

TRUSTing or TRACKing Transfusion Prediction

Validation of red blood cell transfusion prediction models for low transfusion rate cardiac surgery and high transfusion rate post-cardiotomy veno-arterial extracorporeal life support

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Introduction

- ✓ **TRUST: Transfusion Risk Understanding Scoring Tool**
- ✓ **TRACK: Transfusion Risk And Clinical Knowledge model**
- ✓ **TRACK model (5 Variables)** : Age > 67 years; Weight < 60 kg (female) or < 85kg (male); Female; Complex Surgery; Hematocrit
- ✓ **TRUST model (8 variables)** : Age > 65 years; Weight < 77 kg; Female; emergency operation; Hemoglobin < 8.4 mmol/L; Creatinine > 120 μmol/L; Previous cardiac surgery; double surgery

- ✓ Both models assess preoperative transfusion risk in cardiac surgery
- ✓ Models developed in high transfusion rate populations (> 50 %)
- ✓ **STUDY 1 Cardiac surgery:** TRACK re-evaluation in low transfusion rate population (< 30 %)
- ✓ **STUDY 2 Post-cardiotomy veno-arterial extracorporeal life support (VA ECLS):** performance evaluation of TRACK & TRUST in high transfusion rate population (> 85 %)

STUDY 1 Cardiac surgery

Methods

- ✓ Original TRACK validation: total population (n = 4053)
- ✓ Database divided:
 - ✓ Derivation (n = 2873)
 - ✓ Validation (n = 1216)
- ✓ Original TRACK coefficients updated in derivation data
- ✓ Updated TRACK coefficients validated in validation data
- ✓ Discriminative ability assessment: Area under the receiver operating characteristic curve (AUC)
- ✓ Calibration assessed in both models

