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Powering data into scleral lens design and outcomes: Correlation between patient generated health data (PGHD) and objective fitting endpoints from a data-driven scleral lens design

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Abstract

Purpose: To determine if there are correlations between patient generated health data (PGHD) from scleral lens wearers and objective fitting endpoints from a data-driven scleral lens design.

Methods: Retrospective analysis of OSDI and patient satisfaction data from de-identified, patient volunteered, PGHD surveys. Matching order numbers were used to correlate the PGHD data to objective fitting and lens manufacturing endpoints from a data-driven scleral lens design obtained from a real-time analytics platform and data warehouse – Power BI.

Results: A total of 81 patients completed the pre and post PGHD surveys. Overall, these patients had a 49% improvement in OSDI score after wearing a data-driven scleral lens design and reported a satisfaction rating of 8 out of 9, in vision and comfort. 94% of patients (76) responded they intend to continue to wear their lenses and reported a 50% improvement in OSDI. 80% (65) of patients were fitted with the predicted Standard, data-driven trial lens with built-in scleral shape in a quadrant-specific manner. This subset of patients exhibited a 57% improvement in OSDI score. Along with other fitting parameters in this data-driven lens design, 88% of patients were fitted with the built-in eccentricity (FSE1), while 78% didn't require a base curve change from the built-in value of 8mm. The average number of lens orders per eye was 2.

Conclusions: The use of big data is used in many areas to power innovation. Big data was not only used to develop a scleral lens design, but in keeping with the initiative of powering data into a scleral lens design and offering, a PGHD program was also launched. Real-time analysis, as powered by an internal data warehouse, from objective manufacturing and fitting endpoints validate the data-driven nature of the lens design, i.e., not much deviation is observed from the built-in design. The strong correlation between PGHD and the validation of the data-driven nature of the scleral lens design, with a significant improvement in OSDI score and patient satisfaction, shows that the use of big data in scleral lens design is a viable and reliable way to innovate and develop scleral lens designs – in a way that leads to high levels of patient satisfaction and improvement in symptoms. PGHD complement provider-directed capture of data, and the use of predictive analytics can be used to drive further improvements to the lens design.

Introduction

From "How big data drives product innovation"

Most major product manufacturers are collecting and using Big Data in ways to improve product quality, streamline manufacturing performance, and optimize their product offerings. The use of this data crowdsourcing is employed by global businesses, but more and more by mid-size businesses to build their own intelligence and improve products and customer satisfaction.[1]

From: Health Data Science

In addition to this initiative, and specifically in health care, the use of Big Data to improve patient outcomes, has been employed more and more in the form of Patient-Generated Health Data (PGHD). The use of PGHD has been employed to improve chronic disease management, to drive the Precision Medicine initiative, and to empower the patient.

