Value-Based Surgical Care

Predictive-Prevention Platforms

Calcium

PulseDataAI
Advancing Health, from Data to Care.

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Agenda

I. The ED Utilization Challenge in VBC
II. Why Traditional ED Reduction Strategies Fall Short
III. Predictive Analytics for Early Risk Detection
IV. From Prediction to Prevention
V. Financial Impact in Value-Based Care

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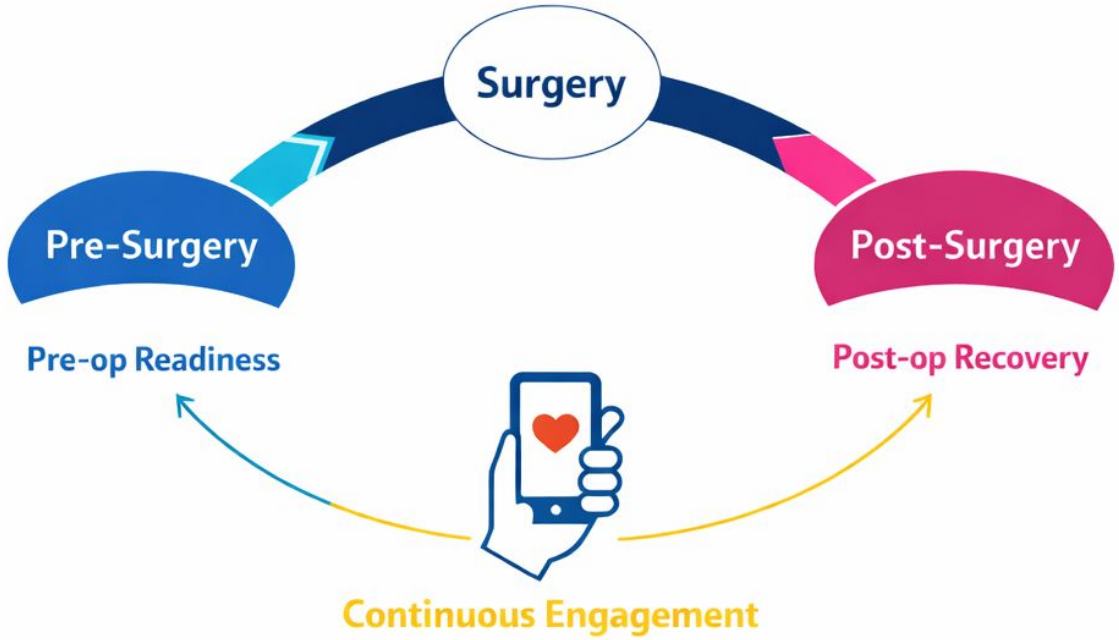
Our Central Thesis

Surgical **outcomes are often determined outside the Operating Room**:

- How well patients are prepared before surgery, and
- How effectively they are monitored and supported after discharge

Many of the highest-cost events—complications, readmissions, delayed recovery—are driven by factors that occur entirely outside the hospital.



22% of surgeries have complications – and 28% of complications occur after discharge. https://jamanetwork.com/journals/jamasurgery/fullarticle/1820451

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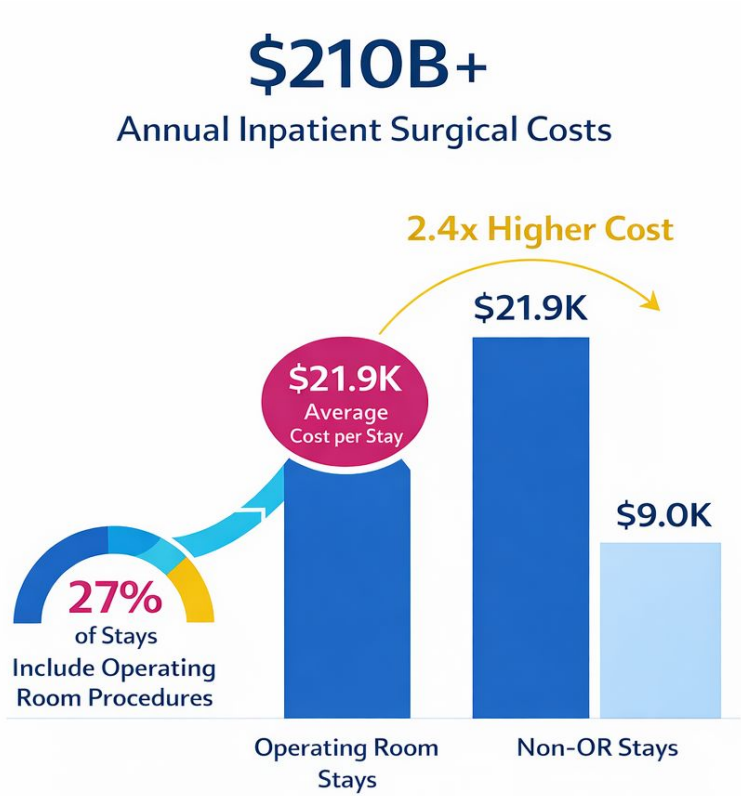
The Cost of Surgical Care in the U.S.

In the U.S., inpatient stays involving an operating room account for more than $210 billion annually.

What's striking is that these cases represent only about 27% of hospitalizations—but they account for a disproportionate share of total cost.



