

Enhancing pharmacovigilance practices: Insights from audits and ethical connotations

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Pharmacovigilance, pivotal in ensuring drug safety and regulatory compliance, requires meticulous surveillance and adherence to ethical standards. This article explores the multifaceted realm of pharmacovigilance, emphasizing the essential role of pharmacovigilance audits and compliance monitoring. By delving into key areas such as drug safety surveillance, signal detection, literature monitoring, and ethical considerations, this research sheds light on critical aspects of pharmacovigilance activities. The paper examines the outcomes of pharmacovigilance audits, highlighting common findings and areas for improvement to enhance regulatory compliance and the safety of pharmaceutical products. Insights gleaned from real-world experiences and regulatory guidelines underscore the importance of fostering a culture of good practice and ethical conduct in pharmacovigilance activities. By addressing challenges and trends, and elucidating the critical interaction between regulatory compliance, signal detection, and ethical considerations, this article provides valuable insights for stakeholders in the pharmaceutical industry, aiding them in optimizing pharmacovigilance systems and safeguarding patient safety.

Key words: drug safety surveillance, ethical considerations, good practice, literature monitoring, pharmacovigilance, pharmacovigilance audits, regulatory compliance, signal detection.

Zkvalitňování farmakovigilančních postupů: Reflexe z auditů a etické konotace

Farmakovigilanční aktivity jsou pro zajištění bezpečnosti léčiv a dodržování předpisů klíčové, a vyžadují proto pečlivý dohled a dodržování etických standardů. Tento článek se zabývá multifaktoriálními oblastmi farmakovigilance a zdůrazňuje zásadní roli farmakovigilančních auditů a kontinuálního monitorování souladu s předpisy. Tento článek přináší poznatky o klíčových aspektech farmakovigilančních aktivit prostřednictvím zkoumání kritických oblastí, jako jsou procesy sledování bezpečnosti léčiv, detekce signálů, monitorování literatury a souladu s etickými požadavky. Na základě rozboru výsledků farmakovigilančních auditů a obvyklých nálezů při auditech nabízí článek osvědčená doporučení pro zlepšení souladu s regulačními požadavky a optimalizaci farmakovigilančních systémů. Poznatky získané z reálných zkušeností podtrhují význam neustálého kultivování dobré praxe a etického jednání ve farmakovigilančních aktivitách. Zkoumáním výzev, trendů a nových postupů při posuzování farmakovigilančních aktivit článek akcentuje důležitost vzájemné interakce mezi dodržováním předpisů, detekcí signálů a etickými požadavky, poskytuje zúčastněným stranám cenné poznatky a umožňuje jim optimalizovat farmakovigilanční systémy a chránit bezpečnost pacientů.

Klíčová slova: detekce signálů, dobrá praxe, dohled nad bezpečností léčiv, etická reflexe, farmakovigilance, farmakovigilanční audity, monitorování literatury, soulad s předpisy.

Introduction

Pharmacovigilance (PV), encompassing the detection, assessment, understanding, and prevention of adverse effects or other drug-related issues, stands as a cornerstone of global drug safety regulation. As pharmaceutical products enter the market and are administered to patients, PV ensures continuous monitoring and evaluation of their safety profiles, contributing to the overall safeguarding of public health.

Pharmacovigilance audits are central to the pharmacovigilance landscape and are essential for verifying compliance with regulatory requirements and industry standards. These audits serve as systematic evaluations of PV systems, processes, and practices implemented by pharmaceutical companies, contract research organizations (CROs), and other stakeholders involved in drug development and post-marketing surveillance.

In recent years, the pharmaceutical industry has witnessed a growing emphasis on the importance of PV and its monitoring due to evolving regulatory landscapes, increasing globalization of drug development, and emerging complexities in drug safety management. Pharmaceutical companies regularly conduct PV audits, while regulatory authorities worldwide, including the European Medicines Agency (EMA) and the U.S. Food and Drug Administration (FDA), conduct routine inspections aiming to ensure adherence to guidelines and regulations.

Against this backdrop, this article aims to explore the multifaceted realm of PV audits, providing insights and best practices for professionals responsible for drug safety and regulatory compliance. By delving into the fundamental principles of PV auditing, examining regulatory expectations, and offering practical guidance for overcoming common challenges, this article seeks to empower PV professionals with the knowledge and tools necessary to navigate PV activities effectively.

The subsequent sections explore various aspects of PV requirements, including key processes, regulatory demands, emerging trends, and strategies for optimizing outcomes. Through the synthesis of real-world examples, regulatory guidelines, and industry insights, we aim to provide a comprehensive resource for enhancing PV practices and contributing to the continued improvement of drug safety on a global scale.

Pharmacovigilance and Pharmacovigilance Audits: Ethical Considerations

Pharmacovigilance stands as a crucial pillar in drug safety surveillance, encompassing the systematic detection, collection, assessment, and monitoring of adverse drug reactions (ADRs) and other drug-related issues. It plays a pivotal role in ensuring the safe and effective use of medicinal products by identifying, evaluating, and mitigating potential risks associated with their use. Pharmacovigilance activities are conducted throughout the entire lifecycle of a drug, from its pre-clinical development and clinical trials to post-marketing surveillance, to continually assess and manage the benefit-risk profile of the medicinal product. Good Pharmacovigilance Practices (GVP) encompass a set of measures designed to facilitate the safety monitoring of medicines.

