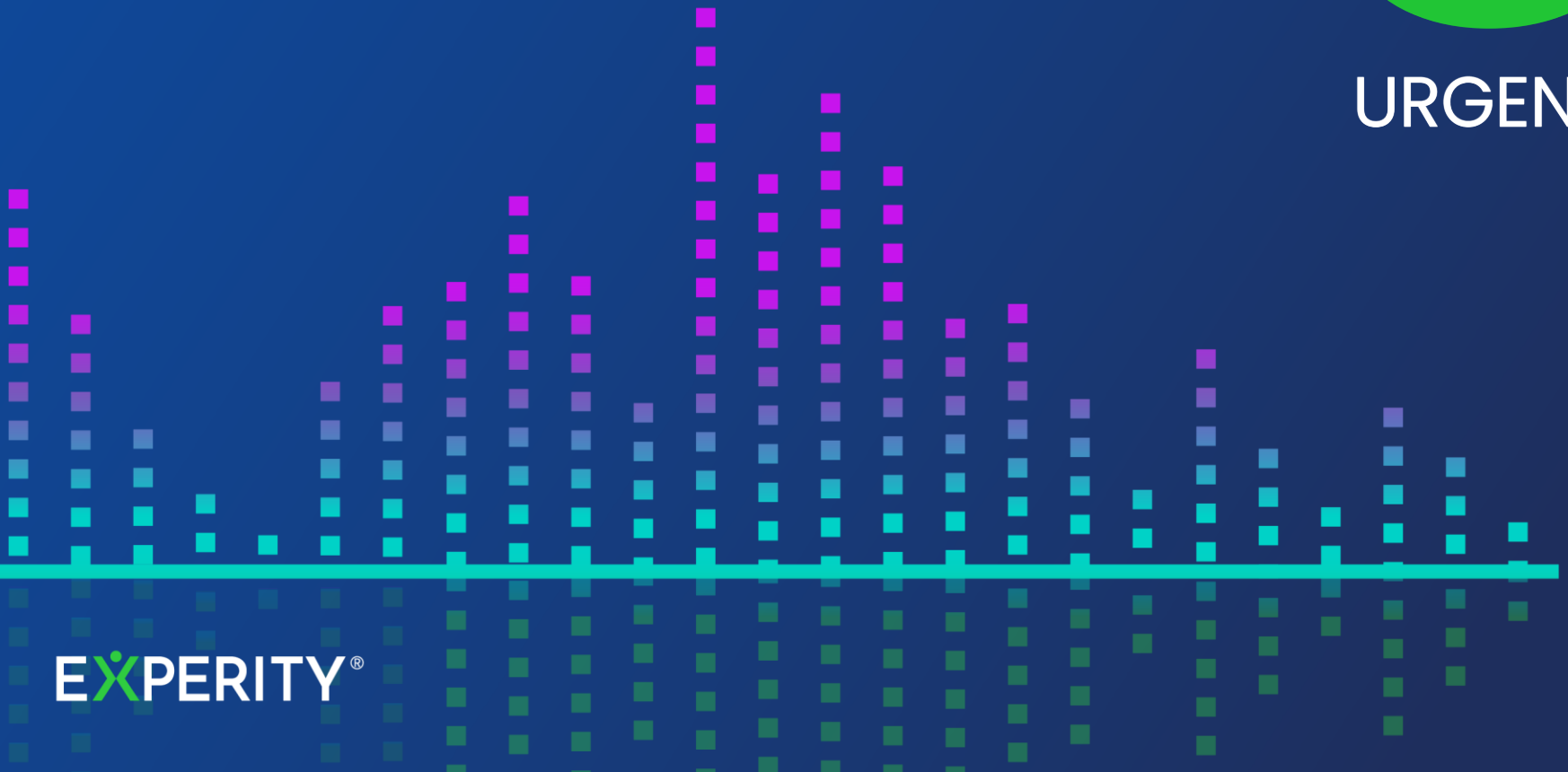


URGENT CARE CONNECT

TURN IT UP

EXPERITY®

WELCOME

Building an Enterprise Data Platform & Predictive Modeling Systems for Urgent Care



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SPEAKER



Jacob Strock

Lead Data Scientist

convenientMD

Overview

1. **The Reality of Urgent Care Data**
   - Why high-volume EMR data doesn't automatically lead to better decisions
2. **Creating a Single Source of Operational Truth**
   - Unifying EMR data at enterprise scale
3. **Designing a Production-Grade Data & AI Platform**
   - From pipelines to governance to reliability
4. **Operationalizing Predictive and Prescriptive ML**
   - Turning forecasts into decisions

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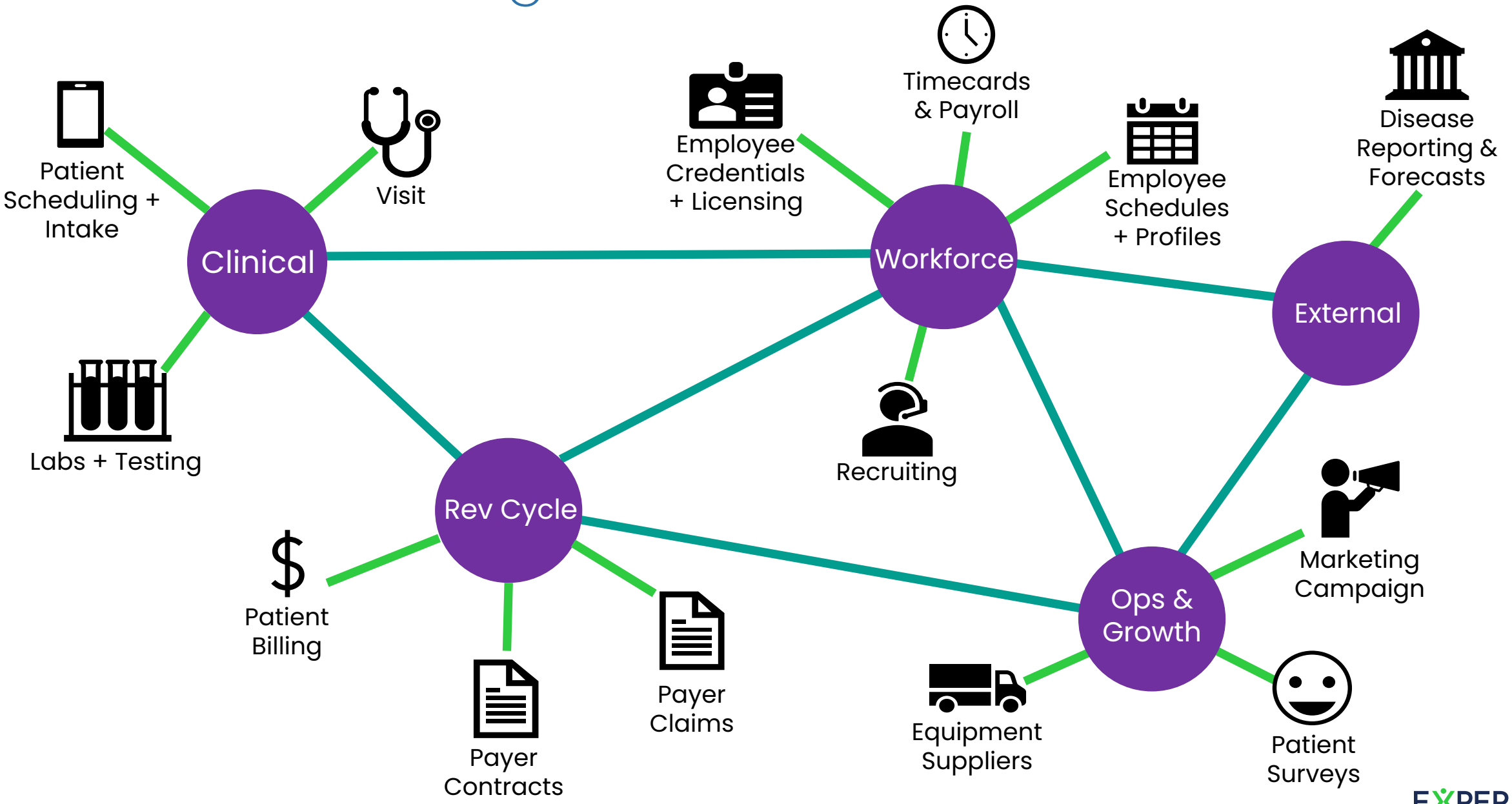
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Data Powers Urgent Care

