role of ethics committees in medical error management. Special attention is given to diagnostic errors, their causes, consequences, and prevention strategies, while also addressing ethical considerations, legal liability, and the essential role of communication, training, and technology in improving patient safety outcomes.

**Keywords:** medical errors; definition; impact; types; contributing factors; diagnostic error; causes; consequences; prevention strategies; ethical considerations; legal liability; communication; training; technology; patient safety; multidisciplinary approach; patient safety culture; ethics committees

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## 1. Introduction

Despite remarkable advances in medicine and the noble mission of preserving life and alleviating suffering, healthcare practice remains fallible, and healthcare professionals are not immune to making errors despite their best intentions. Human error represents an inherent factor that must be acknowledged, particularly given the challenging nature of healthcare environments characterized by sleep deprivation, high patient volumes, and fast-paced workflows. While the confluence of these factors makes errors inevitable, this reality does not preclude the implementation of comprehensive prevention strategies designed to reduce their frequency, severity, and impact on the broader healthcare system, including patients, providers, facilities, and national healthcare institutions.

## 2. Definition and Scope of the Problem

A medical error is defined as any act or omission committed by a healthcare professional during patient care that causes or has the potential to cause harm to the patient, distinct from harm caused by the underlying disease itself. These errors can occur at any stage of the care continuum, from initial admission and diagnosis through treatment and follow-up care. Recent epidemiological studies reveal the extraordinary scope of this problem, as medical errors continue to represent a leading cause of death, disability, and illness worldwide. The World Health Organization estimates that millions of patients annually suffer consequences from preventable medical errors, resulting in substantial economic costs to healthcare systems and imposing significant burdens on patients and their families.

Medical errors can manifest at any point throughout the patient care process. The most prevalent types include:

1. **Diagnostic errors:** These encompass incorrect, delayed, or missed diagnoses, as well as overdiagnosis, which can lead to unnecessary and potentially harmful treatments.
2. **Treatment errors:** These include errors in prescribing, administering, and monitoring medications, as well as surgical procedural errors and other therapeutic interventions.
3. **Prevention errors:** These involve failures to implement appropriate preventive measures, such as vaccination or disease screening programs, potentially increasing the risk of complications and preventable diseases.
4. **Communication errors:** These encompass failures in communication between healthcare professionals and patients, as well as inter-professional communication breakdowns, leading to misunderstandings and erroneous clinical decisions.

It is crucial to recognize that medical errors are not invariably the result of negligence or incompetence among healthcare professionals. Rather, they often arise from complex interactions among multiple factors, including healthcare system limitations, resource constraints, personnel fatigue, care delivery pressures, and cognitive biases.

## 3. Impact of Medical Errors on Public Health and the Economy

Medical errors exert a profound impact on public health. Beyond being among the leading causes of death across all age groups in the United States, they can result in long-term morbidity and disability. This translates into prolonged hospital stays and additional treatments, further increasing risks for secondary conditions and creating complex clinical scenarios requiring resolution.

From an economic perspective, medical errors significantly impact healthcare system efficacy perceptions, eroding patient trust and consequently reducing the likelihood of seeking necessary medical care. They can cause irreparable damage to the professional reputation of healthcare providers and institutions, who must bear costs associated with additional treatments

and legal compensations, alongside indirect costs such as decreased productivity and personnel burnout.

Direct costs encompass expenses related to treating complications and adverse events, as well as medical malpractice compensation. Indirect costs, including lost productivity and broader social costs, are equally significant. Medical errors represent a complex, multifactorial problem affecting patients, healthcare professionals, and healthcare systems worldwide, with considerable public health and economic implications that underscore the urgent need for effective intervention strategies.

#### 4. Historical Perspective of Patient Safety

Although medical errors have existed since the inception of medical practice, they were not addressed as a preventable healthcare problem until the 20th century. The watershed moment occurred in 1999 when the United States Institute of Medicine published the landmark report "To Err is Human: Building a Safer Health System," which catalyzed discussions about medical errors, highlighted the problem's magnitude, and called for systematic healthcare system action to improve patient safety conditions.

