

Ready2Go

Real-Time Discharge Forecasting for Smarter Bed Management

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MIT
MANAGEMENT
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TGH Tampa
General
Hospital

PROBLEM

- ED overflow starts upstream. Longer-than-needed stays keep beds full and costs climbing.
- TGH predicts how many patients discharge each day, **but not who**.
- Case managers spend hours triaging patients instead of getting them home.

Goal: Flag which Cardiac Telemetry (3H) patients will leave within 48 hours, then rank who to work on first.

DATA

8,850

Patient Stays

7,803

Unique Patients

223

Features/Snapshot

1.4B+

Raw Source Rows

Every 3H stay since August 2022, rebuilt from 10+ Epic / Palantir Foundry sources. Vitals, labs, procedure & discharge orders, medications & IVs, functional status, diagnoses (DRG), insurance, and case-manager notes are all included.

APPROACH

One patient stay: Admission → Discharge

Day 0	Day 1	Day 2	Day 3	Day 4	Discharge
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Each stay becomes daily snapshots aligned to 10:00 AM, so predictions land right before rounds. Gray partial windows are never scored.

Model: Hyperparameter-tuned XGBoost handles missing vitals and labs natively, so no risky imputation (forward-fill only for slow-moving status features).

Benchmarked against logistic regression, random forest, LightGBM, and a temporal CNN.

Grouped 80/20 split + 5-fold CV keeps every patient's windows together, with no leakage.

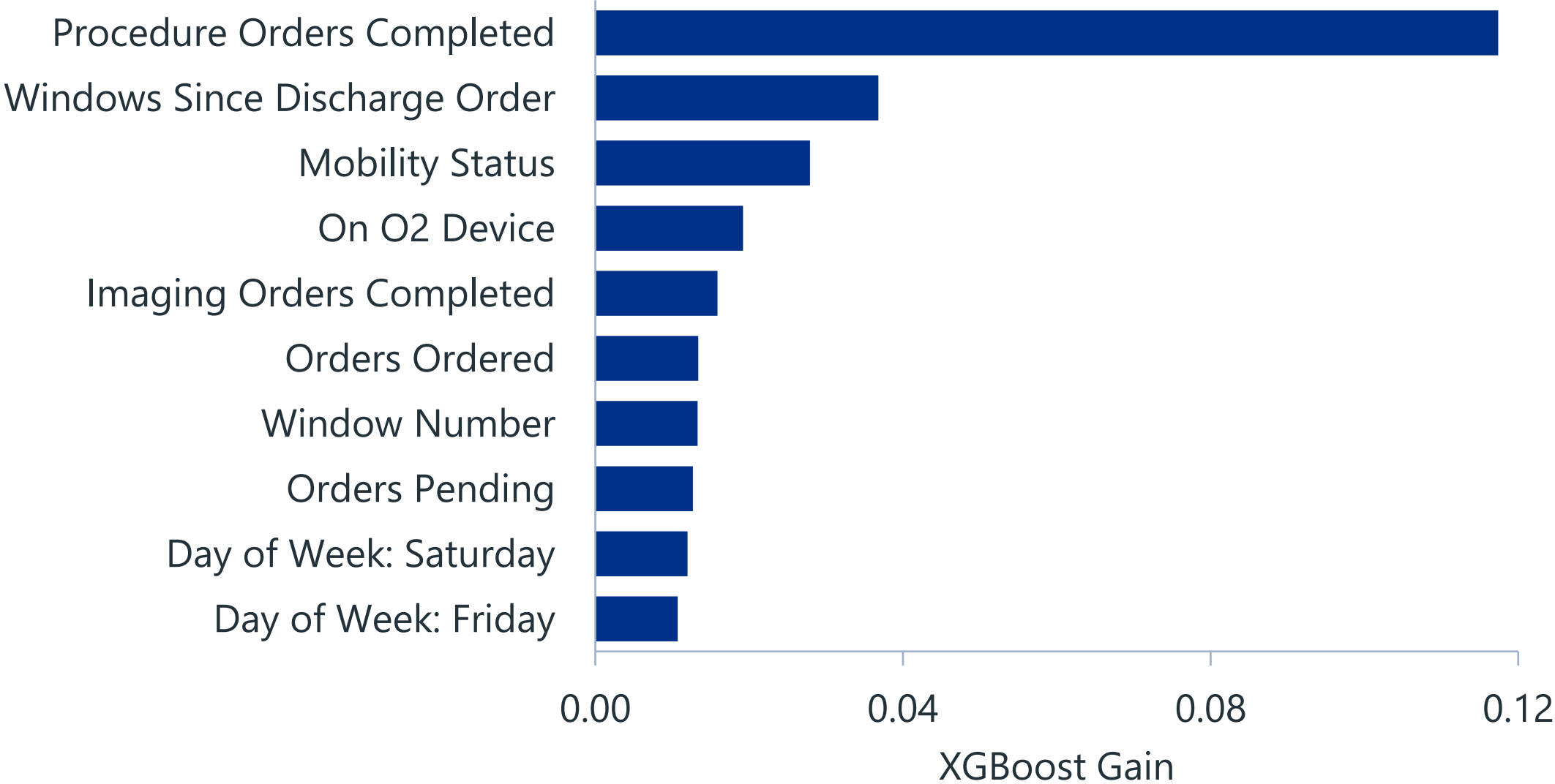
Why 24-hour windows?