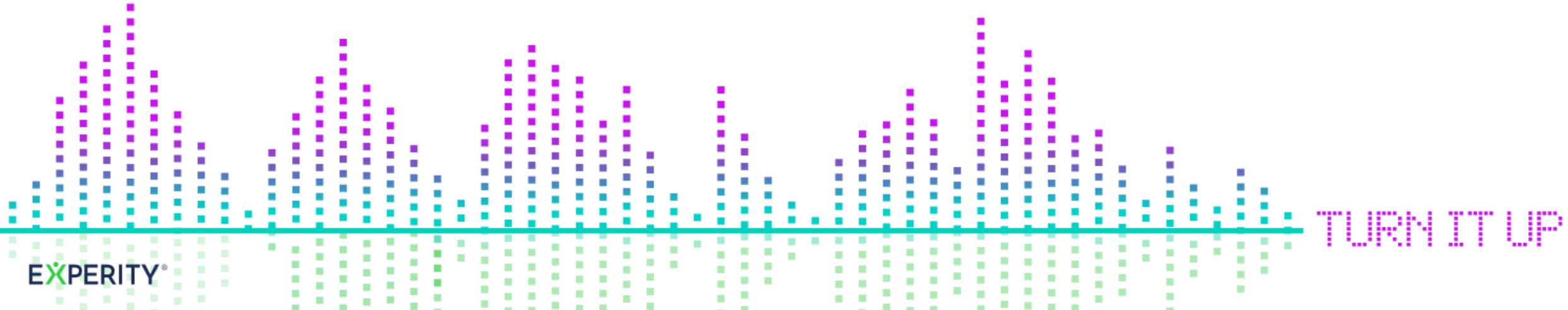


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Reality of Urgent Care Data

- Urgent care generates high-volume, high-velocity EMR data
- Operational, clinical, and financial data live in silos
- Traditional dashboards answer what happened, not what to do next
- Urgent care is an ecosystem of data that needs system analysis
- Why reactive monitoring breaks down at network scale

Data availability ≠ decision readiness



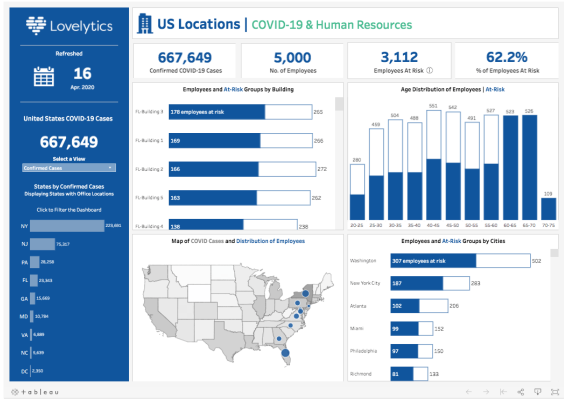
Leveraging the Experity Data Ecosystem

Experity provides multiple access paths to EMR data

1. Tableau reporting for day-to-day operational monitoring
2. Snowflake Warehouse access for deeper analytical and modeling use cases

1

Production-Ready Monitoring Dashboards



tableau

2

Cloud Data Warehouse



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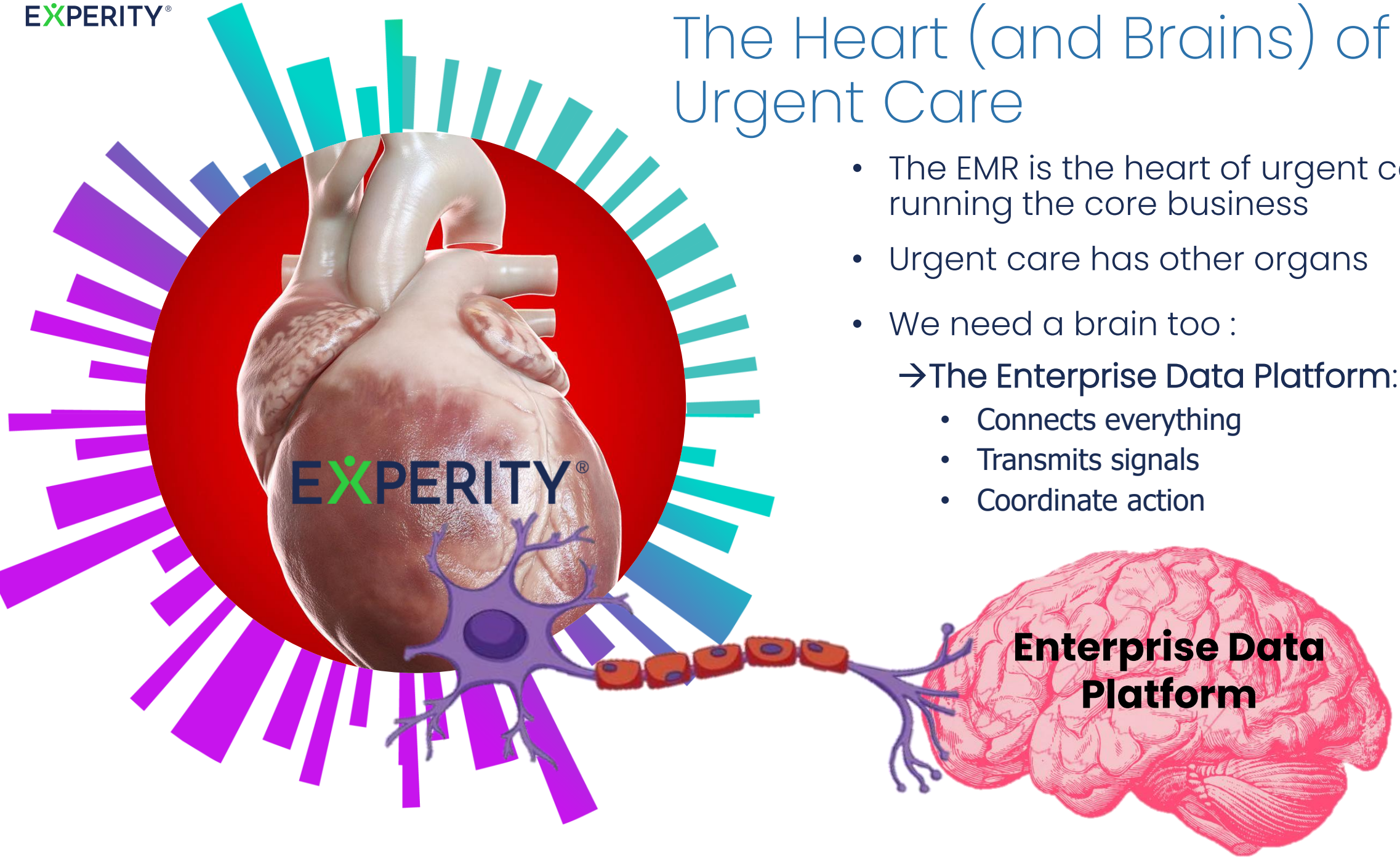
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The Heart (and Brains) of Urgent Care

