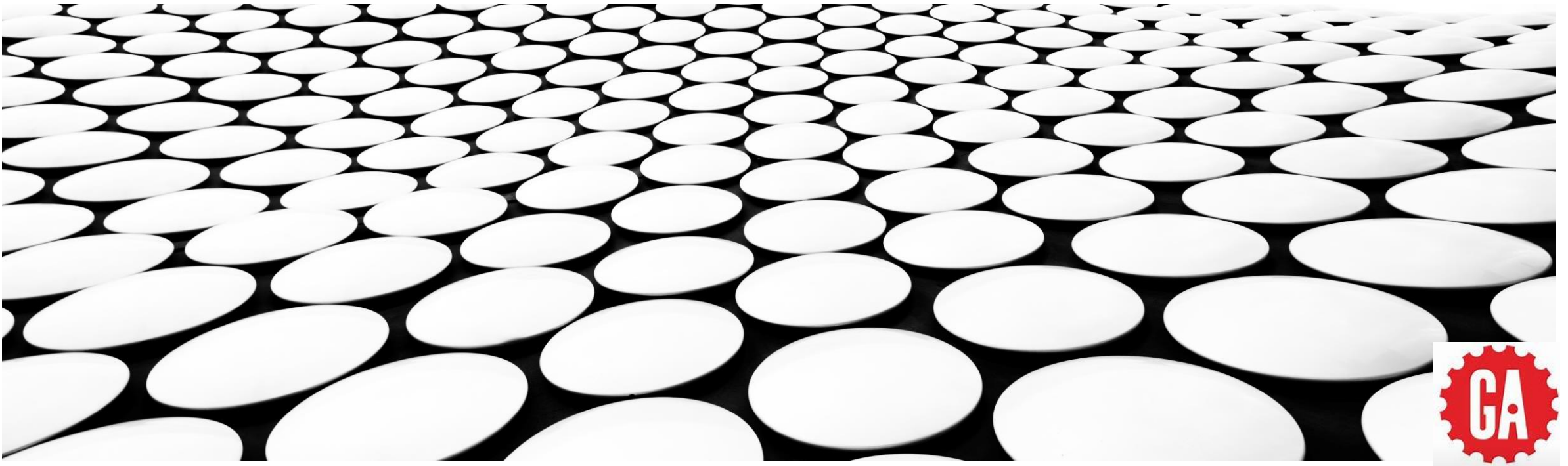

HOSPITAL READMISSION AMONG DIABETIC PATIENTS: UNDERSTANDING KEY ATTRIBUTES & SEGMENTING HIGH-RISK PATIENTS

NAVANEET DUTT | DATA SCIENTIST, DSI | GENERAL ASSEMBLY



WHY?

- ❖ Medicare spent \$600 billion in benefits to Seniors in 2015.
- ❖ 2 million Seniors were readmitted to hospitals after discharge.
- ❖ \$27 billion was spend on readmittance
- ❖ \$17 billion was avoidable.





OBJECTIVE

- ❖ Identify diabetic patients who are at a high-risk of hospital readmission.
- ❖ Identify attributes of high-risk and low-risk patients.
- ❖ Develop an activation strategy to reach high-risk patients.



DATA SET

- ❖ The Health Facts database compiled by Cerner Corporation.
- ❖ HIPPA Compliant
- ❖ 10-years, 130 hospital
- ❖ 100K patient encounters
- ❖ 50 features – medications, diagnosis, limited demographics
- ❖ All except 8 were categorical

