



Original Research Article

Implementation of Electronic Records as a Safety Tool in a Pediatric Service

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Abstract: The integration of electronic health records (EHRs) in pediatric services is transforming care delivery through enhanced standardization, documentation, and communication. With unique patient safety risks in pediatrics, the timely and targeted application of EHRs holds promise for reducing errors but introduces new challenges if pediatric-specific functionality is overlooked. This article reviews the implementation of EHRs in pediatric care as a safety tool, critically examines effectiveness, outlines practical challenges, and presents empirically grounded strategies to optimize outcomes—supported by real-world data and graphical analyses.

Keywords: Electronic Health Records (EHRs), Pediatric care, Patient safety, Healthcare technology implementation, Clinical documentation.

INTRODUCTION

Pediatric patients present complex, age-specific needs that pose distinct safety challenges, especially regarding medication doses, growth tracking, and preventive care^[1]. Traditionally, paperwork processes are prone to errors and inefficiencies. The transition to EHRs—though nearly ubiquitous in US pediatric practices as of 2016—still finds fewer than 20% using systems with full pediatric capabilities^[1]. This comprehensive review explores EHR implementation in children's services, focusing on measurable safety outcomes, best practices, and necessary adaptations for pediatric healthcare.

RATIONALE FOR EHRs AS SAFETY TOOLS IN PEDIATRICS

Core Safety Functions

- **Standardization of Care:** Automated protocols and order sets reduce variability and human error^{[2][1]}.
- **Medication Safety:** Electronic prescribing with weight-based dosing calculators and allergy alerts reduces adverse drug events^{[3][4]}.
- **Growth and Immunization Management:** EHRs enable accurate, automated tracking of growth curves and vaccination schedules^{[1][5]}.
- **Enhanced Communication:** Immediate access to centralized medical records lowers risk of miscommunication between care teams^[5].

Unique Pediatric Challenges

- Children's weight and age variability increase risks with improper medication orders^{[4][6]}.

- Lack of dedicated pediatric EHR features (such as age-specific alerts) can create safety blind spots and usability issues^{[1][3][7]}.

EVIDENCE ON EHR IMPACT IN PEDIATRIC SAFETY

Empirical Data

Multicenter studies show that EHR transitions in pediatric hospitals do not significantly increase hospital-acquired condition (HAC) rates, such as infections or adverse drug events, within seven months around implementation^[8].

Event	Before EHR (%)	During EHR (%)	After EHR (%)
Hospital-acquired conditions (HACs)	Stable	No spike	Stable
Preventive care compliance	Stable	No decline	Stable
Medication safety reports	↑ post-implementation, resolves by 3 months ^[9]		

Medication Errors and EHR Usability

In a review of 9,000 pediatric safety reports:

- 36% were linked to EHR usability issues contributing to medication events.
- 18.8% of these resulted in harm reaching the patient.
- Most frequent errors: improper dosing and ambiguous interface design^{[3][4][10]}.

Figure 1. Pediatric Medication Error Reports Relative to EHR Implementation

Month	Baseline	1st	2nd	3rd
Safety Reports (relative)	1	5	4	1

There is a notable spike in reported events immediately after EHR implementation, returning to baseline within three months, suggesting adaptation and safety vigilance are critical during transition^{[9][11]}.

Pediatric Functionalities that Promote Safety

Features considered essential include^{[1][12]}:

- Weight-based dosing calculators
- Growth and development modules
- Immunization tracking and alerts
- Pediatric-specific privacy and security standards

Systems lacking these functionalities can inadvertently introduce risks, especially for medication and age-adjusted protocols.

Implementation: Best Practices & Barriers

Facilitators

- Multidisciplinary collaboration during planning and rollout
- Customization of EHR modules for pediatric workflow
- Regular training and simulations for staff
- Ongoing reporting and analysis of safety events for rapid improvement

Barriers

- Resistance to adoption among clinicians unaccustomed to digital systems
- Initial increase in near-miss and safety reports due to unfamiliar workflows
- Generic EHRs that lack pediatric modules may increase risk of dosing errors and workflow mismatches^{[3][7]}

Case Example: Transition in a Major Pediatric Center

- Implementing a new EHR led to a brief, five-fold increase in medication safety event reports, largely near-misses.

- By the third month, error reports returned to baseline.
- Major intervention themes: standardizing order sets, clarifying digital displays, and refining age- and weight-based dosing logic^{[9][11]}.

Quantitative Analysis

EHR Usability Issue	% of Reports
Any Usability Issue	36
Cases Resulting in Harm	18.8

Figure 2. Proportion of EHR-Associated Medication Safety Reports With Harm

- This emphasizes the need for pre-deployment usability testing and ongoing refinements specific to pediatric care^[10].

DISCUSSION AND RECOMMENDATIONS

- **Customization is Crucial:** Implementing generic EHRs poses significant risks. Pediatric services should ensure systems include tailored functionalities and age-specific logic.
- **Staff Training and Multidisciplinary Support:** To mitigate post-implementation spikes in errors, training should be rigorous and continuous.
- **Continuous Quality Improvement:** Monitor safety event trends and rapidly iterate on system design, especially within the first three months.
- **Stakeholder Engagement:** Include physicians, nurses, pharmacists, and IT in all EHR adaptation stages.

Limitations and Future Directions

- More high-quality outcome data in pediatric settings are needed.
- Studies indicate EHRs are only as effective as their fit with pediatric-specific workflows and robust post-implementation monitoring.
- National and international standards for pediatric EHR features must be strengthened and universally adopted.

CONCLUSION

The implementation of electronic health records offers significant promise for improving patient safety in pediatric services through standardization, support for clinical decisions, and reducing variability in care. Success hinges on ensuring pediatric-specific customizations, robust transitional processes, and sustained quality improvement efforts. With careful planning, multidisciplinary engagement, and continuous vigilance, EHRs can become a cornerstone of safer pediatric care delivery.

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