

Value-Based Surgical Care

Predictive-Prevention Platforms



VBCExhibitHall
.com



Educational Webinar Series

Presenters

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Agenda

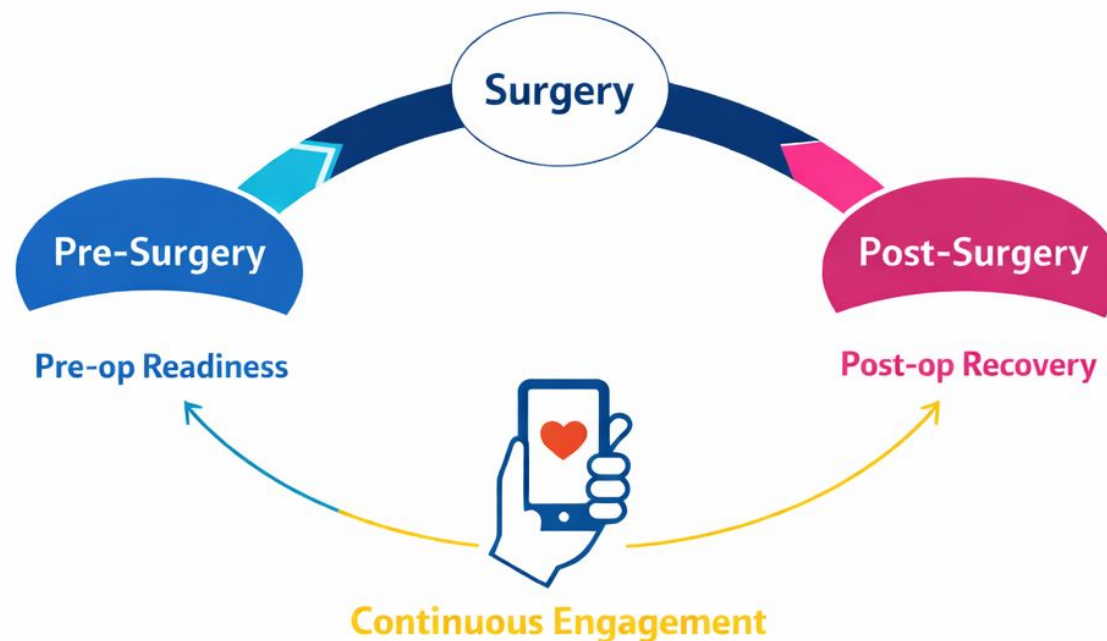
- I. The ED Utilization Challenge in VBC
- II. Why Traditional ED Reduction Strategies Fall Short
- III. Predictive Analytics for Early Risk Detection
- IV. From Prediction to Prevention
- V. Financial Impact in Value-Based Care

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.

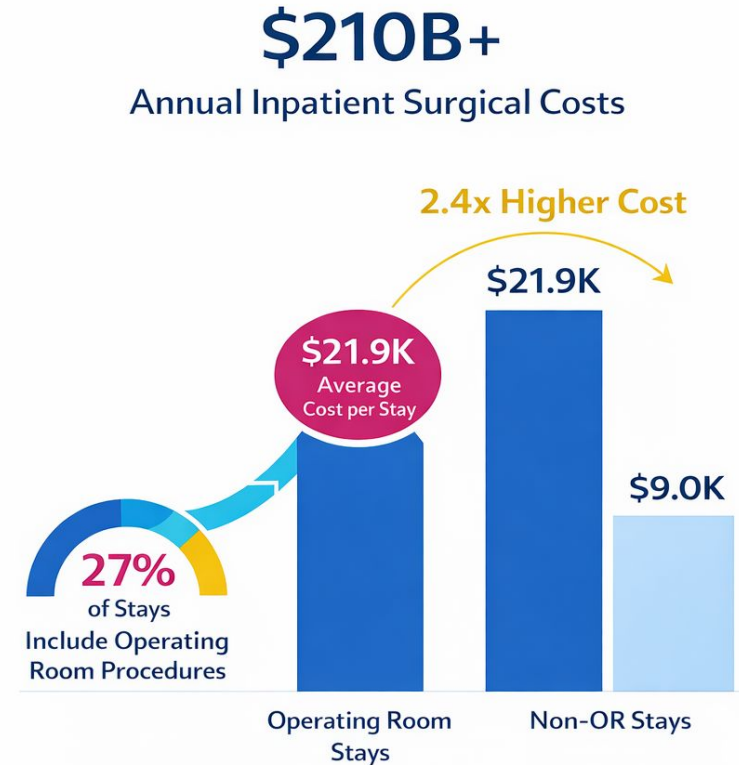


22% of surgeries have complications – and 28% of complications occur after discharge.
<https://jamanetwork.com/journals/jamasurgery/fullarticle/1820451>

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.