ANALYTICAL APPROACH



Classification Problem



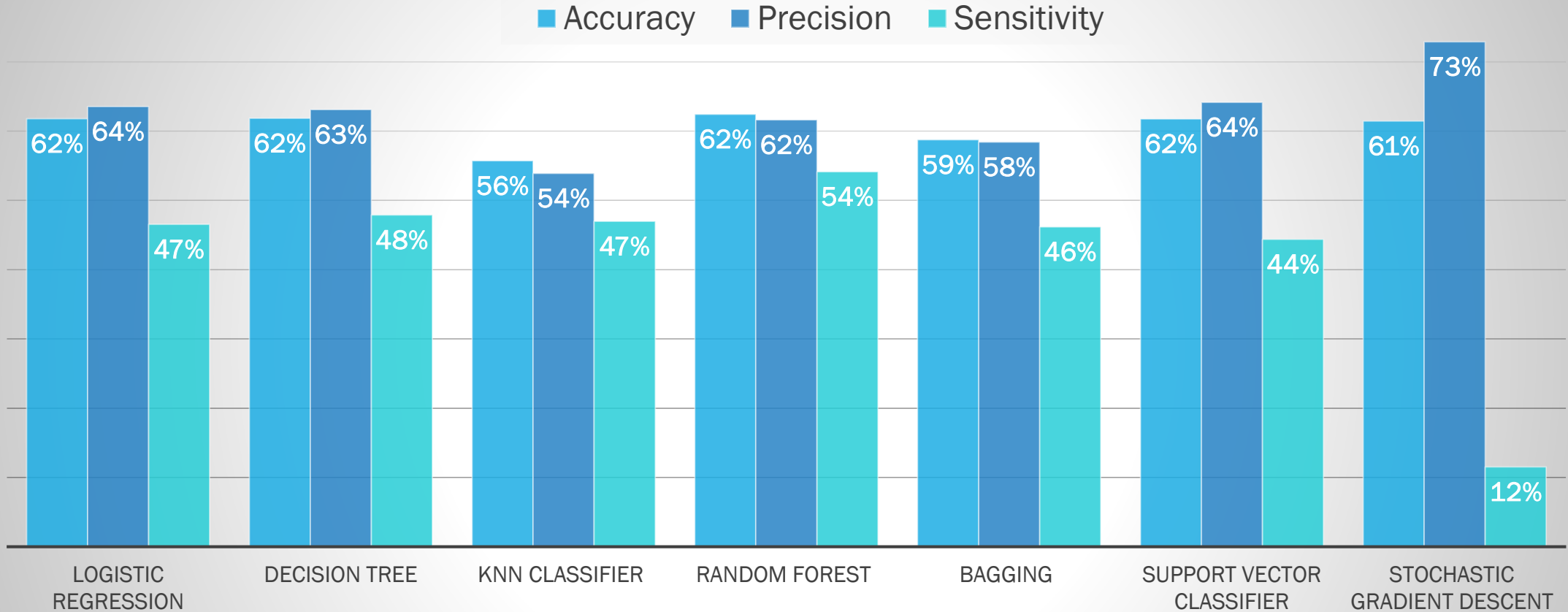
Seven classification algorithms



Select based on

* Accuracy * Precision * Sensitivity

MODEL EVALUATION



ALL MODELS HAVE SIMILAR PERFORMANCE EXCEPT SGD CLASSIFIER



LOGISTIC REGRESSION



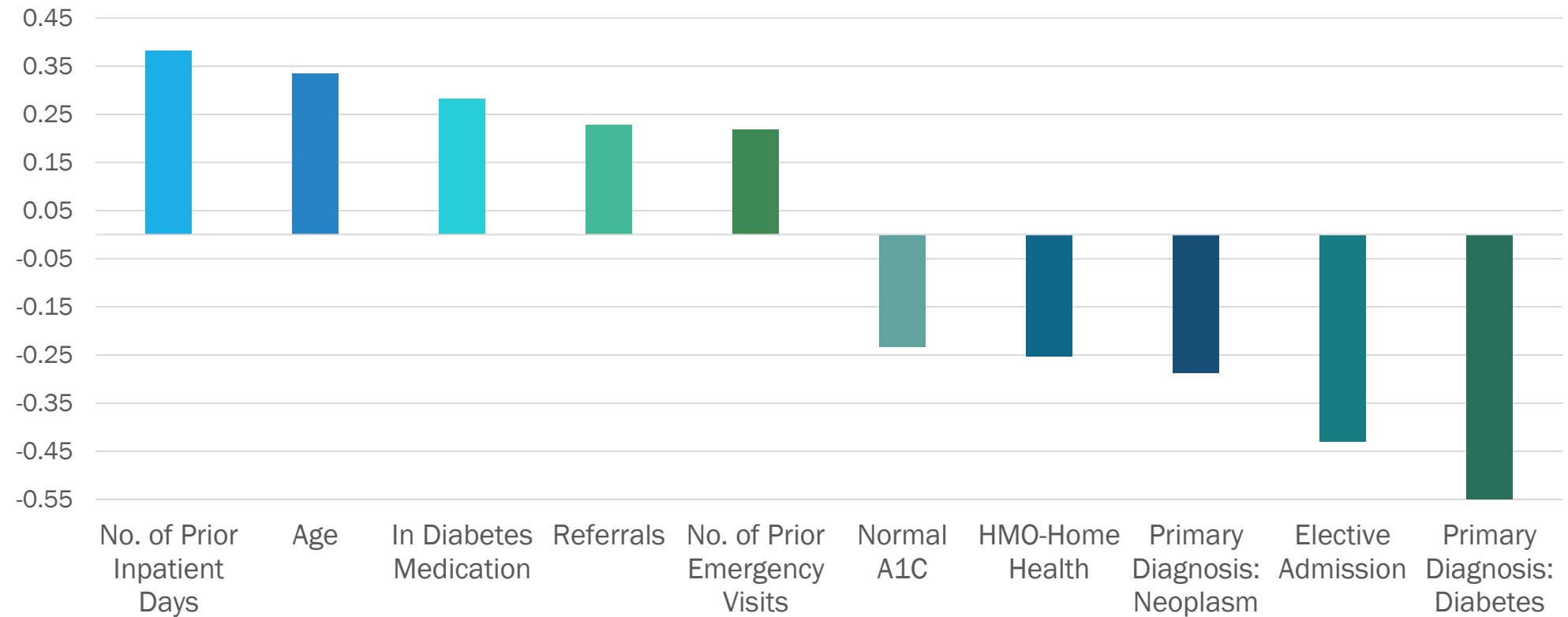
Interpretability

The diagram consists of two large, stylized arrows pointing from left to right. The first arrow is blue and contains the word 'Interpretability'. The second arrow is teal and contains the word 'Actionable'. The arrows are connected by a small gap, suggesting a sequential process or relationship between the two concepts.