Source: HCUP Statistical Brief
https://hcup-us.ahrq.gov/reports/statbriefs/sb281 Operating Room-Procedures-During-Hospitalization-2018. pdf

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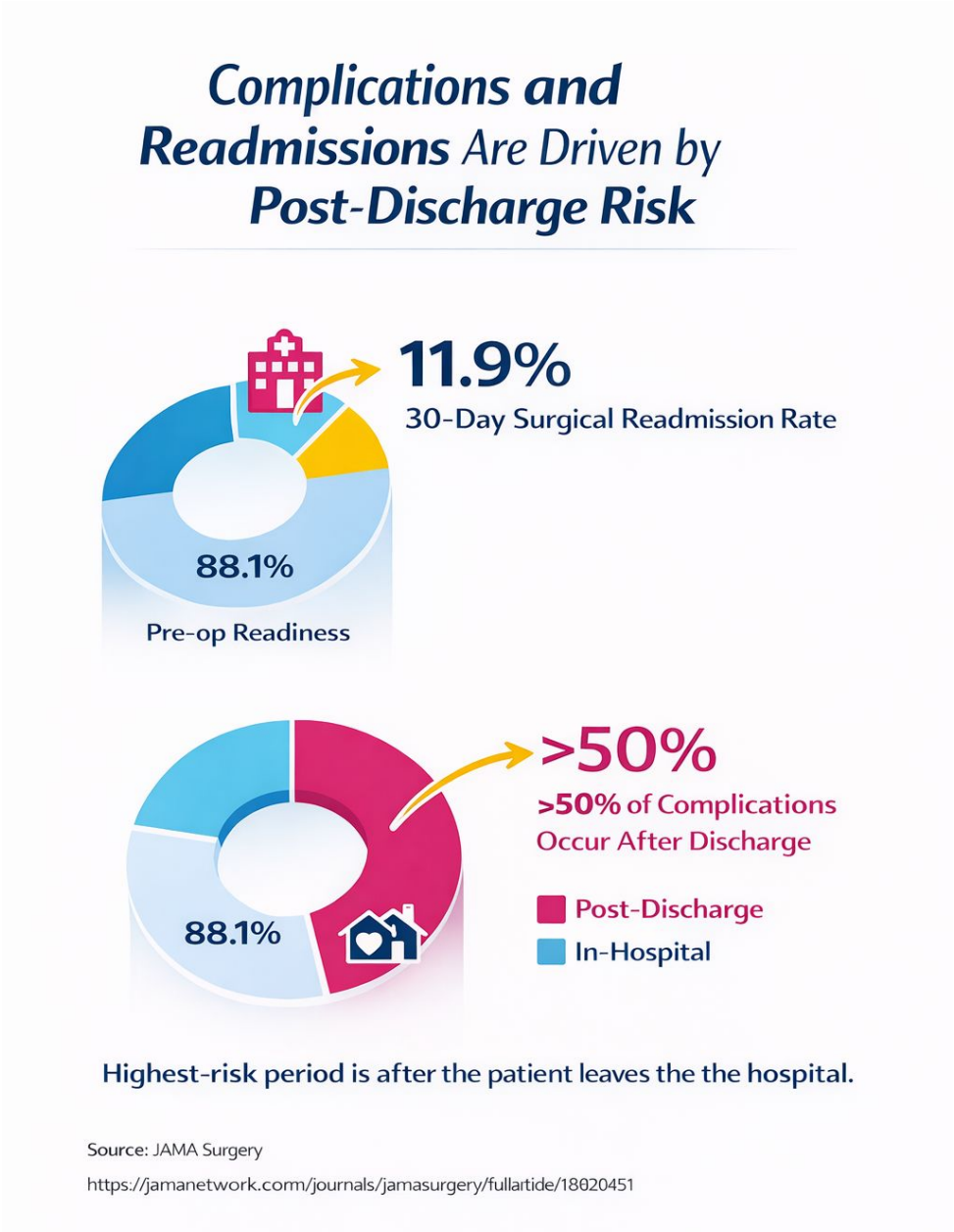
Readmissions & Complications

More than half of surgical site infections—and about one-third of all complications—are diagnosed after discharge.

This creates a major structural problem:

- The highest-risk period is outside the hospital
- The least monitored period is also outside the hospital



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Preventable Disruptions

Most of these disruptions are not random. They are predictable:

- Missing labs
- Unmanaged comorbidities
- Patient non-adherence
- Poor coordination

These are signals—not surprises.

International Journal for Quality in Healthcare – https://academic.oup.com/intqhc/article/33/2/mzab092/6294831

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Poll Question 1

How confident are you in your organization's ability to identify high-risk surgical patients early??

