Predicting drop-out in early-stage Type 1 Diabetes clinical trials to improve retention through Personalized Engagement Strategies

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BACKGROUND:

- **Patient non-adherence and drop-out increase clinical trial costs** and duration.
- **A predictive tool could improve trial management** by identifying early patients at risk of drop-out.
- **Personalized engagement strategies** could enhance retention.
- This analysis aims to **develop a multivariate model to predict drop-out risk in early-stage Type 1 Diabetes** (T1D) trials

METHOD:

- Data analyzed from the **IMPACT study** (109 T1D patients)
- Used a **multivariate Cox survival model** with Monte-Carlo cross-validation.
- Baseline predictors included **study site perception, belief in medicine, and health literacy** (measured via the Compl-AI questionnaire).

RESULTS

- Model **effectively identified early drop-outs**:
  - **Concordance-index: 0.82** (high predictive accuracy).
  - **ROC Curve AUC: 0.80** (strong discrimination of non-completers).
  - Possibility to fix a cut-off with **sensitivity of 93% and specificity of 65%**, allowing accurate detection of at-risk patients.

CONCLUSION

- **Drop-out risk can be predicted at baseline** with beliefs and behaviours features combined through a multivariate model.
- Early identification **enables targeted interventions** for at-risk patients.
- **Improved retention strategies could enhance trial efficiency** and reduce costs.

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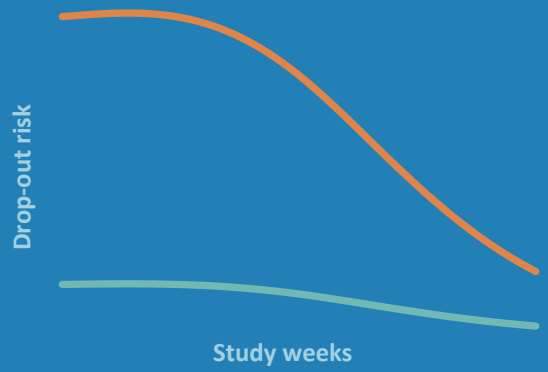
Patient Retention Starts with Drop-out Prediction



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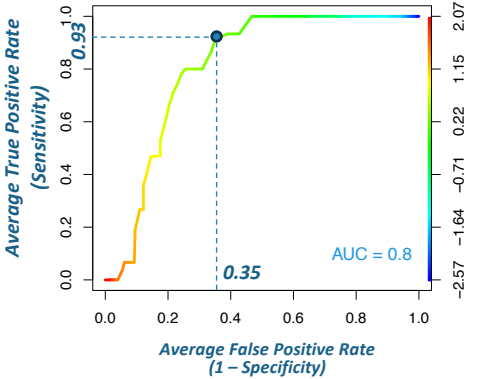
SUPPLEMENTARY MATERIAL

ROC Curve of Early T1D Compl–AI Model



ROC Curve of the New Behavioral Model predicting drop-out risk. The AUC (Area Under the Curve) represents the model's ability to correctly identify true drop-outs (Sensitivity) while minimizing false classification of non-dropouts (Specificity).

At the specified cut-off, a personalized engagement strategy would be applied to 93% of future non-completers, while only 35% of future completers would also be included in this strategy.

Features	Correlation with the drop-out
Health literacy	↓
Perception Staff	↓
Side effect anxiety	↑
Stress	↑

Most impactful baseline features for the prediction of the drop-out.

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