Actionable

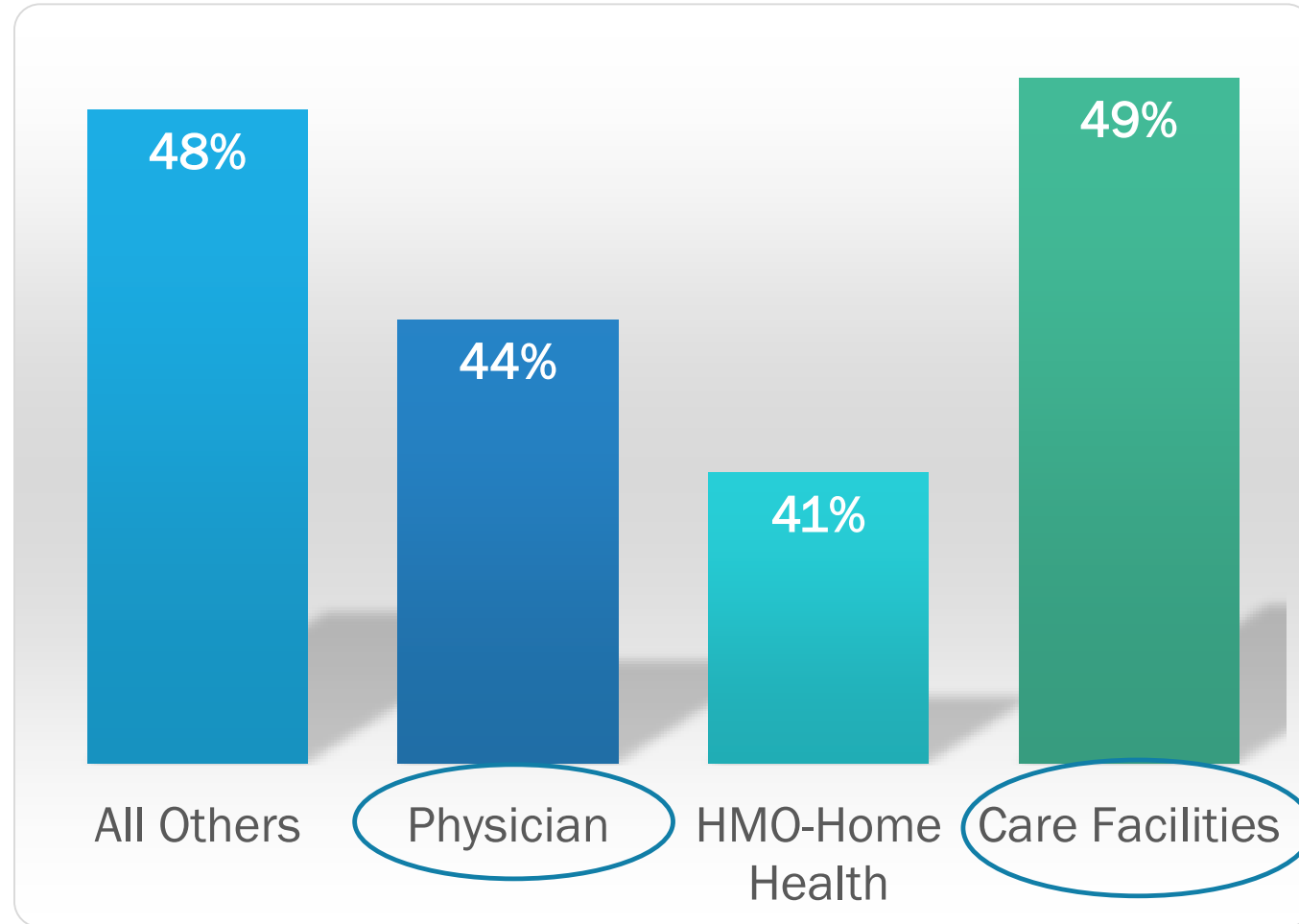
LOGISTIC REGRESSION: FEATURE IMPORTANCE

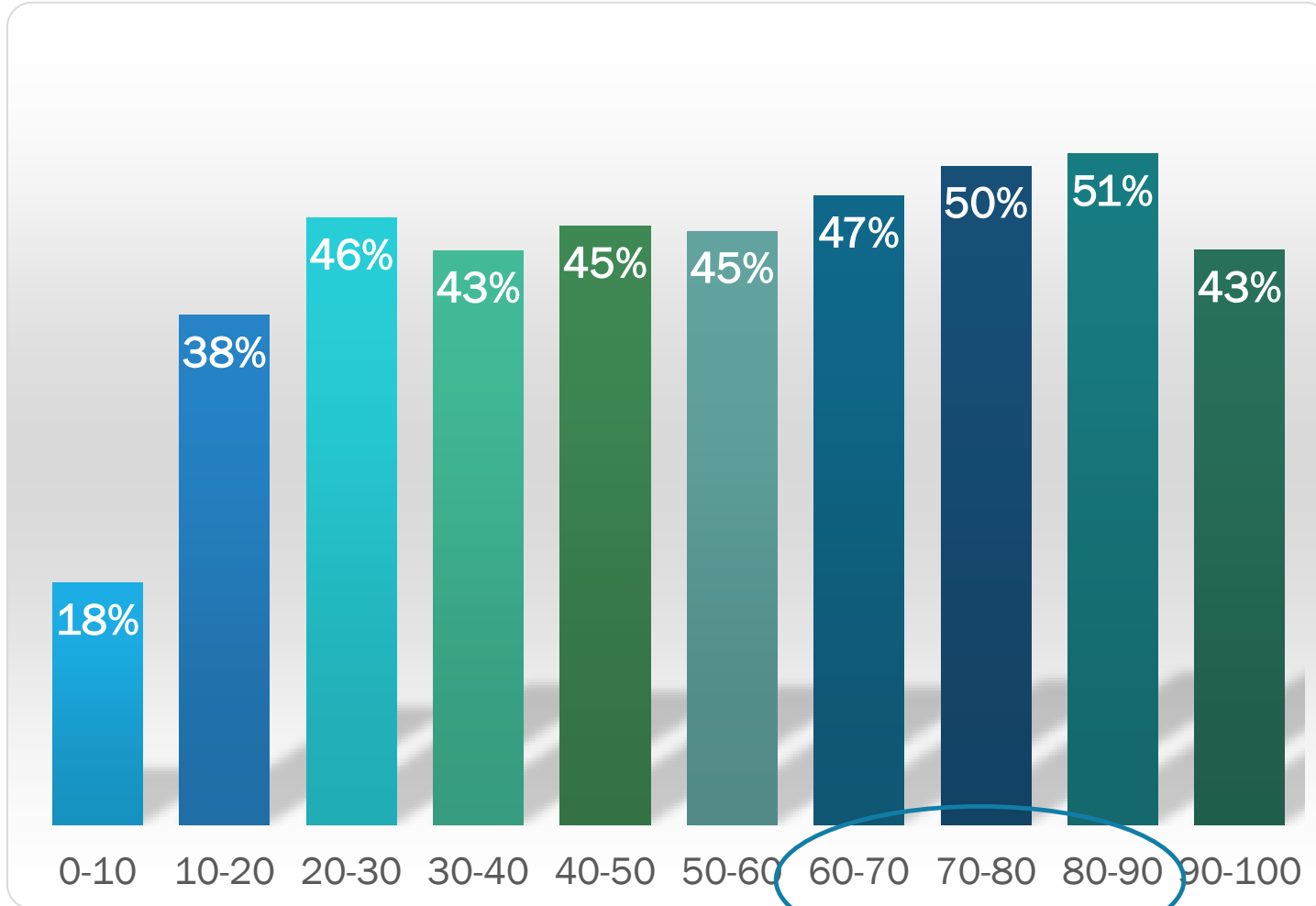
Most and Least Important