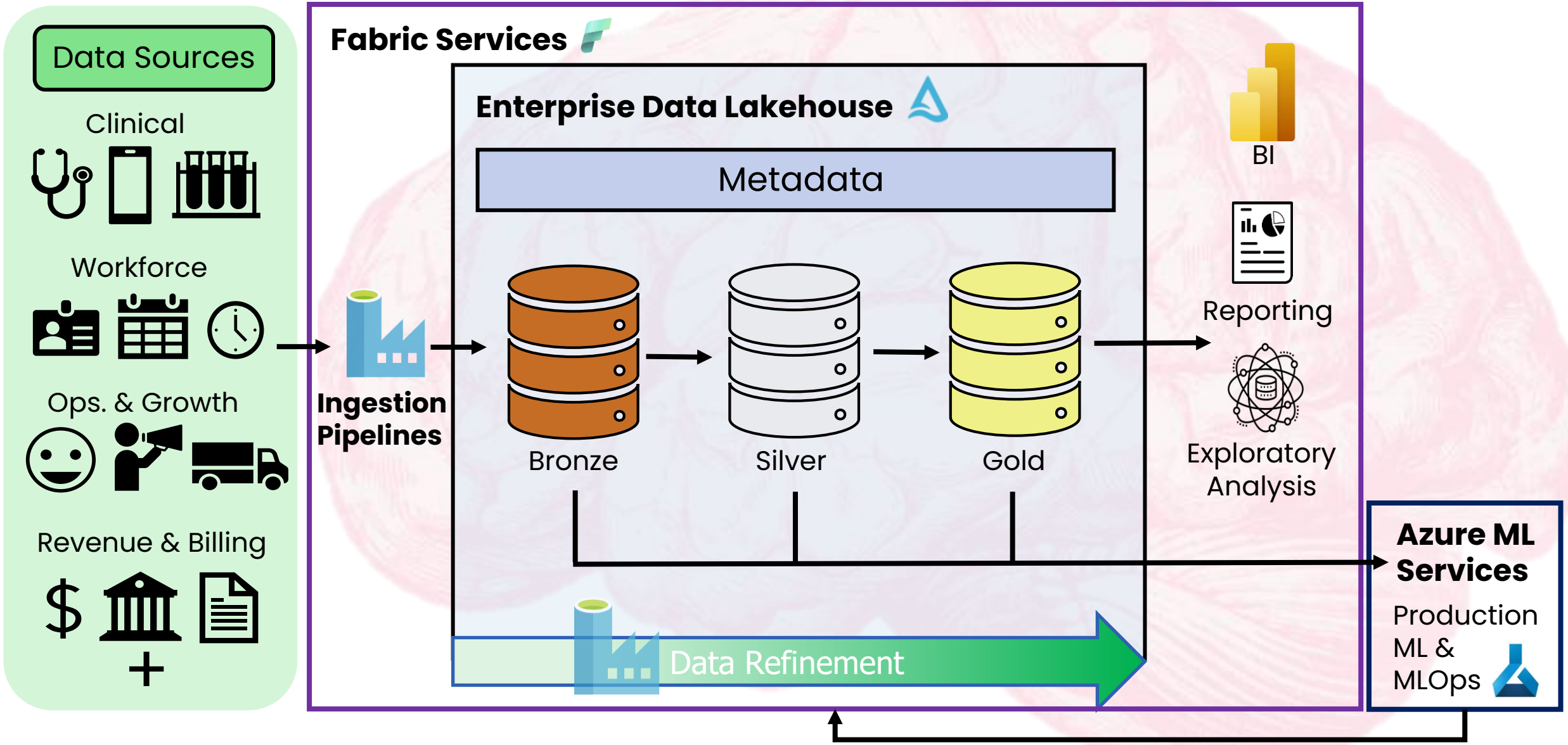
- The EMR is the heart of urgent care running the core business
- Urgent care has other organs
- We need a brain too :

→The Enterprise Data Platform:

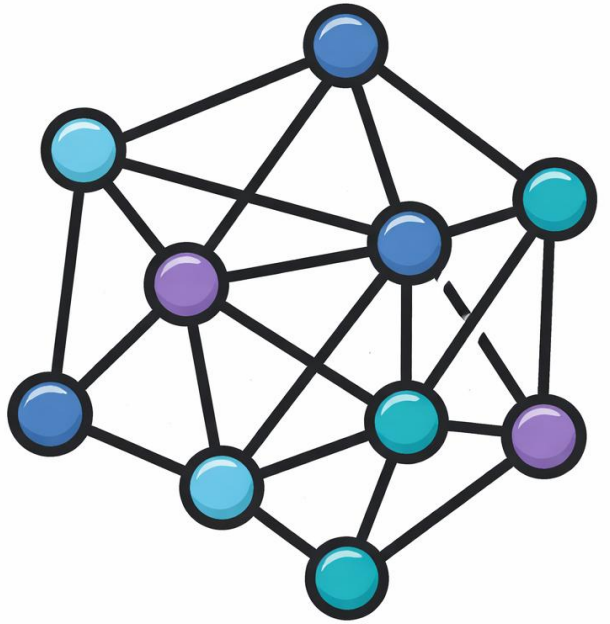
- Connects everything
- Transmits signals
- Coordinate action