Variation = Financial Risk

Complication rates and downstream costs vary significantly within surgical episodes, creating financial exposure.

Source: HCUP Statistical Brief

[https://hcup-us.ahrq.gov/reports/statbriefs/sb2bl281 Operating Room-Procedures-During-Hospitalization-2018.pdf](https://hcup-us.ahrq.gov/reports/statbriefs/sb2bl281%20Operating%20Room-Procedures-During-Hospitalization-2018.pdf)

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

Complications and Readmissions Are Driven by Post-Discharge Risk



Highest-risk period is after the patient leaves the the hospital.

Source: JAMA Surgery

<https://jamanetwork.com/journals/jamasurgery/fullarticle/18020451>

Preventable Disruptions

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

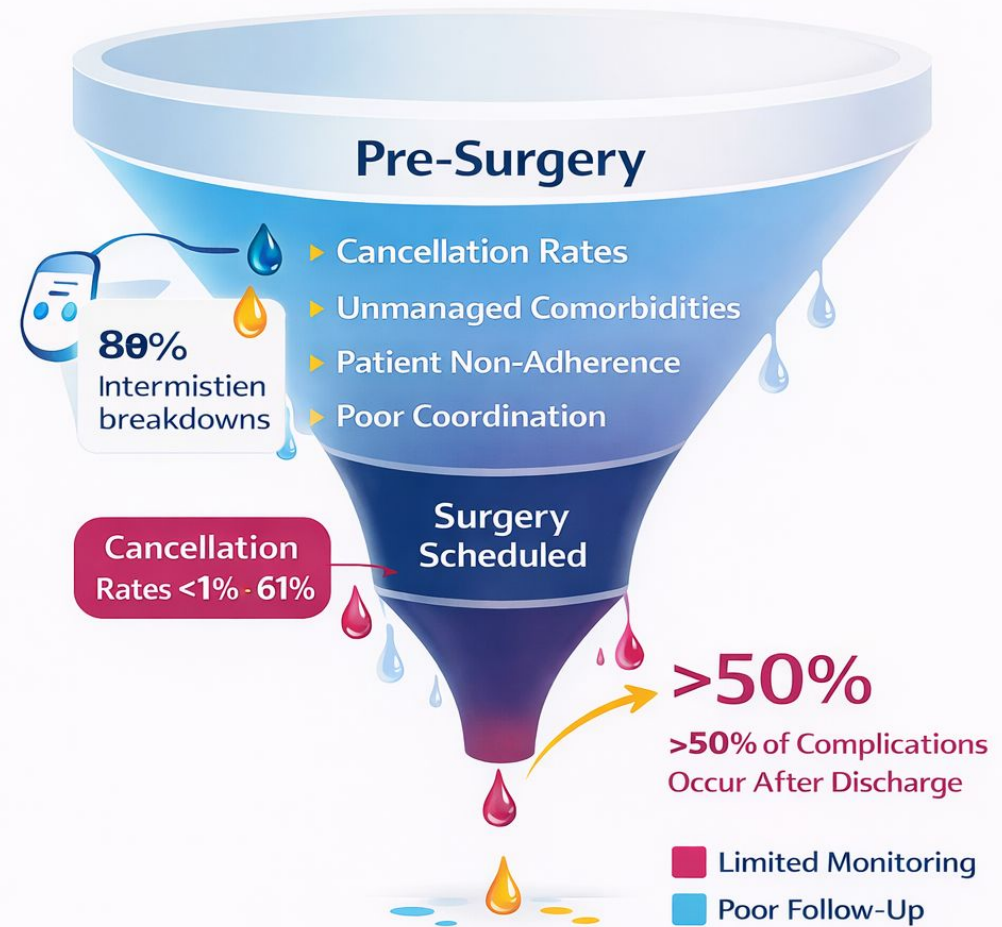
- Missing labs
- Unmanaged comorbidities
- Patient non-adherence
- Poor coordination

These are signals—not surprises.

