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Ensuring the right patient is seen by the right person at the right time

How can the healthcare system ensure that every glaucoma patient is seen, while also maintaining empathic health professional - patient relationships, asks **Michael Marshall**

A 2014 meta-analysis estimated the global prevalence of glaucoma at 3.54% in people aged 40 - 80.¹ Demographic changes mean the challenges of delivering timely and effective glaucoma care are only likely to increase

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Glaucoma is mostly a disease of later life. A 2014 meta-analysis estimated the global prevalence of glaucoma at 3.54% in people aged 40-80.¹ Demographic changes mean the challenge of delivering timely and effective glaucoma care are only likely to increase in the future, many glaucoma clinics may already have enormous waiting lists. "We just have too many patients and not enough resources to see them all." So says Nishani Amerasinghe at University Hospital Southampton, and most UK ophthalmologists would agree with her – so people with suspected glaucoma can wait months before seeing a clinician.²

It's important to detect glaucoma early, before people lose significant amounts of vision.³ "If they're picked up when they're nearly blind," says Amerasinghe, "social care then has to take over." This is bad for patients and for society.

"We need more staff," says Wai Siene Ng at University Hospital of Wales in Cardiff. "But the problem is there's no money."

Since huge injections of funding do not appear to be forthcoming, the glaucoma care system needs to be reformed to accommodate the needs of its many patients.⁴ The aim is to ensure that the right patient is seen by the right person at the right time. People at lower risk need less intensive care, and this will free up capacity for those with more complex needs. But to achieve this, the processes by

which people are diagnosed, treated and monitored need to be radically changed.⁴

In recent years, the ophthalmology world has been forced to challenge traditional modes of service delivery. In the UK, this means we are in a good position to harness emerging technologies to help meet these challenges.⁵

Creeping blindness

According to the Office for National Statistics, the proportion of people aged 65 years and over rose from 16.4% in 2011 to 18.6% in 2021 – reaching 11 million people.⁶ This means the number of people with glaucoma is also rising. Furthermore, glaucoma is a chronic condition, so once a person has entered the glaucoma

care system they are in for life.⁴ "We don't lose the patients," says Amerasinghe. Older patients are also more likely to be living with other conditions, such as heart disease, so caring for them is complex.⁷

Yet while glaucoma is a growing problem, it is a low political priority. As a result, large increases in funding for glaucoma care are unlikely to materialise. To make the system work with existing funding levels, it will be necessary to make changes at multiple stages in the patient journey: from entry into the system, to diagnosis, treatment and monitoring.⁴

to go," says Andrew Tatham at Princess Alexandra Eye Pavilion Edinburgh.

This idea has been explored for decades and involves offering glaucoma tests to everyone over a certain age. However, such programmes have repeatedly failed cost-benefit analyses.^{8,9}

What's more, there are limitations in the testing used for diagnosis and so it generates a lot of false positives.¹⁰ This is a major issue leading to costly and pointless treatments, much inefficiency in the health system, and unnecessary distress to patients, which is why the UK National Screening Committee recommends against this approach.¹¹

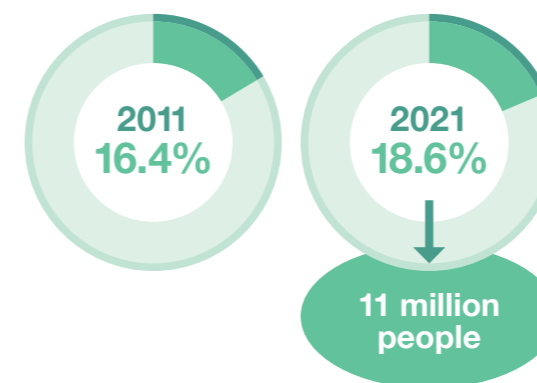
Currently, opportunistic screening during routine eye tests by optometrists is our best tool for early detection.¹⁰ But with →

Catching glaucoma early

Let's first consider the related problems of under-diagnosis and late diagnosis. How can we ensure that all cases of glaucoma are picked up early enough to prevent significant vision loss?

"A national screening of everybody to find out if they've got glaucoma is not the right way

Percentage of UK population 65 years and over





increasing referrals to the hospital eye service (HES) and significant strain on clinics,² it is clear it's not enough.

A more promising approach is the adoption of virtual clinics for new glaucoma diagnoses. The UK is already a leader in non-doctor-led service delivery, with optometrists, nurses and technicians playing a key role in glaucoma care. Virtual clinics are an evolution of this approach, but until now they have primarily been used for monitoring existing patients.¹²

Many UK glaucoma clinics pivoted to virtual care during the Covid-19 pandemic, when in-person clinics had to shut down.¹³ "We completely rebuilt the glaucoma service," says Gus Gazzard at Moorfields Eye Hospital in London. "That bought us a huge increase in capacity... but also an improvement in the quality of care, because of the frequency with which patients were able to access imaging and visual field testing."