Following this publication, numerous researchers have addressed the issue, and various initiatives have been tested and implemented to reduce medical errors, including the development of comprehensive reporting systems, continuous educational programs, and implementation of new safety-enhancing technologies. However, despite these extensive efforts, medical errors persist. The healthcare system's extraordinary complexity means that while advances help preserve patient health, they simultaneously add layers of complexity for providers who must continuously update their knowledge while managing high patient loads, fast-paced environments, and chronic fatigue.

Healthcare system complexity, human variability, and resource limitations continue to pose significant challenges to patient safety. Continued investigation into medical error causes and development of effective prevention and mitigation strategies remains essential.

#### 5. Classification of Medical Errors by Severity and Consequences

Medical errors represent acts or omissions by healthcare providers that can lead to negative patient consequences. When errors occur, establishing the severity of resulting consequences and identifying system gaps that permitted their occurrence becomes crucial. Adverse events are defined as injuries caused by medical treatment rather than the underlying disease; thus, adverse events can be viewed as error consequences.

Based on the cause of adverse events, they are classified as:

- **Preventable adverse events:** Results from errors in selecting or applying accepted strategies.
- **Ameliorable adverse events:** Events that were not preventable but could have been less harmful with different strategies.
- **Adverse events due to negligence:** Occurred due to inadequate or substandard care.

Medical errors can produce wide-ranging consequences, from minor and temporary to severe and permanent. According to severity, medical errors can be classified as:

1. **Mild adverse events:** Errors causing minimal or temporary harm, such as mild allergic reactions to medications or minor injection site infections.
2. **Moderate adverse events:** Errors causing significant but reversible harm, such as bone fractures from hospital falls or adverse medication reactions requiring hospitalization.
3. **Severe adverse events:** Errors causing permanent or life-threatening harm, such as brain injuries during surgery or severe allergic reactions causing anaphylactic shock.
4. **Fatal adverse events:** Errors resulting in patient death, such as fatal medication errors or serious nosocomial infections.

5. **Near miss events:** Adverse events that occurred due to errors but caused no actual harm.

## 6. Contributing Factors to Medical Errors: A Multidimensional Analysis

Healthcare systems worldwide have endeavored to minimize medical errors over recent decades, yet despite immense efforts, they remain integral to daily healthcare processes. To continue improving prevention strategies, understanding the factors that can lead to medical errors and adverse events is crucial. Research has identified and grouped causes into three distinct categories: human, system-related, and patient-related factors. These categories involve components that interact within and between groups in complex, intricate ways, creating susceptible environments that allow medical errors to occur at any stage of patient care.

### 6.1. Human Factors: Healthcare Professionals

Healthcare is universally regarded as a noble and reputable field, yet increasing educational costs, prolonged training periods, lack of recognition, non-competitive salaries, and poor work-life balance have decreased the number of candidates pursuing healthcare careers. Even in countries without personnel shortages, institutions tend to offer minimal compensation and maintain minimal staffing levels, making it difficult to attract and retain healthcare workers. The resulting personnel shortage leads to chronic overwork among existing staff, with system-wide consequences.

Healthcare professionals, despite their training and experience, remain human beings susceptible to errors. Fatigue, stress, inadequate communication, and cognitive biases represent human factors that can compromise patient safety.

- **Fatigue and Stress:** Excessive workloads, prolonged shifts, and inadequate rest negatively affect healthcare professionals' cognitive and physical performance, increasing error risk. Fatigue can decrease attention, concentration, memory, and decision-making ability, while chronic stress can lead to emotional exhaustion and depersonalization, affecting response time, judgment, and care quality.
- **Communication Deficits:** Effective communication among healthcare team members is essential for patient safety. Lack of clarity in information transmission during shift changes, poorly written instructions, ambiguous verbal orders, lack of coordination between professionals involved in patient care, and linguistic or cultural barriers can lead to misunderstandings and errors.
- **Cognitive Biases:** Systematic thinking patterns that can lead to erroneous judgments and hasty decisions. In medical contexts, these biases can influence how professionals collect, interpret, and process clinical information, leading to diagnostic and treatment errors. Common cognitive biases in medical practice include confirmation bias (seeking information that confirms pre-existing beliefs), anchoring bias (over-relying on first information received), and availability bias (overestimating easily remembered event probabilities).

### 6.2. System-Related Factors: The Healthcare Context

Healthcare systems encompass all organization, rules, and resources (software and hardware) present in facilities involved in healthcare processes. These components can facilitate medical error occurrence.