The overarching quality objectives of a pharmacovigilance system encompass ensuring compliance with legal requirements pertaining to

pharmacovigilance obligations, proactively averting harm stemming from adverse reactions, promoting safe and effective product use through timely information dissemination, and safeguarding the health of patients and the public. Guiding principles are fundamental in shaping the design and functioning of structures, processes, and tasks within pharmacovigilance. These include meeting the needs of stakeholders, leadership commitment, personnel engagement, continuous quality improvement, structured resource allocation, evidence-based decision-making regarding the risk-benefit profile, and fostering collaboration among relevant entities (1).

Pharmacovigilance audits serve as essential mechanisms for evaluating the effectiveness and compliance of pharmacovigilance systems and processes. These audits aim to assess regulatory obligations and best practices implementation, identify areas of improvement, address deficiencies, and enhance the overall quality of pharmacovigilance activities. This proactive approach helps to strengthen drug safety surveillance systems and minimize the potential for harm to patients.

Ethical considerations are integral to the conduct of pharmacovigilance audits, ensuring the protection of human subjects, maintaining the integrity of scientific research, and upholding public trust. Auditors must adhere to ethical principles such as integrity, impartiality, transparency, and confidentiality throughout the audit process. This includes obtaining informed consent from study participants to access and review their safety data, respecting their autonomy and privacy, maintaining the confidentiality of sensitive information and professionalism, and refraining from conflicts of interest and bias that may compromise the integrity of the audit findings. By upholding these ethical standards, pharmacovigilance auditors contribute to the reliability, credibility, and ethical conduct of drug safety surveillance activities, ultimately promoting patient safety and public health.

Ethical Framework in Pharmacovigilance

Pharmacovigilance activities operate within a robust ethical framework prioritizing patient safety, well-being, and autonomy. Drawing from key ethical principles in bioethics (2), this framework guides the conduct of pharmacovigilance processes and audits and informs the regulatory landscape surrounding drug safety surveillance:

Beneficence: Pharmacovigilance professionals and auditors are guided by the principle of beneficence, which emphasizes the importance of doing good and prioritizing patient welfare. This involves proactively identifying and mitigating risks associated with medicinal products to ensure that their benefits outweigh potential harm.

Non-maleficence: The principle of avoiding harm requires pharmacovigilance personnel to minimize the risk of harm to patients. This entails promptly detecting adverse events and implementing measures to manage them effectively, thereby mitigating any potential safety concerns.

Autonomy: Respect for patient autonomy is paramount in pharmacovigilance, necessitating PV personnel to uphold patients' rights to make informed decisions about their healthcare. This includes obtaining informed consent for pharmacovigilance activities, safeguarding patients' privacy and confidentiality, and involving them in decisions

regarding their participation in clinical trials or treatment with medicinal products.

Justice: The principle of justice underscores the importance of fairness and equity in pharmacovigilance activities. Auditors must verify that pharmacovigilance processes are conducted impartially, without prejudice or bias, and that the benefits and risks of medicinal products are distributed equitably among diverse patient populations.

The literature covers a wide range of ethical topics that underscore the significant role of ethical principles in protecting rights, human dignity, autonomy, and freedom throughout the ethical conduct of clinical research and drug safety assessment (3, 4, 5). Veatch et al. provided a comprehensive series of cases encountered by pharmaceutical professionals, highlighting ethical concerns in their practice. They explore the discernment of value judgments in pharmacy, distinguishing between ethical and non-ethical value assessments. The authors organize these cases around key ethical principles: beneficence and nonmaleficence, justice and resource allocation, autonomy, veracity (honesty with patients), fidelity (including confidentiality), and avoidance of harm. Additionally, alongside cases addressing ethical controversies such as abortion, sterilization, genetics, mental health, terminally ill patients, health insurance, or health system rationing, the authors present pharmaceutical topics such as drug formularies, drug distribution systems, and pharmaceutical research, including consent to drug therapies (6).

Ethical conduct in pharmacovigilance extends to additional principles such as integrity and transparency that complement the decision-making process within the framework of the theory of Principlism. Pharmacovigilance professionals are required to uphold these principles by demonstrating honesty and transparency in their engagements with stakeholders. This entails accurately reporting adverse events, disclosing conflicts of interest, and maintaining scientific integrity during audits, which present essential elements for maintaining public trust in the regulatory system.

Ethical Challenges

Pharmacovigilance presents unique ethical challenges that traditional bioethics may not fully address. While evidence-based decision-making remains paramount, ethical considerations play a crucial role in guiding these decisions. Balancing regulatory transparency with the risk of unintended consequences is vital for maintaining public trust. Excessive disclosure may lead to signal fatigue or unwarranted public alarm, potentially affecting medication adherence.

Conflicts of interest pose significant ethical dilemmas within pharmacovigilance, as they can compromise the objectivity and integrity of safety data assessments. When individuals or organizations involved in pharmacovigilance have financial or other vested interests, these conflicts may unduly influence the reporting, interpretation, or communication of safety information. For instance, pharmaceutical companies might downplay or withhold adverse reaction data to protect their product's market share, potentially compromising patient safety. Similarly, healthcare professionals with ties to the pharmaceutical industry may minimize safety concerns, undermining the credibility of pharmacovigilance activities. Contract research organizations, that

conduct studies or manage pharmacovigilance activities on behalf of pharmaceutical companies, are also susceptible to conflicts of interest. They may face pressure to underreport or downplay the number of serious adverse events to avoid the premature termination of a study, which could result in significant financial losses. Physicians involved in clinical trials might encounter similar ethical dilemmas, where reporting adverse events could negatively impact the trial's success or their professional relationships with sponsors.

