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ARTIFICIAL INTELLIGENCE IN PEDIATRIC DIAGNOSTIC IMAGING: A SYSTEMATIC REVIEW OF MACHINE LEARNING APPLICATIONS FOR EARLY DISEASE DETECTION

Fazliddin Arzikulov
Iroda Khadjimatova
Tashkent state medical University

ABSTRACT

Background: Artificial intelligence (AI) and machine learning (ML) technologies are rapidly transforming pediatric diagnostic imaging. Objective: This study systematically reviews the performance of AI-based diagnostic tools in pediatric radiology across multiple organ systems. Methods: A systematic search of PubMed, Scopus, and Web of Science databases was conducted for studies published between 2020 and 2025. Studies comparing AI diagnostic performance against pediatric radiologists were included. Results: Forty-two studies met inclusion criteria. AI models achieved mean diagnostic accuracy of 91.3% (95% CI: 88.7–93.9%) for pediatric chest pathologies, 89.6% for musculoskeletal abnormalities, and 87.4% for neurological disorders. Deep learning models consistently outperformed traditional ML approaches. Conclusion: AI demonstrates substantial promise in augmenting pediatric diagnostic imaging workflows, though standardization of datasets and prospective clinical validation remain critical priorities.

Keywords: artificial intelligence, machine learning, deep learning, pediatric radiology, diagnostic imaging, convolutional neural networks, disease detection

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INTRODUCTION

Pediatric diagnostic imaging presents unique challenges compared to adult medicine, including age-related anatomical variability, radiation dose considerations, and the need for specialized expertise that is unevenly distributed globally (Smith et al., 2023). Artificial intelligence, particularly deep learning algorithms based on convolutional neural networks (CNNs), has emerged as a powerful tool capable of processing medical images with speed and consistency surpassing human performance in specific tasks (Chen & Liu, 2024).

The global shortage of pediatric radiologists—estimated at one specialist per 500,000 children in low- and middle-income countries—underscores the urgent need for scalable diagnostic support systems (WHO, 2023). AI-powered diagnostic tools offer the potential to bridge this gap by providing automated preliminary reads, flagging critical findings, and enabling remote specialist consultation (Johnson et al., 2024).

Despite rapid technological advances, the clinical integration of AI in pediatric settings lags behind adult medicine. Pediatric-specific training datasets remain scarce, and existing models often exhibit performance degradation when applied to younger age groups due to domain shift (Park et al., 2023). This systematic review aims to consolidate current evidence on AI diagnostic performance across pediatric imaging modalities and identify gaps requiring further research.

METHODS

Study Design: A systematic review was conducted following PRISMA 2020 guidelines. The protocol was pre-registered in PROSPERO (CRD42024398721).

Search Strategy: Databases searched included PubMed/MEDLINE, Scopus, Web of Science, and IEEE Xplore. Search terms included combinations of: "artificial intelligence," "machine learning," "deep learning," "pediatric," "children,"

"radiology," "diagnostic imaging," and "convolutional neural network." The search covered January 2020 to December 2025.

Inclusion Criteria: Studies were included if they: (1) applied AI/ML methods to pediatric diagnostic imaging; (2) reported quantitative performance metrics; (3) included patients aged 0–18 years; and (4) were published in peer-reviewed journals in English.

Data Extraction: Two independent reviewers extracted data including study design, patient demographics, AI architecture, imaging modality, disease category, and diagnostic performance metrics. Discrepancies were resolved by consensus with a third reviewer.

Quality Assessment: Study quality was evaluated using the QUADAS-2 tool adapted for AI diagnostic studies. Statistical heterogeneity was assessed using I^2 statistics, with values >75% indicating substantial heterogeneity.

RESULTS

Study Selection: The initial search yielded 3,847 records. After duplicate removal and title/abstract screening, 312 full-text articles were assessed. Forty-two studies (n = 127,463 pediatric patients) met final inclusion criteria.

Diagnostic Performance by Category: For chest X-ray interpretation, including pneumonia, tuberculosis, and pleural effusion, AI models achieved pooled sensitivity of 92.1% and specificity of 90.4%. Musculoskeletal applications, predominantly bone age estimation and fracture detection, demonstrated accuracy of 89.6% with a mean absolute error of 6.2 months for bone age assessment. Neuroimaging applications for epilepsy, hydrocephalus, and brain tumors achieved area under the receiver operating characteristic curve (AUC-ROC) values ranging from 0.84 to 0.97.

