Digestive Endoscopy

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REVIEW

World Endoscopy Organization's Response to the World Health Organization's Global Initiative on Artificial Intelligence for Health

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ABSTRACT

In response to the World Health Organization's (WHO) Global Initiative on Artificial Intelligence (AI) for Health, the World Endoscopy Organization (WEO) highlights the unique challenges and opportunities AI presents for gastrointestinal endoscopy, particularly in resource-limited settings. While AI technologies have shown promise in improving diagnostic accuracy and efficiency in high-resource environments, their implementation in low- and middle-income countries is hindered by infrastructural, economic, regulatory, and training barriers. This commentary explores how these challenges may exacerbate existing healthcare disparities, emphasizing the need for localized datasets, affordable AI models, simplified regulatory frameworks, and workforce capacity building. The WEO supports WHO's call for equitable AI deployment and advocates for region-specific solutions, including mobile and offline AI tools, public-private partnerships, locally developed algorithms aligned with prevalent disease patterns, and a flexibly adapted regulatory framework. By leveraging WEO's training networks and fostering collaboration among governments, clinicians, and industry, the integration of AI into endoscopy can become more accessible and relevant to underserved populations. The commentary underscores that AI should not be seen as a luxury but as a tool to bridge global disparities in care quality. Ensuring responsible and inclusive AI integration requires both global coordination and context-specific adaptations to truly benefit all healthcare systems.

Artificial Intelligence (AI) is transforming the landscape of healthcare, particularly in medical fields such as gastrointestinal (GI) endoscopy, where randomized trials have shown AI technologies have the potential to enhance diagnostic accuracy, optimize efficiency, and possibly improve patient-important outcomes such as incidence and mortality of colorectal cancer [1–5]. The World Health Organization's (WHO) 2023 report on the regulatory considerations for AI in health emphasizes the ethical, legal, and technical challenges of implementing AI across diverse healthcare settings, particularly in resource-limited regions. Tedros Adhanom Ghebreyesus, Director of WHO, states, "This new report provides countries with ways to maximize the benefits of AI while minimizing risks and avoiding pitfalls. The report touches on the usefulness of AI from multiple

perspectives, emphasizing, among other things, the potential for its use in countries and regions with scarce healthcare resources to help correct healthcare disparities [6]."

This WHO's message is quite relevant given the currently lacking research and implementation activities of AI in healthcare in such countries and regions. The World Endoscopy Organization (WEO), which represents the global community of endoscopists, concurs with the WHO's initiative but acknowledges the specific challenges that need to be overcome to implement WHO's ambition in the field of GI endoscopy. The WHO's 2023 statement on AI emphasizes the need for a global framework that addresses the ethical, legal, technical, and regulatory aspects of AI in healthcare. Endoscopy practice and research should align with these guidelines, as they ensure that the deployment of AI technologies is safe, equitable, and beneficial to patients across diverse settings. The WHO points out that it is essential to ensure that AI does not exacerbate existing inequalities in healthcare. The WEO has a role to play in advocating for the equitable distribution of AI technologies, ensuring that resource-limited regions are included in the global adoption of AI. The WEO must consider the utility of AI in endoscopy, particularly in underserved regions.

In this commentary, we address the current state of AI implementation in resource-limited regions, exploring its priority among other pressing goals. We identify key barriers that hinder the adoption of AI and propose potential solutions to overcome these challenges to enhance the global impact of AI on endoscopy practice. This document is a collaborative output of the AI Committee of the WEO and has been approved by the WEO governing board.

1 | Status of AI Implementation and Barriers in Resource-Limited Settings

The evolution in AI technology has been at a breathtaking pace and is especially suited to health provision where it can improve accuracy and lower health care costs. However, the adoption of AI tools in endoscopy practice is relatively slow due to high cost, low or none reimbursement, lack of physicians' motivations, and limited understanding of legal liability. This is particularly significant in resource-limited regions where there is a paucity of endoscopy services at all, marked by a shortage of human and equipment resources, including lack of endoscopists, nurses, endoscopy processors, endoscopes and consumables [7–9]. Thus, in general, implementing AI for endoscopy has been considered as a "too advanced, unrealistic" step given current limited healthcare resources.