With this in mind, BostonSight sought to develop a scleral lens design back in 2014 solely based on patient objective fitting outcomes; launching in 2017 the first data-driven scleral lens design. Unique to its product offering was also the fact that it launched a PGHD program – first of its kind in this industry – to track product performance and patient satisfaction. In the spirit of its data-driven approach, a real-time data-analytics analytics platform was established to track and monitor manufacturing data, after product launch.
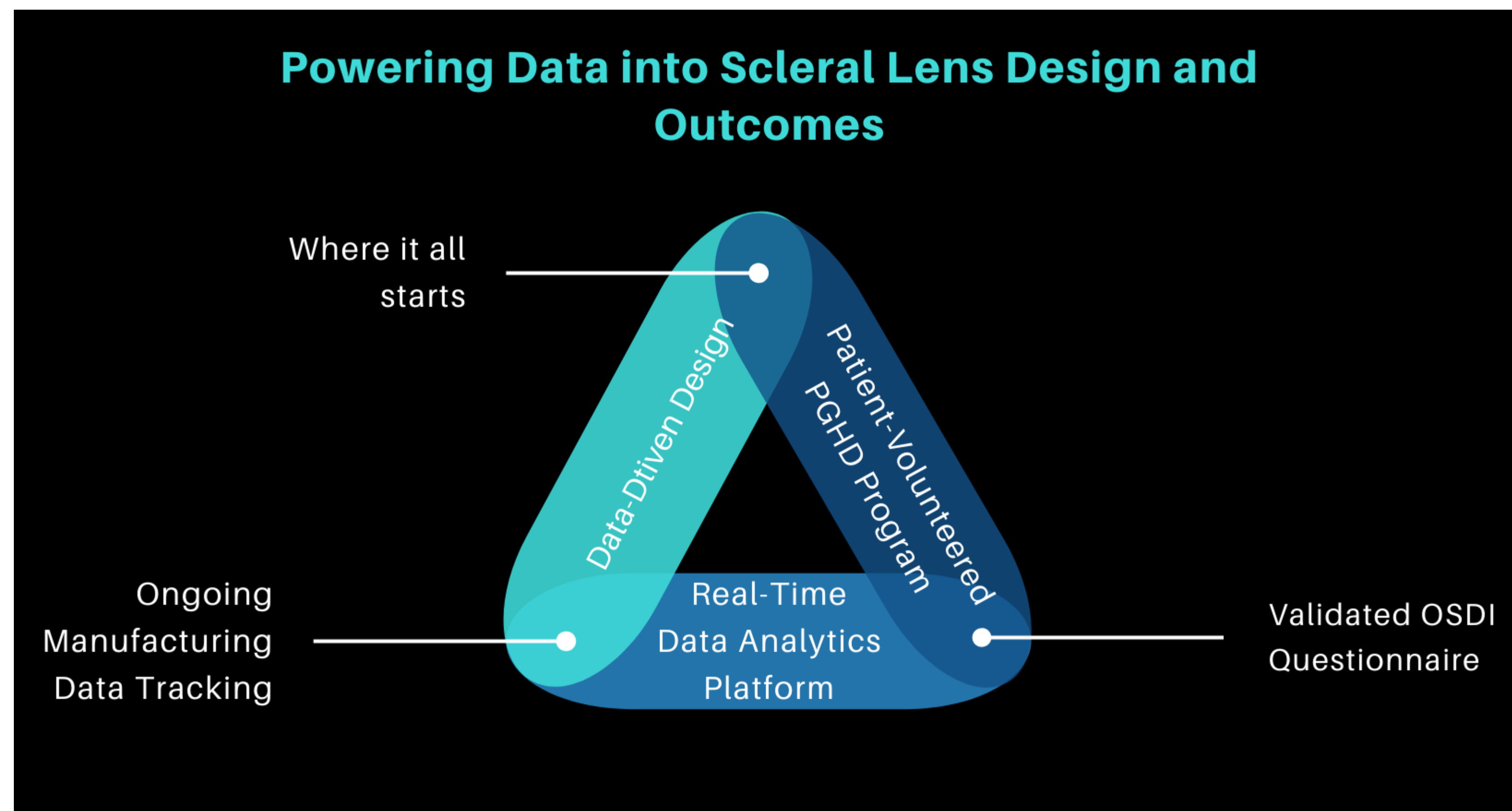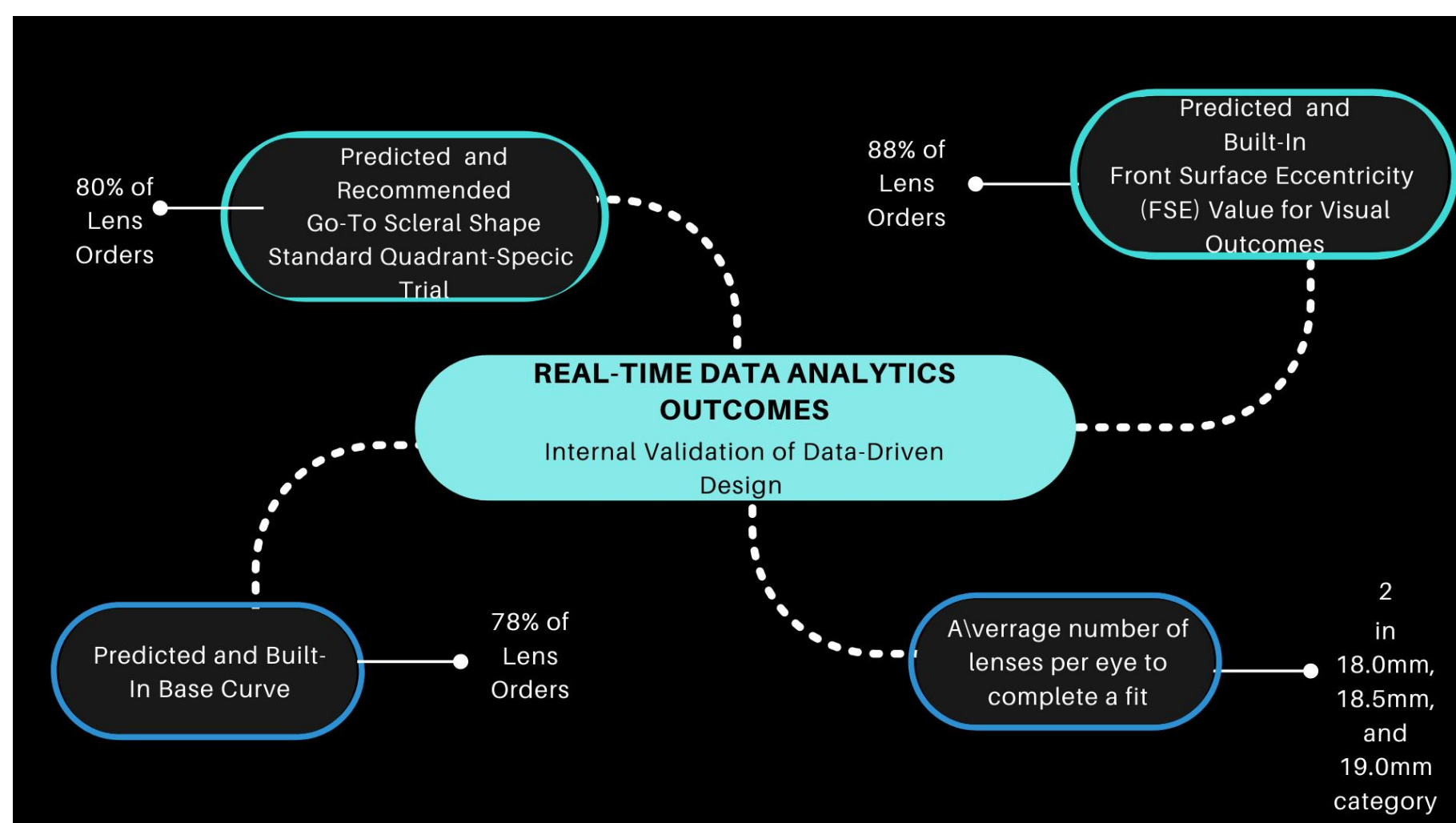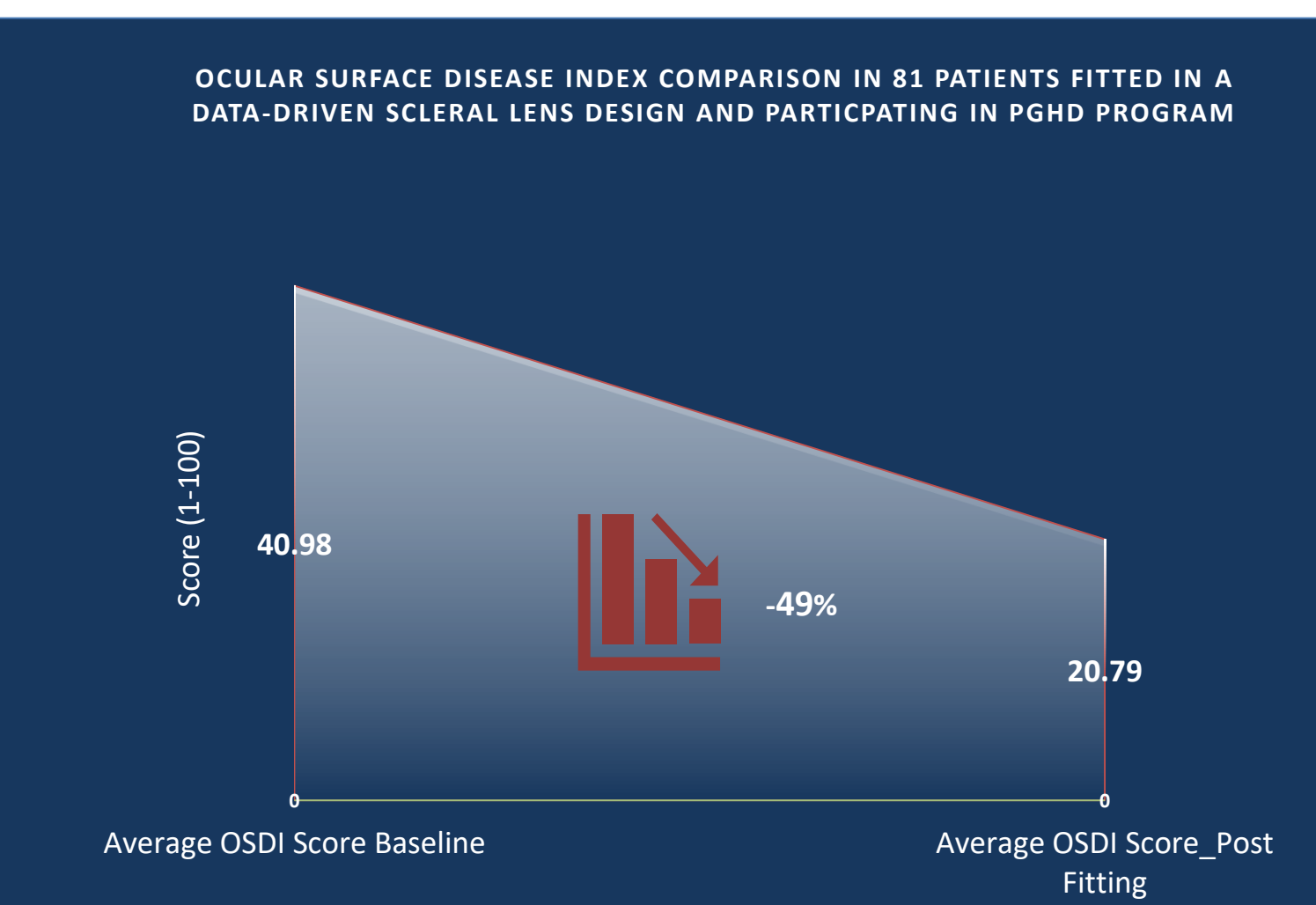
The goal was to continue to leverage the use of big data sets and incorporate them to drive design innovations, optimizations, and ultimately improve patient outcomes and satisfaction.