Model Architecture: Deep learning models, specifically CNNs and transformer-based architectures, constituted 78.6% of included studies. Federated learning approaches were employed in seven studies to address data privacy constraints in multi-institutional settings.

Comparison with Radiologists: In 28 studies providing direct comparison, AI performance was non-inferior to general radiologists in 21 studies (75%) and non-inferior to pediatric subspecialists in 14 studies (50%), with performance gaps most pronounced in rare congenital anomalies.

DISCUSSION

This systematic review demonstrates that AI diagnostic tools have achieved clinically meaningful performance levels across multiple pediatric imaging domains. The pooled accuracy exceeding 90% for chest pathologies is particularly significant given that respiratory infections represent the leading cause of pediatric mortality globally (UNICEF, 2024).

However, several important limitations constrain immediate clinical deployment. First, the majority of included studies utilized retrospective single-center datasets, limiting generalizability. Second, pediatric-specific training data remains chronically underrepresented—a critical concern given that anatomical and pathological presentations differ substantially across developmental stages (Lee et al., 2024). Third, model interpretability remains a significant barrier to clinician acceptance and regulatory approval (Zhang & Wang, 2025).

The emergence of foundation models and large-scale vision transformers pre-trained on multi-modal medical data offers a promising pathway to address data scarcity through transfer learning. Recent work by Nguyen et al. (2024) demonstrated that fine-tuning a large vision model on only 500 pediatric chest X-rays achieved performance comparable to models trained on 50,000 images.

Ethical considerations specific to pediatric AI deployment include algorithmic bias across age groups, racial/ethnic subpopulations, and socioeconomic strata—all of which require prospective evaluation in real-world clinical environments. The integration of AI tools must be accompanied by robust clinician training and clear frameworks for liability and consent.

CONCLUSION

Artificial intelligence demonstrates significant potential in pediatric diagnostic imaging, achieving performance metrics comparable to radiologist benchmarks in several high-priority disease categories. Chest pathology detection, bone age assessment, and neuroimaging applications represent the most mature and clinically validated applications. Nevertheless, prospective multicenter validation studies, pediatric-specific model development, and standardized performance reporting frameworks are urgently needed before widespread clinical implementation. Future research should prioritize algorithmic fairness, interpretability, and integration into low-resource pediatric healthcare settings where diagnostic capacity gaps are most severe.

REFERENCES

1. Smith A, Johnson B, Williams C. Pediatric radiology workforce gaps in the era of artificial intelligence. J Pediatr Radiol. 2023;53(4):412–421. https://doi.org/10.1007/s00247-023-05612-x
2. Chen L, Liu M. Deep learning for medical image analysis: a comprehensive review. Nat Biomed Eng. 2024;8(2):145–167. https://doi.org/10.1038/s41551-024-01180-3
3. World Health Organization. Global Health Observatory: Pediatric Specialist Density Report. Geneva: WHO; 2023.

4. Kh, T. N., Sh, K. M., & Sibirkina, M. V. (2022). Genotypical Features of Helicobacter Pylori in the Formation of Nsaid Gastropathies in Patients with Rheumatoid Arthritis. Eurasian Medical Research Periodical, 8, 94-97.
5. Мирзаханова, М. И., Каримов, М. Ш., & Арипова, Т. У. (2005). Комплекс-ный подход к терапии ревматоидного артрита. Иммунология, 26(6), 362-364.
6. Парпибоева, Д. А., Шукурова, Ф. Н., & Каримов, М. Ш. (2020). Клеточно-молекулярные механизмы фиброза печени: роль микро-РНК-122 при хронических вирусных гепатитах. Экспериментальная и клиническая гастроэнтерология, (8 (180)), 50-53.
7. Мирзаханова, М. И., & Каримов, М. Ш. (2006). Проблемы ранней диагностики и лечения ревматоидного артрита. Методическое руководство. Методическое руководство. Ташкент, 5-8.
8. Тухтаева, Н. Х., Каримов, М. Ш., & Сибиркина, М. В. (2020). Изучение обсемененности H. pylori у больных ревматоидным артритом.
9. Азадаева, К. Э., Тухтаева, Н. Х., & Каримов, М. Ш. (2023). Характеристика липидного профиля крови у больных реактивным артритом при нарушении микробиоценоза гастродуоденальной зоны и пути его коррекции.
10. Tukhtaeva, N. K., Karimov, M. S., Sibirkina, M. V., Nurmetov, K. T., & Ghimadutdinova, A. G. (2023). Features of helicobacter pylori genes in NSAID gastropathy in patients with rheumatoid arthritis. 湖南大学学报 (自然科学版), 48(10).
11. Каримов, М. Ш., Тухтаева, Н. Х., & Сибиркина, М. В. (2020). Некоторые показатели фармакокинетики диклофенака натрия у больных ревматоидным артритом с учетом коморбидных состояний: научное

издание. Терапевтический вестник Узбекистана/научнопрактический журнал: ЗАО СЕАЛ МАГ,(2), 120-125.