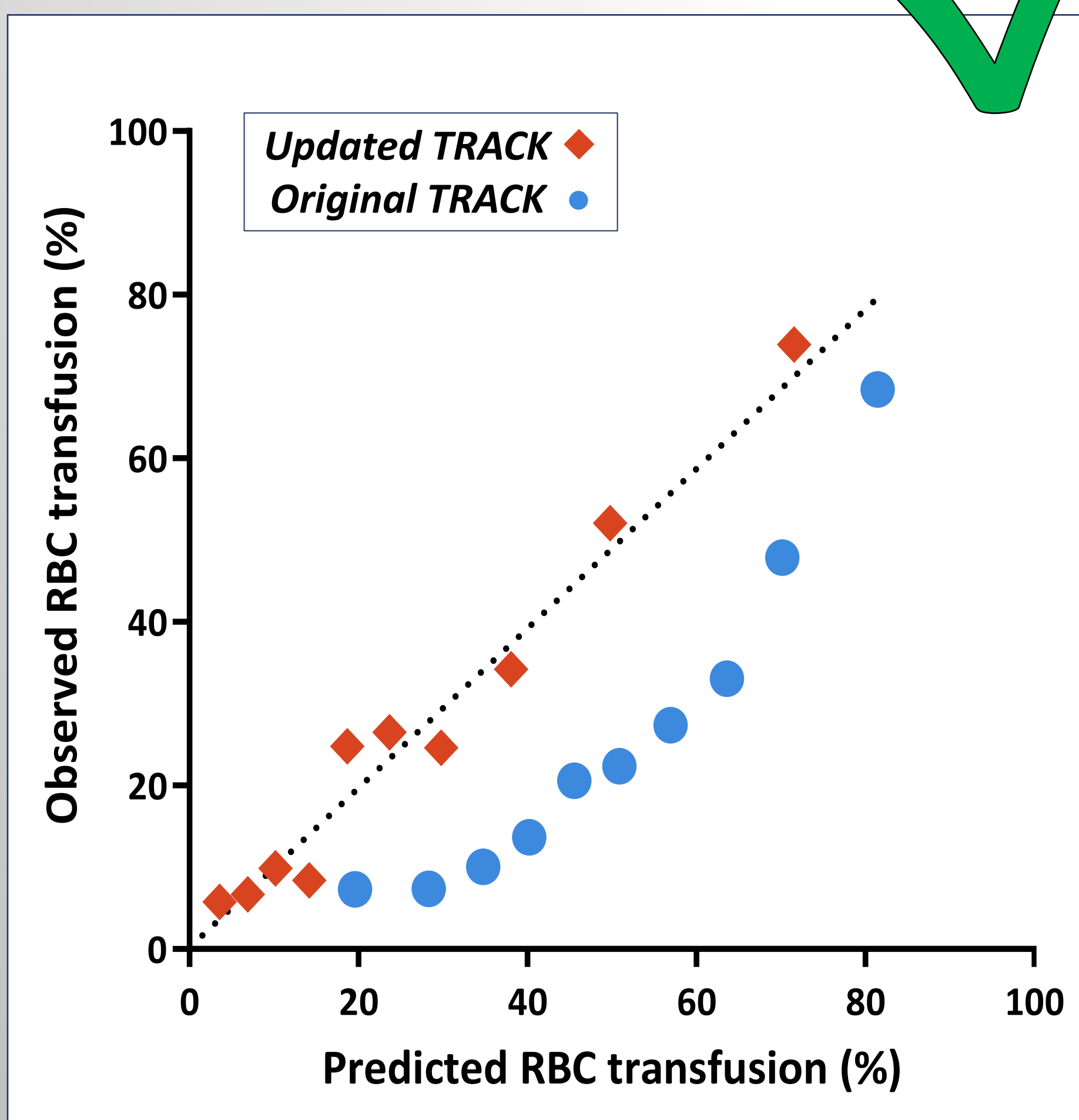


STUDY 2 Post-cardiotomy VA ECLS

Methods

- ✓ TRACK and TRUST validation: adult post-cardiotomy VA ECLS population (n = 35)
- ✓ Original TRACK and TRUST coefficients used
- ✓ Discriminative ability assessment: Area under the receiver operating characteristic curve (AUC)
- ✓ Calibration assessment:
 - ✓ Hosmer & Lemeshow test
 - ✓ Calibration plots

