Seeing the future of vision care

Revolutionizing vision care with AI

Envision a future where a routine eye exam can uncover life-altering conditions years before symptoms appear

This is the transformative potential of artificial intelligence(AI) in vision care. The integration of AI into vision care is redefining diagnosis, treatment and patient care, delivering a new era of precision medicine in optometry and ophthalmology. Recent studies highlight AI's remarkable ability to diagnose diabetic retinopathy, outperforming traditional diagnostic methods.[1] This means that millions of people at risk of blindness due to undetected conditions can be identified and treated early, potentially saving their vision.

As we explore AI's applications across various aspects of eye health, it becomes clear that this technology is not just revolutionizing vision care but also transforming lives. As vision care continues to evolve, employers will continue to see firsthand the value of vision benefits for their employees.

[1]"Artificial Intelligence Detection of Diabetic Retinopathy"; National Library of Medicine; ncbi.nlm.nih.gov; September 30 2022.

AI is transforming the vision care industry

We're here to help keep you up to date

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Improving early detection and enhancing personalization

Optometrists will begin to detect eye conditions with unparalleled accuracy and efficiency by leveraging tools and technologies that utilize algorithms and machine learning models. These AI-powered systems can analyze vast amounts of data from retinal scans, optical coherence tomography (OCT) images, and visual field tests to detect early signs of eye diseases like glaucoma, diabetic retinopathy and age-related macular degeneration.[2]

Beyond diagnosis, AI enables predictive analytics, allowing optometrists to forecast the progression of eye diseases and create individualized treatment plans. This level of personalization means that conditions can be addressed in their earliest stages, often preventing vision impairment altogether. [3]

A prime example of the potential impact is in the early detection of diabetic retinopathy (DR). In the United States alone, 38.4 million adults (~11.6% of the population) have diabetes,[4] and it is estimated that more than half of people with diabetes will develop diabetic retinopathy.[5]

Recent advances in automated DR detection using artificial intelligence (AI) algorithms[6]

- **Provide increased opportunities for care**
- **Improve access to diabetic eye examinations**
- **Identify patients requiring specialist referrals**

With **AI-supported screenings**, optometrists can reliably detect DR, drastically improving management and outcomes for diabetic patients.[7]

Employer insight
Employees with diabetes should prioritize regular eye exams to check for diabetic retinopathy. Early treatment can help prevent vision loss.[8]

38.4 million

U.S. adults, ~11.6 of the population, have diabetes[4]

[2]"Deep-Learning–Aided Diagnosis of Diabetic Retinopathy, Age-Related Macular Degeneration, and Glaucoma Based on Structural and Angiographic OCT"; American Academy of Ophthalmology; ophthalmologyscience.org; November 2, 2022. [3] "Artificial Intelligence-aided diagnosis and treatment in the field of optometry; National Library of Medicine; ncbi.nlm.nih.gov; September 18, 2023. [4] "National Diabetes Statistics Report"; Centers for Disease Control and Prevention; cdc.gov; last update May 15, 2024." [5] "Diabetic Retinopathy"; National Eye Institute; nei.nih.gov; last updated June 28, 2024. [6] "Pivotal Evaluation of an Artificial Intelligence System for Autonomous Detection of Referrable and Vision-Threatening Diabetic Retinopathy"; National Library of Medicine; ncbi.nlm.nih.gov; November 15, 2021. [7] "Study Finds AI-Driven Eye Exams Increase Screening Rates for Youth with Diabetes"; Johns Hopkins Medicine; hopkinsmedicine.org; January 11, 2024. [8] Prevalence of Diabetic Retinopathy (DR)"; Centers for Disease Control and Prevention; cdc.gov; page last reviewed June 13, 2023.
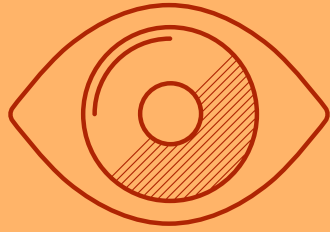
OPHTHALMOLOGY

Enhancing patient outcomes

AI is also impacting the field of ophthalmology, introducing unprecedented levels of surgical planning to post-operative care as well as enhancing traditional ophthalmic practices.[9]

Currently, the primary application is surgical planning and execution. **AI's integration into cataract surgery marks a significant advance**, offering precise diagnosis and preoperative planning. By analyzing historical data, algorithms can now predict the most effective surgical approaches and recommend the best intraocular lens for each patient, enhancing the prospects of optimal outcomes.[10]