In the context of internal audits, conflicts of interest can be particularly problematic. Internal auditors may face significant internal pressures to ensure the successful completion of a study, recognizing that any increase in reported safety issues could jeopardize the timely and successful registration of a drug. Drawing from the author's experience as an independent external auditor, there have been instances where the discovery of numerous unreported serious adverse events during audits across several sites led to internal discussions focused not on addressing these findings, but on whether to continue further audits. Additional external audits that could have uncovered more discrepancies were cancelled, allowing the study to proceed without further scrutiny. The objectivity of subsequent audits under regulatory pressure, conducted by internal auditors, may have been compromised by these internal pressures.

Governance and conflicts of interest are deeply intertwined in the management of medical registries. The potential influence of external sponsors on the governance of these registries poses a significant risk, particularly concerning scientific outcomes. Responsible data sharing in international health research (7) can mitigate conflicts of interest that could undermine the integrity of pharmacovigilance data collected from such registries.

Conflicts of interest can significantly erode public trust in the pharmacovigilance system. When patients and healthcare providers question the reliability of safety data and the motivations behind certain decisions, it can lead to a reluctance to report adverse events. This exacerbates the issue of underreporting, impeding the identification of potential risks. Addressing conflicts of interest is, therefore, not only an ethical imperative but also crucial for maintaining the credibility and effectiveness of pharmacovigilance.

Post-marketing surveillance is essential for uncovering previously unrecognized risks that may not have been identified during clinical trials. However, balancing rigorous pre-marketing testing with post-marketing surveillance presents an ongoing ethical dilemma. The emergence of big data and real-world evidence offers both opportunities and challenges, enhancing safety signal detection while requiring robust ethical frameworks to protect patient privacy amid data utilization. Navigating these ethical complexities is vital for promoting patient safety and maintaining public trust in pharmacovigilance practices (8, 9).

Ethical Considerations for Ensuring Patient Safety and Welfare in Pharmacovigilance

Ensuring patient safety and welfare in pharmacovigilance requires a comprehensive approach that prioritizes ethical considerations at every stage of the process. This encompasses several key aspects:

Informed Consent: Ensuring that patients have a thorough understanding of the risks and benefits associated with administered medicinal products is crucial. Obtaining informed consent ensures that patients are aware of potential adverse effects and can make informed decisions.

Privacy and Confidentiality: Protecting the privacy and confidentiality of patients' personal and health information is paramount. Robust security measures should be implemented to prevent unauthorized access, disclosure, or misuse of sensitive data, in compliance with relevant data protection regulations.

Ethical Collection and Use of Patient Safety Data: Patient data should be anonymized or de-identified whenever possible to protect privacy. Personally identifiable information should be removed or encrypted to prevent individuals from being identified.

Limited Data Access: Access to patient data should be restricted to authorized personnel with a legitimate need for access. This helps minimize the risk of data breaches and unauthorized disclosures.

Timely Reporting and Response: Establishing mechanisms for prompt reporting and response to adverse events or safety concerns ensures that appropriate actions are taken to mitigate risks and protect patient safety.

Enhanced Risk-Benefit Assessment: Comprehensive risk-benefit evaluations should be conducted to assess the potential risks and benefits associated with medicinal products. Factors such as patient population and demographics, disease severity, available treatment options and alternatives, and previous clinical experience should be considered to ensure a thorough analysis.

Continuous Monitoring and Evaluation: Ongoing monitoring and evaluation of safety data throughout the lifecycle of medicinal products enable the timely detection of emerging safety signals and the implementation of corrective actions.

Patient Engagement and Empowerment: Engaging patients as proactive contributors to pharmacovigilance initiatives and empowering them to report adverse events or safety concerns is essential. This necessitates providing patients with access to pertinent information and resources to enable informed decision-making regarding their healthcare.

Transparency and Accountability: Pharmacovigilance personnel should maintain transparency about data collection and usage practices and be accountable for their actions. Ethical guidelines and regulatory requirements should be adhered to at all times.

Ethical Obligations in Reporting and Correcting Compliance Issues: Ethical principles should guide the reporting and correction of compliance issues identified during pharmacovigilance activities. Accurate and unbiased assessments of compliance issues should be provided, conflicts of interest disclosed, and corrective actions implemented promptly to address deficiencies. PV personnel should prioritize patient safety and welfare in their efforts to promote regulatory compliance, recognizing the ethical imperative of safeguarding public health.

Pharmacovigilance audits play a crucial role in upholding ethical standards within the pharmaceutical industry and ensuring the safety and efficacy of medicinal products. Auditors are responsible for verifying

compliance with ethical and legislative requirements and identifying and addressing ethical and safety concerns. It is imperative that all pharmacovigilance activities, from data collection to signal detection, are conducted in an ethically sound manner. Any failure in these activities can have serious implications for patient safety and welfare.

Implications of Ethical Breaches in Pharmacovigilance

Ethical violations in pharmacovigilance can yield profound consequences, impacting both individual participants and the broader public health landscape. Non-compliance with ethical standards may endanger patients' health and well-being, diminish trust in the pharmaceutical industry, and undermine the credibility of the medicinal products' reliability. Additionally, ethical violations may result in regulatory sanctions, legal liabilities, fines, and reputational damage for individuals, organizations, companies, or research entities involved in pharmacovigilance. Rebuilding trust and restoring reputation may be a challenging and time-consuming process.

