

# THE ERA OF AUTOMATED SYSTEMS TO FACILITATE HEALTH CARE

Rahul **Chakrabarti**, Dr<sup>1</sup>

<sup>1</sup>Chief Editor, Journal of Mobile Technology in Medicine

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Dear Readers,

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It is with great pleasure that we present the second issue of the *Journal of Mobile Technology in Medicine* for 2016 with excellent examples of translational mHealth research. One of the great challenges confronting global health care is accessibility and affordability to diagnostic technologies and timely referral to specialist services.

In this issue, Ludwig et al provide a brief overview of the existing technologies available to aid automated diagnostic and referral in the field of the ophthalmology. The authors provide a summary of a potential pathway for automated ophthalmic care through the use of mobile diagnostic devices that can facilitate image collection. The first step in the clinical algorithm is safe and accurate image capturing technologies. The authors highlight examples of mobile diagnostic adapters developed by the Peek Vision group (UK), D-eye system (Italy), and iExaminer (Welch Allyn) which convert the modern smartphone into an anterior and posterior segment image capturing device. These images can then be collated, filtered for quality, and interpreted by automated software and results can, in theory, be graded in real-time to provide risk stratification and triaging of patients.

Whilst the concept of automated diagnostics in ophthalmic care is not new, the challenge over the last 20 years has been to develop algorithms that

meet sensitivity and specificity criteria to be safe for day to day real world clinical practice.<sup>1</sup> Ludwig et al succinctly illustrate examples whereby the two common modes of automated image analysis, neural networks and deep learning are now meeting the level of reliability and reproducibility for safe clinical practice. Importantly, Ludwig et al highlight examples of the utility of automated grading technologies developed for two of the most common, yet insidious causes of global vision loss, glaucoma and diabetic retinopathy.

The evolution of automated diagnostic technologies now truly positions health care in the 21<sup>st</sup> century to reach and provide care to a greater population breadth than ever before. The benefits of such technologies will always be balanced by the caveats of the necessity for clinical correlation by a specialist or appropriately trained medical professional, the costs of equipment, and the need for further evidence in larger population based studies. This is particularly poignant for automated software based learning. Nevertheless, there is a clear value in ability of these technologies to facilitate early diagnosis, triaging and timely referral of patients in rural and remote and low-resourced settings, where the greatest burden of global morbidity exists.

## Reference

1. Gardner GG, Keating D, Williamson TH, Elliott AT. Automatic detection of diabetic retinopathy using an artificial neural network: a screening tool. *The British journal of ophthalmology*. Nov 1996;80(11): 940–944.