- **Healthcare System Organization:** Healthcare system organization and management can influence patient safety. Lack of clear protocols, care fragmentation, continuity deficits, and inadequate supervision can increase error risks. Additionally, pressure to reduce costs and increase efficiency can lead to work overload and staff reduction, potentially compromising care quality.

- **Resource Deficiencies:** Inadequate human, material, and financial resources can limit healthcare professionals' ability to provide safe, quality care. Staff shortages can lead to work overload and burnout, while inadequate medical equipment and supplies can lead to diagnostic and treatment errors.
- **Inadequate Technology:** While medical technology can improve care efficiency and accuracy, it can also be an error source if used inappropriately. Specifically, inadequate training in new technology use, poor interoperability between information systems, and technical failures can contribute to medical errors.

### 6.3. Patient-Related Factors: The Importance of Active Participation

Despite common beliefs that patients leave their health entirely in healthcare professionals' hands, they actually play active roles in their care processes. Indeed, without patient engagement, all attempts to help them will prove futile. From describing symptoms to adhering to treatments, patients must be involved and work toward their goals alongside providers to prevent medical errors.

- **Treatment Non-adherence:** Treatment adherence refers to the degree patients follow medical recommendations. Non-adherence can result from various factors, including lack of instruction understanding, medication side effects, financial barriers, or lack of social support. Provider responsibility includes ensuring patients fully understand instructions and working around patient needs and barriers. Nonadherence can lead to complications and additional treatment needs, increasing error risks.
- **Communication Deficits:** Effective communication between patients and healthcare professionals is essential for safe, quality care. Patients should feel comfortable asking questions, expressing concerns, and sharing relevant information about their medical history and symptoms. Communication deficits can lead to misunderstandings, misdiagnoses, and inappropriate treatments.
- **Understanding Deficits:** Patients may struggle to understand complex medical information, impacting their ability to make informed health decisions and follow treatment recommendations. Understanding deficits can result from various factors, including medical jargon use, lack of appropriate educational materials, or language or cultural barriers. Providers must ensure proper communication, explaining medical situations as simply as possible, remaining open to questions, and negotiating with patients to develop feasible care plans.

## 7. Diagnostic Error: Definition and Types

Diagnostic error represents a complex, multifaceted problem affecting medical practice at all care levels. Although medicine has advanced significantly in recent decades, the possibility of delayed, wrong, or missed diagnoses remains a concerning reality. The Institute of Medicine (IOM), now known as the National Academy of Medicine (NAM), defines diagnostic error as "the failure to establish an accurate and timely explanation of the patient's health problem or problems, or to communicate that explanation to the patient." This patient-centered definition emphasizes the importance of not only establishing correct diagnoses but also doing so in timely manners, especially for potentially life-threatening conditions.

The Society for Improving Diagnosis in Medicine (SIDM) proposes classifying diagnostic errors into three main categories:

1. **Missed or missing diagnosis:** When no explanation is found for patient symptoms, despite performed diagnostic tests.
2. **Incorrect diagnosis:** When initial diagnoses prove incorrect, and true symptom causes are discovered later.

3. **Delayed diagnosis:** When correct diagnoses are established, but with significant delays that may have negatively affected patient prognosis or treatment.

These categories are not mutually exclusive, and diagnostic errors often involve combinations of them.

## 8. Factors Influencing Diagnostic Errors in Medicine

Medical diagnosis represents the primary goal in care planning. To effectively treat patients, the first step involves determining their affecting conditions. Reaching diagnoses involves complex processes requiring both patients and providers working together with available information, experience, knowledge, and diagnostic tools. Despite incredible advances in diagnostic procedures, diagnostic errors still occur and can have serious consequences, from delayed treatments to patient death. Diagnostic error causes are multifactorial and can be attributed to combinations of cognitive, system-related, and patient-related factors.

### 8.1. Cognitive Factors: Providers

Cognitive factors are defined as mental processes clinicians use to gather, interpret, and evaluate clinical information for decision-making. Despite years of training and experience, healthcare providers remain susceptible to bias and affected by other limitations that can influence their judgment and lead to diagnostic errors.