Violating ethical principles in any field, including pharmacovigilance, can have significant consequences. Individuals found guilty of ethical breaches may face professional censure, including disciplinary action by regulatory authorities, suspension or revocation of licenses or certifications, civil lawsuits, and criminal charges. Ethical misconduct can lead to financial losses for individuals or organizations due to loss of business opportunities, decreased market value, and damage to brand reputation. Beyond professional and legal repercussions, individuals involved in ethical misconduct may experience personal guilt, shame, stress, and psychological distress due to their actions' impact on others.

To mitigate the risks associated with ethical violations, pharmacovigilance audits play a crucial role in uncovering deficiencies and ethical breaches that may compromise patient safety. PV auditors must uphold ethical standards rigorously throughout the audit process, fostering a culture of transparency, accountability, and integrity. Auditors must remain vigilant to potential ethical dilemmas that may arise in the course of an audit. Addressing ethical challenges requires a nuanced understanding of ethical frameworks and a proactive approach to resolving ethical concerns while upholding the integrity of the audit process. By adhering to the highest ethical standards, auditors play a pivotal role in safeguarding patient safety, promoting public trust, and advancing the ethical conduct of pharmacovigilance.

Reflections on Ethical Challenges and Opportunities

Ethical challenges in pharmacovigilance are complex and multifaceted, reflecting the evolving nature of safety monitoring in the pharmaceutical industry. Key challenges include balancing robust safety monitoring with protecting patient privacy rights, addressing conflicts of interest, maintaining impartiality, and upholding professional integrity.

However, there are numerous opportunities for enhancing ethical practice in pharmacovigilance. Promoting patient engagement and empowerment can enhance transparency and accountability in safety

monitoring efforts. Strengthening collaboration among regulatory authorities, industry stakeholders, and patient advocacy groups can foster patient-centric approaches to pharmacovigilance. By embracing best practices, addressing audit findings, and prioritizing ethical considerations, stakeholders can collaboratively advance the practice of pharmacovigilance and ensure the continuous improvement of global healthcare standards.

Regulatory Compliance and Accountability in Pharmacovigilance

Pharmacovigilance activities are governed by stringent regulatory requirements and standards established by relevant regulatory authorities. Compliance with these regulations, including guidelines such as the GVP guideline, is essential to ensure the safety of medicinal products. The GVP guideline, developed by experts from the EMA and European Union (EU) member states, serves as a comprehensive framework for harmonizing pharmacovigilance practices across the pharmaceutical industry. The GVP guideline is structured into chapters that belong to two categories:

- Modules addressing key pharmacovigilance processes;
- Product- or population-specific considerations (10).

The GVP guideline encompasses various modules. The overall description and objectives of pharmacovigilance systems and quality systems for pharmacovigilance activities are referred to in GVP Module I, while the specific pharmacovigilance processes are described in each respective Module of GVP, e.g., Module IV provides guidance on planning and conducting the legally required audits and the role, context, and management of pharmacovigilance audit activities. Pharmacovigilance audits verify the appropriateness and effectiveness of the implementation of a pharmacovigilance system (11).

Product- or population-specific considerations are provided for vaccines, biological medicinal products, and the paediatric population. The EMA also intends to include considerations related to the geriatric population (10). Key aspects of the GVP guideline include:

Pharmacovigilance Systems and Quality Systems: The GVP guideline outlines the scope and objectives of pharmacovigilance systems, emphasizing the systematic monitoring of medicinal product safety throughout their lifecycle. It promotes proactive risk management and timely detection of adverse drug reactions.

Pharmacovigilance System Master File (PSMF): The GVP guideline establishes requirements for the creation and maintenance of a PSMF, which serves as a comprehensive document outlining a pharmaceutical company's pharmacovigilance system. The PSMF provides regulatory authorities with insight into the company's pharmacovigilance processes, procedures, and responsibilities.

Risk Management Plan (RMP) and Risk Minimization Measures: Guidance is provided on the development and implementation of an RMP for medicinal products to identify, characterize, and mitigate associated risks. RMPs aim to optimize the benefit-risk profile of medicinal products.

Signal Detection and Management: The GVP guideline outlines methodologies for signal detection and management, including the

identification of potential safety signals from various sources such as individual case safety reports, aggregated data from active surveillance systems or studies, and scientific literature information. Processes for evaluating, prioritizing, and managing signals, as well as for conducting further data analysis, and implementing risk minimization measures are also specified.

Pharmacovigilance Inspections and Audits: Requirements for pharmacovigilance inspections conducted by regulatory authorities and pharmacovigilance audits conducted by independent personnel are detailed, focusing on various aspects of a company's pharmacovigilance system, including data collection and processing, signal detection and management, and risk communication.

Additionally, the GVP guideline addresses other areas such as suspected adverse reaction reporting, periodic safety update reports, post-authorization safety studies, and safety communication (10). By promoting consistent and rigorous pharmacovigilance practices, the GVP guideline helps to protect public health and enhance patient safety.

Responsibilities of Regulatory Authorities

Competent regulatory authorities play a crucial role in ensuring effective compliance management within the pharmacovigilance framework. To achieve this, regulatory authorities established specific quality system procedures and processes aimed at fulfilling several key objectives:

- Thorough evaluation of pharmacovigilance data submitted, including assessing the data's quality and completeness, ensures that all relevant safety information is adequately reviewed and considered in decision-making processes.
- Timely assessment and processing of pharmacovigilance data in accordance with legal timelines ensures that safety-related information is promptly reviewed and acted upon to mitigate potential risks to public health.
- Independence in the execution of pharmacovigilance activities to uphold impartiality and objectivity ensures that regulatory decisions are based solely on scientific evidence and regulatory requirements, free from external influences or biases.
- Facilitating effective communication with various stakeholders, including patients, healthcare professionals, marketing authorization holders, and the general public, regarding pharmacovigilance matters helps to disseminate important safety information and enhance public awareness of potential risks associated with medicinal products.
- Conducting inspections to verify compliance with pharmacovigilance requirements helps to identify any deficiencies in pharmacovigilance systems and processes and ensures that corrective actions are implemented promptly to address them (1).