AI technologies, including AI-assisted endoscopy platforms, require advanced computational infrastructure, reliable internet connectivity, and integration with existing medical equipment. In many low- and middle-income countries (LMICs), the healthcare infrastructure is already under strain due to limited financial resources, making the deployment of AI systems impractical. Also, the successful implementation of AI requires specific training in operating AI-based tools. In underserved regions, there remains a deficit in specialized training in endoscopy, let alone AI technology. This gap further poses a significant hurdle to the widespread dissemination of AI. The applicability of data to the population is another hurdle that must be considered prior to application of algorithms. AI algorithms depend on large datasets to provide accurate results. These datasets are often derived from high-resource healthcare environments, which may not reflect the unique characteristics of patients and disease prevalence in resource-limited settings. The absence of localized, diverse datasets for training AI models means that existing AI solutions may not perform optimally in these regions.

Ironically, the evolution of AI in medicine seems to diverge from its original goal of "improving healthcare quality for those in need." Instead, it often enhances already advanced healthcare systems in developed countries, further widening global disparities in healthcare access and quality. This is evidenced by current endoscopy AI technologies, which have been geared toward addressing prevalent problems in high-income countries such as surveillance for gastric cancer and colonic polyps, which are not highly prevalent in most LMIC in Africa. This raises significant ethical concerns [10]. In this context, the WHO's 2023 report, which emphasizes the urgent need for robust global regulatory frameworks for AI in health, is both sensible and timely [3, 11–16].

2 | Prioritization

It is important to consider the current endoscopy priorities in a resource-limited environment. Typically, LMICs prioritize immediate public health concerns over innovative technologies like AI, seeing them as unnecessary luxuries. AI technologies are, however, becoming increasingly less expensive and have the potential to support broader healthcare goals, such as early lesion detection and reduction in the overall cost of care. Policy makers need evidence of AI's return on investment, with real-life studies to demonstrate comparative outcomes. Establishing multi-stakeholder forums, including government, clinicians, and patient advocacy groups, can help to prioritize AI integration in endoscopy.

Separately, addressing workforce capacity through targeted education and training programs is essential for the long-term sustainability of AI use in healthcare. Initiatives aimed at building local expertise in AI and endoscopy should be a priority, with an emphasis on equitable access to educational resources. Likewise, the effect of AI on endoscopy education needs urgent evaluation, particularly in LMIC where it is expected that the number of endoscopists in the next few years will exponentially rise due to government funding and targeted training programs. It is important that the newer generation of endoscopists should not be adversely influenced in their learning by inaccurate or irrelevant AI endoscopy systems.

3 | Relevance

AI tools often fail to meet the specific clinical and logistical needs of LMICs, as they are typically developed in high-resource settings with different disease patterns and healthcare priorities. For example, current AI-based cancer surveillance recommendations are derived from high-income country data.

To be relevant, data from the target population is needed. Furthermore, training AI systems to recognize locally prevalent conditions such as gastric cancer or liver fluke-related cholangiocarcinoma in Asia could have a significant impact on patient outcomes. Moreover, endoscopy-based AI training systems may exhibit reduced accuracy in detecting specific pathologies, as they are often trained on image datasets from developed countries. For instance, it remains uncertain how effectively polyp detection software performs in populations where amoebic cysts are also prevalent. Finally, incorporating local input during development ensures that the tools are optimized for the resources available and incorporated into relevant workflows, such as integrating AI outputs into handwritten records or mobile platforms used in rural clinics.

Many LMIC are among the most economically fast-growing countries. As technology develops along with the economy, it is to be expected that the patient population will require and demand health care of an increasingly higher standard. As AI-assisted endoscopy becomes the new standard of care in the developed world, it is reasonable for patients to demand such technology in their own countries. Its deployment in private sector endoscopy in LMIC should reflect regional relevance and accuracy, and be validated for the local population to meet standards of care.