#### 8.1.1. Cognitive Biases

Cognitive biases are systematic thinking patterns that can lead to deviations from rational judgment. In medical diagnosis contexts, the most common biases include:

- **Confirmation bias:** Tendency to search for and interpret information confirming preconceived hypotheses, ignoring or minimizing contradictory information.
- **Anchor bias:** Tendency to fixate excessively on first information received from patients, even if incomplete or inaccurate, and incorrectly adjust diagnoses toward that information, even as new information becomes available.
- **Availability bias:** Tendency to overestimate disease probabilities that are easier to remember or recently encountered, potentially missing less common diagnoses and perpetuating false beliefs that the most common diagnosis is always correct.
- **Overconfidence bias:** Tendency to overestimate one's diagnostic capacity and underestimate error possibilities.

#### 8.1.2. Heuristics

Heuristics are mental shortcuts allowing doctors to make quick decisions under uncertainty. While useful in clinical practice, they can also lead to errors if applied inappropriately. Examples include:

- **Representativeness heuristic:** Tendency to diagnose diseases based on patient symptom similarity to typical cases of certain diseases, without actively considering other possibilities.
- **Availability heuristic:** Tendency to diagnose more common or recently encountered diseases, without adequately considering actual disease prevalence in populations.

#### 8.1.3. Limitations of Human Reasoning

Beyond biases and heuristics, human reasoning has inherent limitations contributing to diagnostic errors:

- **Limited information processing capacity:** Clinicians must process large amounts of clinical information in short periods, potentially leading to errors due to cognitive overload.

- **Fatigue and stress:** These factors can affect attention span, memory, and judgment, increasing error likelihood.
- **Knowledge or experience deficits:** Doctors can make diagnostic errors without necessary knowledge or experience to recognize particular diseases.

### 8.2. System-Related Factors

System-related factors are work environment and health system organization characteristics that may contribute to diagnostic errors.

- **Time constraints:** Constant pressure and short time slots healthcare professionals face during medical consultations are important factors leading to diagnostic errors. Providers often care for large numbers of patients in limited time, making it difficult to take complete histories and physical examinations and consider all possible diagnostic hypotheses.
- **Environmental pressure:** Constant pressure of caring for high patient volumes, especially in consistently fast-paced departments, is very demanding for providers. Accompanied by multiple simultaneous stimuli and chronic fatigue, this can affect diagnostic ability. Furthermore, needs to make quick decisions in emergency situations can lead to errors due to lack of proper reflection and analysis.
- **Poor communication and electronic tool use:** Poor communication between different health professionals caring for the same patient can be important causes of diagnostic errors. Failure to share relevant information, test result misinterpretation, or lack of coordination in patient follow-up can lead to diagnostic delays or misdiagnoses. Additionally, misuse of electronic medical records to track patient updates or failing to upload recent changes can lead to errors.

### 8.3. Patient-Related Factors

Patient-related factors may also influence diagnostic error likelihood, not just through poor communication or lack of engagement. Cases with rare presentations or uncommon diseases can lead to medical errors.

- **Case complexity:** Some patients present with complex or atypical clinical symptoms, making diagnosis difficult. Rare diseases, unusual presentations of common diseases, or comorbidity presence can increase diagnostic uncertainty and error probability.
- **Communication:** Patient-provider relationships are complex interactions. Patients need to build trust to openly share personal details with providers about their medical history. Without sufficient comfort, they might not mention crucial information needed for accurate diagnoses, delaying processes or leading providers to consider other probable causes.

## 9. Overdiagnosis, Diagnostic and Therapeutic Cascades

Overdiagnosis is an increasingly recognized phenomenon in modern medicine, referring to diagnosing medical conditions that, if undetected, would never have caused symptoms or affected patient health. Overdiagnosis can occur due to several factors, including excessive screening test use, lowering disease definition thresholds, and pressure to find explanations for patient symptoms.

Another negative outcome from excessive screening test use is diagnostic and therapeutic cascades, which are series of events triggered by incidental diagnostic test findings or treatment side effects.

The implications of both overdiagnosis and cascades are significant, primarily because they can lead to unnecessary treatment, which can be expensive, cause side effects, and create patient anxiety. They can also divert healthcare system resources that could be used to treat patients with real and potentially serious illnesses. Finally, they can create false security senses in patients, leading them to ignore important symptoms of other diseases, believing they're already being treated and improving.