Features Driving Readmission



READMISSION RATE BY REFERRAL SOURCE

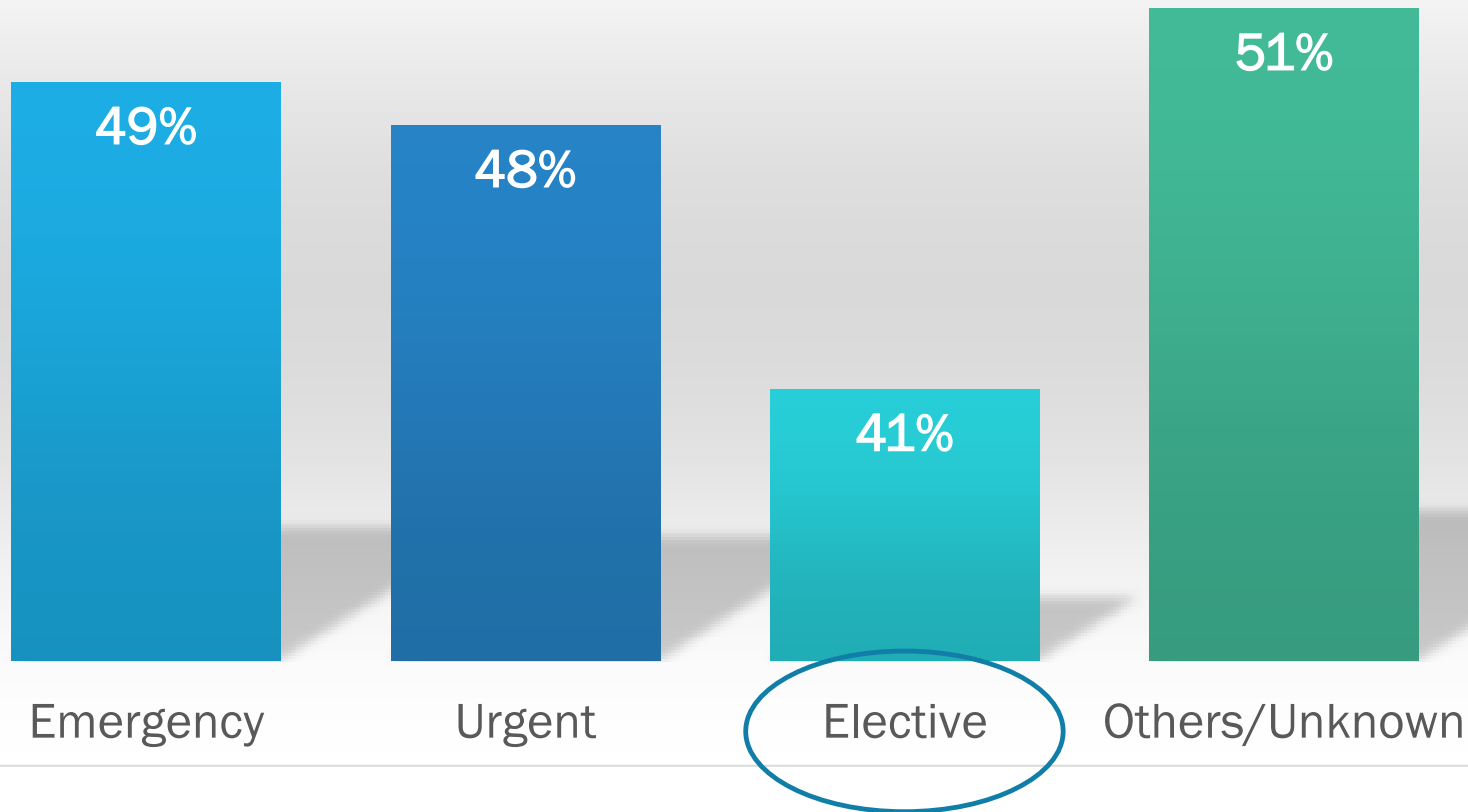
*Trends very similar
to its relative
importance.*





