Position statement

Artificial intelligence in ophthalmology

The ROYAL COLLEGE of OPHTHALMOLOGISTS

Key messages

- With potential for strengthening patient care, streamlining processes and advancing research, artificial intelligence (AI) undoubtedly has an important role to play in transforming eyecare delivery in the UK.
- We believe that AI tools should be adopted via an iterative process, with ophthalmology services conducting regular audits, quality assurance and inclusive patient engagement to ensure safe, equitable and effective implementation.
- Enhanced digital integration, adequate workforce capacity and robust governance frameworks are needed to facilitate such efforts, and clinicians must remain central to patient care, with AI-enabled tools supplementing – not replacing – their expertise and judgement.

Context

Ophthalmology is at the forefront of the development and implementation of AI tools that can enhance patient care, streamline administrative processes, and advance clinical research. With a historic focus on image analysis, AI presents opportunities to improve diagnostic accuracy, personalise treatment plans, and broaden access to ophthalmology care. However, careful consideration must be paid to workforce adaptation, digital integration, and ethical implications if we are to fully realise the benefits of AI and minimise disparities in eyecare.

Harnessing AI to advance ophthalmology

Current and potential applications of AI in ophthalmology are numerous, from automating administrative tasks and improving service delivery (appointment scheduling, waiting lists, patient correspondence and staff rotas) to advancing diagnostic and screening tools.[1] AI algorithms have, for example, demonstrated accuracy comparable to human experts when detecting diabetic retinopathy and therefore offer great potential to achieve timelier and more consistent detection of disease.[2] Similarly, AI analysis of retinal scans enables identification of unique disease "fingerprints", including for cardiovascular and neurodegenerative diseases, making it an invaluable tool in the emerging field of oculomics.[3]

As well as supporting diagnosis and screening, AI holds the potential to facilitate personalised treatment plans – such as by calculating the optimal refractive power of an intraocular lens in cataract surgery – and to improve the efficiency and quality of medical and clinical research.[4,5] AI-enabled tools may also enhance surgical training, such as through visual simulations with real-time audiovisual feedback during cataract surgery and personalised learning experiences with intelligent tutoring systems.[6,7]

Our position

As the representative voice for ophthalmologists in the UK, we recognise the potential of AI to revolutionise ophthalmology services and are committed to leading the integration of AI in a manner that upholds the highest standards of patient care and equitable access. We believe that AI can bolster the capacity of ophthalmology services, enhance diagnostic and treatment provision, and widen access to specialised care.

To fully realise this potential, we believe the following are required:

1. **Education and training** to equip the eyecare workforce with the knowledge and skills to leverage AI tools effectively and safely. This should be streamlined and targeted, recognising that not all ophthalmologists need to become AI experts.

2. **Ethical and equitable implementation** to minimise the risk of exacerbating health inequity among varied demographics, including marginalised and at-risk groups. AI technologies should be developed, validated and deployed across the full diversity of the patient population.

3. **Data governance and privacy frameworks** to cover the collection, storage and analysis of patient data, with clear guidelines on data usage and sharing between patients, practitioners, regulatory bodies and technology providers.

4. **Clinical accountability** defined by a clear intended use statement distinguishing between user and manufacturer liabilities.

5. **Digital interoperability** to standardise methods for extracting and sharing patient data from electronic medical records across primary and secondary care.

6. **Ongoing research and innovation** into AI applications in ophthalmology aligned with patient need and clinical demand.

7. **Sufficient workforce capacity** to ensure efficiencies gained by the introduction of AI tools are not restricted due to a demand-capacity bottleneck elsewhere in the clinical pathway. The workforce itself must also have the knowledge and willingness to implement and critically review AI-enabled tools in their service.

We are committed to supporting the specialty to navigate the complexities of AI integration and will advocate for policies that ensure these technologies enhance, rather than compromise, high-quality and accessible patient care. We invite our members and the wider ophthalmic community to join us in this endeavour, ensuring that AI tools serve as a catalyst for positive change in ophthalmology.

Further reading

Explore the AI issue in *Eye* for an in-depth discovery of the latest research and insights on AI applications in ophthalmology.

References

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