## 10. Diagnostic Error in Primary Care

Primary care providers represent first contact points for most patients and are responsible for continuing care after specialist treatment. They provide long-term care for diverse patients with varying complexity levels, making primary care providers especially susceptible to diagnostic errors.

As referral initiators, diagnostic errors by primary care providers can have serious consequences, delaying proper diagnosis and treatment, or subjecting patients to unnecessary tests and therapies carrying their own risks. Given primary care's importance as healthcare system foundations, medical error prevention efforts should also target primary care settings, even when they may not face the same life-or-death decision-making scenarios as other specialties.

## 11. Consequences for Patient Health

Patients directly suffer diagnostic error consequences, ranging from mild to severe and, in some cases, irreversible. They also carry mental and emotional components that many patients never fully recover from, permanently changing their healthcare system and provider perceptions. Consequences can be divided into the following categories:

- **Increased morbidity:** Morbidity refers to disease or medical condition presence. Diagnostic errors can increase morbidity by delaying appropriate treatment initiation, providing incorrect treatment, or not providing treatment at all, potentially leading to long-term complications and sequelae.
- **Increased mortality:** In severe cases, diagnostic errors can have fatal consequences. A study published in the British Medical Journal estimated that medical errors, including diagnostic errors, are the third leading cause of death in the United States.
- **Decreased quality of life:** Even when not fatal, diagnostic errors can significantly affect patient quality of life. Chronic pain, disability, anxiety, and depression are some possible long-term consequences of misdiagnosis or delayed diagnosis.
- **Mental and emotional impact:** For some, simply visiting doctors is already stressful. Receiving diagnoses can be relieving, but when involving life-impacting illnesses, it can cause significant emotional pain. Undergoing tests and treatments only increases this stress. It is devastating when diagnoses prove wrong and patients have undergone unnecessary tests and treatments, and even worse when they didn't receive life-saving measures. This can lead to long-term depression, anxiety, and permanently impact patient healthcare system perceptions, as well as create conflicts within patient support systems.

## 12. Economic Impact

Diagnostic errors also have significant economic impacts, both for patients and healthcare systems. These costs may include:

### For patients:

- **Additional medical expenses:** Misdiagnosis or late diagnosis can lead to unnecessary tests and treatments, increasing medical expenses for patients and healthcare systems.
- **Lost productivity:** Undiagnosed or misdiagnosed illnesses can lead to decreased work productivity, resulting in income loss for patients and their families.

### For healthcare systems:

- **Litigation costs:** In some cases, diagnostic errors can lead to medical negligence claims, resulting in legal and compensation costs for healthcare professionals and institutions.
- **Health system burden:** Diagnostic errors can cause healthcare facility resource misuse and generate population mistrust, leading to significant losses for involved facilities and providers.

## 13. Addressing Contributing Factors: Steps Towards Safer Healthcare

Preventing medical errors requires multidimensional approaches addressing human, systemic, and patient-related factors. Key strategies include:

- **Improving Communication:** Encourage open and effective communication between healthcare team members, promoting healthy work environments focused on patient safety. Implement open communication pathways between professionals and patients, including using clear and understandable language, actively listening, asking open-ended questions, showing empathy and validation, continuously checking patient understanding, and encouraging patient participation in decision-making.
- **Continuous Training:** Provide ongoing training to healthcare professionals on patient safety, effective communication, teamwork, and error management. Training in clinical reasoning and decision-making skills can help reduce cognitive biases and improve diagnostic accuracy. It is also important to keep professionals trained in electronic healthcare tools so they are aware of updates and modifications.
- **Healthcare System Support:** Improve healthcare system organization and management, ensuring adequate resource availability, clear protocol implementation, and care continuity. Foster safety cultures where mistakes are seen as learning and improvement opportunities, rather than causes for blame or punishment.
- **Technology Implementation:** Use technology effectively to improve patient safety, such as electronic medical records, early warning systems, and decision support tools, as well as mandatory double checks for decision making. With advances in medicine and medical technology, it is easier to catch errors before they turn into adverse events.
- **Patient Empowerment:** Encourage active patient participation in their care by providing clear and understandable information about their diseases and treatments, and promoting treatment adherence.