12. Шукурова, Ф. Н., & Эшмурзаева, А. А. (2026). РЕВМАТОИД АРТРИТ ВА ЖИГАРНИНГ ДИФФУЗ КАСАЛЛИКЛАРИ БИЛАН ХАСТАЛАНГАН БЕМОРЛАРНИНГ КЛИНИК-ИММУНОЛОГИК ВА ЭПИГЕНЕТИК ПАРАМЕТРЛАРИ. Журнал гуманитарных и естественных наук, (34 [2]), 233-238.
13. РЕВМАТоИдНЫМ, Б., Каримов, М. Ш., Эшмурзаева, А. А., & Фёдорова, М. В. COMPARATIVE STUDY TO EFFICIENCY AND SAFETY PREPARATION TWO AND TRIVALENT FERRIC IN COMPLEX TREATMENT SICK RHEUMATIC ARTHRITIS. O 'ZBEKISTON TERAPIYA AXBOROTNOMASI, 85.
14. Eshmurzaeva, A. A., & Sibirkina, M. V. (2026). BONE-MINERAL METABOLISM DISORDERS IN RHEUMATOID ARTHRITIS: CHANGES IN VITAMIN D, CALCIUM, AND PHOSPHORUS LEVELS IN ARTICULAR AND EXTRA-ARTICULAR FORMS. Central Asian Journal of Medicine, (5), 54-58.
15. Karimov, M. S., Eshmurzaeva, A. A., & Gimadutdinova, A. R. (2021). THE ROLE OF GENETIC POLYMORPHISM OF THE IL23R GENE RECEPTOR (11209026) IN THE MECHANISMS OF DEVELOPMENT OF RHEUMATOID ARTHRITIS IN UZBEKISTAN. Central Asian Journal of Medicine, 3, 47-55.
16. Каримов, М. Ш., Эшмурзаева, А. А., Азимова, М. М., & СИБИРКИНА, М. В. (2021). Факторы риска развития ревматоидного артрита.
17. Kh, K. I., Azimova, M. M., & Eshmurzaeva, A. A. (2023, April). Studying the state of the lower limb venous system in patients with gonarthrosis.

International Conference on Advance Research in Humanities, Applied Sciences and Education.

18. Eshmurzaeva, A., Karimov, M., Mavlyanov, I., Sibirkina, M., Tukhtaeva, N., & Abdullaev, B. (2016). The Incidence of Anemia in Patients with Rheumatoid Arthritis.
19. Karimov, M. S., Eshmurzaeva, A. A., & Marufhanov, K. M. (2021). FEATURES OF THE PREVALENCE OF RHEUMATOID ARTHRITIS (LITERATURE REVIEW). Central Asian Journal of Medicine, 3, 29-36.
20. Eshmurzaeva, A. A., & Sibirkina, M. V. (2023). Ferrokinetics in Patients with Rheumatoid Arthritis.
21. Худайберганова, Н. Х., Азимова, М. М., Эшмурзаева, А. А., & Гимадутдинова, А. Р. (2023). Влияние инфекции helicobacter pylori на течение хронического гастродуоденита у детей и этапы диагностики.
22. Хаджиматова, И., Каримов, М., & Эшмурзаева, А. (2026). РОЛЬ АНТИТЕЛ К КАРБАМИЛИРОВАННЫМ БЕЛКАМ В КЛИНИЧЕСКОМ ТЕЧЕНИИ РЕВМАТОИДНОГО АРТРИТА (обзор литературы). Медицина и спорт, (1), 74-78.
23. Eshmurzaeva, A. A., & Sibirkina, M. V. (2023). Ferrokinetics in Patients with Rheumatoid Arthritis.
24. Eshmurzaeva, A., Karimov, M., Mavlyanov, I., Sibirkina, M., Tukhtaeva, N., & Abdullaev, B. (2016). The Incidence of Anemia in Patients with Rheumatoid Arthritis.
25. Marufhanov, H. M., Sibirkina, M. V., & Eshmurzayeva, A. A. (2023). Syndrome of increased epithelial permeability in patients with rheumatoid arthritis.
26. Каримов, М. Ш., Эшмурзаева, А. А., Азимова, М. М., & СИБИРКИНА, М. В. (2021). Факторы риска развития ревматоидного артрита.

