

Artificial intelligence and the future of oral health equity

Muhd Firdaus Che Musa^{1*}

¹*Department of Paediatric Dentistry and Dental Public Health, Kulliyah of Dentistry, International Islamic University Malaysia (IIUM), 25200, Kuantan, Pahang, Malaysia.*

*Corresponding author:

Address:

Department of Paediatric Dentistry and Dental Public Health, Kulliyah of Dentistry, International Islamic University Malaysia (IIUM), 25200, Kuantan, Pahang, Malaysia.

Telephone: +609 5705489

Email address:

muhdfirdaus@iium.edu.my

How to cite this article:

Che Musa, M. F. (2026). Artificial intelligence and the future of oral health equity. *IIUM Journal of Orofacial and Health Sciences*, 7(2), 117–119. <https://doi.org/10.31436/ijohs.v7i2.539>

Article DOI:

<https://doi.org/10.31436/ijohs.v7i2.539>

Received:

24 May 2026

Revised:

16 July 2026

Accepted:

27 July 2026

Published Online:

31 July 2026

Introduction

Artificial intelligence (AI) is reshaping oral healthcare through advances in diagnostics, clinical decision support, predictive analytics, teledentistry, and digital health systems. Its growing capacity to improve disease detection, treatment planning, and service efficiency has positioned AI as an important component of contemporary dentistry (Khurshid *et al.*, 2025; Xu *et al.*, 2025). AI-enabled remote assessment and decision-support systems may also help extend oral healthcare to populations facing geographic or workforce-related barriers (Beltrán Varas *et al.*, 2025; Glassman *et al.*, 2024).

Nevertheless, technological progress does not automatically produce equitable outcomes. Oral health inequalities remain deeply influenced by socioeconomic disadvantage, unequal access to services, geographic isolation, and wider structural determinants (Bastos *et al.*, 2023). Yet much of the dental AI literature continues to prioritise technical performance over whether implementation reduces or inadvertently reinforces these disparities. This editorial argues that AI should be

judged not only by how accurately it performs, but by how effectively it advances oral health equity.

Embedding equity in artificial intelligence

AI is only as equitable as the data, systems, and assumptions on which it is built. Models developed primarily from data obtained in high-income countries or specialist settings may perform less reliably when applied to populations with different demographic characteristics, disease patterns, or healthcare environments. Without representative datasets and subgroup evaluation, even technically accurate algorithms may reproduce existing inequalities (Khoury *et al.*, 2024; Rojas *et al.*, 2022).

Equity must therefore be embedded throughout the AI lifecycle from data collection and model development to validation, implementation, and evaluation. The central question should move beyond whether an algorithm works to ask: *for whom does it work, under what circumstances, and who may be excluded from its benefits?* Fairness-oriented evaluation,

transparent development, and meaningful engagement with underserved communities should become essential requirements rather than optional additions.

Equitable implementation also depends on the strength of the health systems into which AI is introduced. AI cannot compensate for workforce shortages, fragmented services, financial barriers, weak digital infrastructure, or inadequate primary oral healthcare. If these structural limitations are ignored, AI may disproportionately benefit populations already well served while leaving those with the greatest needs further behind. AI should therefore be integrated within broader reforms involving universal health coverage, primary oral healthcare, digital health infrastructure, and population-based planning. Ultimately, AI will contribute to oral health equity only if technological innovation is matched by strong health systems capable of delivering equitable, accessible, and person-centred care.

From innovation to action

A prepared workforce is essential for translating technological innovation into equitable care. AI should augment, rather than replace, professional judgement. Dental professionals must be able to critically evaluate AI-generated recommendations, recognise their limitations, communicate their use transparently, and interpret them within each patient's clinical and social circumstances. This requires AI literacy alongside critical thinking, ethical reasoning, communication, and an understanding of health equity (Sharab *et al.*, 2024). Excessive reliance on AI, particularly among less experienced clinicians, may weaken independent clinical judgement and compromise patient-centred decision-making (Glick *et al.*, 2022).

Governance must also evolve alongside innovation. Current uncertainties surrounding transparency, accountability, data protection, algorithmic fairness, and professional responsibility may undermine trust and widen inequalities if AI is scaled

prematurely (McGrath *et al.*, 2025). Governance frameworks should extend beyond technical validation to evaluate whether AI performs fairly across populations, improves access, and produces meaningful real-world benefit.

Collective leadership is therefore required. Researchers should prioritise representative evidence and equity-oriented evaluation; educators should prepare clinicians for responsible AI use; professional organisations should establish practice standards; and policymakers should promote transparency, accountability, public trust, and equitable access. Governance should not be regarded as a barrier to innovation, but as the mechanism through which innovation becomes safe, legitimate, and socially responsible.

Conclusion

The question is no longer whether AI will transform oral healthcare, but whether it will transform it equitably. Achieving oral health equity requires an equity-centred approach in which fairness is embedded throughout AI design, health system implementation, workforce preparation, and governance. The future contribution of AI will depend not on increasingly intelligent algorithms alone, but on collective decisions that ensure innovation serves all populations, particularly those who have historically faced the greatest barriers to oral healthcare.

Declaration on the Use of Generative Artificial Intelligence and AI-Assisted Technologies

During the preparation of this work, the author used artificial intelligence-assisted technology (ChatGPT) in order to support language refinement and editing of the manuscript. After using this tool/service, the author reviewed and edited the content as needed and takes full responsibility for the content of the published article.

References

- American Academy of Pediatric Dentistry (2024). Behavior guidance for the pediatric dental patient. The Reference Manual of Pediatric Dentistry. Chicago, Ill: 358-378.
- Che Lah, N. A., Badrul Hisham, A. R., Zakaria, N. S., Mohamad Jurimi, N. H., Mohd Fathil, N. H., Mohamad, F. N., & Leong, K. J. (2024). Perception of behaviour management techniques for paediatric patients among dental officers. *Compendium of Oral Science*, 11(1), 11-22. <https://doi.org/10.24191/cos.v11i1.26033>
- Malaysian Dental Council. (2022). Code of Professional Conduct. Retrieved 15 May 2025, from <https://hq.moh.gov.my/ohp/mdc/index.php/?id=24>
- Ministry of Health Malaysia (2015). National Oral Health Survey of Preschool Children 2015. In: *Oral Health Status and Caries Treatment Needs of 5-Year-Old Children*; Ministry of Health Malaysia, Volume 1, pp. 3-58.
- Yuan, S., Humphris, G., MacPherson, L. M. D., Ross, A. L., & Freeman, R. (2021). Communicating with parents and preschool children: a qualitative exploration of dental professional-parent-child interactions during paediatric dental consultations to prevent early childhood caries. *Frontiers in Public Health*, 9, 669395. <https://doi.org/10.3389/fpubh.2021.669395>