Preventing medical errors is an ongoing endeavor requiring involvement from every participant in care processes. Once we understand causes, we can make collective efforts to improve healthcare systems and take patient-based approaches in all decisions, bearing in mind that patient safety is not a destination but an everyday journey for providers.

## 14. Clinical Importance: Providers' Perspective

Despite decades of effort, medical errors remain common causes of morbidity and mortality in the United States and worldwide. As part of ethical foundations of practicing medicine, the main goal for healthcare providers should be to "cause no harm," but medical errors happen even with the best intentions.

Most errors are not the fault of single providers or provider groups; instead, they result from healthcare system failures affecting care processes, such as similarly spelled medications stored together, unstandardized dosage writing, absence of pharmacist supervision, or unbalanced workloads.

Errors can be prevented with all previously mentioned strategies, but even then, the first step in learning error root causes is reporting them. Currently, error reporting is often avoided by healthcare professionals, especially if consequences were mild or near misses, because reporting can lead to severe sanctions and permanently affect provider careers. Therefore, one of the main efforts should be toward embracing system improvement cultures instead of individual punishment.

Providers involved in medical errors should be held accountable, but they should also have open pathways to discuss problems and share their thoughts on error root causes so that modifications can be implemented to prevent future adverse events. When the focus of correcting medical errors shifts from individual or group sanctions to foundational system modifications, we can actually prevent the same mistakes from happening again by double-checking all steps in care chains. This perspective also allows providers to feel secure in their

work environments, encouraging them to report issues rather than minimizing problems that can perpetuate adverse event cycles.

Creating safe work environments is essential to break down barriers that prevent underlying problems in healthcare organization from being fixed. It is crucial to understand that retaliating against healthcare professionals won't improve systems; it will only delay necessary changes to embrace patient safety-centered healthcare models.

## 15. Implementation of Error Notification and Learning Systems

Implementing error reporting systems is essential to learn from previous mistakes and improve patient safety. These systems must be confidential and non-punitive, promoting safety cultures and organizational learning. Errors must be analyzed systematically to identify root causes and develop effective prevention strategies.

Patient safety training should be an integral part of health professional education and training. Students and residents must learn to identify, report, and analyze errors, and actively participate in improving patient safety.

## 16. Patient Participation in the Diagnostic Process

Active patient participation in their own care is crucial to improve diagnostic accuracy and reduce errors. Patients need to feel safe sharing their concerns and should be encouraged to share details about their medical history, symptoms, and anything they feel is related to their current situation. Once diagnoses are made, providers should always communicate in timely and sensitive manners, explaining findings in ways that are easy for patients to understand, informing them about treatment options, risks, and benefits, while always giving them the opportunity to ask questions and express their preferences.

The use of electronic tools like electronic medical records systems and patient interfaces that patients can access anytime is an excellent way to empower them to participate in their care processes. These tools provide accessible information, explanations, and ways to communicate with providers, and can even help patients provide information they might not feel comfortable sharing face-to-face, thereby improving provider-patient relationships and lowering the chance of missing or mistaking diagnoses.

## 17. Ethical Considerations in the Management of Medical Errors

Despite the best efforts and intentions of medical providers, medical practice is not exempt from errors and their consequences. Healthcare providers should take every possible step to prevent medical error occurrence, but once they have occurred, ethical considerations must prevail when making decisions about managing adverse events.

### 17.1. *The Importance of Transparency and Open Communication with Patients*

When adverse events occur, the most important step is transparent communication with patients, showing respect and consideration, as these are the foundations of provider patient relationships. All errors must be communicated honestly and in timely manners, allowing patients to make decisions about next steps required to recover their health.

Healthcare providers always have duties to inform. It is understandable that in highly competitive environments like medicine, acknowledging mistakes is incredibly difficult—it not only gives feelings of inadequacy but also represents failures to one's perceived self. Nevertheless, what must prevail is patient safety; therefore, healthcare professionals have duties to inform, regardless of personal conflicts, hoping that adverse events can be addressed as soon as possible.

Despite the difficulty of communicating errors to patients, this approach offers benefits for both parties:

**For patients, open communication can:**

- **Reduce anxiety and uncertainty:** Knowing what happened and why can help patients better understand their situations and feel more in control.
- **Facilitate informed decision-making:** Understanding error consequences and available treatment options allows patients to make informed decisions about their care.
- **Strengthen provider-patient relationships:** Honesty and transparency can foster trust and mutual respect, essential for effective therapeutic relationships.