Given the success of virtual clinics for managing known glaucoma patients, expanding them to handle new referrals is a logical next step. By integrating preliminary testing such as imaging, automated assessments, and remote consultations, virtual clinics could help more efficiently manage both screening and the surge in referrals. This would enable timely diagnosis and free up capacity in the system.¹⁴

Right person, right time

After diagnosis, risk stratification can then ensure care is delivered to the right patient by the right person at the right time.

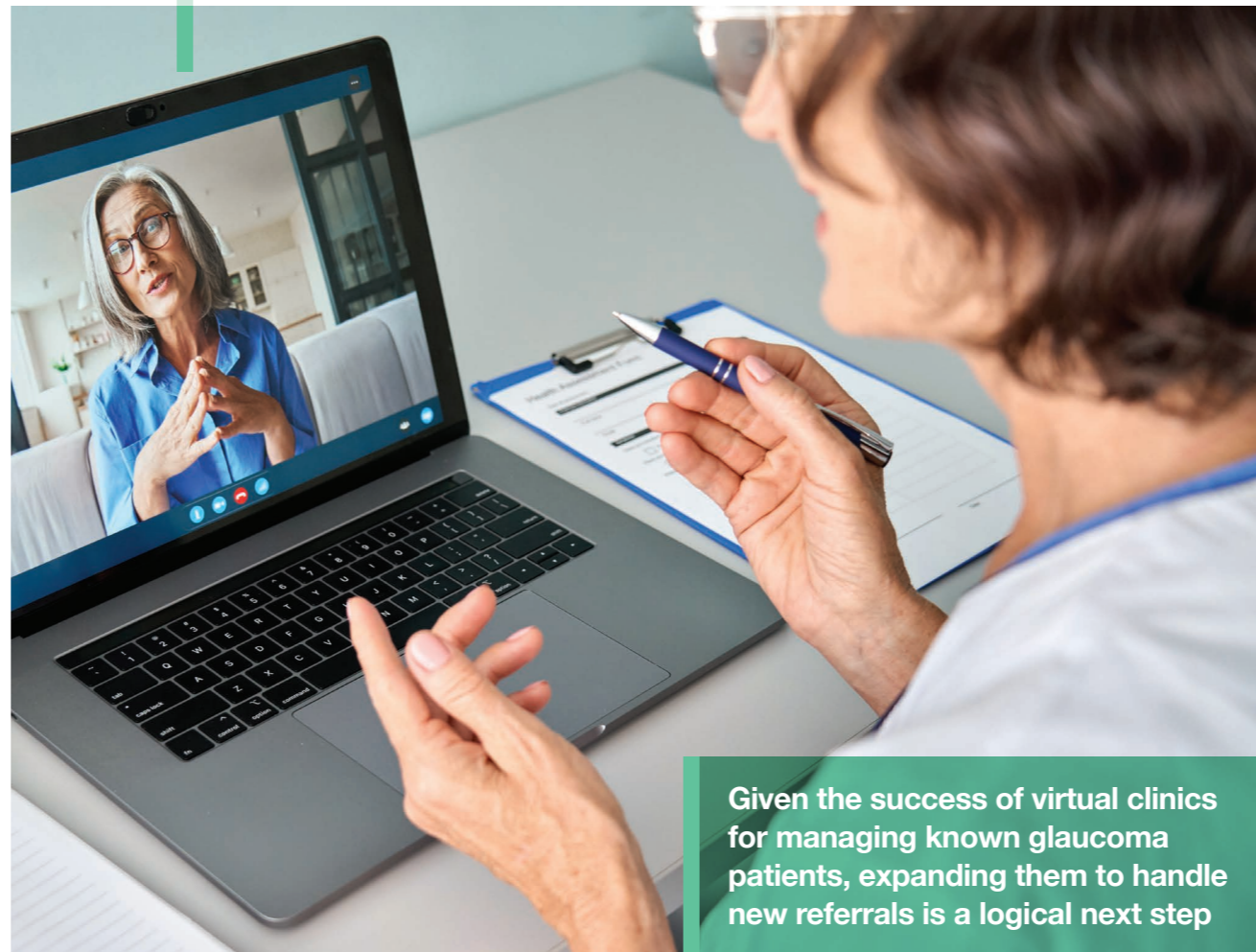
Patients are first given

preliminary tests at technician-led clinics or virtual clinics. Using the results, patients are classified according to their level of risk.¹⁵ This allows high-risk patients to be prioritised for urgent treatment, while those at lower risk are safely monitored at appropriate intervals. Because clinical risk can change over time, safety nets are in place to catch any signs of progression. And because certain features of glaucoma can appear even in low-risk cases, structured monitoring helps avoid unnecessary intervention while still protecting those most at risk of vision loss.¹⁶