Siloed Systems to a Unified Enterprise Brain

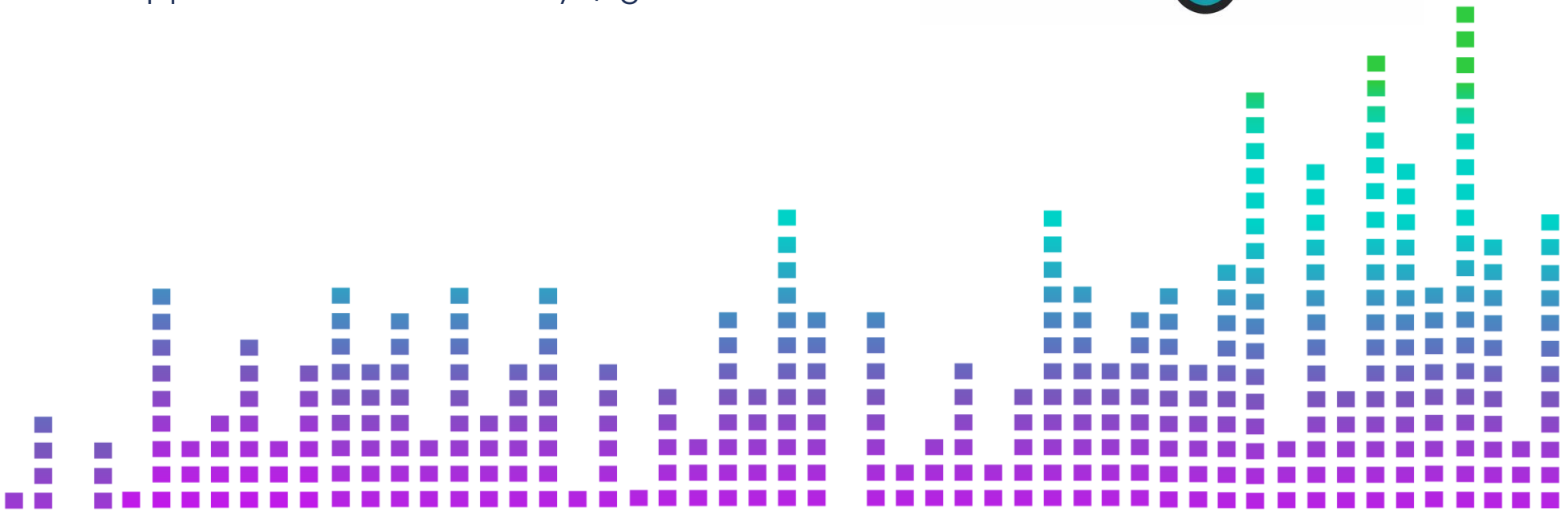


Rewards of the Data Platform



Comprehensive understanding of your UC:

- How does marketing impact our volume?
- Which providers are the most productive?
- How can we schedule to optimize capacity and patient satisfaction?
- How are broader epidemiological patterns driving our UC visits?
- Are clinics appropriately ordering supplies to meet their needs?
- Where are the greatest opportunities for efficiency / growth?



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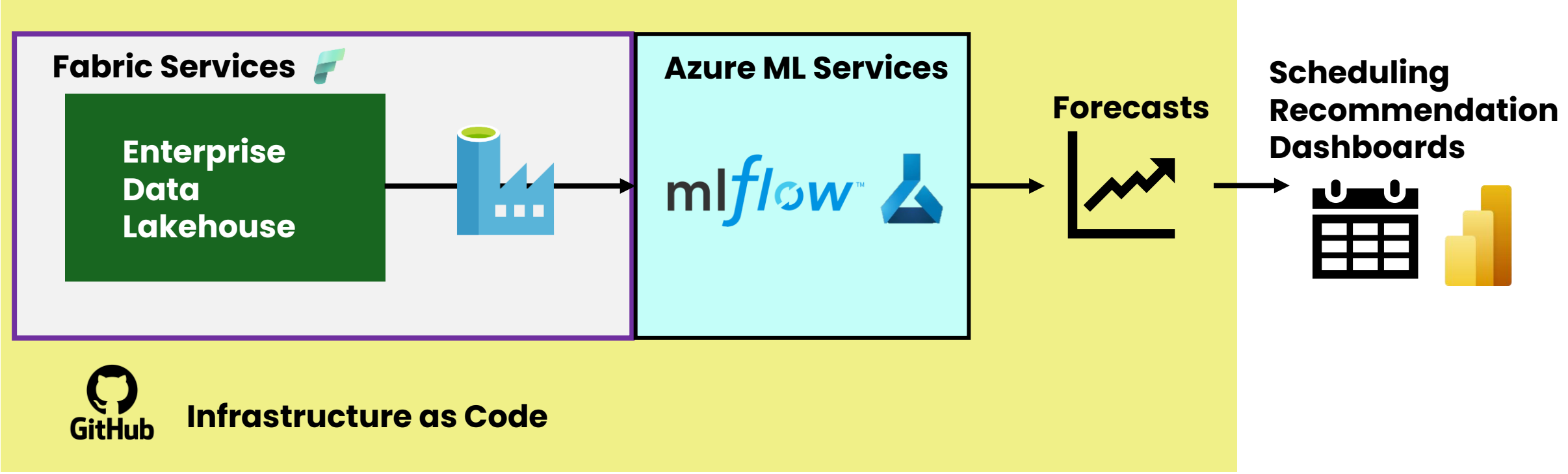
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Building Production ML & AI Pipelines

- Build a production predictive analytical system that is maintainable, scalable and follows the best practices in MLOps
- The difference between ad-hoc analysis and repeatability, enhancement, durability



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Reactivity → Proactivity

1 **Objective :** Predict demand by clinic, and calendar day to plan staffing and schedules across 45 Urgent Care Clinics

2 **Method :** Leverage enterprise data ecosystem data with advanced deep LSTM forecasting techniques.

3 **Data :**

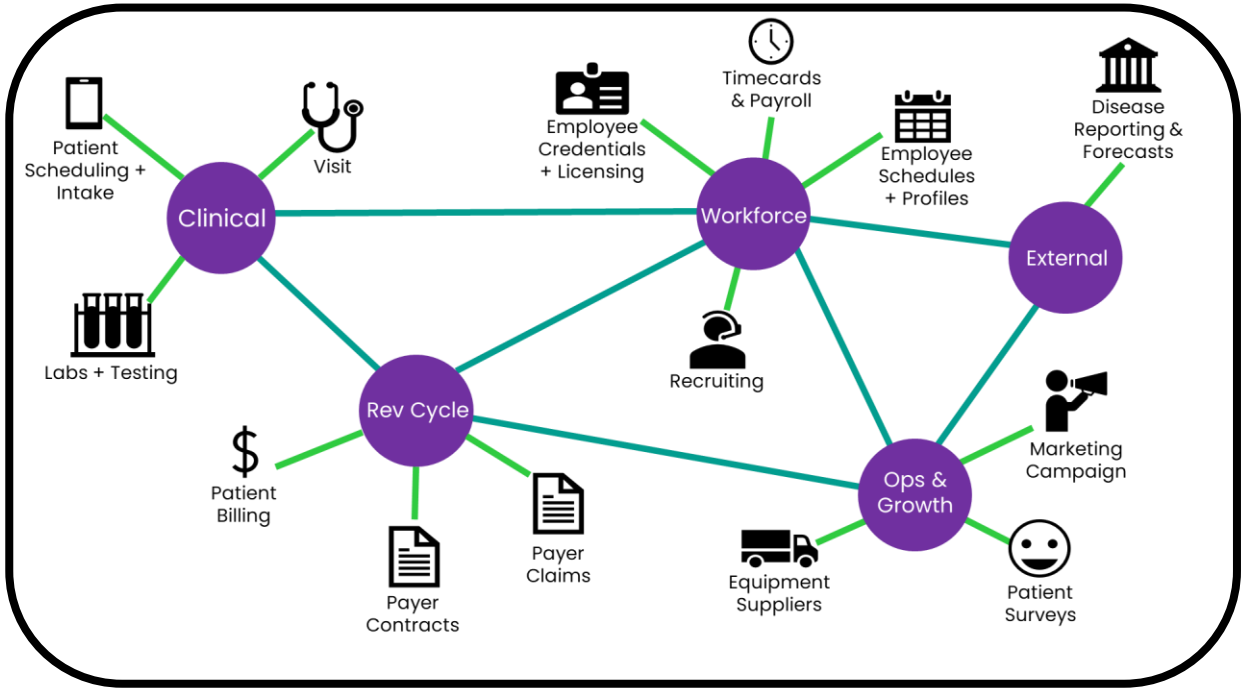
- Volume
- Diagnoses (ICD10)
- CDC & State epidemiological forecasts
- Historical hospital admissions
- Competitive landscape
- Staffing and Staffing models
- Patient Registration Surveys



Predicting Volume & Op Needs

- Urgent care volume is highly complex, influenced by a wide range of interacting factors.
- Accurately forecasting demand requires leveraging rich, multi-source data to capture these trends and cycles.