**For health professionals, open communication can:**

- **Relieve emotional burdens:** Admitting mistakes and apologizing can help doctors deal with guilt and prevent burnout.
- **Encourage learning and improvement:** Recognizing errors and analyzing their causes can help doctors learn from them and take steps to prevent future errors.
- **Improve reputation:** Honesty and transparency can strengthen patients' trust in doctors and health institutions once they have taken steps to correct errors.

## 18. Improving Healthcare Team Outcomes

All healthcare personnel are part of the same team with the shared goal of restoring patients to health. One of the biggest barriers in the medical field is the lack of communication between providers—not just doctors, nurse practitioners, or physician assistants, but also medical assistants, pharmacologists, lab technicians, and every professional who has direct or indirect contact with patients. They all need to be aware of updates and communicate effectively with one another to ensure patient safety.

Implementing tools such as checklists, double checks for prescriptions, EMR notes, and medication charts that all team members can access can drastically reduce medical errors. These tools help avoid double medication administration, medication interactions, unnecessary testing, and facilitate progress confirmation. They also allow verification of verbal orders, which are always prone to misunderstandings. All healthcare team members must continuously train and remain up to date with electronic systems and tool updates, using them in the best interest of patients.

Additionally, accreditation agencies and training programs should continually focus on improving patient safety and teaching ways to reduce common medical errors. A collaborative interprofessional team comprising these agencies, clinicians, and administrators can identify inherent system and process deficiencies and develop corrective measures to reduce medical error incidence in the healthcare industry.

## 19. The Role of Ethics Committees in the Management of Medical Errors

Ethics committees play crucial roles in medical error management, providing guidance and support to both patients and healthcare professionals. These committees are composed of experts in ethics, medicine, law, and other relevant disciplines. Their primary function is to promote ethical, quality healthcare and provide unbiased analysis and resolution of ethical conflicts.

Ethics committees can help analyze and resolve ethical conflicts that arise in relation to medical errors. These conflicts may involve difficult decisions about treatment, information disclosure, or resource allocation. Ethics committees provide objective perspectives and help parties involved reach fair and ethical solutions. Ethics committees also contribute to developing policies and procedures to prevent and manage medical errors. These policies may include protocols for reporting errors, communicating with patients, and implementing corrective measures. Ethics committees help ensure that these policies respect patients' rights.

Ethics committees serve as safeguards that promote integrity and accountability in healthcare.

### 19.1. Functions of Ethics Committees

1. **Protection of Human Rights:** Ethics committees are essential to protect patient rights and ensure that medical practices are carried out ethically. Their creation is justified by the need to navigate human organ use and critical end-of-life decisions, highlighting their role in preventing abuse of power and errors in medical care.
2. **Evaluation of Research Projects:** Health research ethics committees are responsible for evaluating projects to ensure participant protection and scientific integrity. This includes reviewing research protocols involving patient participation, ensuring that ethical practices are followed and that risks to patients are minimized.
3. **Confidence Building:** These committees not only address ethics in research but also foster trust between healthcare professionals and patients. By establishing frameworks for ethical discussion, committees help resolve conflicts and make consistent decisions, which are essential for medical error management.
4. **Independence and Autonomy:** The independence of ethics committees is crucial to their effectiveness. They must operate without outside influences to fairly evaluate cases of medical errors and ensure that decisions are made based on sound ethical principles.

Ethics committees are essential in medical error management, as they protect patient rights, evaluate ethics in research, and foster trust in health systems. Their independence and ability to address ethical dilemmas are critical to improving healthcare quality and preventing future errors. Preventing and managing medical errors is a complex challenge that requires multifaceted approaches. Ethics plays a crucial role in this process, guiding actions and decisions toward protecting patients and promoting safe, quality healthcare. Transparency, open communication, the duty to inform, and the role of ethics committees are key elements in addressing medical errors in ethical and responsible manners, promoting cultures of safety and learning in healthcare fields.

## 20. Legal Liability for Diagnostic Errors: A Legal Analysis

The medical process, particularly diagnosis, is subject to uncertainty inherent in human knowledge and the variability of biological responses. This reality creates the possibility of errors which, under certain circumstances, can generate legal liability for healthcare professionals.