Patient acceptance of AI in healthcare, particularly in LMIC, is essential for successful implementation. Encouragingly, there are several feasibility studies that report high levels of acceptance of AI technology in Africa. Trialed to address screening for endemic cervical cancer, the high uptake of women coming for their "cervical selfies" in digital cervicography screening programs suggests AI in medicine will translate well socially in LMIC [17]. Furthermore, the WEO has conducted an international survey of both physicians and patients from five continents and found that patients are mostly accepting of AI in endoscopy in their care [18].

4 | Technology Infrastructure

One of the primary barriers to implementing AI tools in gastrointestinal endoscopy in LMICs is limited infrastructure. Many healthcare facilities lack advanced imaging systems, reliable internet, and computational power necessary to deploy AI solutions effectively. Addressing this requires targeted investments in healthcare infrastructure, prioritizing affordability and scalability. Additionally, capacity-building initiatives, such as training healthcare professionals to operate and maintain these tools, are crucial for ensuring sustainable integration.

AI models that require minimal computational power and work offline could greatly improve access in regions with limited digital infrastructure. Portable AI-enabled endoscopy units for use in rural or remote settings could help bridge the gap between high-resource and underserved areas. Even in regions with poor internet infrastructure, smartphones are widespread. AI-driven tools, such as mobile applications for image analysis (e.g., polyp detection in endoscopy), triage assistants, and chatbots, can facilitate earlier detection of gastrointestinal diseases, optimize workflow, and support non-specialist healthcare workers in making evidence-based decisions. Moreover, offline AI models can operate on smartphones, enabling diagnosis without internet access. In the resource-demanding areas, the use of commercially available, large language models such as ChatGPT to analyze healthcare image and data for individual patients could be an option, though it is not generally allowed due to the regulatory barriers.

5 | Regulation

Regulatory challenges present significant barriers, primarily because they are resource-and cost-demanding for medical device companies, leading to less commercial interest in patients in LMICs. To overcome this barrier, LMICs need simplified and transparent regulatory frameworks tailored to resource-constrained settings with certain generosity in comparison with the resource-rich areas such as the US and most European countries. Lowering or even eliminating regulatory hurdles for low-to-middle-risk devices would be an option with careful consideration of benefit–risk assessment. Creating harmonized frameworks could streamline approval processes and reduce costs for developers and distributors and therefore for end-users. On the other hand, addressing algorithmic bias associated with the AI development process, guidelines may mandate external validation of AI tools using local patient datasets before implementation. However, more regulation usually leads to higher costs and non-adoption of innovative technologies, especially in LMICs. Policy makers in LMICs are encouraged to adopt safe but dynamic strategies to find the right balance in regulatory approval processes.

6 | Approaches for AI Applications in LMICs

6.1 | Research on the Needs

Research is urgently needed to evaluate the needs for AI-assisted endoscopy in LMIC, which may be significantly different from those of high-income countries. The challenges endoscopists face in resource-limited environments are distinct. Identifying the specific challenges will help to target technology to the needs of the local population. Will AI-assisted endoscopy improve learning thus allowing for reduced training duration? Will it improve lesion detection in less trained endoscopists? These fundamental questions in AI utility should also be addressed in LMIC.

6.2 | Cost Consideration

Prioritizing AI-assisted endoscopy needs evaluation of its benefits in the local real-world setting. Modeling its implementation should be performed using an LMIC framework, including assessment of short-term (e.g., training, procedure numbers, and accuracy of examination) and long-term (e.g., disease prevention, less morbidity, less surgery) outcomes. Developing such models requires collaboration with strongly functioning endoscopy centers in LMIC. From these studies and models, a more accurate cost–benefit analysis and price-point of AI-assisted endoscopy can be determined. While the costs of AI technologies

may be currently prohibitive for public hospital use in most LMIC, costs will drop with time as more providers come to the marketplace. Developing formal partnerships with manufacturers can enable the creation of low-cost AI tools compatible with existing equipment. Creation of subsidized procurement programs and public–private partnerships can also help facilities in underserved areas acquire essential technology.