→ Leverage our diverse data sources to forecast demand volume

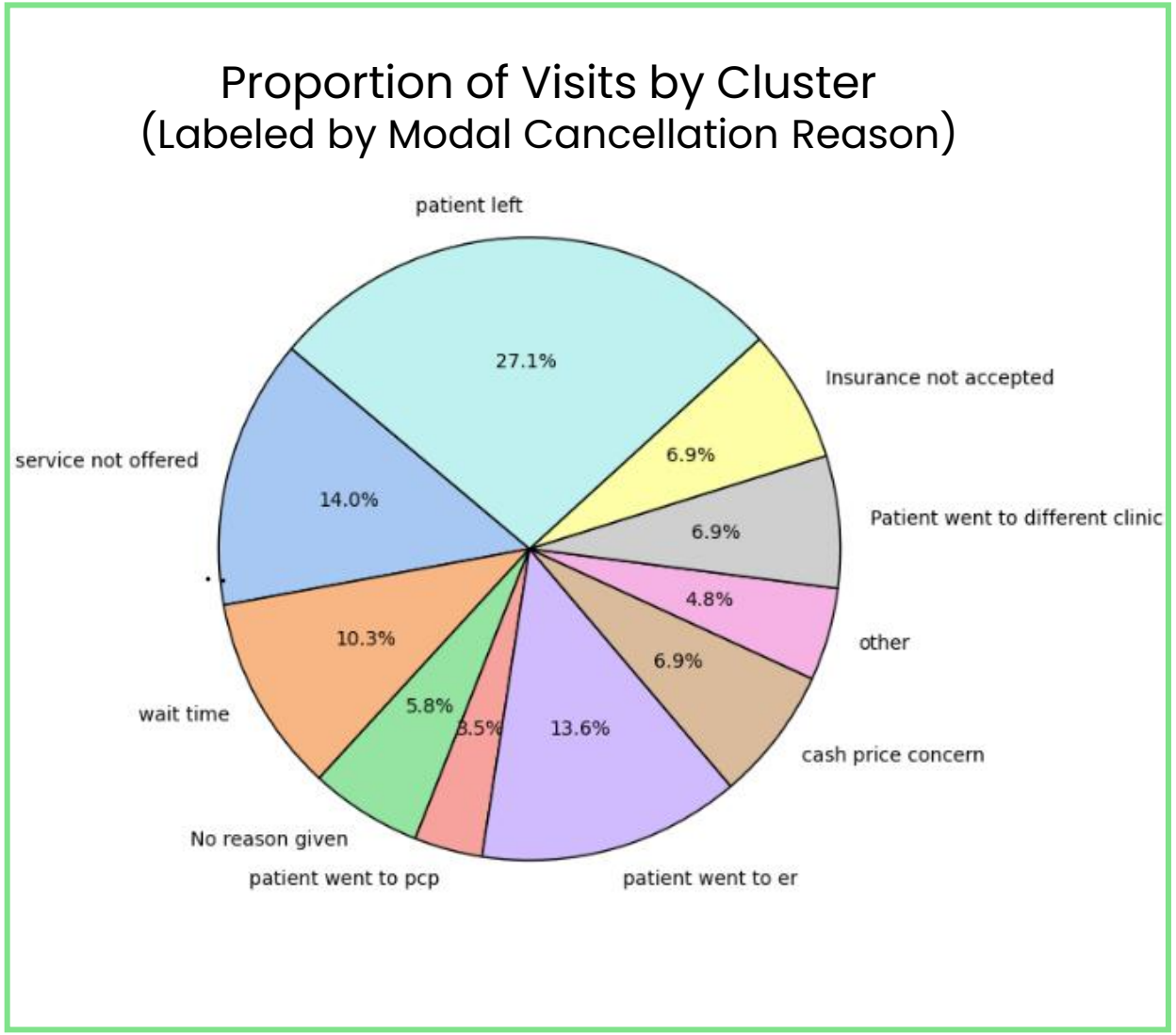


Forecasts

Schedules by Roles, Clinic, Day

Quantifying Potential with NLP

- Predicting for operational preparedness is more than just observed visits
- Cancellations tell us about missed potential
- Free-Text Processing:
  1. Clean & standardization
  2. Semantic Embedding using a Sentence Transformer
     - (Text to numeric)
  3. Unsupervised clustering
  4. Label clusters with modal reason



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Statistical Principles Impose a Limit on Certainty

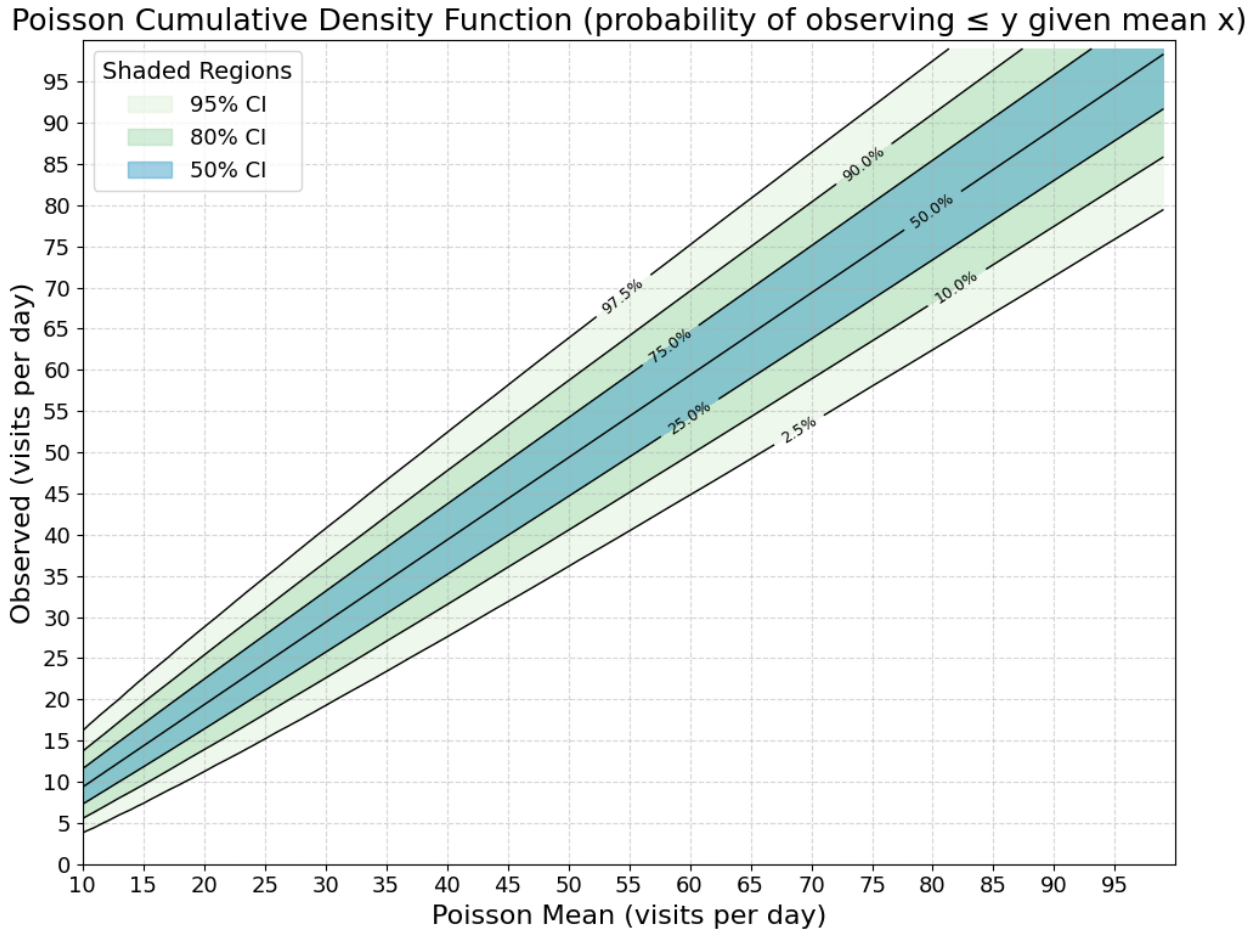
1. Visits per day at a clinic is a **Poisson Process**
2. **Relative Uncertainty** scales with the mean, λ:

$$\frac{1}{\sqrt{\lambda}}$$

→ If we ignore uncertainty we are not preparing for reality

→ Solution is two-fold, predict:

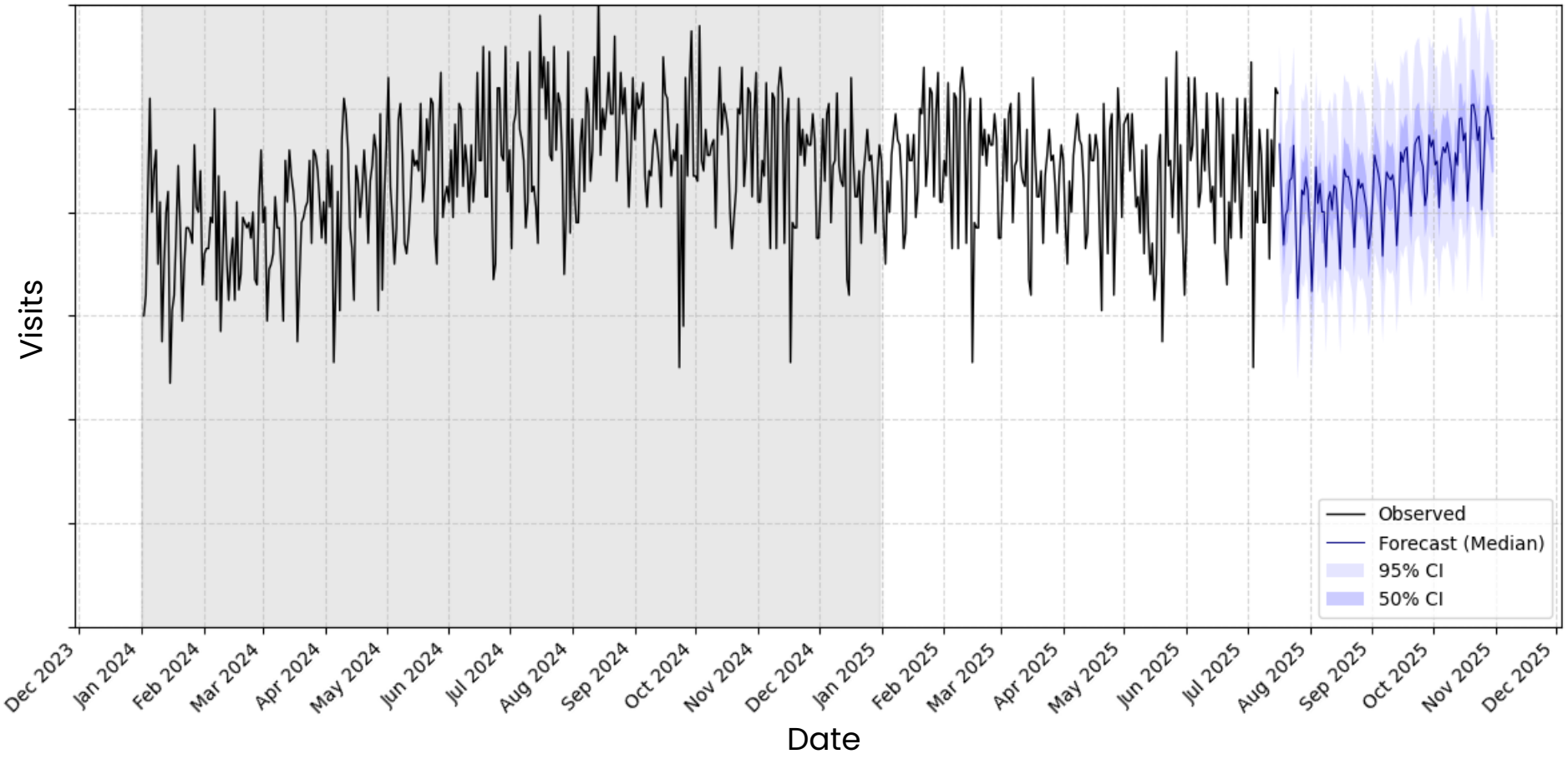
   1. Expected visits
   2. Probability that visits will cross operational thresholds



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Predicting Clinic Volume

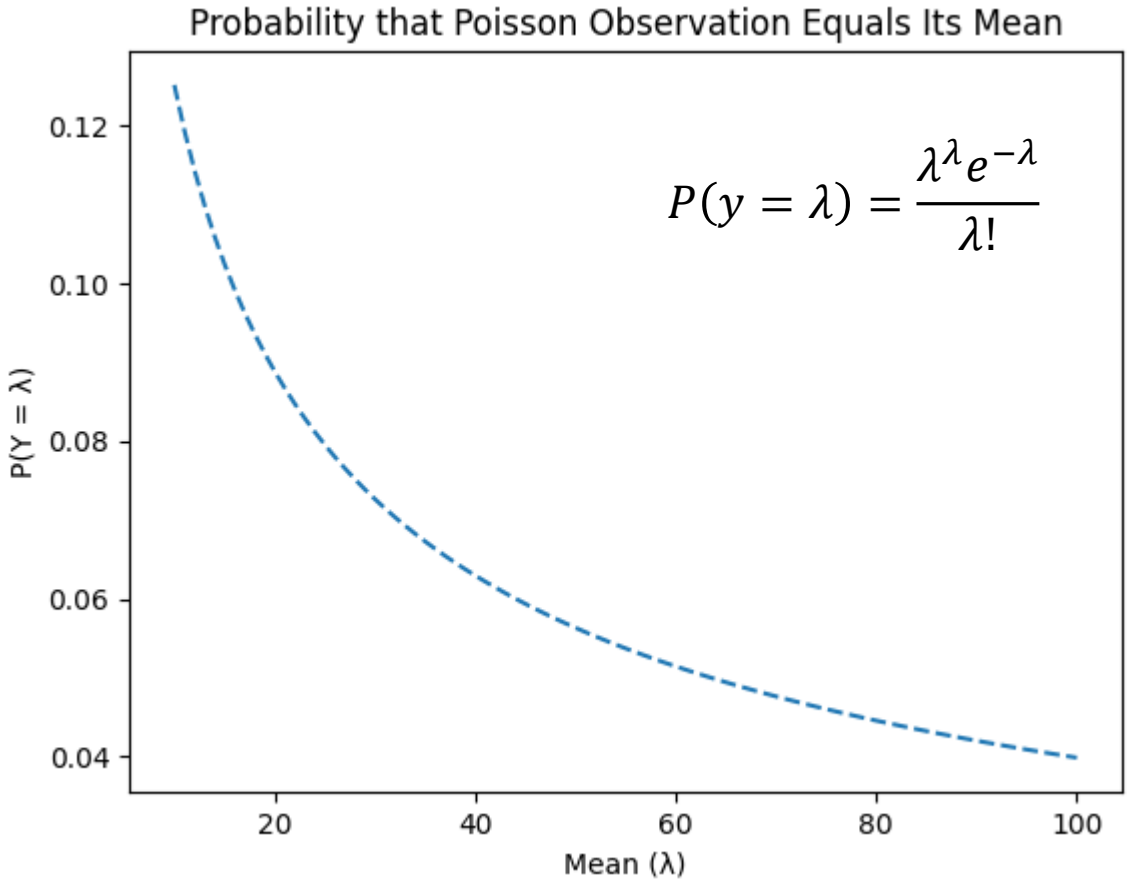
We combine the predictive distribution with observational uncertainty to produce the distribution of future observed demand.