Risk stratification methods are well supported by research. For example, in a 2021 study a team that included Gazzard validated the Glaucoma Risk Stratification Tool (GLAUC-STRAT-fast), concluding that it works well for ocular hypertension and open-angle glaucoma.¹⁷

Nevertheless, there are many potential improvements to existing risk stratification processes. Gazzard was one of the authors of a 2023 review that identified several priorities. People's glaucoma risk could be categorised in more nuanced and individualised ways, for instance giving a higher priority to angle closure glaucoma than to open-angle glaucoma.¹⁵

Other techniques could further refine this risk stratification approach. Genomic data could be screened for glaucoma-associated variants,¹⁸ and artificial intelligence could do initial assessments of tests to detect change and identify those patients in need of closer assessment (see **Artificial Intelligence**).¹⁹ Simply targeting close relatives of people with glaucoma would also catch many cases.²⁰



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Testing and monitoring at home

The high demand for glaucoma care means pressures on clinicians could become overwhelming – leading to burnout and mistakes. One emerging solution is to give patients the means to monitor their condition themselves, instead of coming into clinic for testing. This approach empowers patients (**Empowerment and Education**) and reduces the need to travel to clinics.

Several companies have developed at-home and virtual reality visual field tests. The evidence base for these is emerging but promising. For instance, a 2021 study found that a tablet-based visual field test called Eyecatcher produced results that largely matched those from a clinic.²¹ This also becomes an opportunity to improve digital literacy and encourages patients' own record keeping, an evolution of the glaucoma passport



National sight loss study

In the longer term, clinicians want a national sight loss study. Among other things, such a project could determine how many people in the UK go blind from glaucoma – a number that currently comes with considerable uncertainties. With such data, it would be possible to plan glaucoma care in a more evidence-based and long-term way.

One promising avenue is the UK National Eye-Health and Hearing Study. Currently in the development phase, it aims "to gather data to understand why people in the UK are losing their sight due to preventable causes, and why people continue to live with correctable visual impairment and hearing loss." If this project was fully funded and scaled up, it could yield an enormous amount of information – enabling glaucoma care to be put onto a sustainable footing.²⁴

developed by Pete Shah. Engaging with relatives at home, and even care home settings, will allow access to care for more elderly people at risk of glaucoma sight loss (**Equitable Access**).²¹

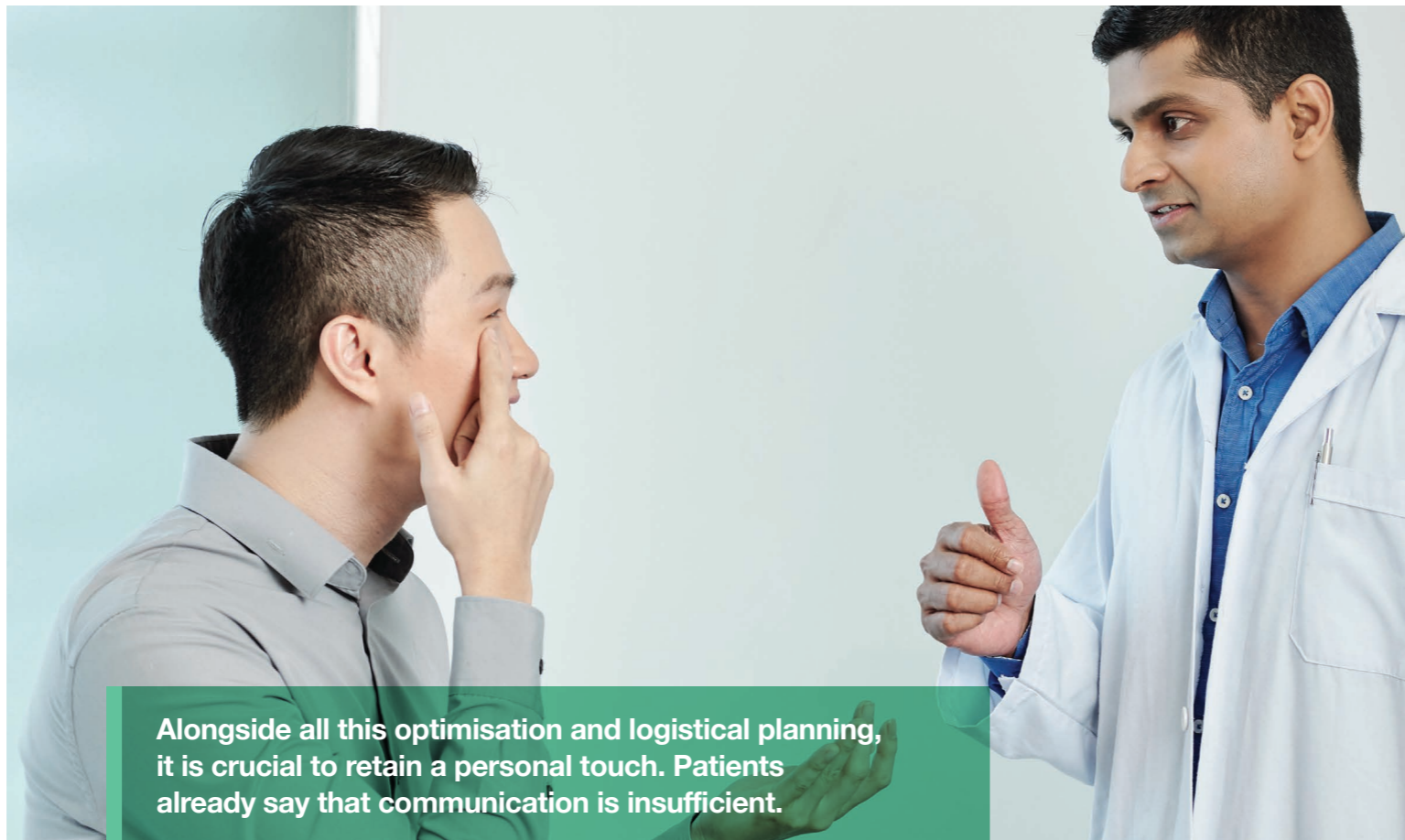
Likewise, there are at-home sensors for intra-ocular pressure. Imran Masood at the Birmingham and Midland Eye Centre says several of his patients use them. "They're able to keep quite a good watch on their own disease, and they can contact me if there's a problem sooner than they would otherwise," he says.

