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The Digital Stethoscope: Harnessing Artificial Intelligence in Pediatric Emergency Medicine

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Artificial Intelligence (AI) is increasingly recognized as a transformative force in healthcare, with Pediatric Emergency Medicine (PEM) standing to benefit significantly from its adoption. Children often present with subtle, atypical signs, making timely recognition of critical illness challenging. AI-driven tools are being applied in triage, predictive monitoring, diagnostic imaging, and resuscitation support, while also enhancing education through simulation and personalized learning. For global health, AI offers opportunities to reduce disparities by extending decision support to resource-limited settings. However, challenges such as data bias, ethical oversight, and the need for clinician training remain critical considerations. AI should be viewed not as a replacement for pediatric emergency physicians but as an augmentation of human expertise, amplifying decision-making, enhancing safety, and expanding access to quality care. This letter to the editor reflects on the promise, pitfalls, and potential of AI in PEM, advocating for its thoughtful and equitable integration into practice and education.

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WHY AI MATTERS IN PEDIATRIC EMERGENCIES

Children are unique individuals with dynamic physiology. Their developmental stages influence clinical presentations, and emergencies can quickly become critical. Traditional triage and diagnostic tools, primarily designed for adults, often fail to meet the specific needs of pediatric care [1]. AI offers a transformative solution by providing rapid risk stratification and pattern recognition that surpasses human intuition, all while maintaining clinician oversight. Just as pulse oximetry revolutionized patient monitoring decades ago, AI is poised to become an indispensable tool in pediatric triage.

DIAGNOSTICS AND RESUSCITATION: AI AS A CLINICAL ALLY

Machine learning systems are already making strides in predicting sepsis, respiratory failure, and unrecognized deterioration [2, 3]. In the realm of cardiac arrest, AI-driven rhythm interpretation and chest compression

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feedback are being tested as digital "coaches" [4]. This evolution mirrors the transformation brought about by Automated External Defibrillators (AEDs), which were once met with skepticism but are now indispensable worldwide. Similarly, AI can enhance the role of the CPR coach or even act as a resuscitation co-lead by providing evidence-based prompts, allowing leaders to maintain their focus on team dynamics.

EDUCATION AND SIMULATION: EXTENDING THE CLASSROOM

Rare pediatric emergencies, like congenital heart lesions or toxin ingestions, are infrequent in training but essential to master. While simulation addresses this gap, it is often resource-intensive and reliant on faculty. AI-enhanced virtual patients and adaptive case generators offer scalable solutions [5]. Just as flight simulators revolutionized aviation training, AI-enabled simulation could democratize access to high-quality pediatric emergency training worldwide. Additionally, natural language processing tools that analyze debriefings can help novice faculty provide structured, personalized feedback [6].

GLOBAL EQUITY: NARROWING THE GAP OR WIDENING IT?

In low- and middle-income countries, where pediatric emergency subspecialists are scarce, AI-assisted decision-support tools embedded in mobile platforms have the potential to dramatically improve outcomes. These tools can provide rapid, evidence-based guidance to healthcare providers, helping them make critical decisions in real-time. However, there is a significant risk that algorithms trained on data from high-income populations may not perform accurately in different contexts, potentially leading to misclassification and inappropriate treatment decisions. This could exacerbate existing health inequities rather than alleviate them [7, 8].

The lesson from global vaccination campaigns is instructive: technology alone is insufficient to address complex health challenges. Successful implementation requires deliberate inclusion of diverse populations in the development and testing of AI tools, local adaptation to ensure relevance and effectiveness, and equitable distribution to ensure that all communities benefit. Without these measures, the promise of AI in improving pediatric emergency care may remain unfulfilled, and the gap between high- and low-income countries could widen further [9,10].

CHALLENGES: NAVIGATING BIAS, TRUST, AND INTEGRATION

AI, like any new diagnostic tool, faces significant barriers. Data bias is particularly problematic when pediatric datasets are small and heterogeneous. Black-box algorithms that clinicians cannot interrogate risk eroding trust. Integration into workflows must be seamless; otherwise, clinicians may abandon tools that slow rather than support their practice. Lessons from electronic health record implementation highlight how poorly integrated systems can frustrate providers and compromise safety.