1. **Very confident** — we use predictive analytics to identify risk early
2. **Moderately confident** — we have risk stratification tools but limited prediction capability
3. **Somewhat confident** — we rely mostly on EHR or claims reports
4. **Not very confident** — we typically identify risk after utilization occurs
5. **Not confident at all** — we currently have no systematic way to identify surgical risk

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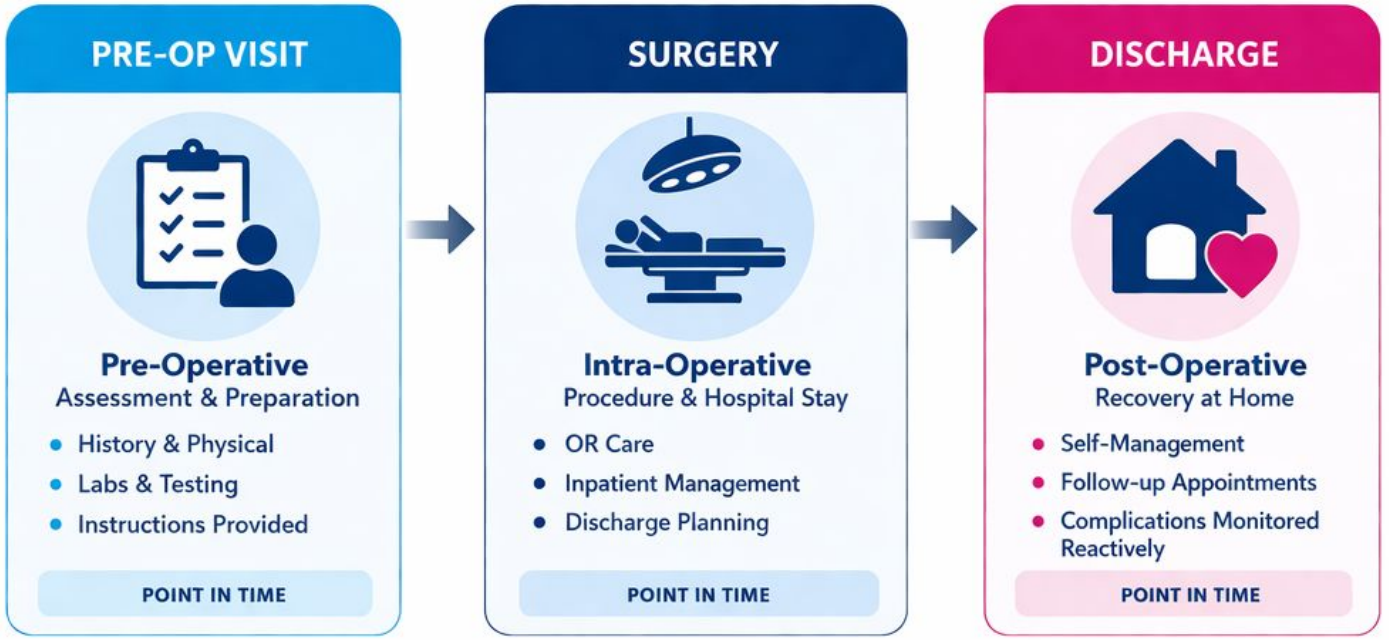
Traditional Model

A patient has a pre-op visit, undergoes surgery, and is discharged. Each step is managed independently.

But risk does not behave in discrete steps.

It evolves continuously over time.



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The Gap

Gaps create blind spots across the entire episode:

1. Limited pre-op optimization
2. Lack of post-op monitoring
3. Fragmented communication across teams

American College of Surgeons – https://www.facs.org/media-center/press-releases/2021/complications-after-discharge-102321/