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From Point Forecasts to Decision-Making Under Uncertainty

If we assume we can predict the exact number of visits, we will be wrong almost all of the time.



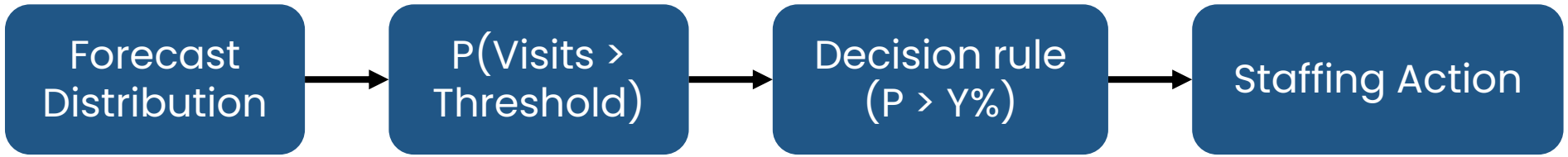
- Operationally, the key question is **not**:
  What is the exact number of visits Clinic X will see on a given day?
- The real challenge is making **optimal decisions in the presence of irreducible uncertainty**.
- We act on probabilities, not point estimates:

  → *If P(Visits > X) > Y% then take action Z.*

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From Forecasts to Staffing Decisions

- Clinic staffing is driven by volume thresholds — not exact predictions.
- We apply a simple rule:
  - **When the probability of exceeding a threshold crosses a defined level, staffing is adjusted.**
- This enables proactive staffing decisions across **45 clinics**, weeks in advance.
- Practice managers and recruiting teams see expected needs by clinic and day through operational dashboards.



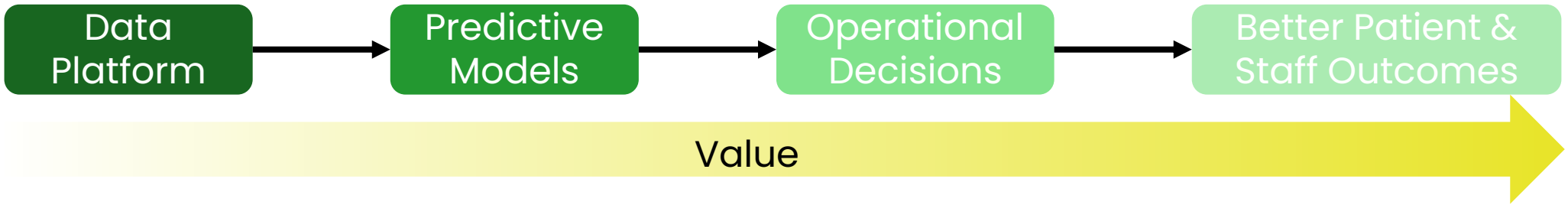
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From Data to Decisions :
What Predictive Modeling Enabled

Key Take-aways:

- Urgent care demand is **inherently complex and uncertain** — single-variable thinking fails
- Accurate forecasting requires **rich, multi-source data** and production-grade pipelines
- Predictive models shift organizations from **reactive monitoring to proactive planning**
- When forecasts are operationalized, they directly inform **staffing, scheduling, and preparedness**

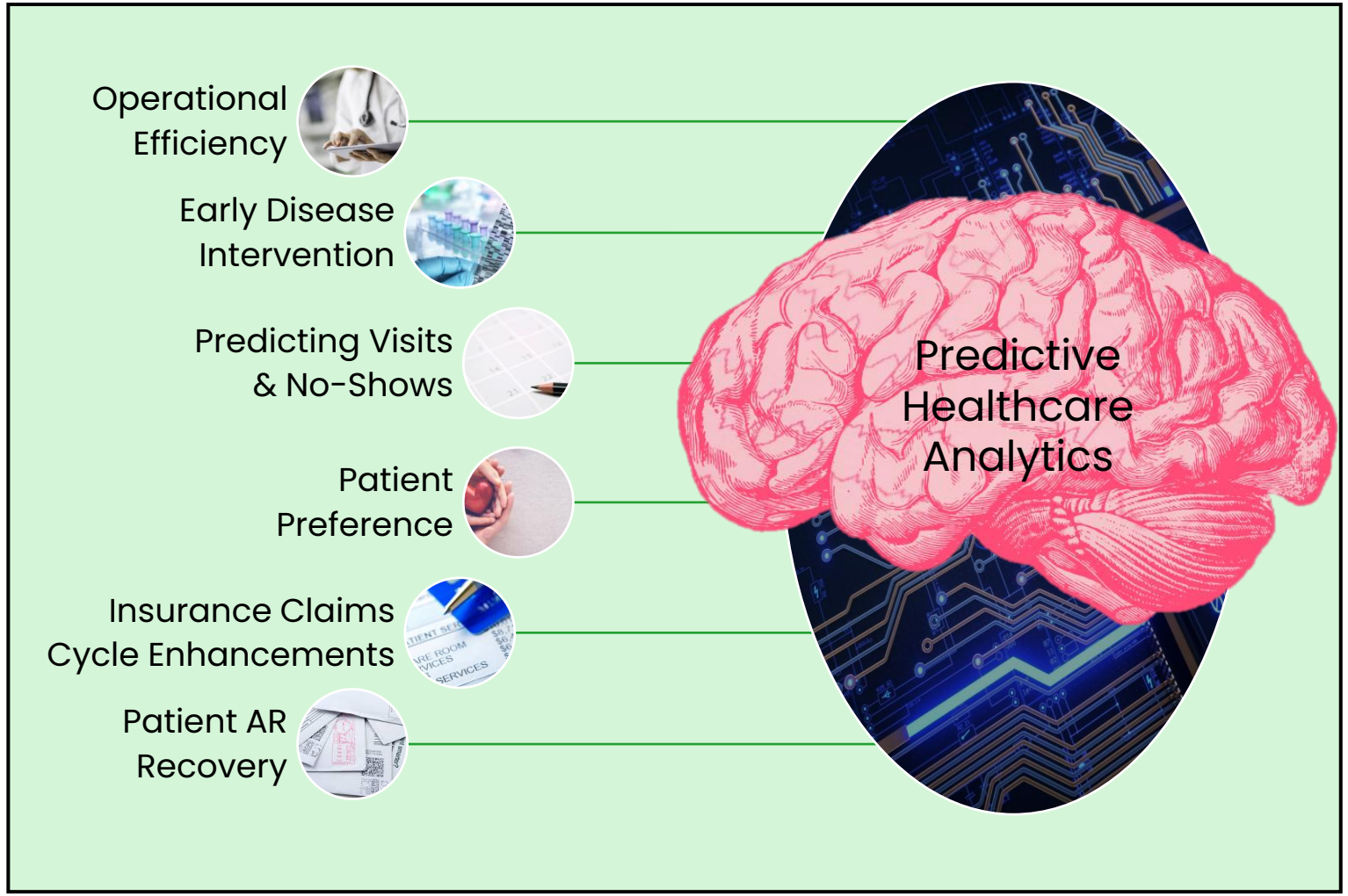
Prediction is not the goal — better, earlier decisions are.