For those who do not want to perform their own tests, intra-ocular pressure sensors are being developed. These are implanted directly into the eye, but this does not remove the need for other clinical measurements such as ganglion cell loss on optical coherence tomography (OCT) imaging or visual field tests. These devices are still expensive and require further testing.²² →



It is noteworthy that patients want more clarity on what the healthcare system expects of them, suggesting many would willingly take some responsibility for self-testing given proper support. A combination of improved patient education and artificial intelligence may prove invaluable for successful testing and early detection of clinical change.^{19,21}

Alongside all this optimisation and logistical planning, it is crucial to retain a personal touch. Patients already say that communication is insufficient, with both their risk level and the various treatments often being under-explained.²³ Technician-led clinics and virtual clinics can become impersonal. “We mustn’t lose that human-to-human contact,” says Masood. In addition,



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What matters to patients

The Future of Glaucoma research project, which was conducted with 18 patients, found that patients say they feel safer and more confident when they see the same person on a regular basis and place trust in the person rather than the system.²⁵

Given the strains on the system and many of the future directions discussed in this article, reliance on the system rather than individuals is going to be crucial. Patients say that they need confidence that the system is joined up and nothing is going to “fall through the cracks”. Patients report that they can feel abandoned by their optometrist once they are referred to hospital, and patients who have had surgery can feel lost in the system once discharged from hospital. Visibility of how the system joins up, and confidence in different

healthcare providers being able to access their data and information, is important to build confidence in the system, they told us.²⁵

Patients want to play a role in their own care, to have clarity on what to look out for in terms of their eyesight deteriorating and to self-advocate. This requires clarity about the expectations placed on patients and the safety net of someone they can contact if they need support or answers.²⁵

Patient-friendly information and access to their own data (in a way they can understand) is important if patients are to take more ownership of their care. Clear communication from health professionals about their eye health and test results, wherever they meet them in their journey, is important for their care and confidence in the system.²⁵

to reach some populations, it may be necessary for technician-led clinics to move around, travelling to where communities gather so important health education can spread by word of mouth.

While there are details to iron out, it is clear that improved risk stratification can get the highest-risk people into the glaucoma care system.¹⁶

Focusing effort where it’s needed most

The overall aim of these technological and logistical changes is to enable glaucoma clinicians to develop systems so that the right patients are seen by the right person at the right time.

“Glaucoma got itself into a bit of a pickle with overtreated patients, because of an overall poor assessment of risk,” says Gazzard.

At present, delayed appointments and limited

resources mean test results are often not available when needed – making it difficult to reliably stratify patients into high and low risk. By increasing capacity and improving efficiency, these changes will help services not only deliver more tailored care, but also more accurately identify those at highest risk in the first place.

Risk stratification can be further enhanced through patient input, automation and at-home testing.^{16,21,22} Patients at lower risk will still receive the care they need, while virtual clinics – supported by optometry and patient education – make it easier to monitor larger numbers safely. This, in turn, frees up consultants to prioritise timely surgical interventions and deliver enhanced peri-operative care to those who need it most. “It basically means we are spending our time seeing the patients we really need to see,” says Masood.

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