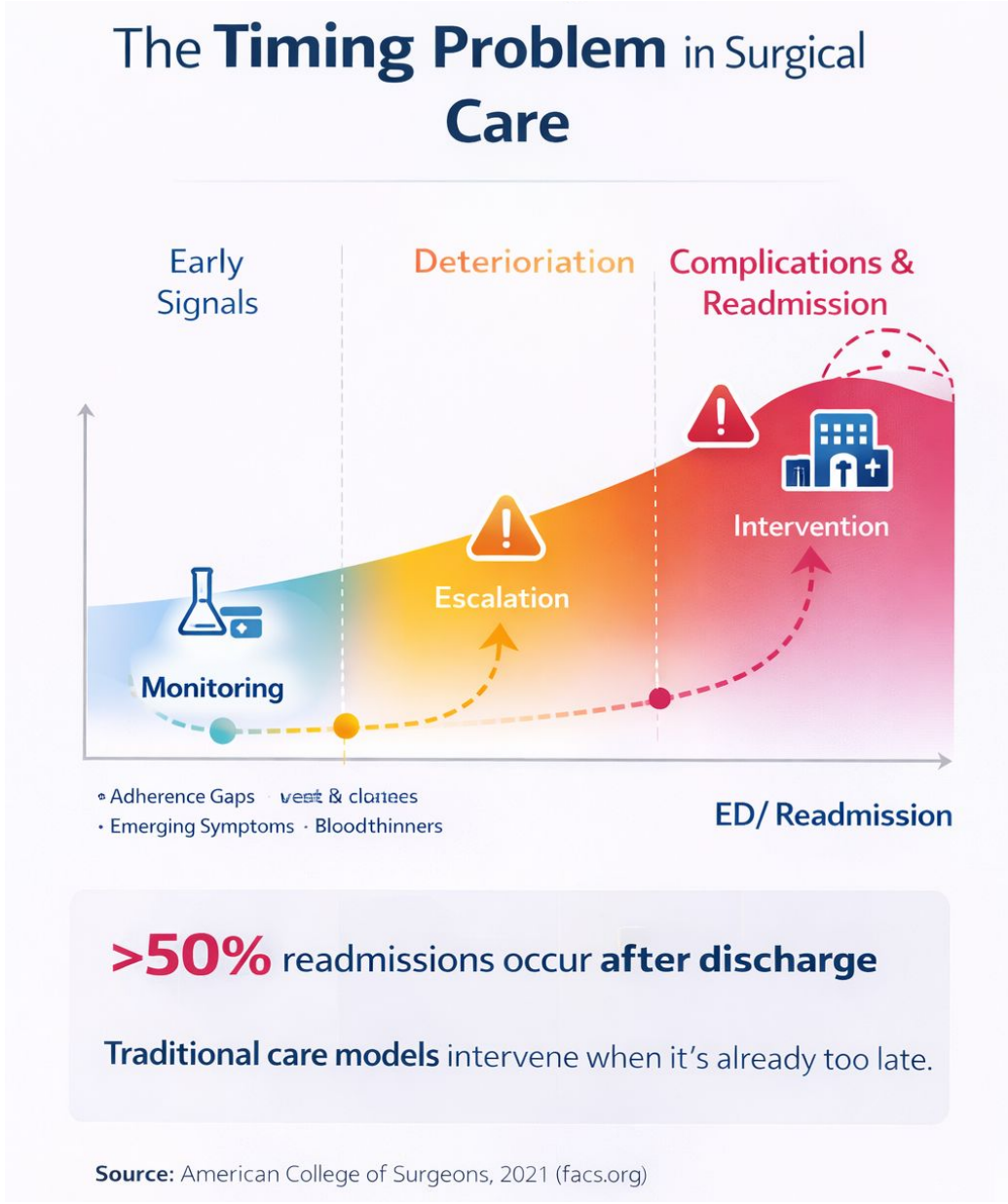
Timing Problem

Complications rarely appear suddenly—they follow a progression.

There is an early signal phase:

- Subtle symptoms
- Declining adherence
- Small deviations from expected recovery

Then deterioration begins.



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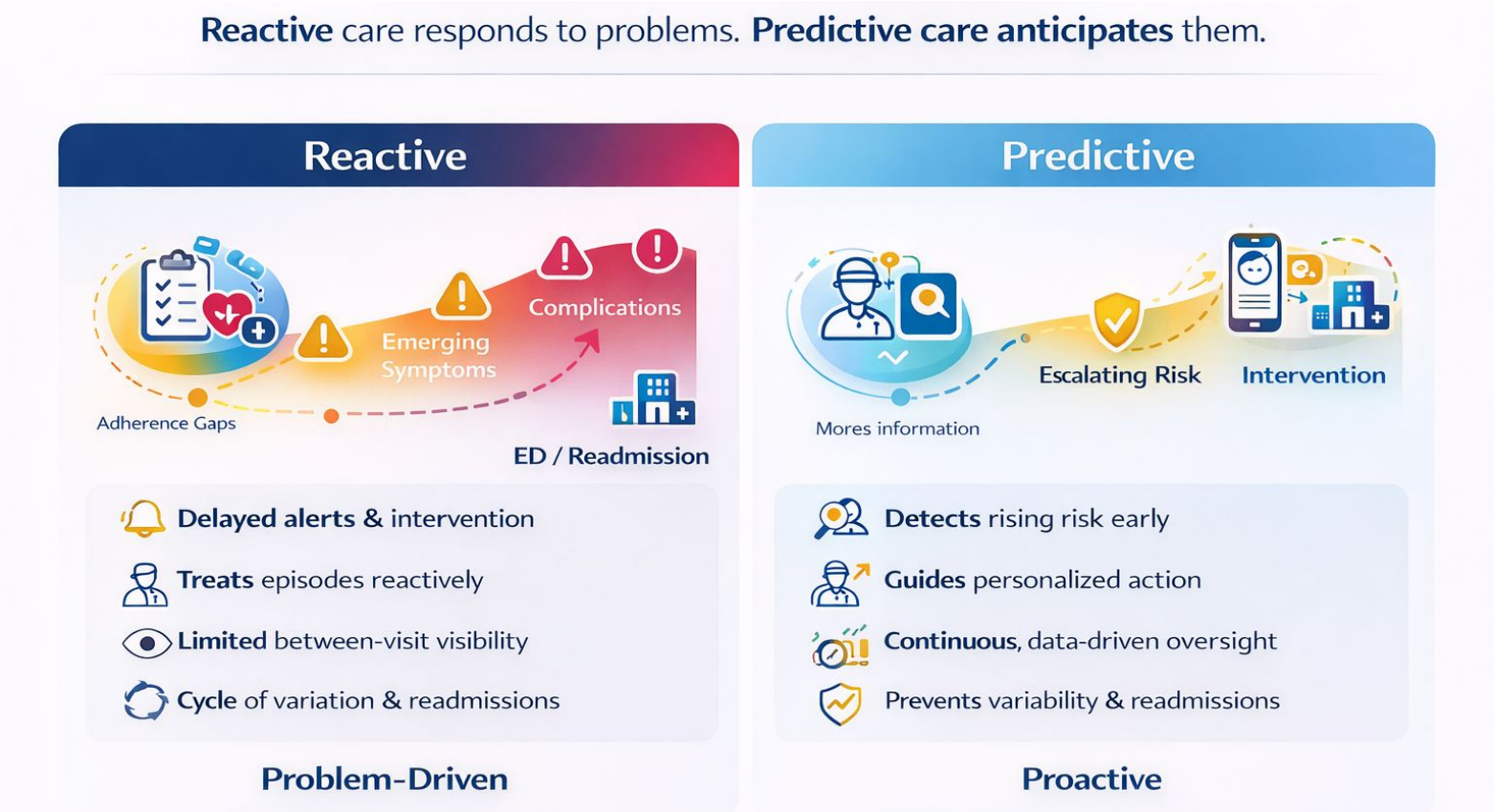
Reactive vs Predictive