The doctor-patient relationship is configured as a service contract in which the doctor undertakes to provide professional services with due diligence. Jurisprudence has established that this obligation is one of means, not results—that is, the doctor does not guarantee the patient's cure but rather commits to using all available means to achieve that goal. In the event of failure to fulfill this obligation, whether by action or omission, the doctor may incur civil liability. Diagnostic error can be one manifestation of this non-compliance.

In cases of medical liability due to diagnostic error, the burden of proof falls on the patient or their family members. They must demonstrate that the doctor acted negligently or recklessly, that damage occurred, and that there is a causal relationship between the medical action and the damage suffered. Proving medical negligence or recklessness can be complex, as it requires establishing that the doctor deviated from the "lex artis ad hoc"—the body of knowledge and practices accepted by the medical community at the time of the action. This typically requires medical experts to evaluate the professional's performance against the standards of the profession.

### 20.1. Concepts of Fault, Negligence, and Recklessness

Fault, in the field of medical civil liability, refers to the lack of diligence or care in professional performance. It manifests in two forms:

- **Negligence:** Omission of due diligence—the doctor fails to do what they should according to professional standards. For example, not performing necessary diagnostic tests based on the patient's symptoms.
- **Imprudence:** Hasty or reckless action without taking due precautions. For example, performing a medical procedure without having the necessary training or experience.

For civil liability to exist, the fault must be serious. A simple diagnostic error without negligence or recklessness is not sufficient to generate liability. Jurisprudence has recognized the inherent difficulty in medical diagnosis and has established that error alone does not constitute liability.

Legal liability for diagnostic errors is a complex and delicate issue. The doctor has the obligation to act with due diligence, in accordance with the "lex artis ad hoc," but cannot be required to guarantee a result. The burden of proof falls on the patient, who must demonstrate medical negligence or recklessness, the damage suffered, and the causal relationship between them. It is important to note that not every diagnostic error generates civil liability.

## 21. Conclusions

As a human-related science, medicine will always be prone to errors. When humans are involved, risk is inevitable. However, this does not mean that healthcare organizations, institutions, and professionals should not use every available resource to prevent errors from occurring.

The goal in medicine should always be the best outcome for the patient. Therefore, preventing medical errors remains a significant endeavor for all participants in the care process. The first step is recognizing the gaps in the system that allow errors to occur in order to correct issues and prevent recurrence.

To achieve this, the entire healthcare system should aim to transition from a punitive to a learning approach, viewing error reports as opportunities to improve and provide high-quality care without compromising the security of a positive work environment for healthcare providers. Medicine with a patient-centered approach is always the goal when it comes to error prevention.

The complexity of modern healthcare systems, combined with the inherent limitations of human decision-making, creates an environment where medical errors are inevitable. However, through systematic approaches that address human factors, system-related issues, and patient-related variables, significant reductions in error rates can be achieved. The key lies in fostering cultures of safety where transparency, continuous learning, and patient-centered care take precedence over blame and punishment.

Future efforts in medical error prevention must continue to evolve with advancing technology, changing healthcare delivery models, and emerging understanding of human factors in healthcare. Only through sustained, collaborative efforts across all levels of healthcare systems can we hope to minimize the impact of medical errors on patient safety and outcomes.

**Table 1.** Impact of Medical Errors: A Comprehensive Overview.

Consequence	Description
Patient harm	Physical harm (injuries, health complications) or psychological harm (anxiety, depression, loss of trust)
Delay or avoidance of appropriate treatment	Wrong or late diagnosis can lead to patients not receiving necessary treatment in time, which can aggravate conditions and decrease recovery chances
Unnecessary or dangerous treatment	Incorrect diagnosis can result in administration of treatments that patients do not need, which may be ineffective or even harmful to their health

Psychological repercussions	Diagnostic errors can have significant emotional impact on patients and families, including anxiety, depression, post-traumatic stress, and loss of trust
Financial implications	Medical errors can result in additional expenses for patients and families, such as additional treatment costs, loss of income, and legal expenses
Malpractice lawsuits	Patients affected by medical errors can file legal claims against healthcare professionals or institutions involved, seeking compensation for damages suffered
Impact on reputation	Medical errors can damage the reputation of healthcare professionals and institutions where errors occurred, affecting trust of patients and the community at large

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