During and after surgery, AI-based tools are revolutionizing both execution and training. They assist in surgical decision-making by identifying risks in real-time and support postoperative care by developing personalized recovery plans. This dual role of AI not only streamlines surgical procedures but also aims to improve the triage pathway and patient recovery times.[11]

[9]"Eye of the AI storm: Exploring the impact of AI tools in ophthalmology; National Library of Medicine; ncbi.nlm.nih. gov; June, 2023. [10] "Application of artificial intelligence in cataract management: current and future directions"; BioMed Central; eandv.biomed.com; January 7, 2022. [11] "Evolution and Applications of Artificial Intelligence to Cataract Surgery"; American Academy of Ophthalmology; ophthalmologyscience.org; April 25, 2022.

THE BRAIN-VISION CONNECTION

AI's role in neurological insights through eye health

AI is not only transforming eye care but also revolutionizing our understanding and treatment of neurological conditions. The retina, being a direct extension of the brain, serves as a window into neurological health. AI algorithms also have the capability to analyze retinal images to detect subtle changes indicative of neurological diseases before symptoms manifest.

Diseases like:[12]

- Alzheimer's
- Parkinson's
- Multiple sclerosis

In fact, **AI-driven analysis** of retinal images is continually improving in accuracy for predicting Alzheimer's disease, offering a non-invasive and highly effective tool for early detection.[13]

The integration of AI into neuro-ophthalmology paves the way for routine eye exams to become a cornerstone of neurological health, facilitating early detection and intervention for a wide range of conditions.

Employer insight
Employers who offer a vision plan experience long-term cost savings.[14]

[12] "Diagnosing Systemic Disorders with AI Algorithms Based on Ocular Images"; National Library of Medicine; ncbi.nlm.nih.gov; June, 2023. [13] "A deep learning model for detection of Alzheimer's disease based on retinal photographs: a retrospective, multicentre case-control study; The Lancet; thelancet.com; September 30, 2022. [14] "The Clear Future: Employer Sponsored Vision Benefits"; Faster Capital; fastercapital.com; Updated February 21, 2024.

Ethical considerations in AI-drive vision care

As AI continues to reshape vision care, navigating the ethical landscape and addressing future challenges is crucial. While AI offers tremendous potential to enhance patient care, streamline operations, and provide personalized treatment plans, it also raises important ethical considerations that must be carefully addressed to ensure responsible and equitable implementation.

Key ethical considerations include data privacy and security, algorithmic bias and fairness, and transparency and accountability. Robust data protection measures, compliance with stringent regulations like HIPAA[15] and GDPR,[16] and the development of AI models trained on diverse datasets to minimize bias are essential. Clear communication about how AI models are developed, trained, and implemented in vision care services is necessary to foster trust and understanding among all stakeholders.

As **AI technology continues to evolve**, the industry must remain proactive in addressing a range of emerging challenges like:

- **Cybersecurity threats**
- **Regulatory changes**
- **The ethical use of AI**

Active engagement with patients, healthcare providers, policymakers, and the wider community is vital to shape a future where **AI-driven vision care improves health outcomes** while upholding the highest ethical standards and protect employee privacy.
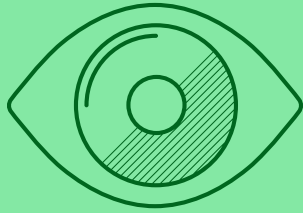
Looking ahead

The future of vision care is full of promises and challenges

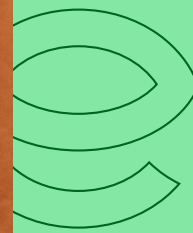**The future of vision care is full of promises and challenges.**
A relentless dedication to ethical innovation ensures that the power of AI is used to revolutionize vision care in a manner that respects individual rights, promotes equity and maintains trust. AI transcends technological advancement; it is about shaping the future of healthcare with foresight, responsibility, and an unwavering commitment to improving lives.

Understanding these AI advancements can help ensure that you continue to offer vision care benefits that meet your employees' unique needs.

94% of Americans surveyed say vision care coverage is valuable[17]

Learn more about AI's impact on the vision industry. **Speak with your EyeMed account representative**

[15] "Health Insurance Portability and Accountability Act of 1996 (HIPAA)"; Centers for Disease Control and Prevention; cdc.gov; page last reviewed June 27, 2022. [16] "The General Data Protection Regulation"; The European Council and Council of the EU; consilium.europa.eu; page last reviewed January 11, 2024. [17] "The new standards for vision care"; The Harris Poll and XP Health; xphealth.com; February 2023.