*And the difference between the two is where **value-based performance** is won or lost.*

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We Can Predict Much More

- Clinical risks
- Utilization risk
- Operational disruptions
- Recovery trajectory

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360° Health Data Sources

Many of the strongest predictors of surgical outcomes are behavioral and social:

- Medication adherence
- Patient engagement
- Social determinants of health

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Risk Indicators

Diabetes & Chronic Conditions

- Rising glucose trends (not just thresholds)
- Weight fluctuations and metabolic drift
- Early neuropathy or vascular symptoms
- Medication effectiveness variability

Emerging Symptoms

- Increasing fatigue or reduced energy
- Subtle changes in pain, mobility, or function
- Wound changes or delayed healing
- Low-grade or intermittent fever patterns

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Poll Question 2

What data sources do you currently use to identify ED risk?

1. Claims
2. EHR
3. Remote monitoring
4. Patient feedback
5. Unsure

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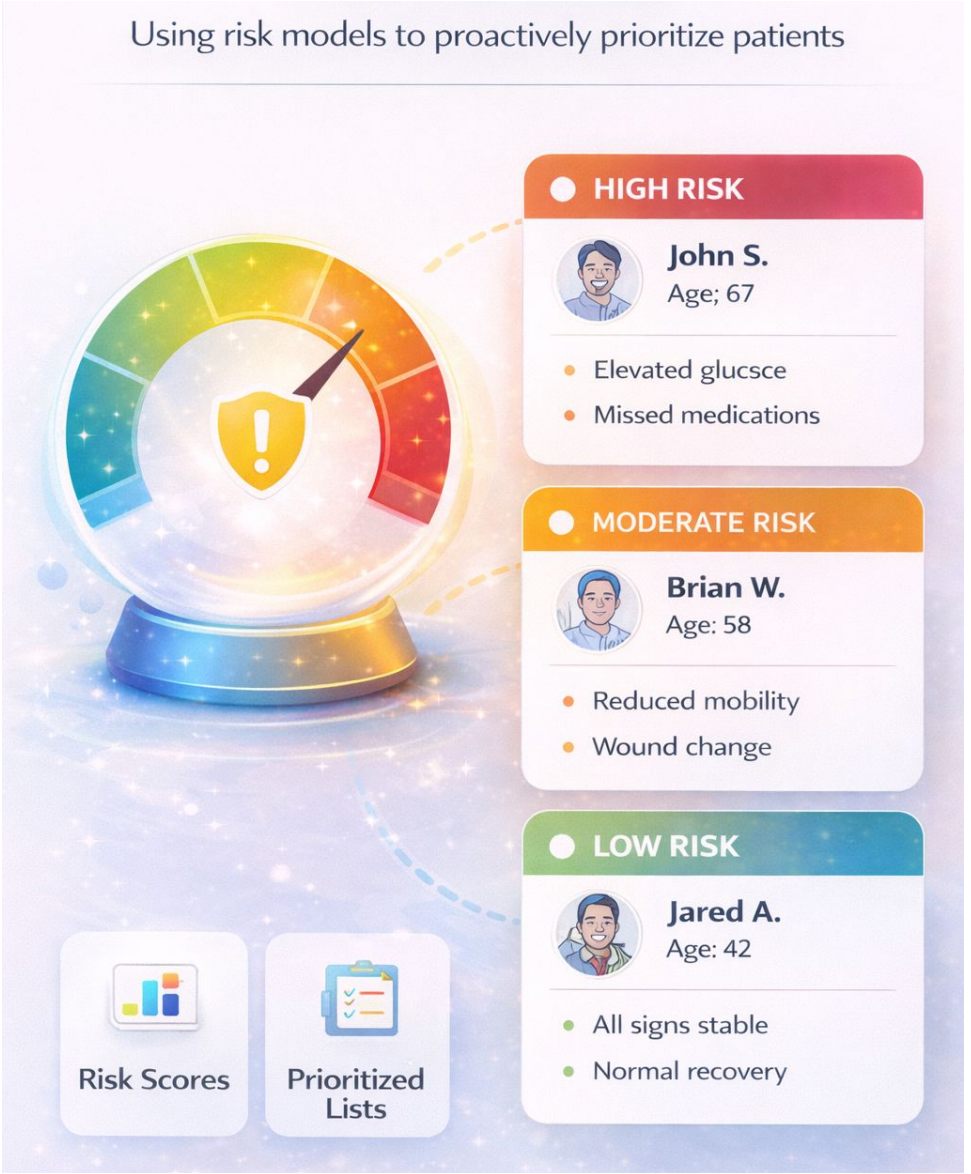
Risk Scoring

- Dynamic risk scores (clinical + behavioral + real-time data)
- Patient prioritization based on likelihood of deterioration
- Real-time updates as patient status changes
- Actionable worklists for care teams
- Focused intervention on highest-impact patients