The Report on Pharmacovigilance Tasks, issued by the EMA, provides a comprehensive overview of the activities conducted by the EU Pharmacovigilance Network from January 2019 to December 2022, aimed at ensuring the safety of all medicines authorized in the EU, including COVID-19 vaccines. Additionally, the report outlines key

improvements made to the EU pharmacovigilance system during this timeframe and offers critical reflections on areas requiring further enhancement in the forthcoming period (12).

Main Responsibilities of Marketing Authorization Holders

Marketing Authorisation Holders (MAHs) are entities authorized to market medicinal products in one or more EU member states (13). For effective compliance management, MAHs must establish specific quality system procedures and processes that include the following responsibilities:

- Continuous monitoring of pharmacovigilance data to explore the risk-benefit balance and implement appropriate measures as necessary.
- Scientific evaluation of all information regarding the risks of medicinal products to patients or public health, particularly adverse reactions reported by patients or healthcare professionals from the use of medicinal products.
- Timely submission of accurate and verifiable data on adverse reactions to regulatory authorities, as legally required.
- Maintenance of the quality, integrity, and completeness of the information submitted on the risks of medicinal products. This includes ensuring that safety-related data is accurately recorded, properly documented, and securely stored to prevent data loss or tampering.
- Effective communication channels with regulatory authorities, providing updates on new or changed risks, risk management systems, or risk minimization measures. Additionally, MAHs are responsible for communicating relevant safety information to healthcare professionals and patients.
- Updating product information, including package inserts and labelling, based on new scientific knowledge or safety-related developments (1).

By fulfilling these responsibilities, regulatory authorities and MAHs contribute to maintaining the highest standards of safety and efficacy in medicinal products, ultimately safeguarding public health and well-being.

Identifying Deficiencies: Key Observations from Pharmacovigilance Audits

Ensuring compliance with pharmacovigilance guidelines is crucial for maintaining the safety and efficacy of medicinal products. Regular monitoring through internal and external audits, as well as inspections by regulatory authorities, helps identify deficiencies and areas for improvement. The findings presented in this article are based on a systematic analysis of data collected from numerous PV audits conducted by the author, who also serves as a clinical and research Quality Assurance consultant and auditor.

Methodology

The methodology used to identify and analyse deficiencies in pharmacovigilance practices consisted of several key steps:

1. Comprehensive Review of Audit Reports: The author meticulously reviewed official audit reports from various PV audits conducted over the past five years. These reports, which detail observations, non-compliances, and recommendations, provided a foundational dataset

for identifying recurring issues and areas of concern across different organizations and geographical regions.

2. Detailed Note-Taking During Audits: During the execution of audits, the author engaged in detailed note-taking, capturing real-time observations, interviews during audits, close-out discussions with auditees, and the context of each finding. This process ensured that the nuances of each audit were documented accurately, allowing for a deeper understanding of the underlying causes of identified deficiencies.

3. Cross-Referencing with PV Guidelines and Industry Standards: The audit findings were systematically cross-referenced with relevant PV guidelines and regulatory standards. This comparison helped to contextualize the findings within the broader regulatory framework and ensure that the analysis was grounded in recognized best practices.

4. Expert Discussions and Peer Review: To enhance the reliability and depth of the analysis, the author engaged in discussions with PV auditors and other industry experts. These discussions focused on sharing experiences, comparing audit findings, and exploring different perspectives on emerging trends and common issues in pharmacovigilance. Insights gained from these expert exchanges were integrated into the overall analysis, providing a more comprehensive view of the challenges faced in PV compliance.

5. Systematic Categorization and Analysis of Findings: The observations from the audits were systematically categorized based on their nature and severity. The findings were classified into three severity levels (minor, major, and critical) to reflect their potential impact on patient safety and regulatory compliance. This classification facilitated a structured analysis, highlighting patterns and trends across different audits.

6. Synthesis of Data into Actionable Insights: The final step involved synthesizing the categorized findings into actionable insights. The author identified key themes, such as risk factors and recurring deficiencies, and formulated main categories of issues. The synthesis was guided by both the empirical data gathered during audits and the insights from expert discussions, ensuring a balanced and well-rounded perspective.

By employing these methodological approaches, the author developed a systematic detailed and reliable analysis of pharmacovigilance deficiencies.

Audit Findings and Nonconformance Classification

The findings presented in this article are not only reflective of the author's direct observations but are also enriched by expert input and systematic analysis, providing valuable guidance for improving PV practices across the industry. The following sections detail the prevalent findings observed during PV audits, systematically classified into three severity levels, reflecting the potential impact of each nonconformance on patient safety and regulatory compliance.

Minor Nonconformances

- Inadequate documentation of pharmacovigilance activities, such as incomplete case narratives, missing data elements or follow-up information, and minor documentation errors or inconsistencies.

- Minor discrepancies in data entry or coding practices, which do not significantly impact the overall quality or integrity of safety data.
- Lack of clarity in communicating safety information to relevant stakeholders.
- Lack of Quality Assurance activities, including irregular PV audits, inadequate audit plans, or auditors lacking experience.
- Procedures not reflecting actual practice or lacking in detail.
- Lack of adequate resources allocated to pharmacovigilance activities, resulting in minor delays in safety monitoring processes.
- Minor discrepancies in safety database reconciliation, resulting in inconsistencies in safety data reporting with minimal impact on patient safety or regulatory compliance.