6.3 | Developing AI Locally

AI algorithms built on data from high-resource settings may not reflect the patient population in LMIC where disease patterns may differ [19]. To overcome this bias, developers should collaborate with local clinicians and researchers to design AI models trained on region-specific datasets. Developed nations have the opportunity to lead the initiative to partner with collaborators in LMICs to enhance and enrich datasets to reduce bias, while providing computing power and technological support. This will require epidemiological, clinical, and image data collection from high-quality endoscopy centers in LMIC. A collaborative network of endoscopy centers such as the WEO training centers may offer an ideal platform to undertake this task. There is an urgent need for epidemiological data from LMIC to avoid a further disparity in health provision. Local policymakers are encouraged to support such an initiative hopefully with low regulatory hurdles.

6.4 | Simplification of Regulation

Multiple and varying regulatory recommendations in different countries will make rolling out AI more difficult, precluding access and increasing the cost of development. Regulatory agencies of different countries in LMIC may collaborate to develop and implement standards for AI-assisted endoscopy. A regional AI-technology board with multinational recognition including stakeholders from governments, doctors, patient advocates, and technology experts may be one model with universal acceptance. Again, it is extraordinary to take an "appropriate" and region-adjusted balance between risk and benefit to make a decision. Too strict regulation would lead to reduced or even nonadoption of technologies.

6.5 | Role of WEO in LMIC

WEO has a growing network of endoscopy training centers throughout Africa and other regions-of-need and could facilitate trialing currently available systems to investigate their validity in these geographic contexts. Multicenter contributions will improve the timeliness and generalization of the data. WEO can also facilitate the coordinated collection of data and images from these centers to build new region-specific AI platforms for gastroscopy and colonoscopy image interpretation. The sharing of open-source AI systems and collaborative research with international academic centers would greatly improve the rapid development of suitable AI systems for use in low-resource, possibly internet-unstable environments; WEO can provide the collaborative framework for experts in African and non-African centers to take this forward.

7 | Conclusion

AI-assisted endoscopy holds great promise for improving diagnostic accuracy and expanding access to quality care worldwide. However, its adoption in resource-limited settings remains hindered by infrastructural, regulatory, and contextual challenges. To achieve equitable implementation, the development and deployment of AI must be reoriented to reflect local needs, disease patterns, and healthcare realities.

The WEO supports the WHO's guidance and calls for global collaboration to ensure AI technologies in endoscopy are safe, relevant, and accessible to all. Leveraging networks like the WEO training centers in LMICs can serve as a platform for developing locally relevant solutions, streamlining regulation, and building workforce capacity. By doing so, we can bridge the digital divide and ensure that the benefits of AI are shared equitably across the globe.

Author Contributions

N.C.-P., P.B., R.K., J.M., H.T., and Y.M. contributed to conceptualization, data curation, investigation, writing the original draft, and reviewing and approving the final manuscript.

Conflicts of Interest

N.C.-P.: Iterative Health (Consultant), Boston Scientific (Speaker fees). Y.M.: Olympus Corp. (Consultation, speaking fees, and device loan), Cybernet System (loyalty fees). The other authors declare no conflicts of interest.

References

1. X. F. Jin, H. Y. Ma, J. W. Shi, and J. T. Cai, "Efficacy of Artificial Intelligence in Reducing Miss Rates of GI Adenomas, Polyps, and Sessile Serrated Lesions: A Meta-Analysis of Randomized Controlled Trials," *Gastrointestinal Endoscopy* 99 (2024): 667–675.e1.

2. J. Makar, J. Abdelmalak, D. Con, B. Hafeez, and M. Garg, "Use of Artificial Intelligence Improves Colonoscopy Performance in Adenoma Detection: A Systematic Review and Meta-Analysis," *Gastrointestinal Endoscopy* 101 (2025): 68–81.e8.

