



CORRESPONDENCE

Automation of diabetic retinopathy grading: advancements and cost analysis

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TO THE EDITOR:

Thank you for publishing the article “Capturing the clinical decision-making processes of expert and novice diabetic retinal graders using a “think-aloud” approach” by Curran et al [1]. Contrasting what is stated regarding the high cost of automated grading software in low-resource areas, automation lowers costs once implemented and should be viewed as a prerequisite to improving health care affordability and accessibility. A cost-minimization analysis performed in Singapore by Xie et al. demonstrated that annual costs per patient of a fully automated deep learning system model were \$66 compared to \$77 for human assessment. Manual diabetic retinopathy grading requires the constant input of experts, a costly and finite resource in marginalized areas, therefore the use of autonomous artificial intelligence (AI) and low-cost technology could potentially provide a long-term solution to screening in low-resource areas [2, 3].

Additionally, the IDx-DR system developed by Abramoff and his team has been authorized by the Federal Drug Administration (FDA) after a preregistered clinical trial of 900 patients for use by any health care providers to detect diabetic retinopathy and macular oedema autonomously. It was the first autonomous diagnostic AI system authorized by the FDA in any field of medicine, without the need of a clinician to also interpret the image or results. The diagnostic performance was evaluated against a prognostic standard by graders at the Wisconsin Fundus Photograph Reading Center, for trials requiring grading of the severity of diabetic retinopathy and macular oedema. This AI system exceeded the superiority endpoints with a sensitivity of 87.2%, a specificity of 90.75%, and an image-ability rate of 96.1%, demonstrating efficacy for use in a primary care setting [4].

While barrier-to-entry for establishing screening programs using AI remains high in resource-starved regions, there are economies of scale once an adequate balance between high sensitivity and specificity is reached for a screening program [5]. Automation of screening using AI-based solutions such as IDx-DR could thereby free limited health care resources, namely ophthalmologists, to provide more complex eye care services and will have a major role in the prevention of blindness from diabetes.

Ryung Lee ¹✉

¹Touro College of Osteopathic Medicine, New York, NY, USA.

✉email: rlee19@student.touro.edu

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AUTHOR CONTRIBUTIONS

Author(s) contributed equally to this work.

COMPETING INTERESTS

The author declares no competing interests.

ADDITIONAL INFORMATION

Correspondence and requests for materials should be addressed to R.L.

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