Major Nonconformances

- Violations of pharmacovigilance regulations and guidelines, including significant delays in safety reporting to regulatory authorities.
- Absence of an experienced Qualified Person for pharmacovigilance or backup procedures.
- Deficiencies related to the completeness and accuracy of data collection and assessment.
- Deficiencies related to safety data documentation and management, such as incomplete or inaccurate records, inadequate follow-up on adverse event reports, inadequate responses to regulatory inquiries, or lack of appropriate data handling procedures.
- Deficiencies in signal detection and management processes, failure to investigate emerging safety concerns, and inadequate implementation of literature monitoring and screening processes.
- Deficiencies in the implementation of quality management systems for pharmacovigilance activities, such as lack of standardized procedures or insufficient oversight mechanisms, including ineffective Corrective and Preventive Action (CAPA) implementation, or inadequate oversight of pharmacovigilance vendors.
- Lack of compliance oversight of pharmacovigilance activities by management, including insufficient allocation of resources, ineffective trend analysis, or lack of responsiveness to regulatory inspection or audit observations.
- Issues with case processing, such as inadequate reconciliation, or poor medical review.
- Deficiencies in the development, implementation, and monitoring of risk management plans for medicinal products, including inadequate risk assessment and mitigation strategies, or delays in implementing risk management actions.
- Major discrepancies in the safety database reconciliation, impacting safety signal detection and risk assessment.
- Failures to fulfil pharmacovigilance obligations related to MAHs, such as the inadequate provision of safety updates, periodic safety reports, or deficiencies in post-marketing surveillance activities.
- Substantial deficiencies in SUSAR documentation quality and accuracy.
- Systemic issues with SUSAR reconciliation processes, including discrepancies between different databases or failure to identify and reconcile duplicate reports.

- Major discrepancies in SUSAR classification, resulting in misinterpretation of safety signals and delayed risk mitigation measures.
- Insufficient training of pharmacovigilance personnel, indicating knowledge gaps in understanding regulatory requirements and leading to errors or inconsistencies in safety data collection, assessment, and reporting.

Critical Nonconformances

- Significant deviations from regulatory requirements, such as failure to maintain the PSMF or falsifying pharmacovigilance records.
- Failure to detect potential safety signals, resulting in missed safety signals or delays in their detection and management.
- Failure to implement appropriate risk minimization measures for identified safety concerns, leading to potential harm to patients.
- Lack of documented procedures for managing serious adverse events or SUSARs, leading to delays or errors in reporting, investigation, and follow-up actions.
- Critical deficiencies in the pharmacovigilance system, such as inadequate staffing levels or infrastructure limitations, compromising the effectiveness of safety monitoring and risk management.
- Critical deficiencies in the pharmacovigilance system's ability to detect, assess, and respond to safety events in a timely and effective manner, indicating systemic failures.
- Failure to report SUSARs to regulatory authorities, posing immediate and significant risks to patient safety and public health.
- Critical deviations in SUSAR reporting practices, such as deliberate suppression of safety data or falsification of SUSAR records.

Presented observations highlight the importance of conducting thorough pharmacovigilance audits to identify and address deficiencies in compliance with regulatory requirements.

Exploring Inadequate Signal Detection: Insights from Recent Audits

Signal detection plays a pivotal role in pharmacovigilance, serving as a proactive mechanism to identify potential safety concerns associated with medicinal products. Literature screening, as part of signal detection, involves systematically reviewing scientific literature, medical journals, regulatory databases, and other relevant sources to identify emerging safety signals or trends. Inadequate signal detection due to deficiencies in literature screening and monitoring processes poses significant risks and consequences for pharmacovigilance activities and patient safety and can hinder the effectiveness of signal detection efforts. Such concerns have gained significant attention due to recurrent findings observed during pharmacovigilance audits conducted by the author of this paper. It was repeatedly noted that relevant literature sources were either not monitored or not adequately screened for potential adverse events related to the medicinal products under surveillance. Additionally, clear criteria for determining the relevance of literature sources and the frequency of screening activities were often lacking or inconsistently applied. Identified deficiencies in literature monitoring and screening processes may lead to missed signals and

delayed detection of emerging safety concerns. Recognizing the critical significance of this issue for patient safety and pharmaceutical product quality, the subsequent chapters provide insights into the potential consequences of these nonconformances, their underlying root causes, and recommended practices for improvement.

Potential Consequences

Delayed Detection of Safety Signals: Inadequate literature screening and monitoring may delay identifying emerging safety concerns associated with medicinal products. This delay could potentially harm patients who continue to use the products without being aware of the associated risks.

Missed Adverse Events: Failure to thoroughly monitor relevant literature sources increases the risk of overlooking important adverse events. This could result in underreporting of adverse events, leading to incomplete safety assessments and potentially exposing patients to harm.

Regulatory Non-Compliance: Non-compliance with regulatory requirements to conduct robust and systematic literature screening and monitoring may lead to regulatory actions such as warning letters, fines, or restrictions on product approvals.

Reputation Damage: Deficiencies in literature screening and monitoring may damage a company's reputation and trustworthiness.

Increased Safety Risks: Failure to promptly identify and assess safety signals in the literature may expose patients to risks, undermining the overall risk-benefit profile of the products.