Background

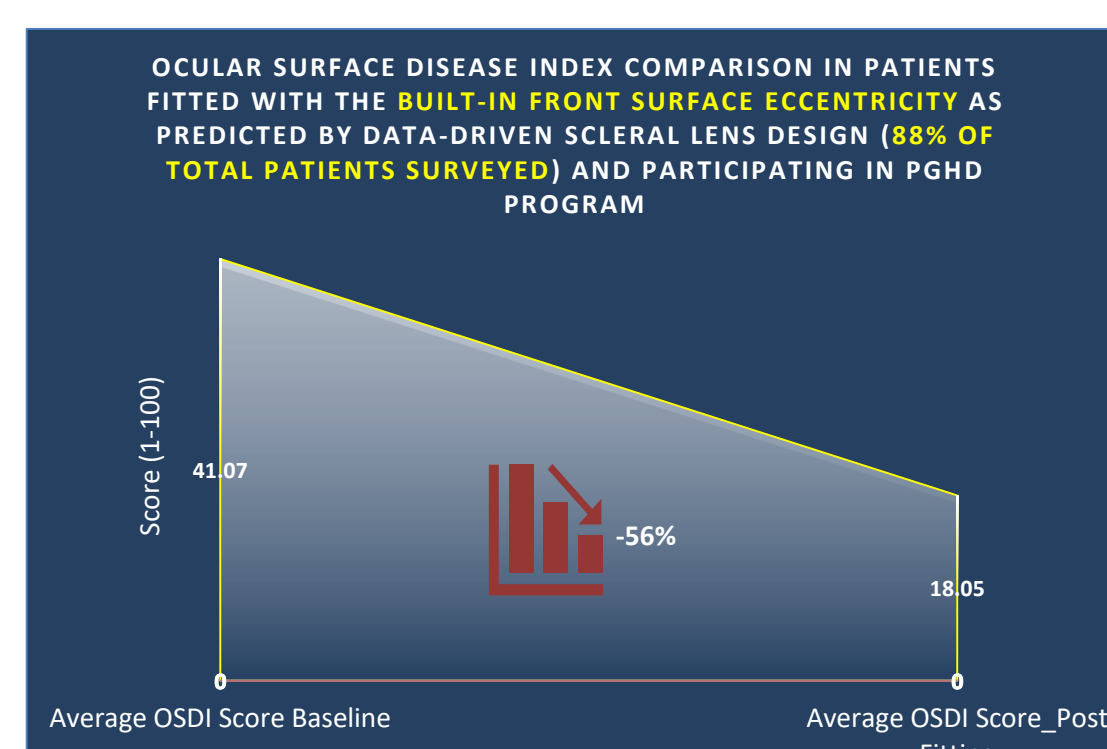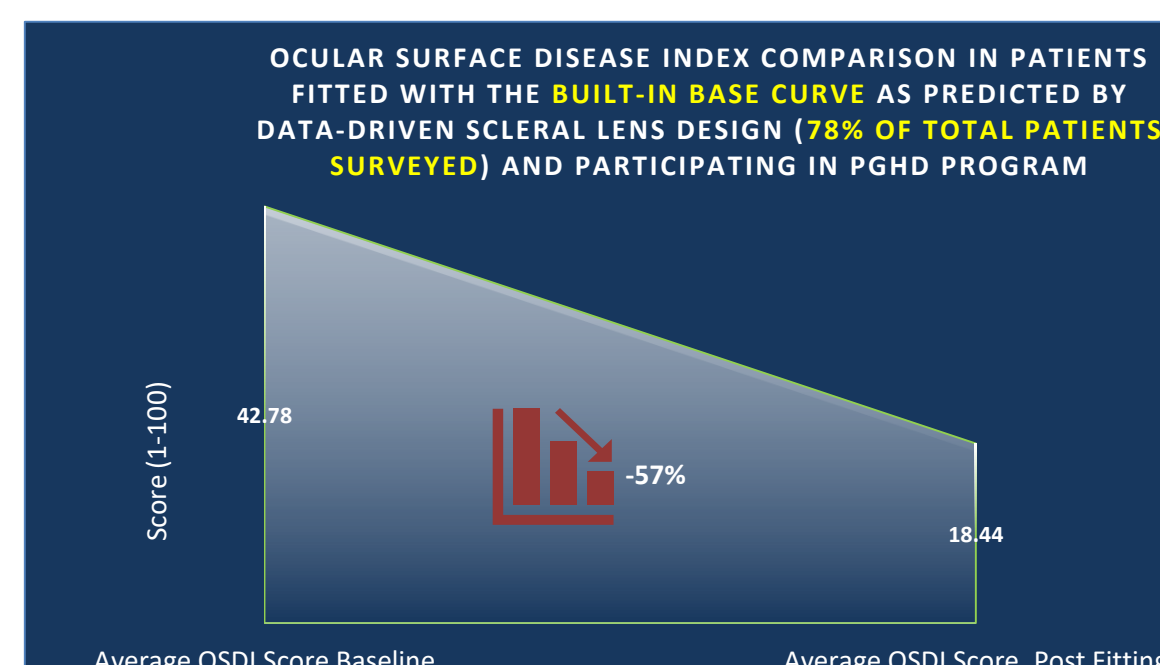