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But Prediction Isn’t Enough

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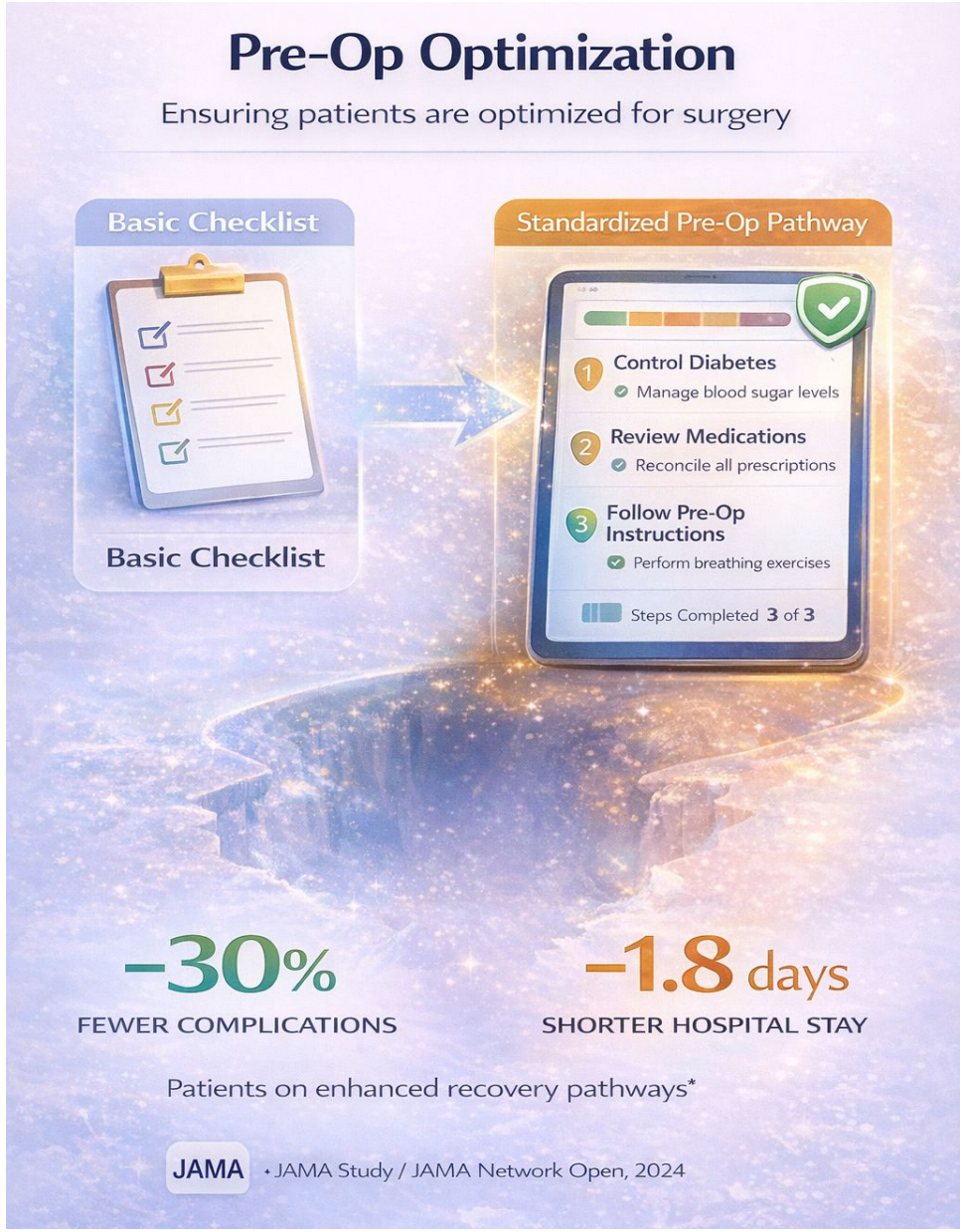
Pre-Op Optimization

- Standardized pre-op pathways replace manual checklists
- Early identification and optimization of comorbidities
- Medication reconciliation and risk mitigation before surgery
- Patient engagement and adherence prior to the OR
- ~30% fewer complications and shorter length of stay

Enhanced Recovery Pathways — JAMA Network Open
https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2820097