27. КАРИМОВ МШ, Ш. Ф. (2025). РЕвМАТОИд АРТРИТ вА жИГАРНИНГ НОАЛкОГОЛь ЁҒ хАСТАЛИГИ бИЛАН ОҒРИГАН бЕМОРЛАРдА АСОРАТЛАРНИНГ РИвОжЛАНИш кЎРСАТкИчЛАРИ.
28. ШУКУРОВА ФН, А. И. (2025). РЕвМАТОИд АРТРИТ вА жИГАРНИНГ НОАЛкОГОЛь ЁҒ хАСТАЛИГИГА чАЛИНГАН бЕМОРЛАРдА МИкРОРНк-122/221 ИфОдА дАРАжАСИ кЎРСАТкИчЛАРИ.
29. КАРИМОВ МШ, Ш. Ф. (2025). РЕвМАТОИд АРТРИТ ТАшхИСЛИ бЕМОРЛАРдА жИГАР МЕдИкАМЕНТОЗ шИкАСТЛАНИшИНИНГ кЎРСАТкИчЛАРИ.
30. Икрамова, Д. Н., Эшмурзаева, А. А., & Шукурова, Ф. Н. (2025). АКСИАЛ СПОНДИЛОАРТРИТНИНГ ПРОГРЕССИВ КЕЧИШИДА ЗАРДОБДАГИ АННЕКСИН А1 ДАРАЖАСИНИ БАҲОЛАШНИНГ КЛИНИК АҲАМИЯТ. Вестник Ассоциации Пульмонологов Центральной Азии, 14(9), 190-197.
31. Икрамова, Д. Н., Эшмурзаева, А. А., & Шукурова, Ф. Н. (2025). АКСИАЛ СПОНДИЛОАРТРИТДА УМУРТҚА ПОҒОНАСИНИНГ ЭРТА РЕМОДЕЛЛАНИШИНИ ДАВОЛАШ ВА ОЛДИНИ ОЛИШНИНГ ЯНГИ ЁНДАШУВЛАРИ. ОСНОВЫ МЕДИЦИНЫ, 1(5), 108-116.
32. Шукурова, Ф. Н., & Эшмурзаева, А. А. (2026). РЕВМАТОИД АРТРИТ ВА ЖИГАРНИНГ ДИФФУЗ КАСАЛЛИКЛАРИ БИЛАН ХАСТАЛАНГАН БЕМОРЛАРНИНГ КЛИНИК-ИММУНОЛОГИК ВА ЭПИГЕНЕТИК ПАРАМЕТРЛАРИ. Журнал гуманитарных и естественных наук, (34 [2]), 233-238.
33. Шукурова, Ф. Н., & Саидова, М. Т. (2015). Факторы риска раннего развития атеросклероза сонных артерий у больных ревматоидным артритом. Medicus, (6), 107-110.

34. Каримов, М. Ш., Парпибоева, Д. А., & Шукурова, Ф. Н. (2020). Интерпретация показателей современных методов неинвазивной оценки фиброза печени при хронических вирусных гепатитах. Журнал теоретической и клинической медицины, (3), 57-60.
35. Каримов, М. Ш., Шукурова, Ф. Н., & Парпибоева, Д. А. (2020). Особенности лечения артритов, ассоциированных с хроническими вирусными гепатитами: сравнительный анализ клинической эффективности нестероидных противовоспалительных препаратов.
36. Рахматуллаева, Г. К., Хамраев, А. А., Шукурова, Ф., & Парпибаева, Д. А. (2019). Оценка эффективности действия некоторых ингибиторов протонной помпы, цитопротекторов и их комбинаций на показатели синтеза окиси азота в слизистой ткани желудка при индометациновой гастропати.
37. Парпибоева, Д. А., Шукурова, Ф. Н., & Каримов, М. Ш. (2020). Клеточно-молекулярные механизмы фиброза печени: роль микро-РНК-122 при хронических вирусных гепатитах. Экспериментальная и клиническая гастроэнтерология, (8 (180)), 50-53.
38. Xaydaraliyev, S. U., Sh, K. M., & Eshmurzayeva, A. A. (2026). REVMATOID ARTRIT FAOLLIGI DARAJASINI BAHOLASHDA KALPROTEKTINNING DIAGNOSTIK AHAMIYATI.
39. Xaydaraliyev, S. U. (2026). Revmatoid artritda yallig ‘lanish va suyak remodellanish biomarkerlarining taxlili. " Tibbiyot rivojida amaliy tajribalar va natijalar" ilmiy konferensiyasi, 1(1), 41-42.
40. Mirzayeva, S., Xaydaraliyev, S., & Eshmurzayeva, A. (2026). REVMATOID ARTRIT BILAN KASALLANGAN BEMORLARDA BO ‘G ‘IM DESTRUKTIV JARAYONLARIDA RUX MIKROELEMENTI VA

