

## **CASE STUDY #1**

# **Extracting Prognostic Signals from Longitudinal Glioblastoma MRI Using Outcome-Driven Radiomics**

### **Project Type**

Independent outcome-driven re-analysis of a public longitudinal glioblastoma imaging cohort (LUMIERE).

### **Problem**

A public longitudinal MRI radiomics dataset with expert RANO assessments and overall survival existed, but analyses were largely descriptive. No longitudinal survival-oriented radiomics model or compact prognostic imaging signature was available for patient risk stratification.

### **Dataset**

- 1 Public LUMIERE glioblastoma cohort
- 2 ~90 patients
- 3 Longitudinal FLAIR MRI radiomics
- 4 Overall survival available
- 5 Multiple timepoints per patient

### **Solution**

Performed an independent outcome-driven re-analysis converting raw longitudinal radiomics into a survival-ready modeling framework with feature reduction, survival modeling, validation, and clinical interpretation.

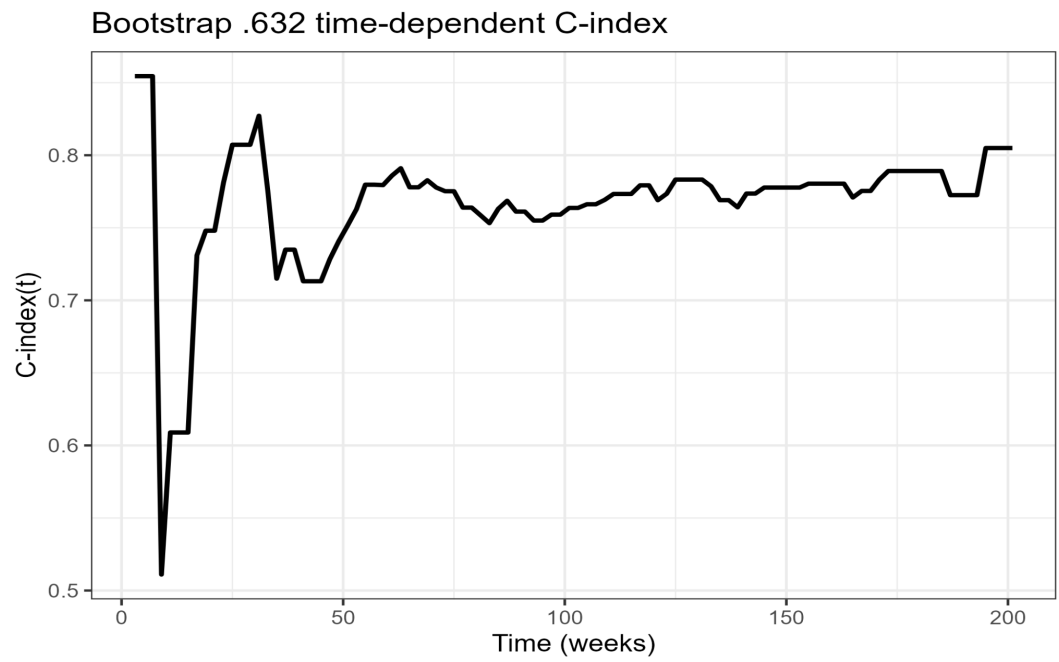
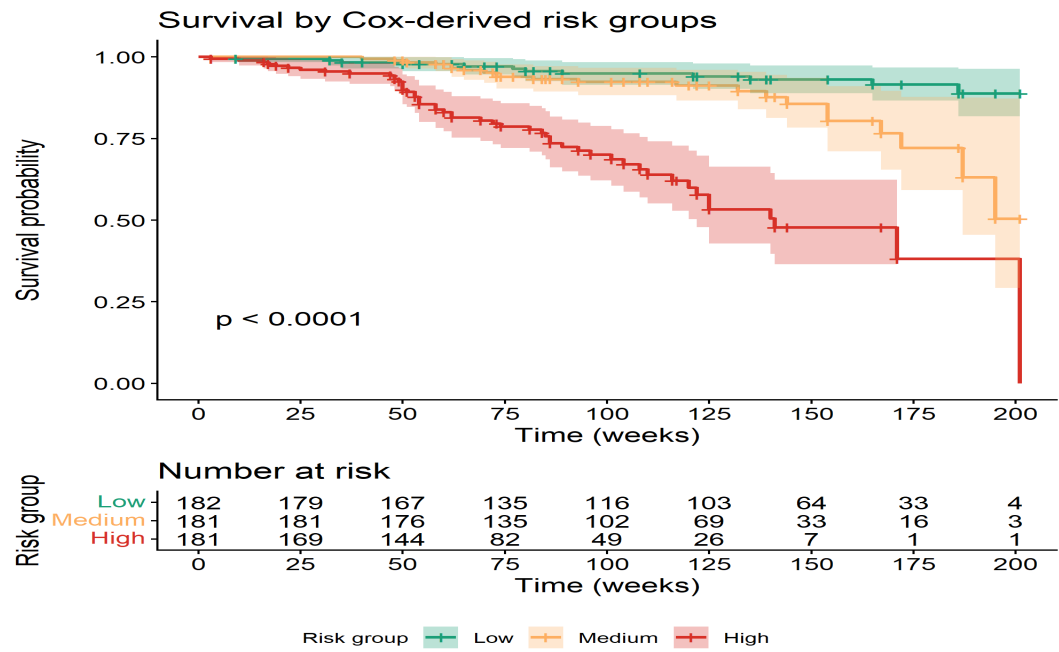
### **What I Delivered**

