

A Risk Calculator for Predicting Enophthalmos Following Orbital Fracture Repair

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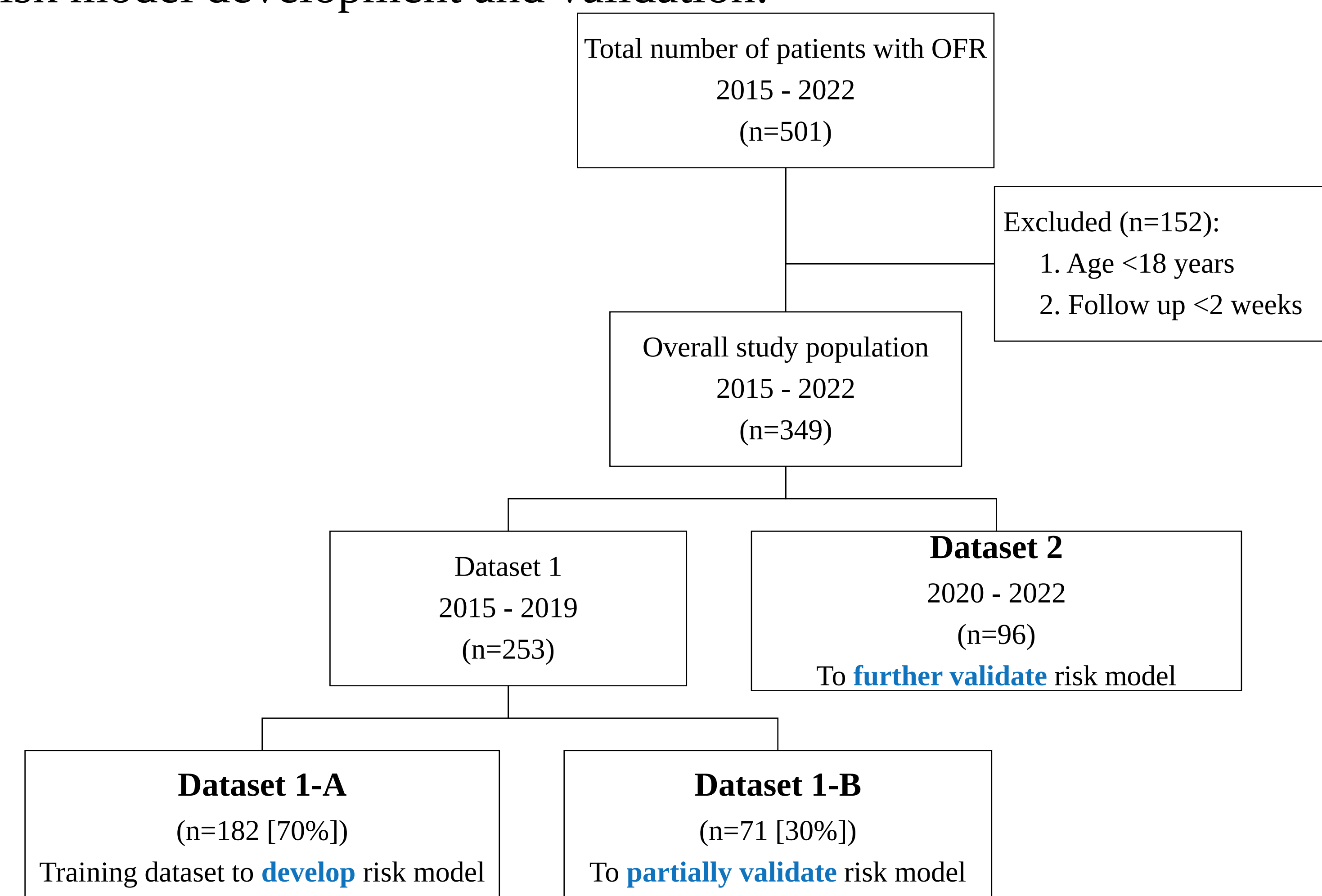
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Introduction

- ❖ Enophthalmos: **most debilitating** complication of orbital fractures.
- ❖ It is notoriously difficult to predict and can still occur even after orbital fracture repair (OFR).
- ❖ Purpose: To **develop** and **validate** a **risk calculator** for the prediction of postoperative enophthalmos following OFR in adults.