Beat the 12-hour cadence (AUC 0.840 vs 0.814) and refresh right before multidisciplinary rounds.

Why rank, not exact times?

Exact-time regression (9.65 hr MAE) fell short, so we rank by discharge probability.

WHAT DRIVES PREDICTIONS



RESULTS

0.840

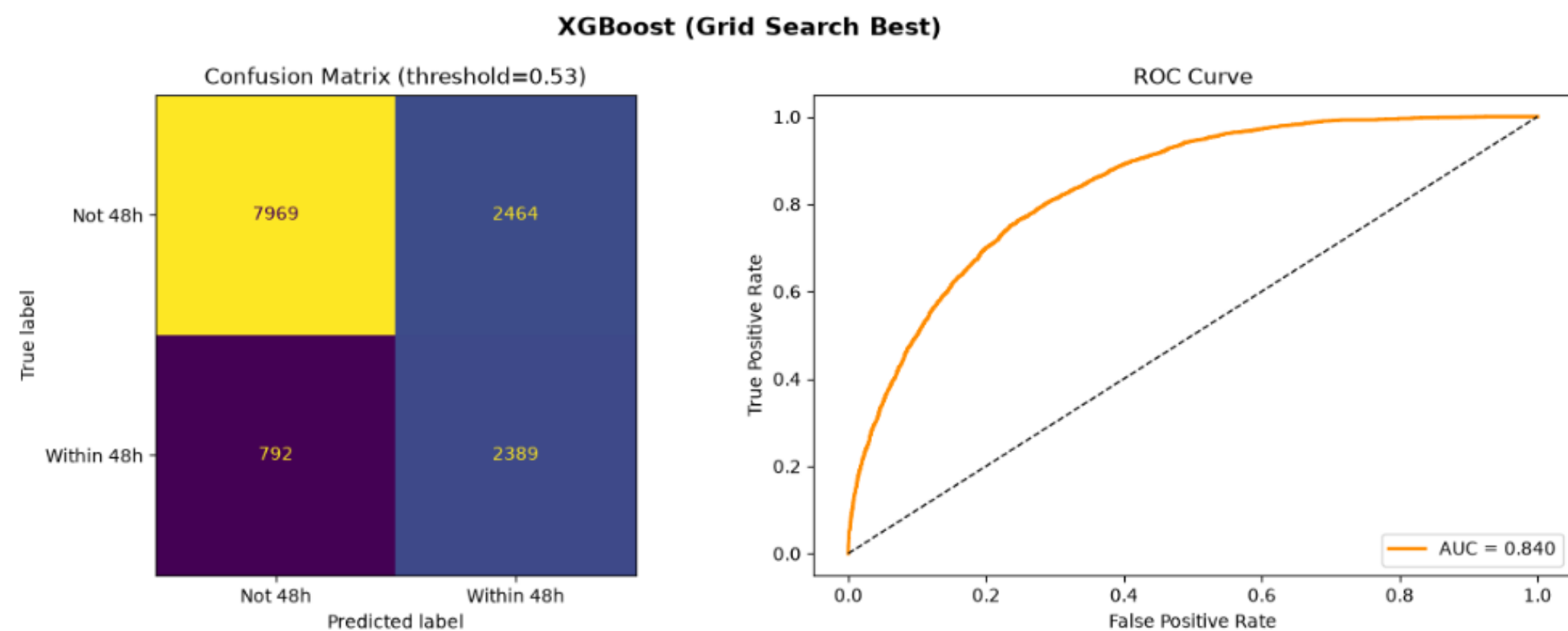
AUC

76%

Overall Accuracy

91%

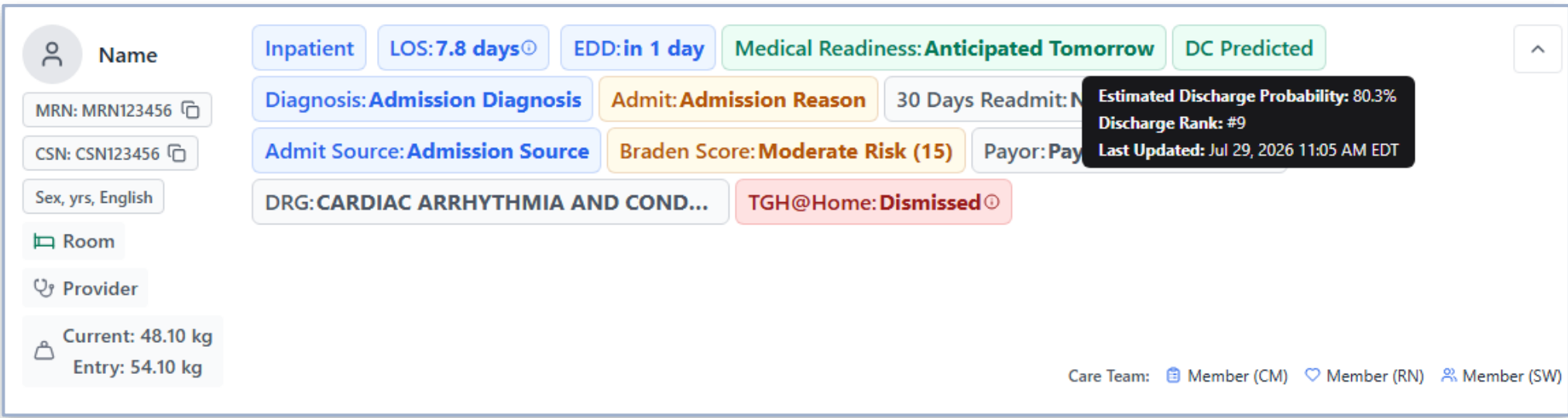
Precision (No Discharge)



Case managers reviewed live predictions patient by patient and agreed with the model's calls. **Scores stay steady day to day**, moving only when something real changes, like a new discharge order.

Team	Horizon	AUC
Ready2Go	48 hr	0.840
MIT ORC × Hartford HealthCare (7 hospitals)	48 hr	0.768–0.852
Asan Medical Center	72 hr	0.865

WHAT CASE MANAGERS SEE



Scores every 3H patient at 9:59 AM daily inside Palantir Foundry.

Auto-ranks patients by discharge probability, filtered per case manager.

Zero new logins or applications: Predictions live where the team works.

IMPACT

\$781K

Estimated annual savings in this 40-bed unit

625

Bed-days freed per year from a 0.25-day LOS cut

3–4 hrs

Returned to each case manager, every single day

Will be measured post-launch with interrupted time-series and difference-in-differences against comparable units at 3, 6, and 12 months.

NEXT STEPS

- Scale up:** From one cardiac unit to hospital-wide coverage.
- Read the notes:** Mine clinical text with NLP / LLM embeddings.
- Stay sharp:** MLOps monitoring and retraining to prevent drift.