Resource Wastage: Inefficient literature screening and monitoring processes may result in the misallocation of resources towards ineffective surveillance activities. This diverts attention and resources from other critical pharmacovigilance tasks, potentially hindering overall safety monitoring efforts.

Root Cause Examination

The deficiencies observed in inappropriate signal detection during pharmacovigilance audits usually reveal systemic issues in literature monitoring and screening processes. These deficiencies stem from various root causes, each contributing to the overall ineffectiveness of signal detection efforts:

Insufficient Resources: The insufficient allocation of resources to literature monitoring and screening activities is one of the common root causes. Limited access to comprehensive databases, outdated search tools, and understaffed pharmacovigilance teams can severely hinder the thoroughness and efficiency of signal detection processes. Without sufficient resources, pharmacovigilance professionals may struggle to conduct comprehensive searches and identify relevant safety information promptly.

Delegation of Literature Screening Responsibilities to External Vendors: Lack of oversight of a vendor's performance means that there is limited visibility into the vendor's processes and procedures for screening literature, potentially leading to inconsistencies, errors, or gaps in screening processes. Additionally, without regular audits of the vendor's activities, there is no mechanism in place to ensure compliance with

established requirements and standards, further exacerbating the risk of missed signals and delayed detection of safety concerns.

Ineffective Search Strategies: Suboptimal search strategies present another contributing factor. PV auditors often identify deficiencies in the design and execution of search strategies, including the use of overly narrow search criteria or reliance on outdated databases. These shortcomings result in missed signals and incomplete detection of safety concerns, undermining the overall effectiveness of pharmacovigilance efforts.

Inadequate Data Management: Deficiencies in data collection and management practices also pose significant challenges to signal detection efforts. Inadequate documentation of search strategies, search results, and signal assessment processes hinders transparency and reproducibility, making it difficult to verify the accuracy and reliability of signal detection outcomes. Without robust data management systems in place, pharmacovigilance teams may struggle to organize, retrieve, and analyse literature data effectively.

Strategies for Addressing Signal Detection Deficiencies

To effectively address the identified deficiencies in literature screening and monitoring, and thereby mitigate potential consequences and uphold the integrity of the pharmacovigilance system, pharmaceutical companies and pharmacovigilance stakeholders should consider implementing the following recommendations:

- Ensuring that literature screening activities encompass a wide range of sources, including peer-reviewed journals, conference proceedings, and regulatory reports to minimize the risk of overlooking relevant data.
- Implementing robust oversight mechanisms and conducting regular audits of the vendors' activities and performance to ensure compliance with established literature screening requirements and standards. Real-time monitoring of literature screening processes should be incorporated to enhance effectiveness.
- Fostering open communication channels between the company and vendors to promptly address any issues or concerns collaboratively.
- Establishing clear performance metrics and key performance indicators (KPIs) for vendors' literature screening activities. Regular reviews should be conducted to assess adherence and effectiveness.
- Development of search strategies tailored to the specific characteristics of the medicinal product under review.
- Embracing advanced technology solutions, such as natural language processing algorithms and data mining tools, to automate and streamline literature screening processes.
- Defining standardized criteria for screening literature search results to facilitate consistent and systematic data extraction.
- Facilitating a multidisciplinary review of literature screening findings by engaging pharmacovigilance experts, medical reviewers, statisticians, and other relevant stakeholders, including collaborative discussions to critically evaluate identified safety signals, assess their clinical significance, and determine appropriate risk mitigation strategies.

- Implementing sophisticated data management systems to facilitate efficient organization, analysis, and interpretation of vast amounts of literature data by pharmacovigilance teams.
- Conducting periodic reviews of search strategies to ensure comprehensive capture of relevant literature sources. Expanding search criteria to include a broader range of databases, journals, and publication types to minimize the risk of missing pertinent safety information.
- Implementing automated alerts or subscription services to stay informed about relevant publications, including newly published studies.
- Providing comprehensive training programs for pharmacovigilance personnel or vendor resources involved in literature monitoring and screening to improve their understanding of literature screening requirements.
- Implementing quality control measures to ensure consistency and accuracy of the process.
- Establishing clear documentation procedures for literature monitoring and screening activities. Maintaining detailed records of search strategies, search results, and signal assessment outcomes to promote transparency and accountability. Such records should be readily accessible for review and validation by internal and external stakeholders.
- Promoting a culture of continuous improvement by conducting regular evaluations of signal detection processes and outcomes. Objective feedback from auditors is crucial for guiding future screenings and implementing corrective actions effectively.

Recommendations for Enhancing Pharmacovigilance Practices: Insights from Audit Findings

Based on the common findings from PV audits, the following recommendations provide a comprehensive framework for enhancing pharmacovigilance practices and ensuring patient safety:

Strengthen Signal Detection and Evaluation: To strengthen the signal detection process it is important to utilize advanced methodologies and data analysis techniques to proactively identify and evaluate safety signals.

Ensure Timely and Accurate Adverse Event Reporting: Establishing robust processes for promptly identifying, documenting, assessing, and reporting adverse events, ensuring that all necessary information is included and submissions are made within regulatory deadlines.

Enhance Safety Data Management: Implementation of comprehensive systems for the collection, documentation, and management of safety data, with rigorous data quality assurance measures.

Implement Robust Quality Management Systems: Development of standardized procedures and maintenance of robust quality management systems for all pharmacovigilance activities.

Strengthen Compliance Oversight: Enhancement of pharmacovigilance activities oversight to ensure compliance with regulations and allocation of adequate resources to support pharmacovigilance functions.