Methods

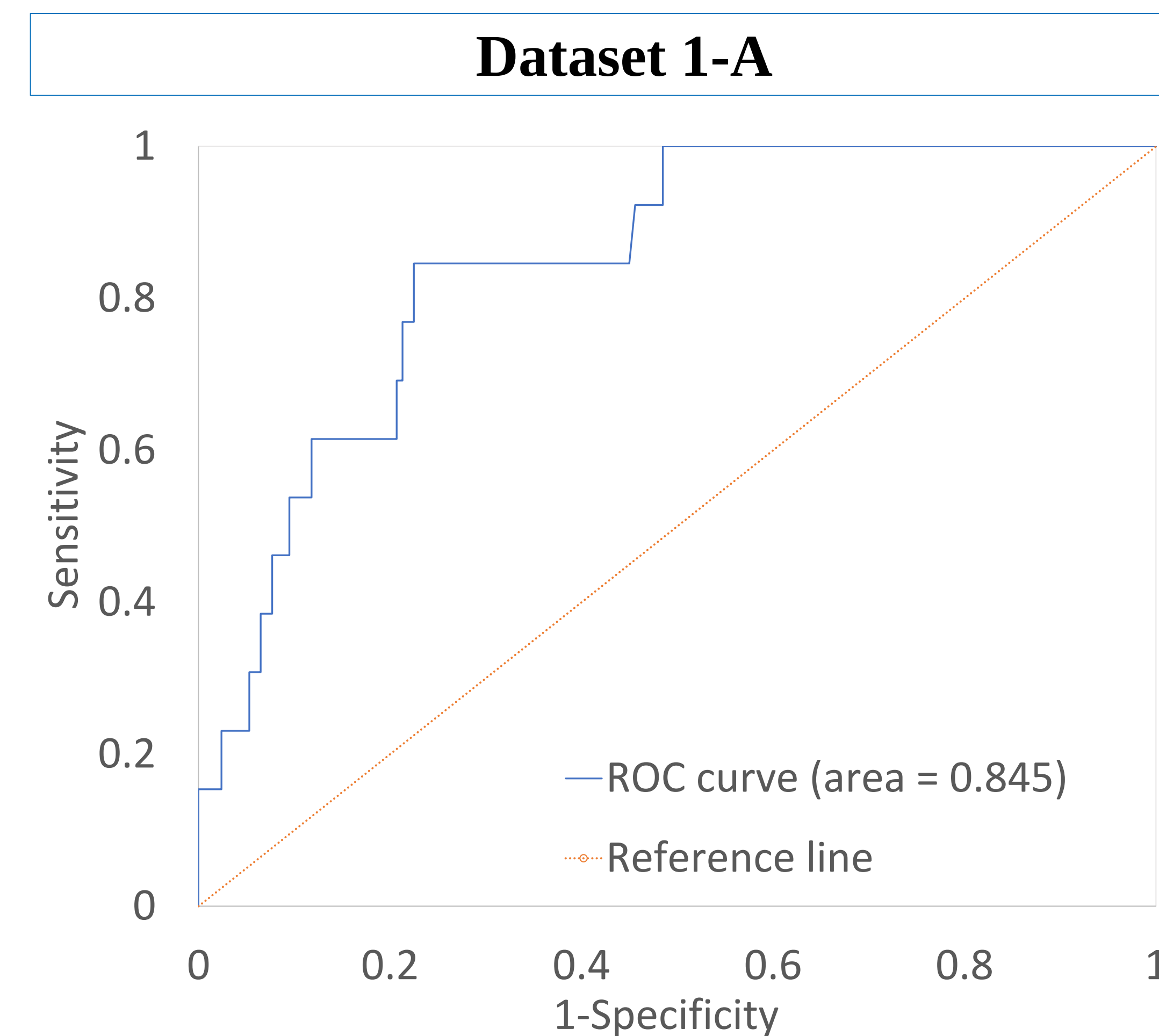
- ❖ **Retrospective cohort** from **2015** to **2022**.
- ❖ Adult trauma patients with OFR at:
 - R Adams Cowley Shock Trauma Center
 - Johns Hopkins Hospital
- ❖ Primary outcome: **incidence** or **persistence** of postoperative **enophthalmos** ≥ 2 weeks following OFR.
- ❖ Risk model development and validation:



