Data are transforming medicine in ways that were unimaginable just a decade ago. In ophthalmology, data-driven care is rapidly evolving from a distant goal to a foundational element of clinical decision-making.

AI is reshaping how we clinicians interpret data and manage our patients. By analyzing data from cases with similar parameters, AI allows us to personalize care plans based on factors such as the patient's age, lifestyle, and ocular history. This approach facilitates patient-centered care, where our treatment recommendations align with the specific needs and preferences of the individual. For instance, AI could suggest customized approaches to keratoconus management that incorporate not only clinical staging but also predictive analytics. The patient's life stage, visual demands, and risk of disease progression could all be taken into consideration.

AI-driven tools are already shaping patient-centered care. The Zeiss AI IOL Calculator, part of the Veracity Surgery Planner (Carl Zeiss Meditec), leverages AI and paraxial ray tracing to refine IOL power calculations. Predictions are improved as additional data are incorporated. Similarly, platforms such as Eyetelligence (Bausch + Lomb) apply machine learning to match patients with the most suitable IOL technologies so that lens selection is tailored to each patient's visual goals and ocular characteristics. The Intelligent Research in Sight (IRIS) registry aggregates large datasets to elucidate disease patterns and treatment outcomes on a population scale. The insights the IRIS registry provides go beyond single-center studies and have helped improve the standard of care for diverse patient populations.

Although AI has remarkable potential, it is not infallible. Clinicians familiar with generative AI platforms such as ChatGPT (OpenAI) know that these systems can produce results that appear to be plausible but are inaccurate. The quality of AI-derived insights depends heavily on the data it processes and the specificity of the questions posed. Human input remains integral to the value of AI. We must ensure data quality and diverse population representation while addressing potential biases.

As data-driven care advances, so does the potential for intraoperative AI applications. Imagine an AI system monitoring the surgical field in real time, detecting critical markers, or warning us of an instrument's proximity to the posterior capsule during phacoemulsification. Similar to adaptive cruise control in a car, this guidance could help us anticipate and prevent complications. One day, robotic systems may perform specific surgical steps autonomously, extending our capabilities as demands on our time and expertise grow.

The age of data-driven, patient-centered care has arrived. As these technologies are integrated into practice, their potential for improving patient outcomes is profound. To fully realize this potential, however, we must maintain focus on quality, bias, and ethical applications. We are entering a new reality where data are not merely collected but actively leveraged to elevate the standard of care in cataract and refractive surgery. ■

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