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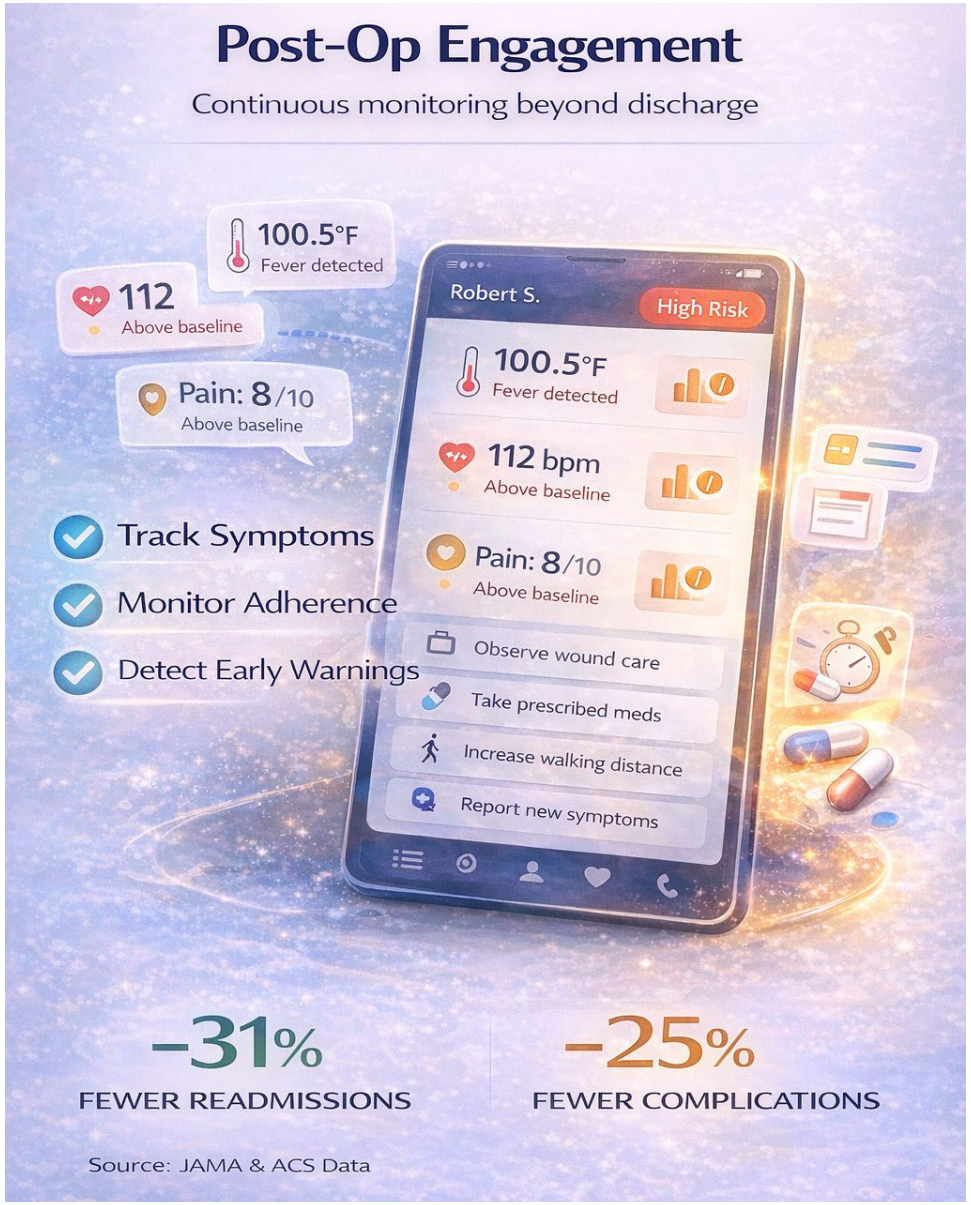
Post-Op Engagement

- Continuous monitoring beyond discharge
- Real-time symptom and recovery tracking
- Medication adherence and patient engagement
- Early detection of complications and deviations
- Reduced readmissions and avoidable utilization



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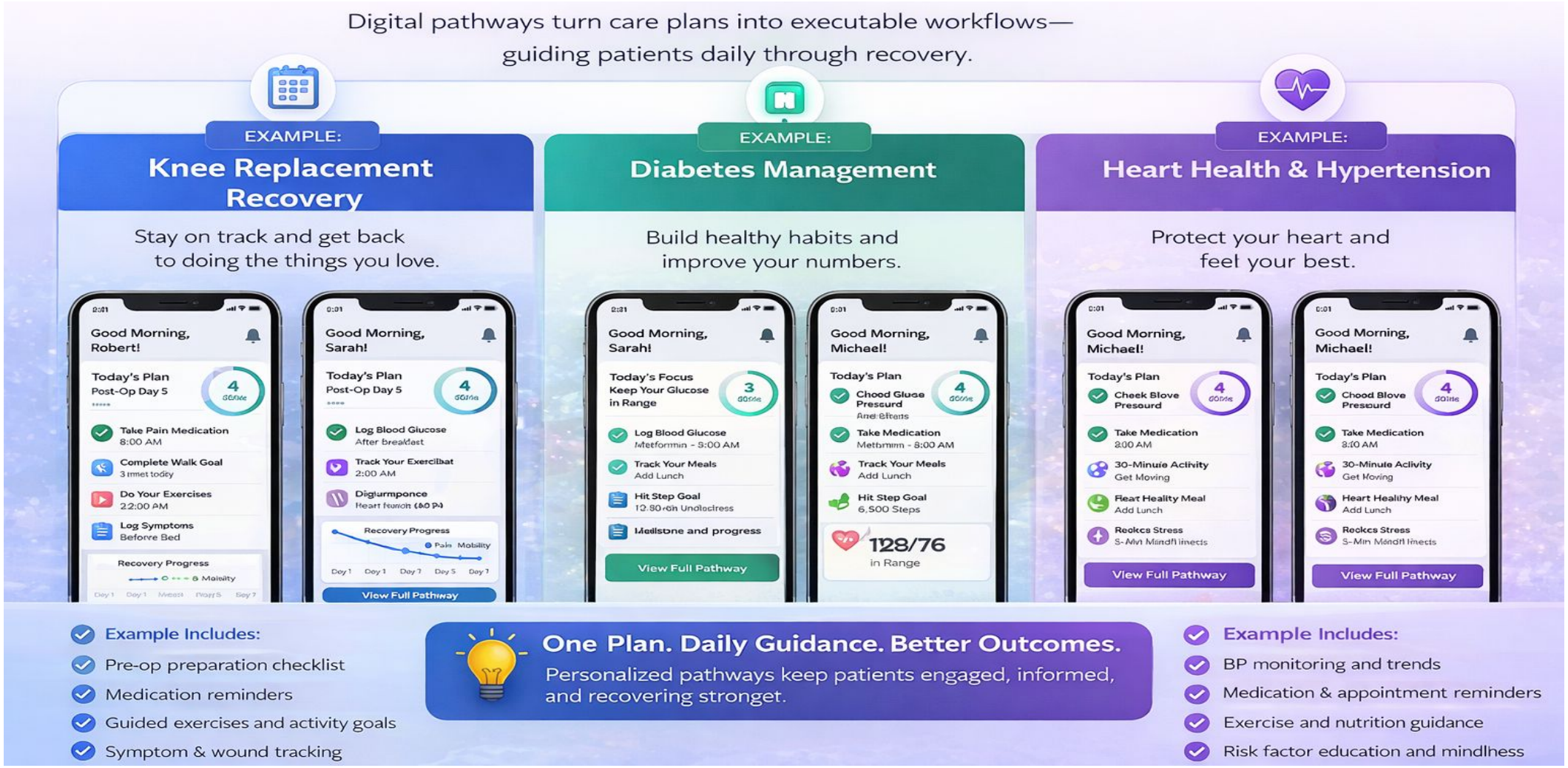
Digital Care Pathways



