a

approval prediction

failure reason prediction

eligibility criteria design

trial duration prediction

drug dosage prediction

TrialBench

patient dropout prediction

adverse event prediction

mortality event prediction

PASSED FAILED

A B C

EFFICIENCY ISSUE · POOR ENROLLMENT · SAFETY ISSUE

b
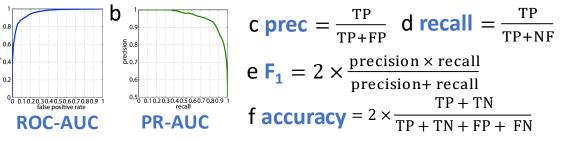
Multi-modal Variables in a Table

Trial ID	Intervention	SMILES	ICD-10 code	...	eligibility
NCT00...	Drug	C(O)(=O)C1=C(OC(C)=O)C=CC=C1	M06.9; M19.90	...	1. Age: 18-65; 2. Healthy individuals are required ...
NCT00...	Medical device	N/A	I11.0; I11.9; I27.1; I51.9	...	1. Age: 45-75; 2. Patients should ...
NCT00...	...	...	...	...	...

Prediction Targets

Trial ID	Failure reason
NCT00...	Efficiency Issue
NCT00...	Poor Enrollment
NCT00...	...

Evaluation Metrics

a ROC-AUC

b PR-AUC

c $\mathbf{prec} = \frac{TP}{TP+FP}$ d $\mathbf{recall} = \frac{TP}{TP+NF}$

e $\mathbf{F_1} = 2 \times \frac{precision \times recall}{precision + recall}$

f $\mathbf{accuracy} = 2 \times \frac{TP + TN}{TP + TN + FP + FN}$

Multi-modality Fusion Baseline Model

probability

fusion layer

Message Passing NN	Bio-BERT	MeSH Embedding	DANet basic blocks	GRAM

drug SMILES text(e.g., eligibility) MeSH cate./ num. feat. ICD-10