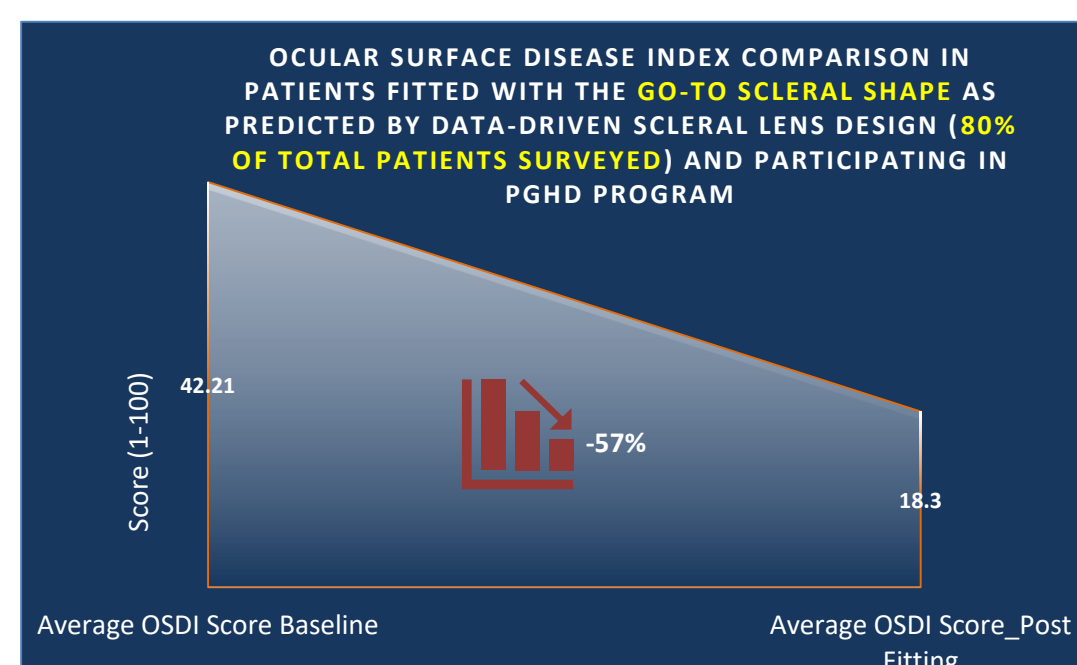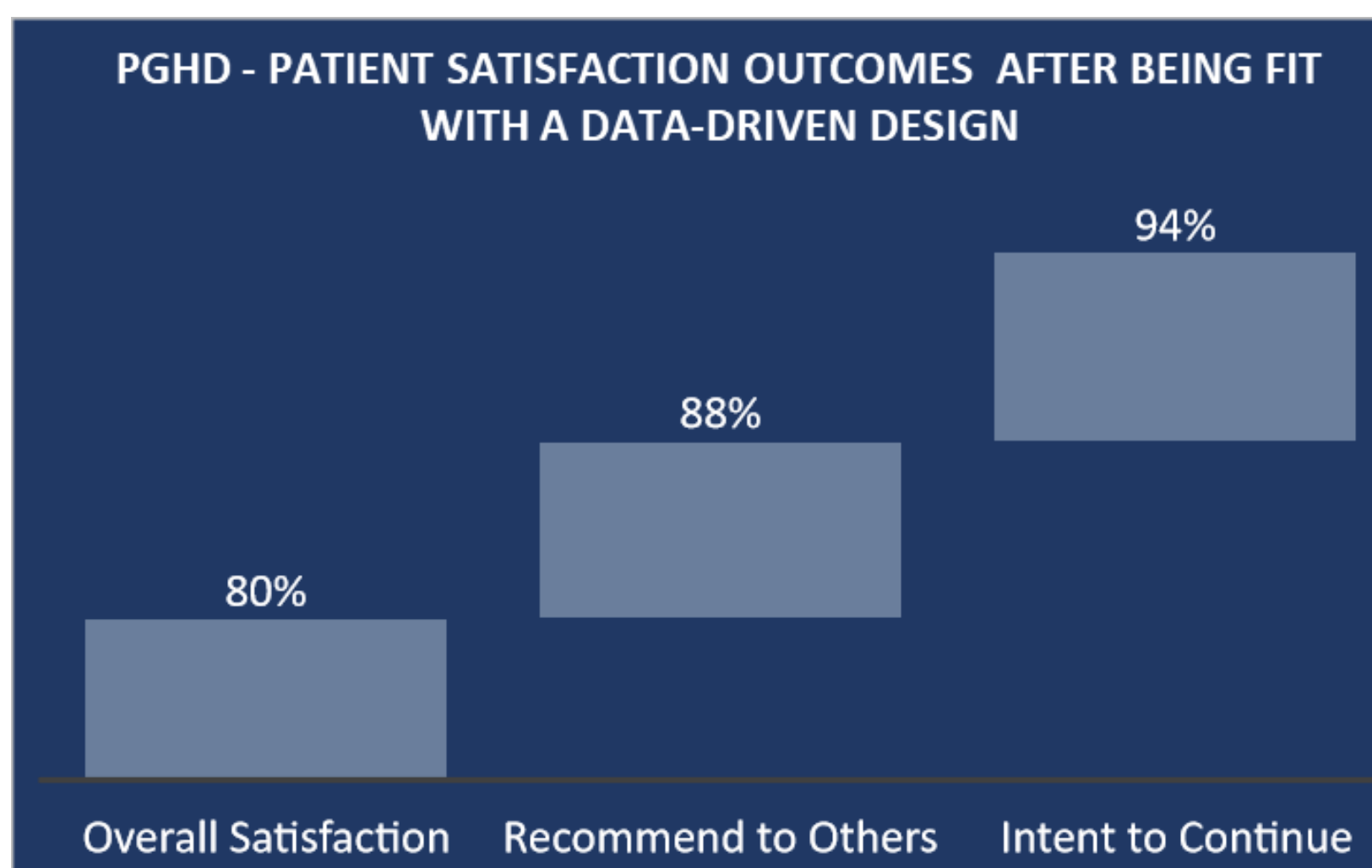### Sample Report - PGHD