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Poll Question 3

How automated is your patient engagement today?

1. Fully automated
2. Hybrid
3. Mostly manual outreach
4. Minimal engagement

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Key Takeaways

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PulseDataAI

Buy, Build, Partner: Flexible Engagement Models

Off-the-Shelf Models

- ✔ Pre-trained, validated models for common chronic risks.
- ✔ Deploy immediately to identify high-risk members without development delays.
- ✔ Fine tune models with expert support

Custom Developed Models

- ✔ Models tailored specifically to your population
- ✔ Unique data features, and internal KPIs.
- ✔ Collaborative development process.
- ✔ Partnerships that combine analytics with care delivery

Action Pathway Library

- ✔ Evidence-based "next steps" mapped to risk signals.
- ✔ Don't just predict risk—know exactly how to intervene clinically.

Platform Access

- ✔ Leverage PulseData's ML/AI infrastructure (Aorta) with your own data science team to accelerate internal innovation.
- ✔ Build models using our platform with guided expert support as needed.

Model Analysis

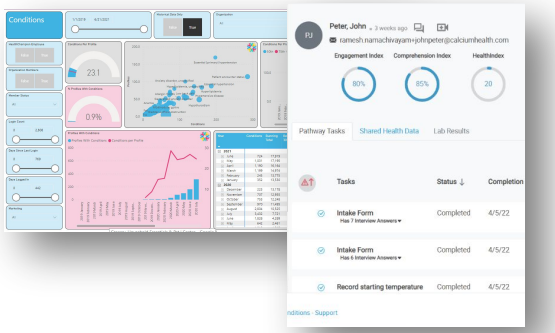
- ✔ Independent benchmarking and analysis of your internal models to identify drift, bias, or performance gaps.

The Calcium Platform

For Organizations

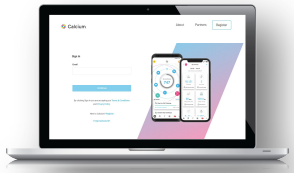
Calcium Core

Robust analytics and trends, AI, and insights, plus patient management and alerts



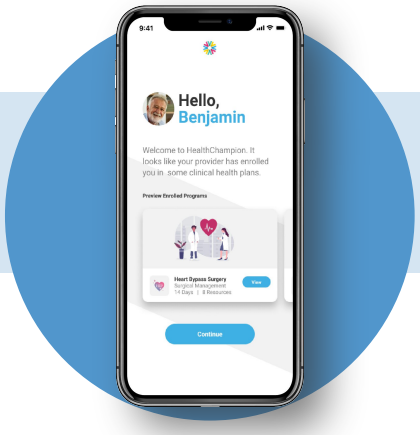
Calcium AI Studio

Modify and create pathways to engage your patients, employees and more



Easily sign-in to Calcium Core and Calcium Studio via desktop browser.

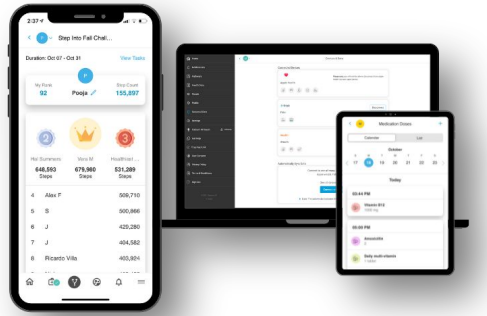
For Individuals



Calcium App

Patient-facing health Super App to deliver your pathways and more

(Available in Google Play, Apple App Store; on Mobile, Desktop and Tablet)



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Q&A

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Stop by our VBCExhibitHall.com Virtual Booth:

[Visit the Calcium Health exhibit booth]

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