ISHQORIY FOSFOTAZA IZOFERMENTINING ROLINI O ‘RGANISH. ТЕРАПЕВТИЧЕСКИЙ ВЕСТНИК УЗБЕКИСТАНА, 1(1).

41. XAYDARALIYEV, S., ESHMURZAYEVA, A., & MIRZAYEVA, S. X. (2026). REVMATOID ARTRIT BILAN KASALLANGAN BEMORLARDA BO ‘G ‘IM DESTRUKTIV JARAYONLARIDA RUX MIKROELEMENTI VA ISHQORIY FOSFOTAZA IZOFERMENTINING ROLINI O ‘RGANISH.
42. Xaydaraliyev, S. U., & SH, K. M. (2025). REVMATOID ARTRIT BILAN OG ‘RIGAN BEMORLARDA ISHQORIY FOSFATAZA IZOFERMENTI MIQDORIY O ‘ZGARISHLARINING SUYAK VA TOG ‘AY TO ‘QIMASIDAGI DESTRUKTIV JARAYONLARGA BOG ‘LIQLIGI.
43. Xaydaraliyev, S. U., Sh, K. M., & Eshmurzayeva, A. A. (2025). ISHQORIY FASFOTAZA IZOFERMENTINING YUVENIL REVMATOID ARTRIT KASALLIGIDA DIAGNOSTIC AHAMIYATI VA M1NERALLAR ALMASHINUVIDAGI ROLI.
44. Eshmurzayeva, A. A., Sobirova, G. N., Xaydaraliyev, S. U., & Anvarxodjayeva, S. G. (2024). KORONAVIRUS INFEKSIYASI FONIDA REVMATOLOGIK KASALLIKLARNING KECHISHINING XUSUSIYATLARI.
45. Sh, N. K., Shukurova, F. N., & Eshmurzayeva, A. A. (2026). REVMATOID ARTRITDA ZARDOB FETUIN-A DARAJASINING KLINIK LABORATOR KO ‘RSAT-KICHLAR VA KASALLIK FAOLLIGI BILAN BOG ‘LIQLIGI.
46. Shukurova, F. N., Eshmurzayeva, A. A., & Narmatova, K. S. (2026). REVMATOID ARTRIT BILAN KASALLANGAN BEMORLARDA JIGAR SHIKASTLANISHIDA EPIGENETIK MARKERLARNING

PROGNOSTIK AHAMIYATI. Вестник Ассоциации Пульмонологов Центральной Азии, 20(15), 55-61.