Results

Outcomes of Leveraging Big-Data to Derive a Lens Design

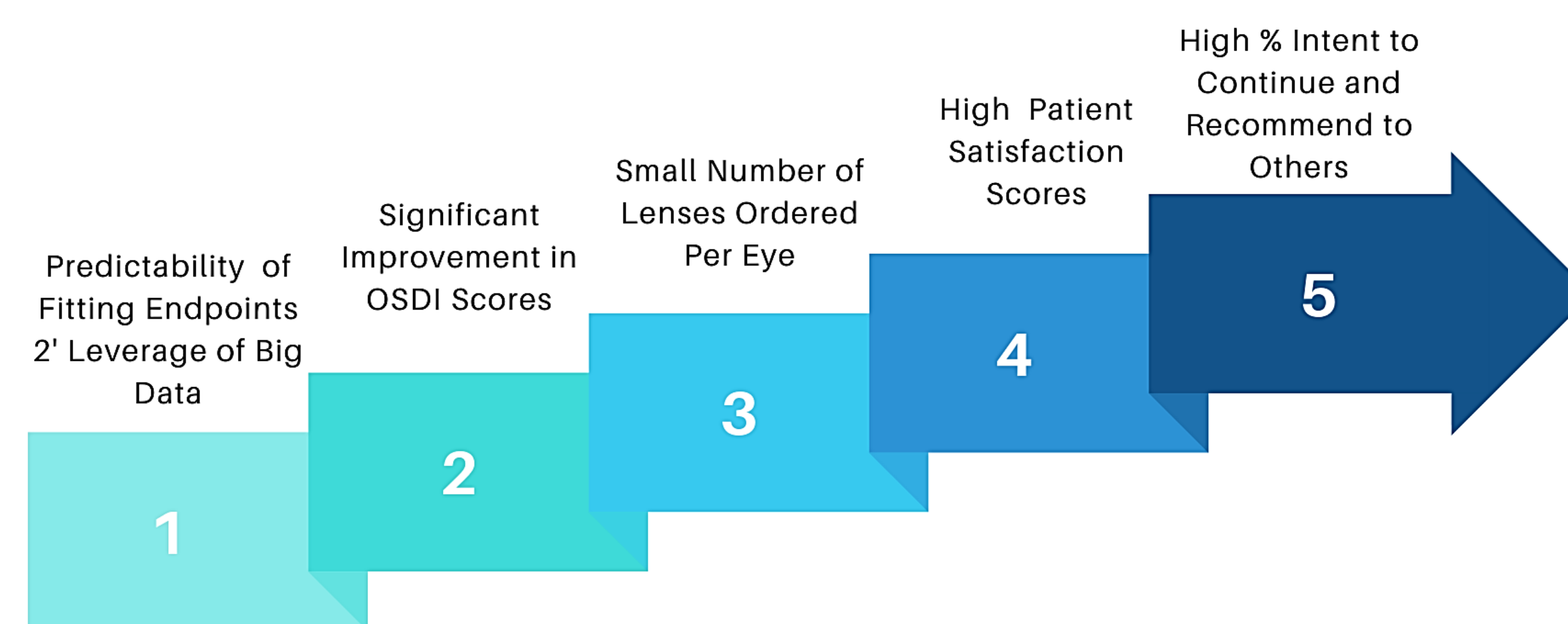### OSDI Outcomes from Patient-Generated Health Data (PGHD)