- 1 Survival-ready longitudinal dataset
- 2 Compact multivariable Cox model
- 3 Risk stratification curves
- 4 Time-dependent discrimination
- 5 Calibration & prediction error assessment
- 6 Decision-curve clinical utility analysis

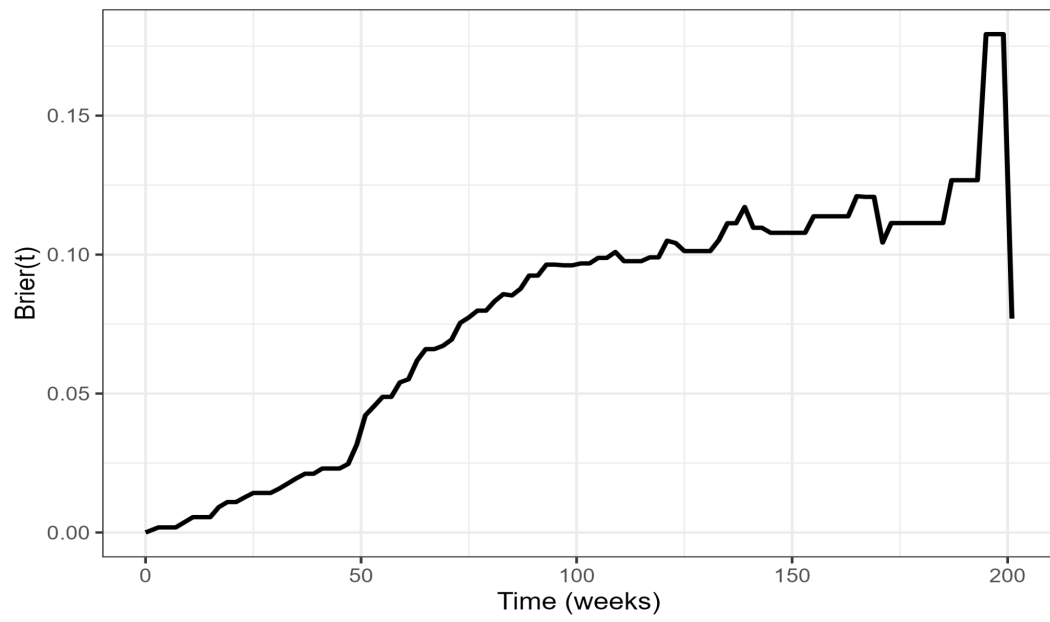
### **Key Results**

- 1 Compact 3-feature radiomics signature + age
- 2 Clear separation of low / medium / high-risk groups
- 3 Stable time-dependent discrimination (~0.75–0.80)
- 4 Good calibration for 1-year survival