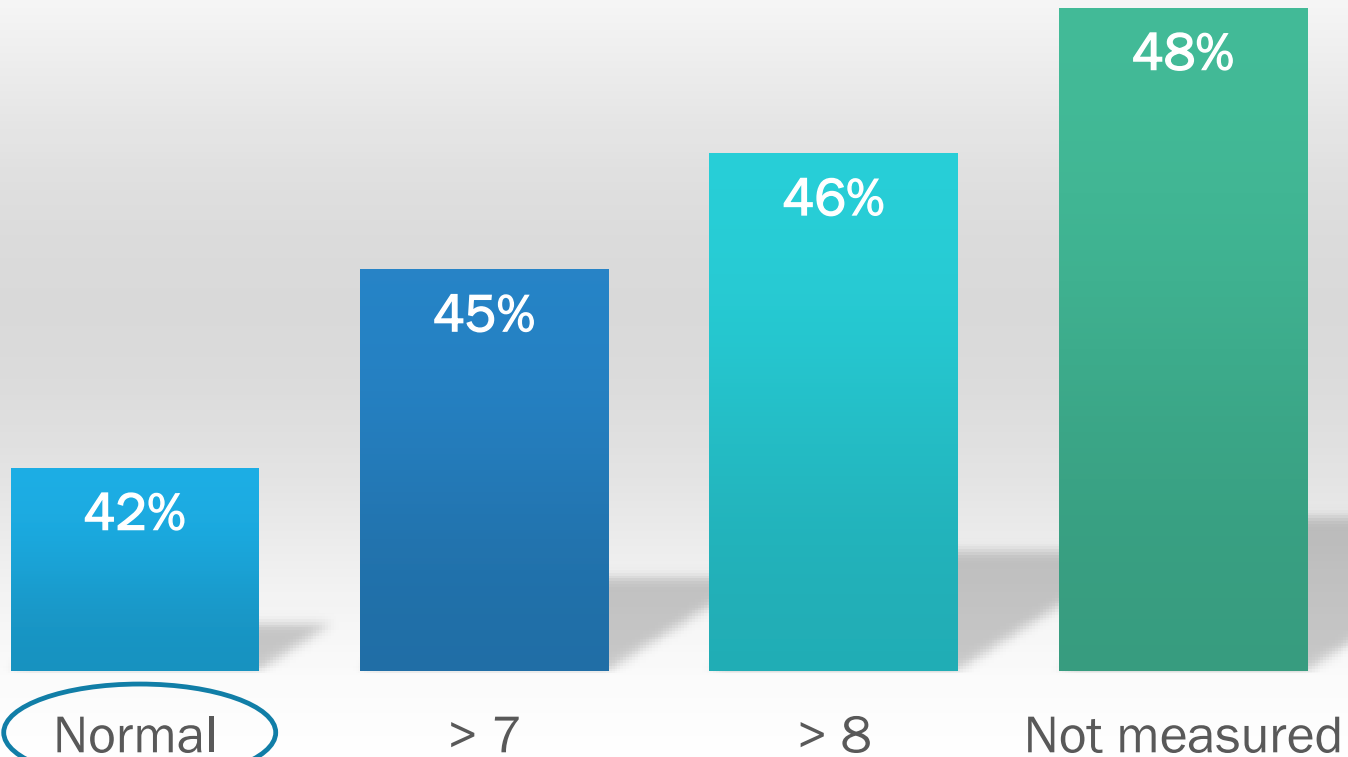
READMISSION RATE BY AGE COHORT

*Trends very similar
to its relative
importance.*



READMISSION RATE BY ADMISSION TYPE

*Trends very similar