Patient Satisfaction Outcomes from Patient-Generated Health Data (PGHD)

CORRELATION OF PGHD AND OBJECIVE FITTING ENDPOINTS
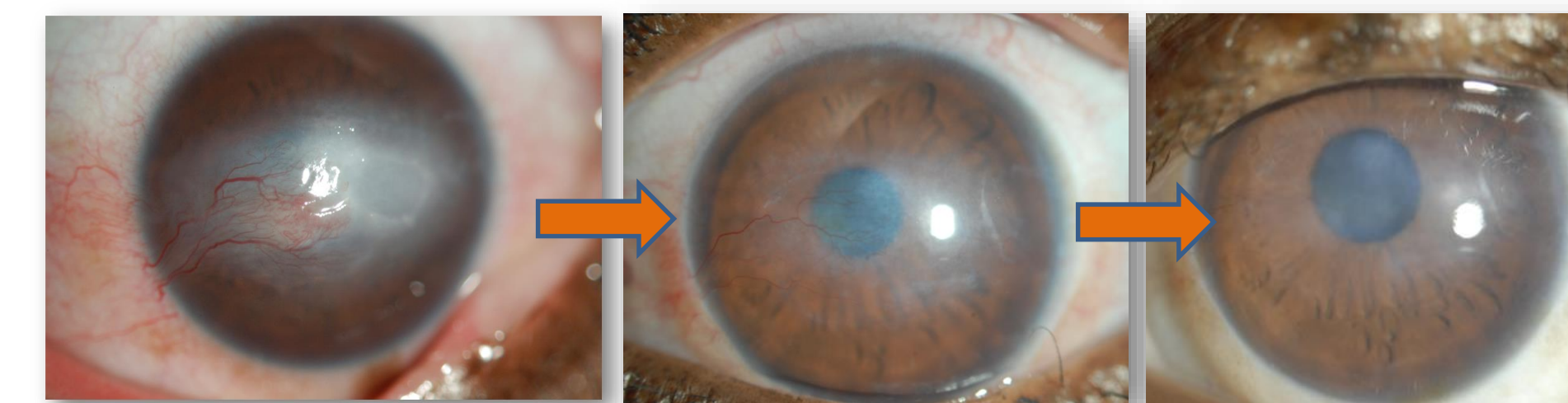#### Outcomes of Levraging Big-Data

Conclusions/Discussion

The use of big data is used in many areas to power innovation. Big data was not only used to develop a scleral lens design, but in keeping with the initiative of powering data into a scleral lens design and offering, a PGHD program was also launched. Real-time analysis, as powered by an internal data warehouse, from objective manufacturing and fitting endpoints validate the data-driven nature of the lens design, i.e., not much deviation is observed from the built-in design. The strong correlation between PGHD and the validation of the data-driven nature of the scleral lens design, with a significant improvement in OSDI score and patient satisfaction, shows that the use of big data in scleral lens design is a viable and reliable way to innovate and develop scleral lens designs – in a way that leads to high levels of patient satisfaction and improvement in symptoms. PGHD complement provider-directed capture of data, and the use of predictive analytics can be used to drive further improvements to the lens design.

Just like in other areas of health care, the use of PGHD to improve objective measures and patient satisfaction will only continue to rise. The use of big-data to drive innovation is here to stay, especially with the advent of artificial intelligence (AI) and the increased use of AI in numerous aspects of health care and in all industries in general. The contact lens industry, in particular, the scleral lens industry, can benefit from this approach and initiative. To the extent that both big-data and PGHD continues to be leveraged, we hypothesize that patient outcomes will improve as well.

BostonSight's mission is to transform the care and understanding of the ocular surface. A way to do this is to embrace the power of data and leverage it to drive innovation in lens designs, patient outcomes and patient satisfaction. With a patient-centric approach and goal in mind, leveraging big-data helps decrease the empirical nature to the treatment of complex corneal diseases with scleral lenses.

References

1. Rampton, K. (2017) How big data drives product innovation. White Paper, BoltGroup, 1-4.

Disclosure

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