Letter to the Editor

Implementing an artificial intelligence system to comprehensively manage people with glaucoma: a blueprint

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We thank Dr. Yoo for his comments (1). Our recent article, "*Defining functional requirements for a patient-centric computerized glaucoma treatment and care ecosystem*" is a blueprint for implementing a worldwide artificial intelligence (AI) system that comprehensively and holistically evaluates and manages people with glaucoma (2). It considers the multiple types of glaucoma, different requirements at various disease stages, managing diagnostic uncertainty, the need for serialised monitoring over time, the pros and cons of treatment including the problems of over- and under-treatment, as well as placing glaucoma in the context of other chronic illnesses, healthcare economic constraints, psychosocial considerations and of maintaining patients' quality of life.

With a globally ageing population, a substantial increase in longevity with chronic disease, insufficient healthcare staff, and increasingly constrained health budgets, patients, healthcare providers and funders are looking to reduce the cost and burden of managing numerous chronic diseases (3,4). In the future, AI-driven clinical diagnostic and management tools will reduce the cost, the travel and the staff hours required to manage chronic illnesses, as well as patients' burden, freeing up precious healthcare resources for more urgent issues, or unstable phases of chronic diseases (5).

Dr. Yoo is correct in that today, with the principal architecture of this critical system defined, urgent action is needed. The call-to-action is strong, while the task is big. There will be obstacles—both ones we can predict now and others unknown. It may take years, decades even, to bear fruitful results. So, the time to start is now.

A huge volume of data is required to build AI-based models to describe multiple variations in outcomes and to support patients in ongoing home management of their chronic diseases. It is critical to collect the right kind of healthcare data globally and from a variety of sources, over

a long time (6-8).

A broad consortium of stakeholders is required to build consensus, generalisability and transferability across different cultures, healthcare models, regulatory and funding environments (9). This will necessitate leveraging current socio-economic and healthcare networks, as well as forging deeper and new networks that include healthcare providers and chronic patients. To ensure genuine progress, strong global reach leadership is needed.

Fortunately, there exists a robust, multifaceted global network of glaucoma specialists, the World Glaucoma Association, in which many of our co-authors are closely involved. Other groups to provide critical input would include patient representative associations, clinicians (from both ophthalmology and optometry), funders, the health insurance industry, and other health tech interest groups.

There are many potential leaders in implementing these initiatives including industry, global big tech (the current owners of most modern AI systems required for this undertaking), electronic medical record providers and ophthalmic diagnostic companies, many of which are integrating AI or already have done so into their diagnostic solutions. Governmental and intergovernmental organizations, which could in turn involve top healthcare system integrators that would be capable of handling such a mammoth worldwide task, could also have an important role. Such organisations include the World Health Organisation (more specifically its Digital Health and Innovation Department) and the National Institute of Health in the USA.

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