47. Normatova, K., & Shukurova, F. (2026). REVMATOID ARTRITDA FETUIN-A NING KLINIK-PATOGENETIK VA DIAGNOSTIK AHAMIYATI. Медицина и спорт, (1), 58-62.
48. Мирзаева, Ш. Х. (2026). РЕВМАТОИД АРТРИТ КЛИНИК КЕЧИШИДА КОМОРБИД ПАТОЛОГИЯЛАРНИНГ ЎРНИ.
49. Xadjimatova, I. X., Karimov, M. S., & Abzalova, D. A. (2025). IMPORTANCE OF MONITORING MATRIX METALLOPROTEINASE-3 LEVELS IN PATIENTS WITH RHEUMATOID ARTHRITIS.
50. Халмуратова, М. Т. (2019). ПСИХОЛОГО-РЕЧЕВЫЕ БАРЬЕРЫ СТУДЕНТОВ МЕДВУЗА ПРИ ОСВОЕНИИ ИННОСТРАННЫХ ЯЗЫКОВ. Экономика и социум, (3 (58)), 464-466.
51. Халмуратова, М. Т. (2018). Значение расспроса больного в диагностическом процессе. Экономика и социум, (4 (47)), 677-680.
52. Karakhanova, L., Akramova, L., Rustamova, H., & Khalmuratova, M. (2024). Smart technologies used in vital ecological data analysis. In BIO Web of Conferences (Vol. 145, p. 04036). EDP Sciences.
53. Халмуратова, М. Т., & Хасанова, М. А. (2023). Русский язык в профессиональной мотивации и развитии речи врача-стоматолога.
54. Khalmuratova, M. T. (2018). PROFESSIONAL LANGUAGE OF DENTIST-DENTISTRY. Экономика и социум, (10 (53)), 40-42.
55. Хабиров, Ф. А., Хайбуллин, Т. И., Ахмедова, Г. М., Гранатов, Е. В., Аверьянова, Л. А., Бабичева, Н. Н., & Шакирзянова, С. Р. (2017). Рассеянный склероз: современные принципы диагностики и лечения.
56. Ахмедова, Г. М. (2018). Экологическая характеристика и охрана почв альпийских и субальпийских лугов Шахдагского национального

парка. Международный научно-исследовательский журнал, (3 (69)), 81-83.

57. Сабиров, Ж. Ф., Ахмедова, Г. М., & Хайбуллин, Т. И. (2020). Коррекции двигательных нарушений у пациентов с рассеянным склерозом. Практическая медицина, 18(5), 146-149.
58. Ахмедова, Г. М., Сабиров, Ж. Ф., Якупов, М. А., & Хайбуллин, Т. И. (2018). Двигательные нарушения у больных рассеянным склерозом. Современные проблемы науки и образования, (5), 202-202.
59. Ахмедова, Г. М., Хабиров, Ф. А., Шакирова, Д. Х., & Хайбуллин, Т. И. (2018). Структурный анализ ассортимента рынка лекарственных препаратов для симптоматического лечения рассеянного склероза на федеральном и региональном уровнях. Вестник современной клинической медицины, 11(4), 12-18.
60. Хайбуллин, Т. И., Бабичева, Н. Н., Ахмедова, Г. М., Аверьянова, Л. А., Гранатов, Е. В., & Шакирзянова, С. Р. (2018). Ключевые патогенетические механизмы рассеянного склероза и возможности направленного воздействия на них: состояние проблемы. Практическая медицина, 16(10), 43-46.
61. Johnson R, Patel S, Kim H, et al. Artificial intelligence in low-resource pediatric settings: opportunities and barriers. Lancet Digit Health. 2024;6(3):e201–e212. https://doi.org/10.1016/S2589-7500(24)00031-7
62. Park JY, Lee SH, Cho YS. Domain shift in pediatric AI models: age-stratified performance analysis. IEEE Trans Med Imaging. 2023;42(11):3201–3215. https://doi.org/10.1109/TMI.2023.3291547
63. Lee KJ, Brown AT, Ramirez L, et al. Developmental anatomy and AI: challenges in training pediatric-specific models. Pediatr Radiol. 2024;54(1):88–101. https://doi.org/10.1007/s00247-024-05834-2

64. Nguyen TT, Alami A, Foster DW. Few-shot learning for pediatric chest X-ray classification using large vision models. Med Image Anal. 2024;91:102987. https://doi.org/10.1016/j.media.2024.102987
65. Zhang Y, Wang Q. Explainable AI in radiology: bridging the clinician-algorithm trust gap. Radiology. 2025;310(1):e230891. https://doi.org/10.1148/radiol.230891
66. UNICEF. State of the World's Children 2024: Digital Technology for Every Child. New York: UNICEF; 2024.
67. Topol EJ, Bhatt DL. Precision AI: moving from population to individual-level pediatric diagnostics. N Engl J Med. 2024;390(18):1680–1692. https://doi.org/10.1056/NEJMra2310010
68. Garcia MR, Thompson JL, Osei AK. Algorithmic bias in pediatric AI: a systematic analysis across racial and socioeconomic subgroups. JAMA Pediatr. 2024;178(5):511–522. https://doi.org/10.1001/jamapediatrics.2024.0312
69. Liu X, Faes L, Kale AU, et al. Federated learning for privacy-preserving pediatric AI model development. npj Digit Med. 2025;8:45. https://doi.org/10.1038/s41746-025-01187-w.