to its relative
importance.*



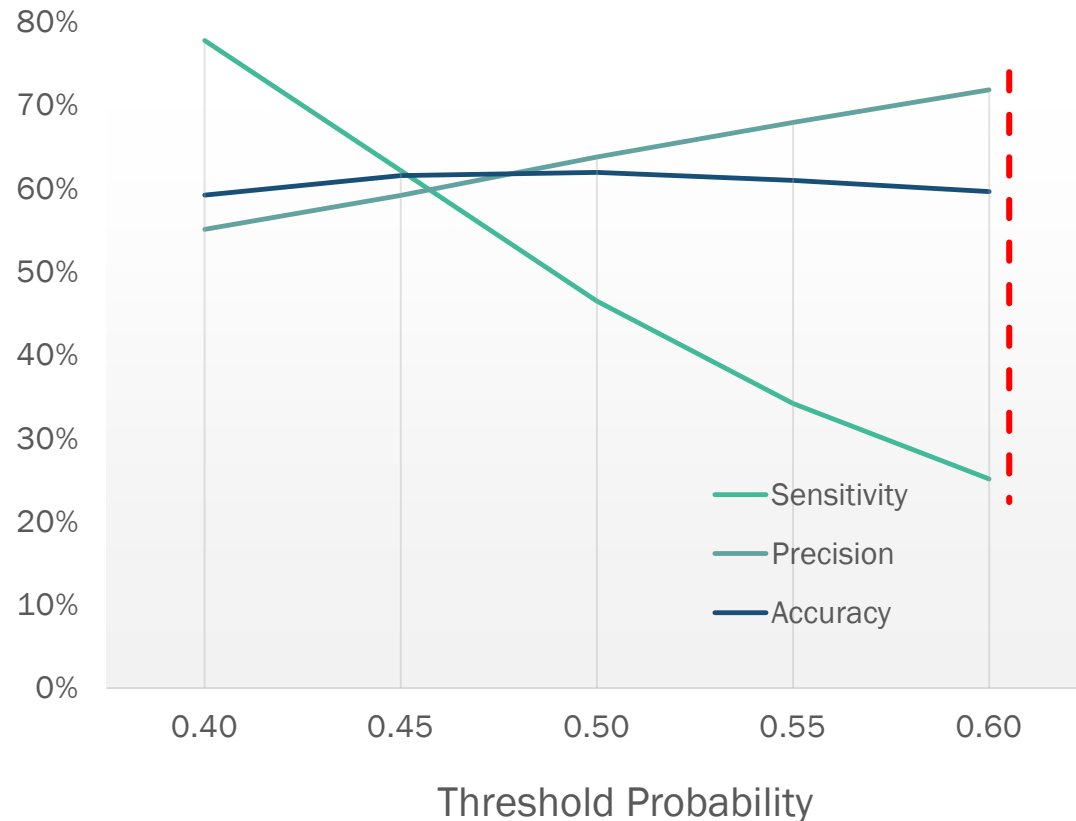
READMISSION RATE BY A1C MEASURE

*Trends very similar
to its relative
importance.*