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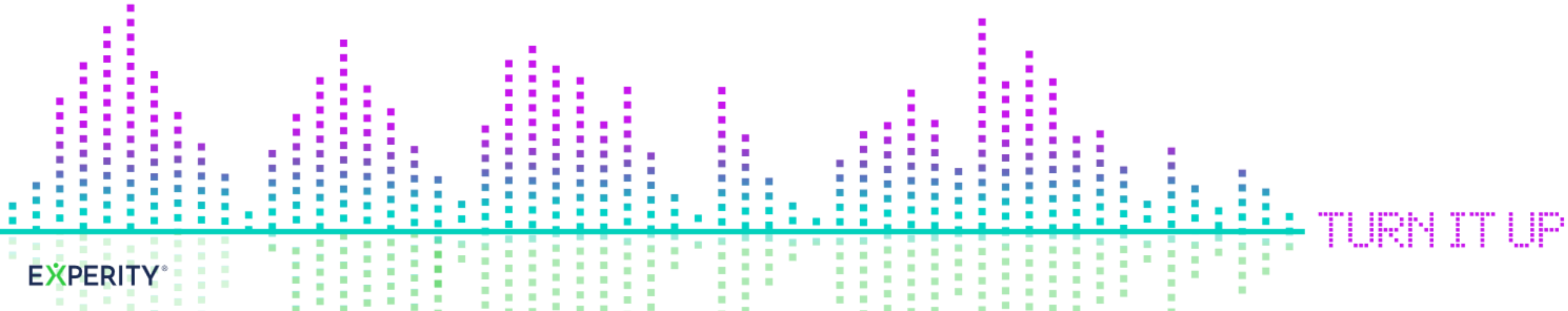
From Monitoring to Anticipation

- Monitoring tells us **what already happened**
- Reactive systems optimize for yesterday's problems
- Forecasting lets us **look ahead** — before constraints hit
- To forecast well, signals must be **joined across systems**
  - Clinical
  - Operational
  - External drivers



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Thank you!



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Q&A

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URGENT CARE CONNECT
AN EXPERITY® EVENT

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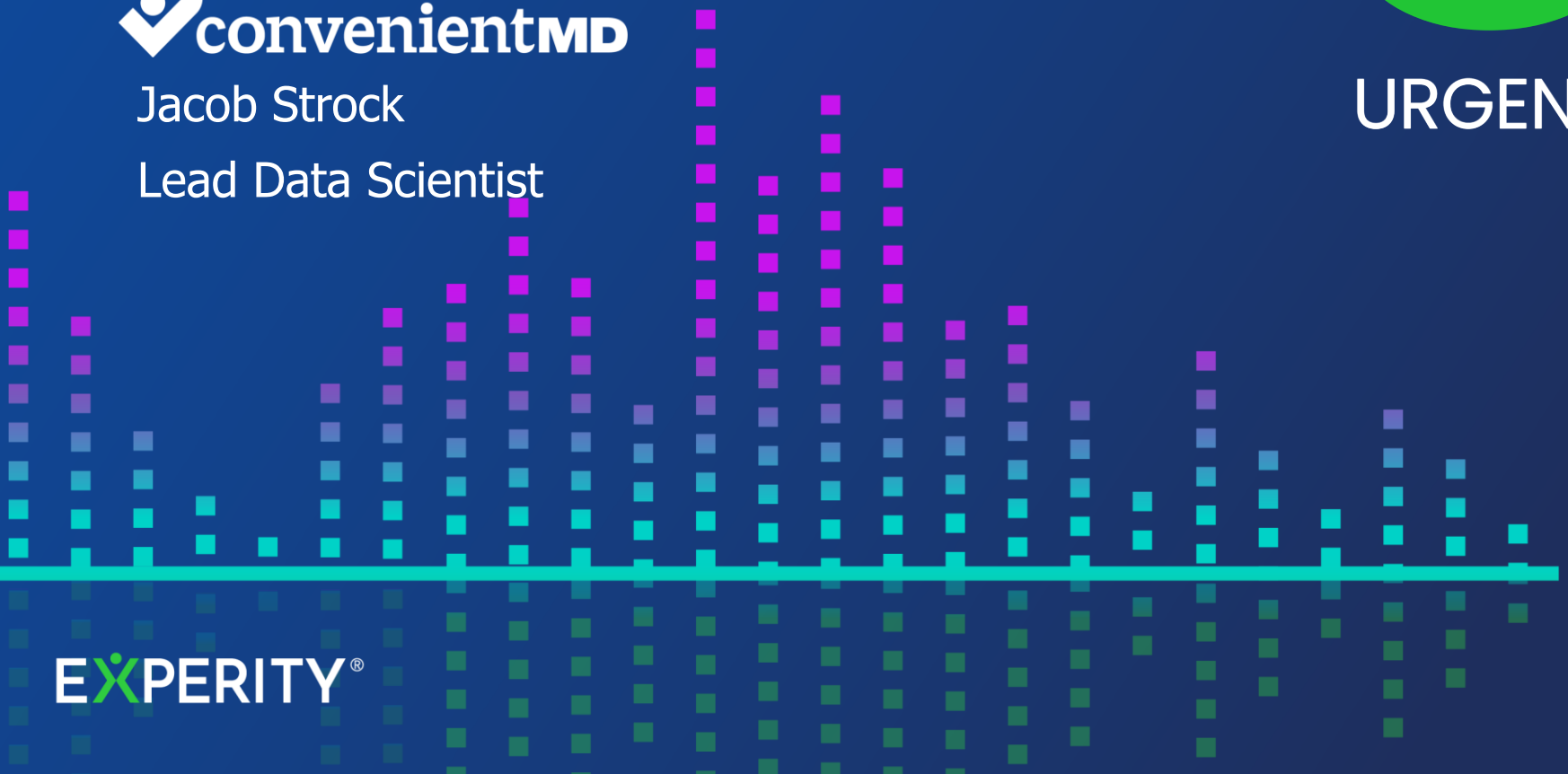
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Building Predictive ML & LLM-Enabled Platforms for Operational Decision-Making in Urgent Care

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