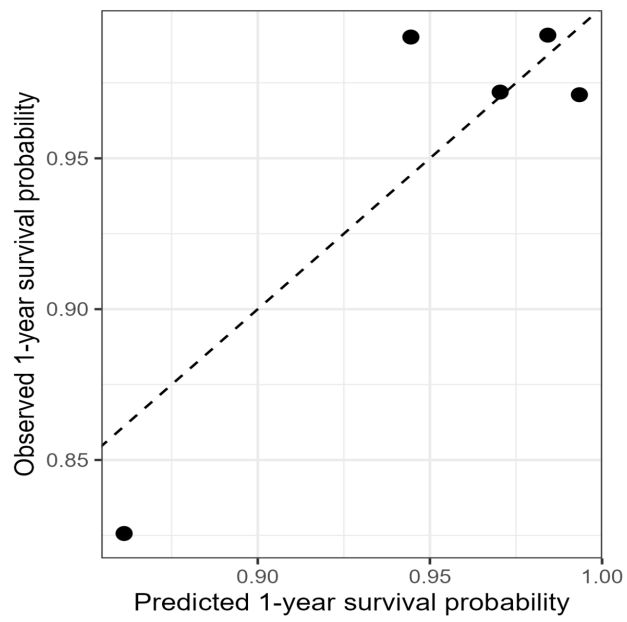
Representative Figures

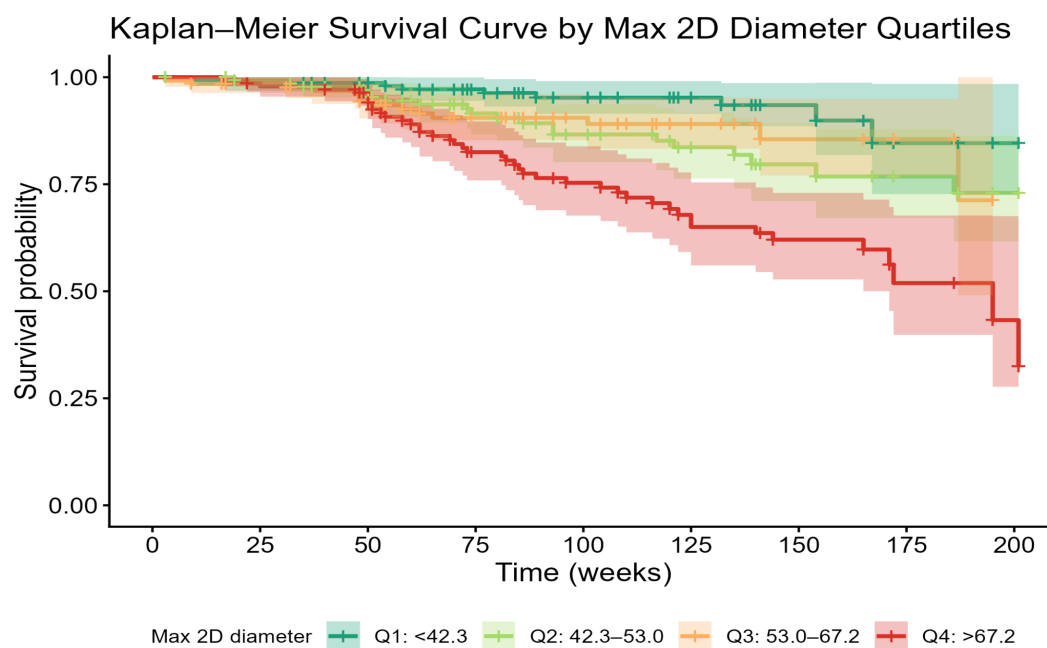
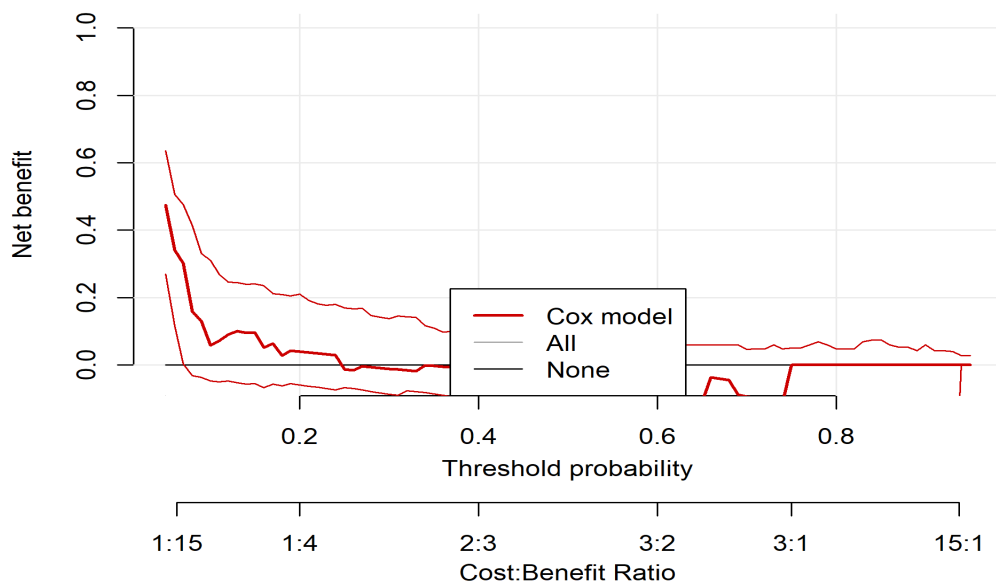


Bootstrap .632+ prediction error curve



Calibration plot for 1-year overall survival





## Impact

Converted a descriptive imaging dataset into an actionable prognostic model enabling patient risk stratification and generation of interpretable imaging biomarkers suitable for downstream validation.

## How This Helps Clients

For MRI or omics datasets with clinical follow-up, I provide survival-ready datasets, prognostic biomarker discovery, interpretable risk models, and publication-ready figures.