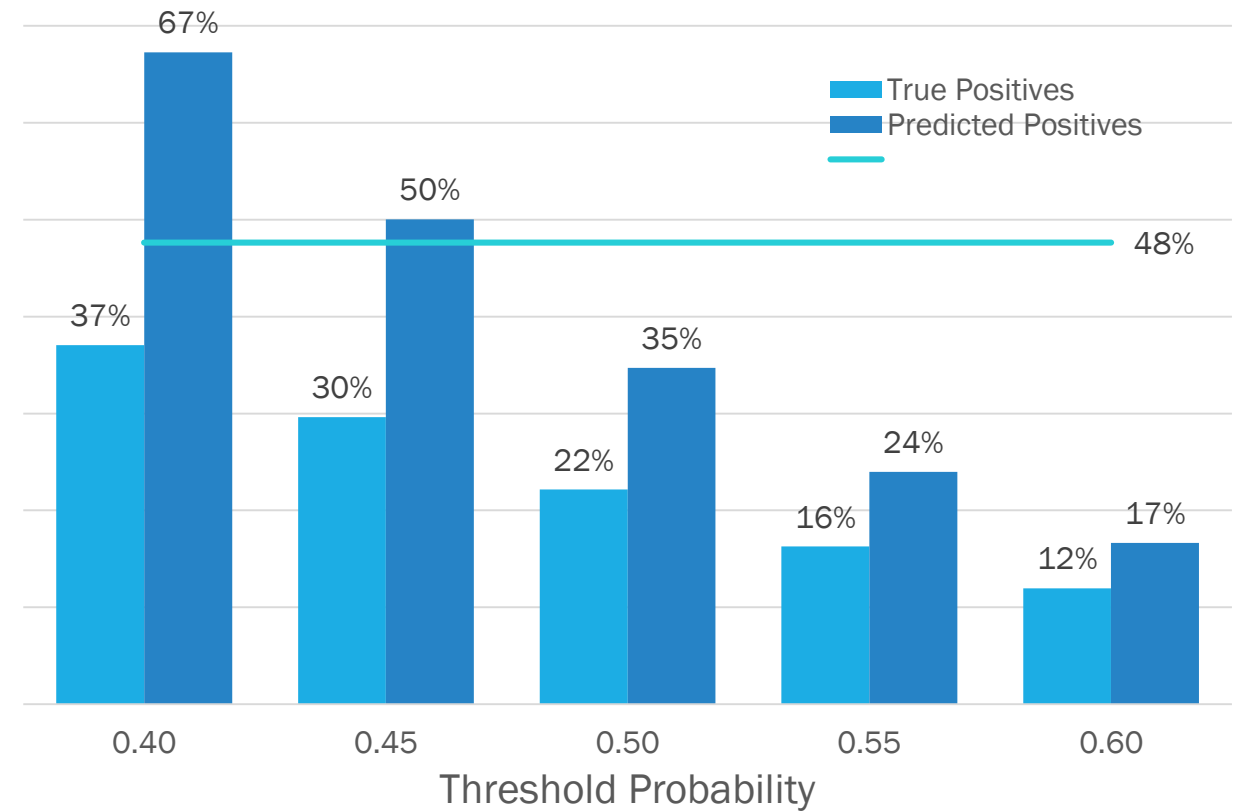
MODEL SENSITIVITY & ACTIVATION STRATEGY

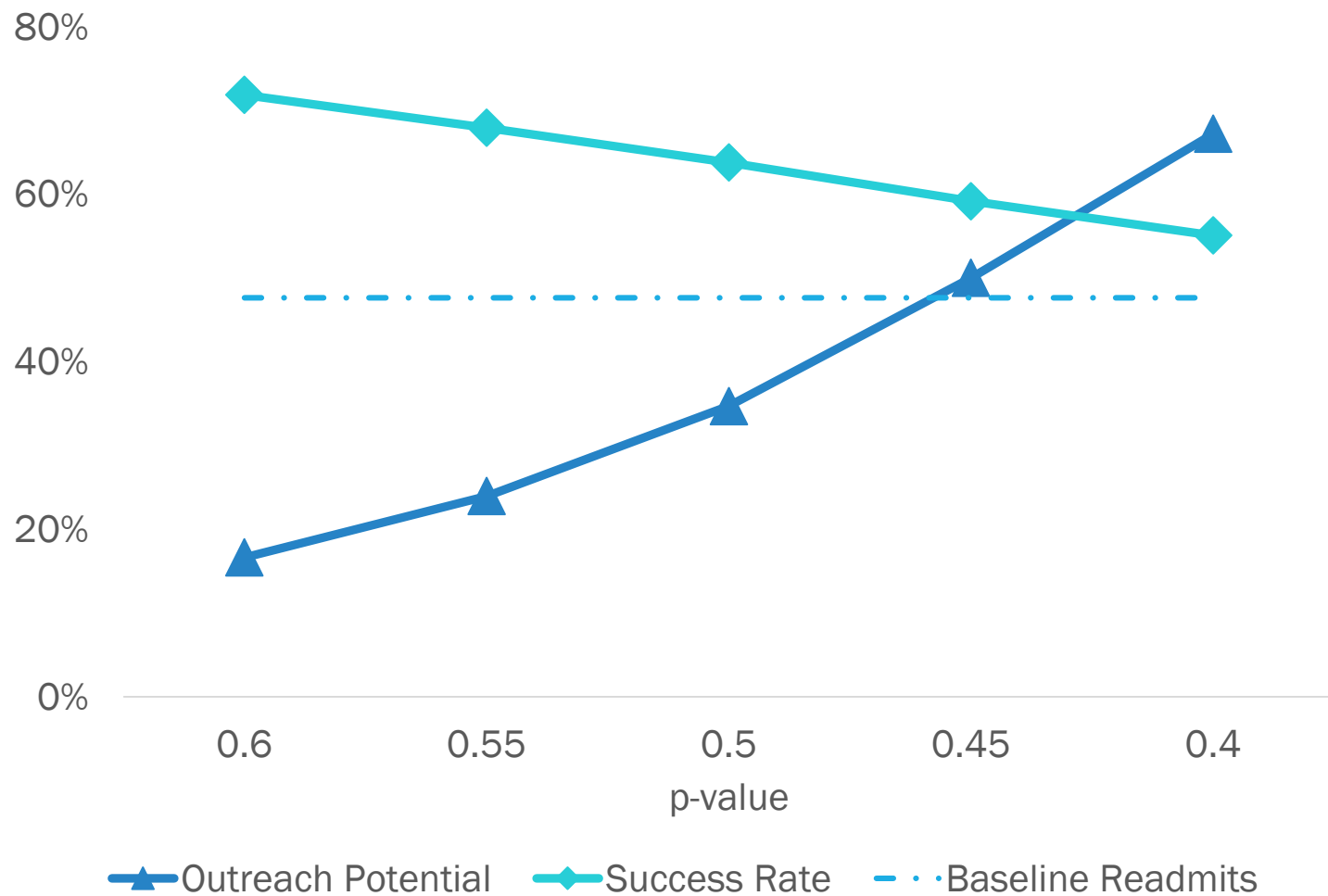
LOGISTIC REGRESSION: SENSITIVITY OF THRESHOLD P-VALUE