Results



Model Calibration

Actual transfusion RISK

- 26 %
- Mean Predicted Risk
- Original TRACK: 48 %
- Updated TRACK: 26 %

Discriminative ability

- Original TRACK: AUC 0.76
- Updated TRACK: AUC 0.78

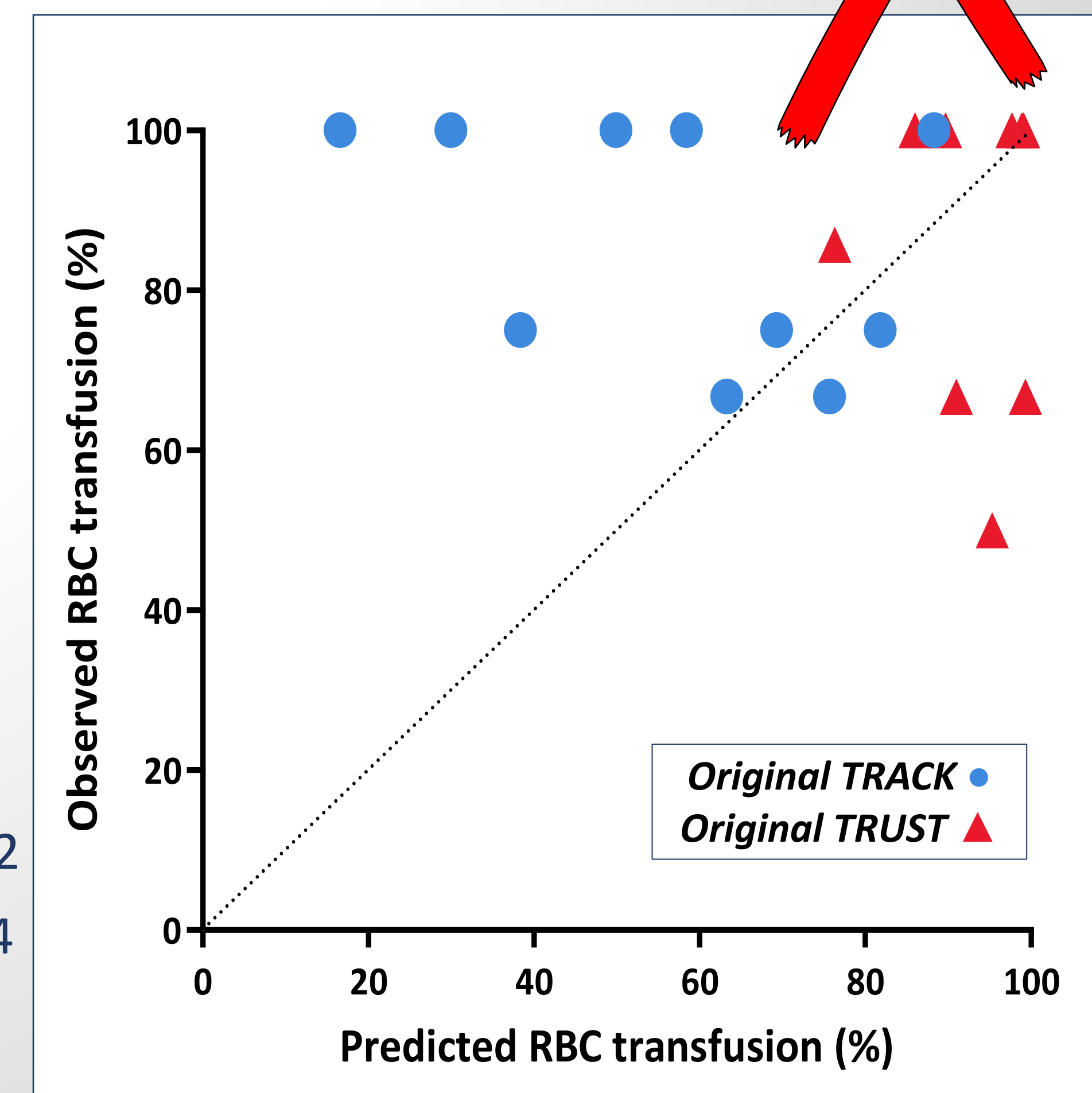
Model Calibration

Actual transfusion RISK

- 86 %
- Mean Predicted Risk
- Original TRACK: 57%
- Original TRUST: 91%

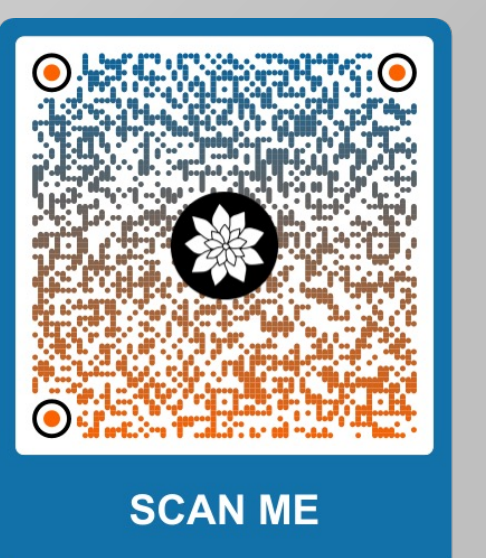
Discriminative ability

- Original TRACK: AUC 0.62
- Original TRUST: AUC 0.54



Conclusions

- ✓ Choose the right model for the right cardiac surgery population
- ✓ Updated TRACK model coefficients: improved accuracy & discriminative ability in low transfusion rate cardiac surgery populations
- ✓ TRACK and TRUST inadequate in predicting transfusion risk in post-cardiotomy VA ECLS patients



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