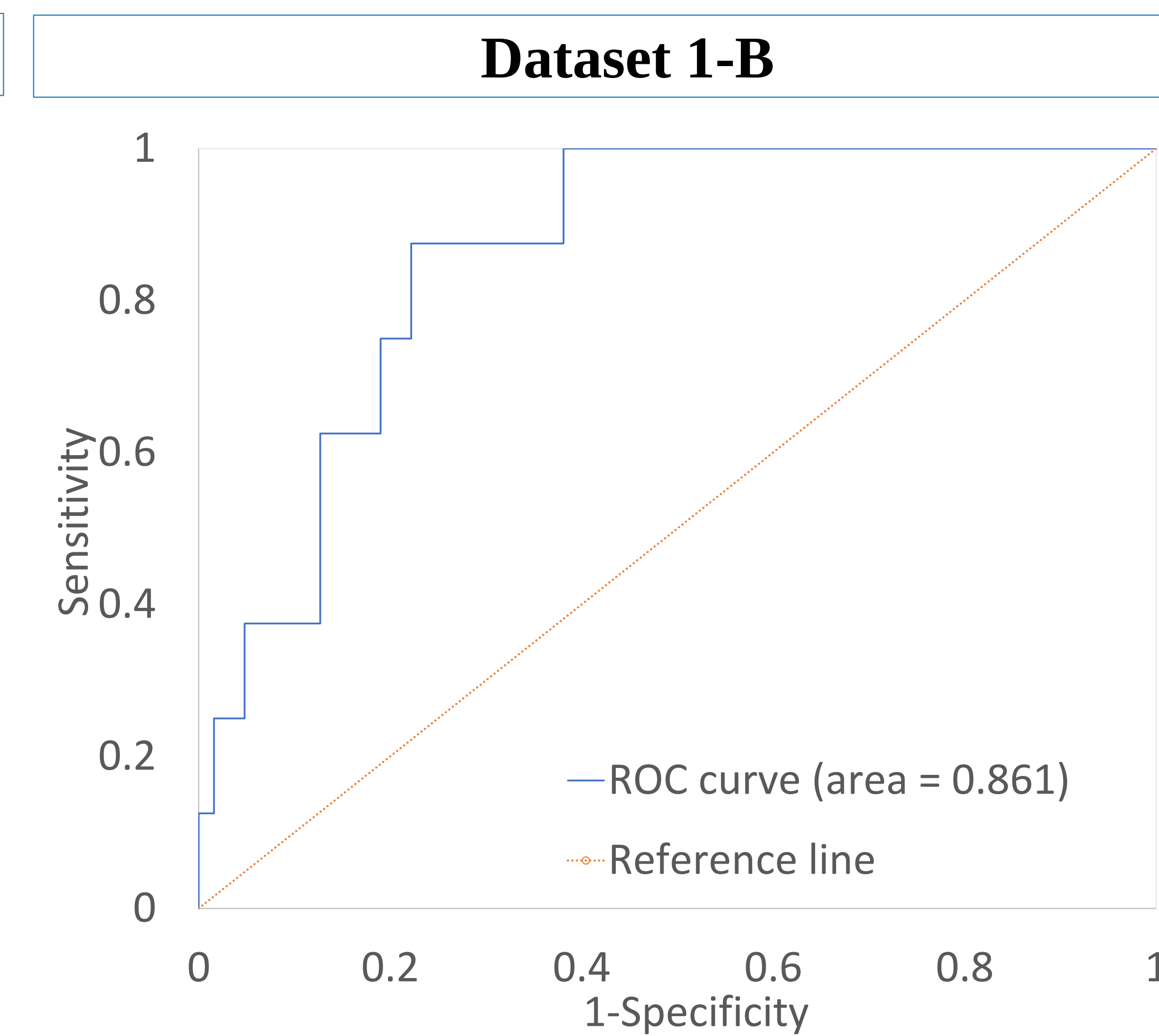
- ❖ C-statistic and Hosmer-Lemeshow tests $\rightarrow$ risk model accuracy.