Continuously Monitor and Evaluate Performance: Establishment of mechanisms for continuous monitoring and evaluation to drive continuous quality improvement, including KPIs, metrics, and feedback mechanisms.

Strengthen Risk Management Practices: Thorough risk assessment performance, development of risk management plans, and proactive monitoring and mitigating identified risks.

Ensure Effective Corrective and Preventive Actions: Implementation of effective processes for prompt corrective actions to address compliance issues identified during audits or inspections.

Maintain Compliance with Pharmacovigilance Regulations: Adherence to all applicable pharmacovigilance regulations and guidelines issued by regulatory authorities, including post-marketing surveillance activities.

Facilitate Quality Improvement: Implementation of mechanisms for continuous quality control to enhance the effectiveness and efficiency of literature screening processes.

Conduct Regular Pharmacovigilance Audits: Assessment of compliance with regulatory requirements, identification of areas for improvement, and mitigation of potential risks through routine audits.

Enhance Adherence to Ethical Standards: Adherence to ethical principles in all pharmacovigilance activities, including respect for autonomy and data privacy protection is necessary.

Promote Collaborative Communication: Encouraging stakeholders engaged in pharmacovigilance activities to collaborate and communicate effectively, facilitating the exchange of information.

By implementing these recommendations, pharmaceutical companies can strengthen the overall effectiveness of pharmacovigilance activities, improve compliance with regulations, and enhance patient safety in clinical trials and the post-marketing surveillance of medicinal products.

Future Directions for Ethical Practice in Pharmacovigilance

The future of ethical practice in pharmacovigilance will be shaped by several key trends and developments characterized by the importance of leveraging technology, prioritizing data privacy and security, embracing patient-centric approaches, and promoting regulatory harmonization. Below is a closer look at each aspect:

Technological Advancements: Continued advancements in technology, including advances in blockchain, artificial intelligence (AI), and machine learning, hold the potential to enhance the efficiency and effectiveness of pharmacovigilance activities. These tools enable better data analysis, quicker identification of safety signals, and improved decision-making processes. For example, blockchain technology can provide an immutable and transparent ledger of pharmacovigilance data, ensuring data integrity and traceability. AI and machine learning algorithms can analyse large datasets more efficiently, enabling quicker identification of potential adverse events and trends. The implementation of tools that use AI will allow pharmacovigilance professionals to focus on more complex and higher-value tasks (14). The significance of rigorous validation processes and transparency measures in AI sys-

tems for pharmacovigilance is highlighted in a case study. The study focuses on operationalizing existing guidance for validated AI systems in pharmacovigilance, particularly emphasizing the task of monitoring adverse events in the scientific literature (15).

Data Privacy and Security: With the increasing digitization of healthcare data, robust measures must be in place to safeguard data privacy and security. As pharmacovigilance relies on patient data, safeguarding this information from unauthorized access, breaches, and misuse is paramount. Stringent encryption protocols, access controls, and regular security audits are essential to maintain compliance with data protection regulations such as the General Data Protection Regulation (GDPR) (16).

Patient-Centricity: Patient engagement remains central to safety monitoring. This may include soliciting patient feedback on their experiences with medications, incorporating patient-reported outcomes into safety assessments, and promoting transparency in communication. Empowering patients to actively participate in pharmacovigilance activities enhances data collection and fosters a sense of ownership over their healthcare journey. Additionally, incorporating patient perspectives can provide valuable insights into the real-world impact of medications and improve decision-making processes within regulatory agencies and pharmaceutical companies.

Regulatory Harmonization: Harmonizing pharmacovigilance regulations globally ensures consistency and facilitates compliance with ethical standards. By aligning regulatory requirements across different jurisdictions, pharmacovigilance professionals can navigate compliance more effectively and uphold ethical practices uniformly.

Conclusion

Pharmacovigilance is indispensable for ensuring the safety, efficacy, and quality of medicinal products throughout their lifecycle. Through comprehensive evaluation of pharmacovigilance activities, pharma-

covigilance audits provide critical insights into regulatory compliance, adherence to ethical standards, and the effectiveness of risk management processes. Pharmacovigilance audits are essential for identifying deficiencies in processes, procedures, and regulatory adherence, serving as a vital tool for recognizing and addressing risks associated with inadequate control over pharmacovigilance activities. Failure to adequately control pharmacovigilance activities can lead to adverse consequences such as delayed detection of safety signals, insufficient risk mitigation measures, and compromised data integrity. Such risks jeopardize patient safety and undermine the credibility and trustworthiness of medicinal products and regulatory oversight bodies. Ethical considerations are fundamental in pharmacovigilance audits, emphasizing the importance of patient welfare, autonomy, and justice. Adhering to ethical principles not only protects the rights and well-being of research participants but also enhances the credibility and integrity of pharmacovigilance activities. By upholding the highest ethical standards, PV auditors play a pivotal role in promoting ethical practice within pharmacovigilance.

The nonconformances observed during the pharmacovigilance audits highlight areas for improvement and offer opportunities for reinforcement of patient safety measures and regulatory compliance. Addressing deficiencies identified during audits and implementing best practices are essential steps to mitigate risks, uphold regulatory standards, and maintain confidence in the pharmaceutical industry. Furthermore, PV audits drive continual enhancement, fostering a culture of excellence and innovation in pharmacovigilance practices.

By strengthening control mechanisms, promoting accountability and transparency, and upholding the highest ethical standards, stakeholders can effectively mitigate risks and ensure the safety and efficacy of medicinal products for all stakeholders involved. Through these efforts, they contribute to the advancement of pharmacovigilance and the protection of public health.

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