3. J. Samarasena, D. Yang, and T. M. Berzin, "Aga Clinical Practice Update on the Role of Artificial Intelligence in Colon Polyp Diagnosis and Management: Commentary," *Gastroenterology* 165 (2023): 1568–1573.

4. H. Messmann, R. Bisschops, G. Antonelli, et al., "Expected Value of Artificial Intelligence in Gastrointestinal Endoscopy: European Society of Gastrointestinal Endoscopy (ESGE) Position Statement," *Endoscopy* 54 (2022): 1211–1231.

5. Y. Mori, J. E. East, C. Hassan, et al., "Benefits and Challenges in Implementation of Artificial Intelligence in Colonoscopy: World Endoscopy Organization Position Statement," *Digestive Endoscopy* 35 (2023): 422–429.

6. World Health Organization, *Ethics and Governance of Artificial Intelligence for Health: WHO Guidance* (World Health Organization, 2021).

7. D. Perl, D. Leddin, D. Bizos, et al., "Endoscopic Capacity in West Africa," *African Health Sciences* 16 (2016): 329–338.

8. C. Hassan, L. Aabakken, A. Ebigbo, et al., "Partnership With African Countries: European Society of Gastrointestinal Endoscopy (ESGE)—Position Statement," *Endoscopy International Open* 6 (2018): E1247–E1255.

9. O. Elshaarawy, S. A. Lashen, N. A. Makhlouf, et al., "Barriers for Resuming Endoscopy Service in the Context of Covid-19 Pandemic: A Multicenter Survey From Egypt," *World Journal of Gastroenterology* 26 (2020): 6880–6890.

10. P. Anirvan, D. Meher, and S. P. Singh, "Artificial Intelligence in Gastrointestinal Endoscopy in a Resource-Constrained Setting: A Reality Check," *Euroasian Journal of Hepato-Gastroenterology* 10 (2020): 92–97.

11. Y. Liu, D. Lin, L. Li, et al., "Using Machine-Learning Algorithms to Identify Patients at High Risk of Upper Gastrointestinal Lesions for Endoscopy," *Journal of Gastroenterology and Hepatology* 36 (2021): 2735–2744.

12. L. Yao, H. Xiong, Q. Li, et al., "Validation of Artificial Intelligence-Based Bowel Preparation Assessment in Screening Colonoscopy (With Video)," *Gastrointestinal Endoscopy* 100 (2024): 728–736.e9.

13. R. Palmier, T. Degand, S. Aho, et al., "A Colonoscopy Quality Improvement Intervention in an Endoscopy Unit," *Scientific Reports* 12 (2022): 817.

14. Y. Mori, P. Wang, M. Loberg, et al., "Impact of Artificial Intelligence on Colonoscopy Surveillance After Polyp Removal: A Pooled Analysis of Randomized Trials," *Clinical Gastroenterology and Hepatology* 21 (2023): 949–959.e2.

15. Y. Mori, S. E. Kudo, J. E. East, et al., "Cost Savings in Colonoscopy With Artificial Intelligence-Aided Polyp Diagnosis: An Add-On Analysis of a Clinical Trial (With Video)," *Gastrointestinal Endoscopy* 92 (2020): 905–911.e1.

16. "WHO Ethics and Governance of Artificial Intelligence for Health: Guidance on Large Multi-Modal Models," 2024.

17. M. Sachdeva, A. M. Datchoua, V. F. Yakam, et al., "Acceptability of Artificial Intelligence for Cervical Cancer Screening in Dschang, Cameroon: A Qualitative Study on Patient Perspectives," *Reproductive Health* 21, no. 1 (2024): 92.

18. O. Ahmad, "Patients' Sentiments on Artificial Intelligence in Endoscopy: A Large-Scale Intercontinental Opinion Survey," DDW 2024 Washington 2024.

19. C. W. L. Ho, J. Ali, and K. Caals, "Ensuring Trustworthy Use of Artificial Intelligence and Big Data Analytics in Health Insurance," *Bulletin of the World Health Organization* 98 (2020): 263–269.