Results

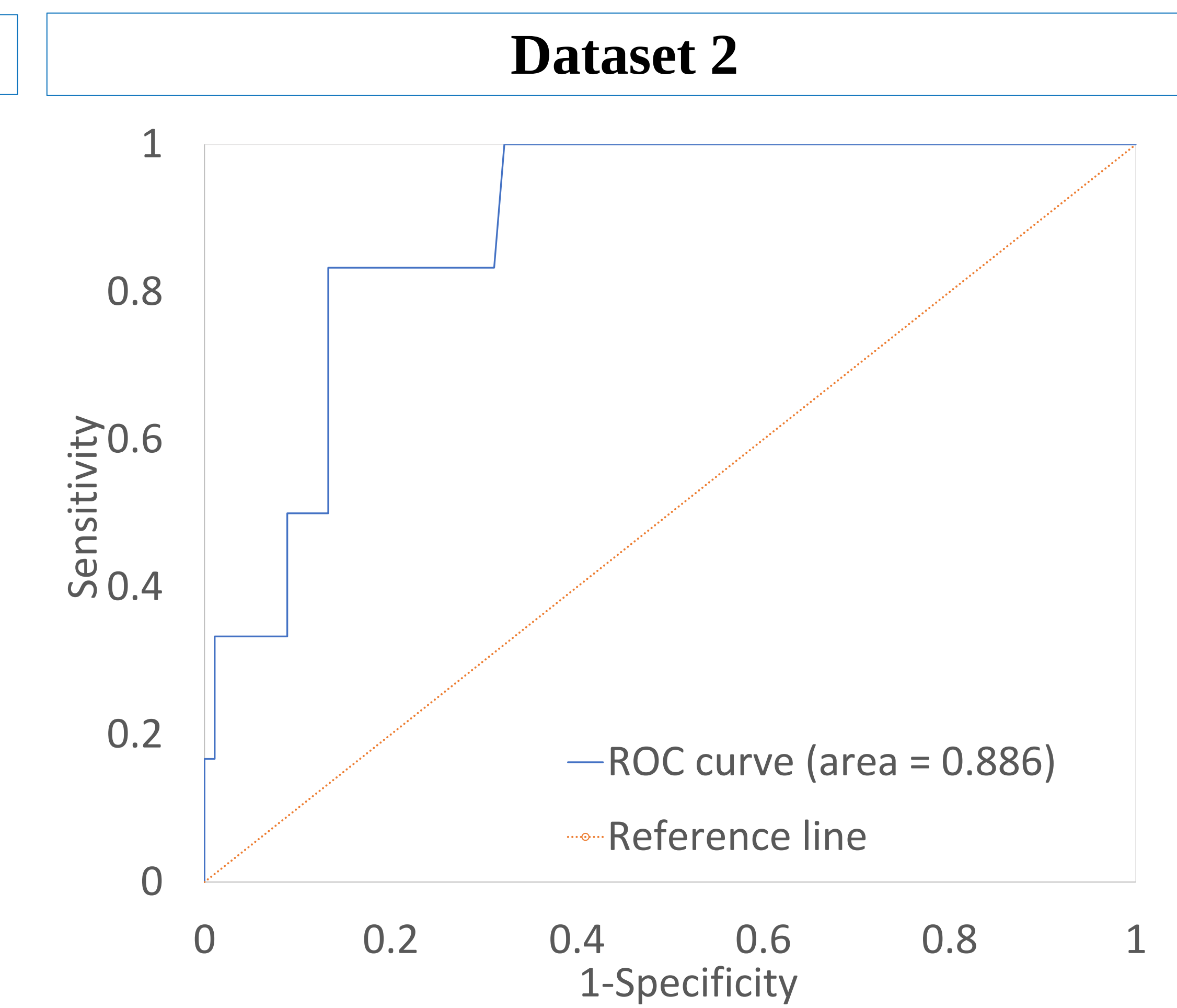
- ❖ **349** patients included: 27 (**7.7%**) had postoperative enophthalmos.
- ❖ Of 79 patients with **preoperative enophthalmos**, only 14 (**18%**) had **residual** postoperative enophthalmos.
- ❖ Median (IQR) follow up = 59 (34-164) days.



AUC = **85%** $\rightarrow$ very good **discrimination**



AUC = **86%** $\rightarrow$ *partial validation*



AUC = **89%** $\rightarrow$ *full validation*

Risk Calculator:

- ❖ Predicted probability **< 2.3%**
 $\rightarrow$ rules out postoperative enophthalmos with **100%** sensitivity and NPV.
- ❖ Predicted probability **< 9.5%**
 $\rightarrow$ rules out postoperative enophthalmos with **85%** sensitivity and **99%** NPV.

Conclusion

- ❖ We designed the **first validated** risk calculator that can be used to **rule out enophthalmos** following OFR.
- ❖ Our risk calculator enables surgeons to preoperatively predict the absence of postoperative enophthalmos in **99%** of cases.



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