Sensitivity of Threshold p-value for Logistic Regression Classification



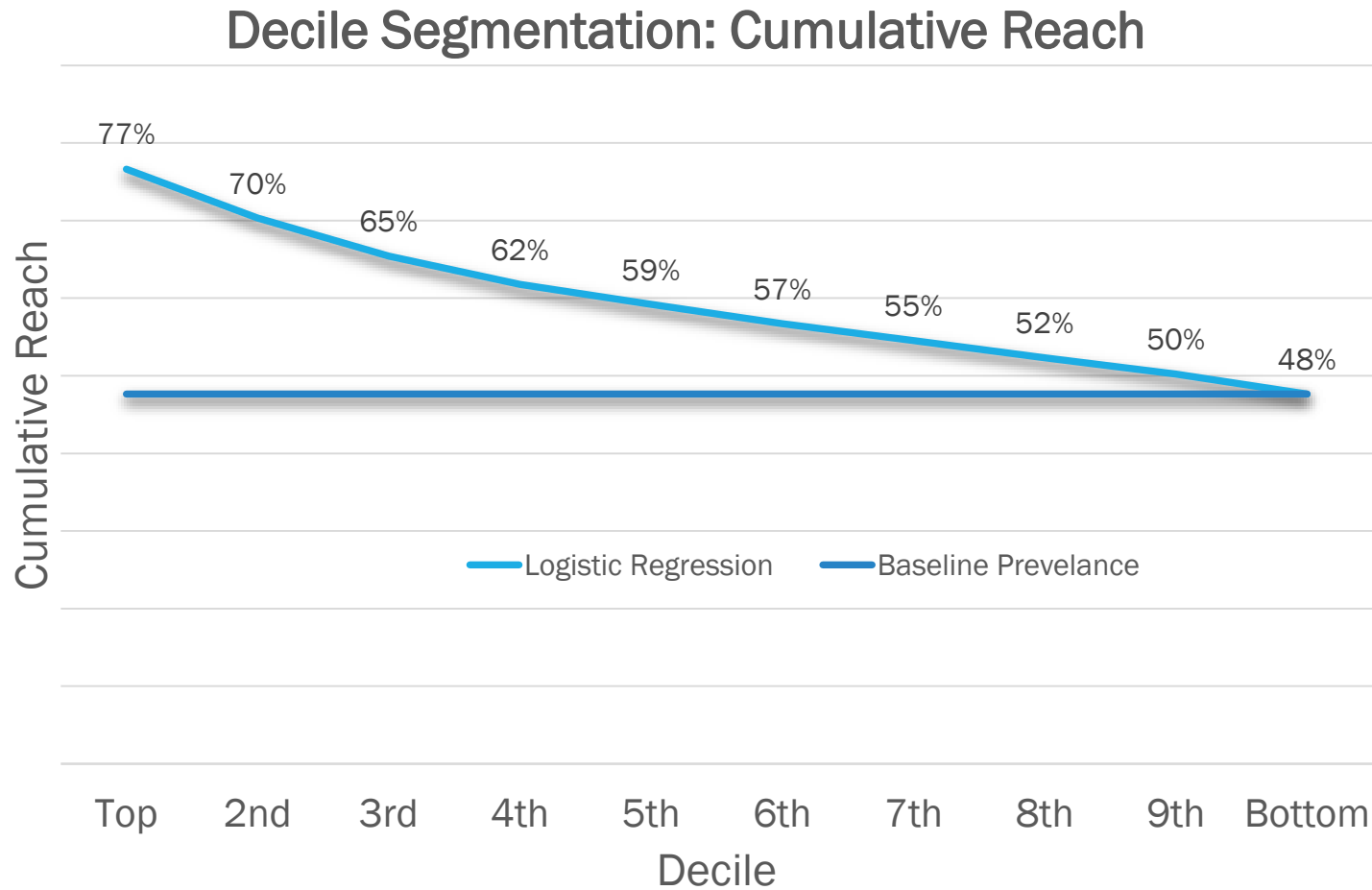
Effect on Precision





DEVELOPING AN EFFICIENT OUTREACH STRATEGY

*Using p-values as the
criterion is hard to
communicate and to
execute*



OUTREACH STRATEGY:

Segment by decile and reach out to the most vulnerable in Top Deciles for higher success rate.

NEXT STEPS

- ❖ GET FEEDBACK FROM IMPLEMENTATION TEAM ON EASE OF USE
 - ❖ GET BIOMETRIC DATA TO IMPROVE THE MODEL
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