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The Fragility of Critical Medication Alerts in Electronic Prescriptions: The Need for Governance and Organizational Culture

Ferreira Drumond JP*

Clinical Pharmacist, UnyLeya College, Santa Casa de Belo Horizonte, Belo Horizonte, Minas Gerais, Brazil

Opinion Article

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***Corresponding author:** Joao Pedro Ferreira Drumond, Clinical Pharmacyst, UnyLeya College, Santa Casa de Belo Horizonte, Belo Horizonte, Minas Gerais, Brazil, Email: pedrojoaodrumond@gmail.com

Abstract

This opinion article discusses the limits and fragility of automated prescription alerts for critical medications when implemented in healthcare systems without proper clinical governance and cultural alignment of the teams. Although Clinical Decision Support Systems (CDSS) are designated as essential barriers to error prevention, excessive and miscalibrated signaling triggers the phenomenon of alert fatigue, leading professionals to compulsively dismiss warnings and become desensitized to risk. Additionally, it examines how the high cost of acquiring and maintaining these technologies, when isolated from improvements in care processes, pressures public and private budgets without generating effective safety gains. It is concluded that technology is not self-sufficient and that the effectiveness of alerts depends on the consolidation of the triad between people, processes, and technology, supported by standardized clinical protocols and ongoing continuing education programs.

Keywords: Prescription Alerts, Patient Safety, Alert Fatigue, Risk Management, Interdisciplinary Team

Introduction

The digital transformation in healthcare institutions has driven the adoption of management software and increasingly complex Clinical Decision Support Systems (CDSS), often integrated with artificial intelligence modules Arantes [1]. Among the main functionalities of these platforms is the automated generation of prescription alerts through visual signals (pop-ups or color highlights) designed to interrupt the workflow and warn professionals about drug interactions, inappropriate doses, nephrotoxicity, or the use of Potentially Dangerous Medications (PDM) [2].

Although the technological promise is to create an automated barrier against medication errors in the medication chain, clinical practice reveals a considerable gap between the resources available in the software and the actual improvement in patient safety [3].The mere presence of the alert does not guarantee reflection or the appropriate clinical decision-making by the interdisciplinary team.

The critical point of this tool lies in the phenomenon known as alert fatigue, originally described by Peterson and Bates[1] [4], and in the subsequent desensitization of

[1]David Westfall Bates is considered a world pioneer in the studies of patient safety applied to electronic prescribing (CPOE) and Clinical Decision Support Systems (CDSS). His work at Brigham and Women's Hospital and Harvard Medical School in the 1990s and 2000s served as the basis for the conceptualization of alert fatigue in pharmacy and medicine.

professionals[2] [5]. When a system generates an excessive volume of irrelevant or poorly configured alerts, users' standard response becomes automatically closing the screens without proper reading. This behavior transforms a protective tool into a bureaucratic obstacle, perpetuating a naive technocentric view in which it is assumed that merely purchasing software resolves complex healthcare errors.

In this context, it is worth questioning: to what extent do investments in digital alert systems translate into real care benefits without the prior structuring of the processes and organizational culture of healthcare institutions?

Complex Systems, Financial Cost, and Healthcare Impact

The acquisition, customization, and maintenance of management and CDSS platforms require substantial financial investments [6,7]. In the field of public health, these costs affect the allocation of budgetary transfers; in the private sector, they reduce the operational margins of institutions. When financial resources are predominantly allocated to Information Technology (IT) infrastructure, at the expense of adequate staffing and team training, an unbalanced scenario arises. In situations of budgetary constraint, the pursuit of automation may lead to the premature simplification of care processes and the reduction of the professional workforce[3]. Consequently, patient care becomes impersonal and mechanistic. Technology, which should function as support and a facilitator of clinical decision-making, ends up assuming an inflexible prescriptive role, replacing interdisciplinary discussions among physicians, pharmacists, and nurses with mere passive interaction with computer screens.

Organizational Culture, Standardization, and Human Factors

Healthcare service providers can obtain certifications and showcase state-of-the-art software, but patient safety is shaped by the daily behavior of the teams. An on-screen alert is a passive barrier; its practical value depends entirely on how the information is interpreted and translated into active clinical conduct.

The absence of institutional clinical protocols and up-to-date guidelines prevents the software from being calibrated according to the institution's reality. Without clinical governance in system configuration, that is, without a clear stratification between blocking alerts (hard stops for vital risks) and informational alerts (soft stops), the system fails to focus the professional's attention on what is truly critical.

As demonstrated by Capretta [8], successful integration of technology into healthcare depends on the implementation of continuous lifelong learning processes. Team training ensures the necessary digital literacy and strengthens a risk management culture, enabling system alerts to serve as triggers for shared clinical analysis rather than as operational noise[4].

Conclusion

The expansion of Clinical Decision Support Systems represents an undeniable advancement for traceability and managerial support in healthcare. However, the isolated implementation of digital alerts for critical medications, without governance and cultural alignment, does not ensure a reduction in adverse events [9].

Overcoming the weaknesses of digital alerts requires healthcare institutions to go beyond a technocentric approach and recognize that technology alone is not sufficient. For financial investments in information systems to yield meaningful improvements in care, it is essential to structure healthcare practices based on the sustainability of the inseparable triad: People, Processes, and Technology.

In this way, it is recommended that institutions prioritize governance in the configuration of their systems, the standardization of practices through care protocols, and the ongoing investment in the training of their interdisciplinary teams, ensuring that human judgment and a patient-centered approach prevail over automation [10-11].

Conflicts of Interest

The author declares no conflicts of interest, financial, commercial, or personal, that could have influenced the preparation or content of this opinion article.

[2]Van der Sijs et al. applied James Reason's accident causation model (Swiss Cheese Model) to analyze human-computer interaction. The study showed that ignoring an alert was not simply a negligence on the part of the professional, but rather a predictable result of software design flaws and organizational conditions of excessive and irrelevant signals for the patient's clinical context.

[3]The report Health for All: transforming economies to provide what matters, by the World Health Organization (WHO) in 2023, highlights that "Currently, health spending may be threatened by governments under pressure to balance their budgets. This jeopardizes the long-term benefits of stable health provision in favor of short-sighted and counterproductive austerity measures," in a free translation.

[4]The article by Capretta et al. (2026) demonstrates that acute kidney injury associated with nephrotoxic medications in pediatric patients is a modifiable and preventable risk through a multidisciplinary strategy that integrated electronic alerts, ongoing resident training, and daily notifications from clinical pharmacists to the medical team. Through these strategies, there was a 12.4% reduction in exposure to nephrotoxic drugs and a 55% decrease in the rates of kidney injury associated with these medications.

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