THE WAY FORWARD

AI in Pediatric Emergency Medicine should be viewed not as "artificial" intelligence but as “an augmented intelligence partner” that enhances human expertise without replacing it. The analogy to the stethoscope is fitting: a tool once controversial, now indispensable, but only effective in the hands of a trained clinician. The same will hold for AI. Preparing the workforce through faculty development, establishing ethical oversight, and ensuring equitable design are essential next steps.

Keywords

Pediatric Emergency Medicine, Artificial Intelligence, Simulation, Clinical Reasoning, Global Health

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References

1. Kauppi W, Imberg H, Herlitz J, Molin O, Axelsson C, Magnusson C. Advancing a machine learning-based decision support tool for pre-hospital assessment of dyspnoea by emergency medical service clinicians: a retrospective observational study. BMC Emerg Med. 2025 Jan 5;25(1):2. **https://doi.org/10.1186/s12873-024-01166-9**
2. Muralitharan S, Nelson W, Di S, McGillion M, Devereaux P, Barr NG, et al. Machine Learning–Based Early Warning Systems for Clinical Deterioration: Systematic Scoping Review. J Med Internet Res. 2021 Feb 4;23(2):e25187. **https://doi.org/10.2196/25187**
3. Jahandideh S, Ozavci G, Sahle BW, Kouzani AZ, Magrabi F, Bucknall T. Evaluation of machine learning-based models for prediction of clinical deterioration: a systematic literature review. Int J Med Inform. 2023 Jul 1;175:105084. **https://doi.org/10.1016/j.ijmedinf.2023.105084**
4. Chikatimalla R, Trivedi YV, Chigurupati HD, Faheem MSB, Naveed MA, Sattar Y, et al. From prediction to precision: Artificial intelligence and emerging technologies in cardiopulmonary resuscitation. Prog Cardiovasc Dis. 2025 Sep 1;92:97–107. **https://doi.org/10.1016/j.pcad.2025.09.004**
5. Díaz-Guio DA, Henao J, Pantoja A, Arango MA, Díaz-Gómez AS, Gómez AC. Artificial intelligence, applications and challenges in simulation-based education. Colomb J Anesthesiol. 2024;52(1).
6. Shaik T, Tao X, Li Y, Dann C, McDonald J, Redmond P, et al. A Review of the Trends and Challenges in Adopting Natural Language Processing Methods for Education Feedback Analysis. IEEE Access. 2022;10:56720–39. **https://doi.org/10.1109/ACCESS.2022.3177752**
7. Mir MM, Mir GM, Raina NT, Mir SM, Mir SM, Miskeen E, et al. Application of artificial intelligence in medical education: current scenario and future perspectives. J Adv Med Educ Prof. 2023 Jul;11(3):133. **https://doi.org/10.30476/jamp.2023.98655.1803**
8. Ejaz H, McGrath H, Wong BL, Guise A, Vercauteren T, Shapey J. Artificial intelligence and medical education: a global mixedmethods study of medical students' perspectives. Digit Health. 2022 May;8:20552076221089099. **https://doi.org/10.1177/20552076221089099**
9. Chin MH, Afsar-Manesh N, Bierman AS, Chang C, Colón-Rodríguez CJ, Dullabh P, et al. Guiding principles to address the impact of algorithm bias on racial and ethnic disparities in health and health care. JAMA Netw Open. 2023 Dec 1;6(12):e2345050. **https://doi.org/10.1001/jamanetworkopen.2023.45050**
10. Nazer LH, Zatarah R, Waldrip S, Ke JX, Moukheiber M, Khanna AK, et al. Bias in artificial intelligence algorithms and recommendations for mitigation. PLOS Digit Health. 2023 Jun 22;2(6):e0000278. **https://doi.org/10.1371/journal.pdig.0000278**