International Journal for Quality in Healthcare –

<https://academic.oup.com/intqhc/article/33/2/mzab092/6294831>

Preventable Disruptions in Surgical Care



Poll Question 1

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

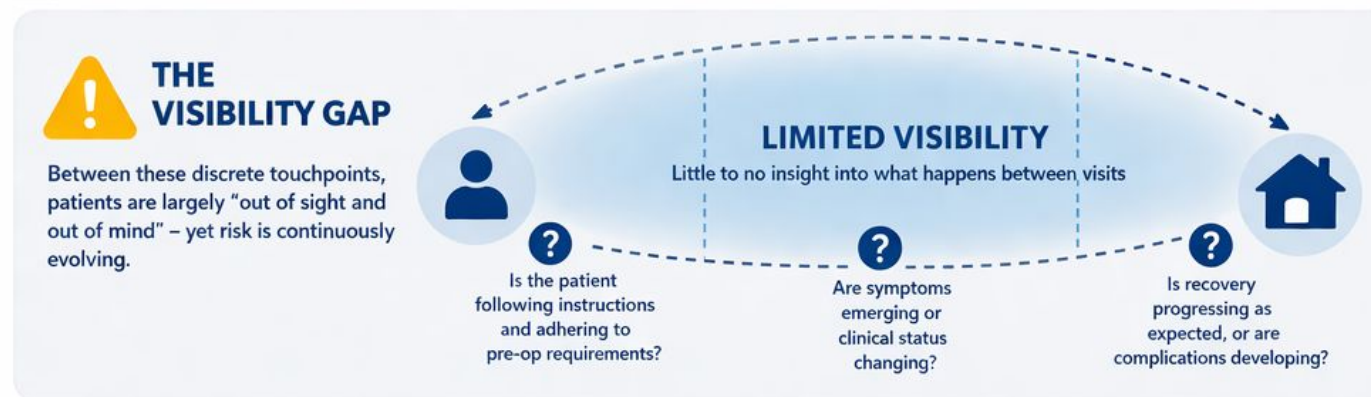
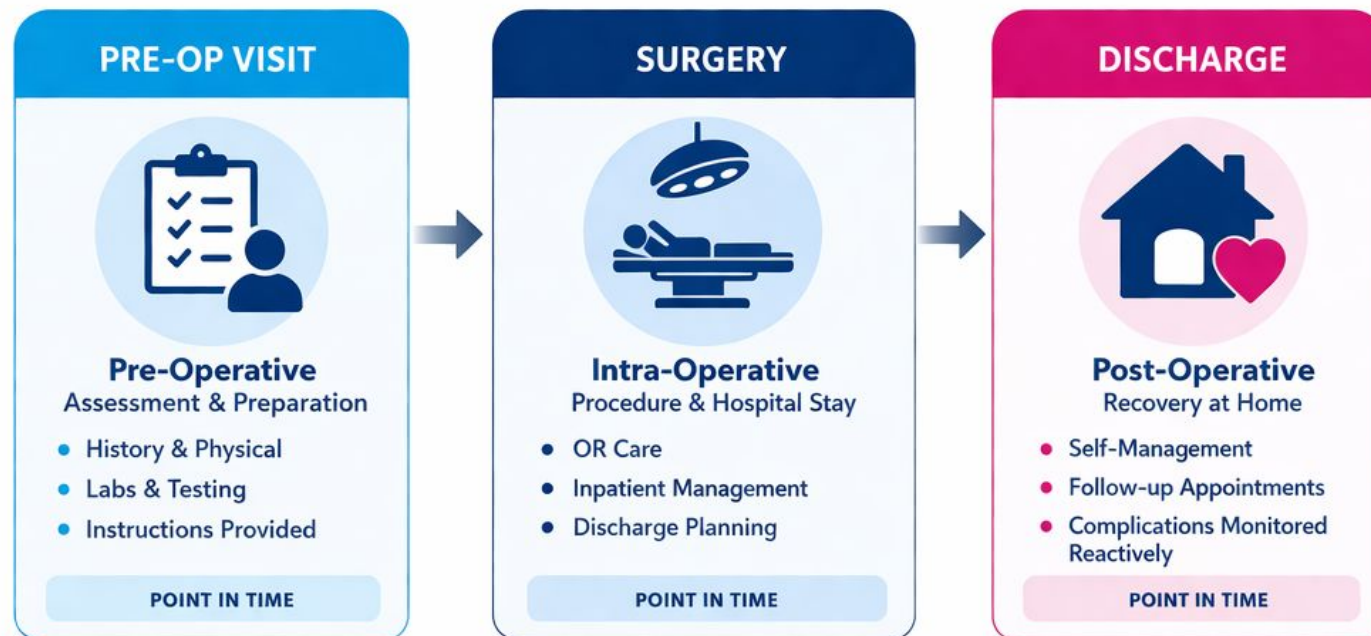
1. **Very confident** — we use predictive analytics to identify risk early
2. **Moderately confident** — we have risk stratification tools but limited prediction capability
3. **Somewhat confident** — we rely mostly on EHR or claims reports
4. **Not very confident** — we typically identify risk after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

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.

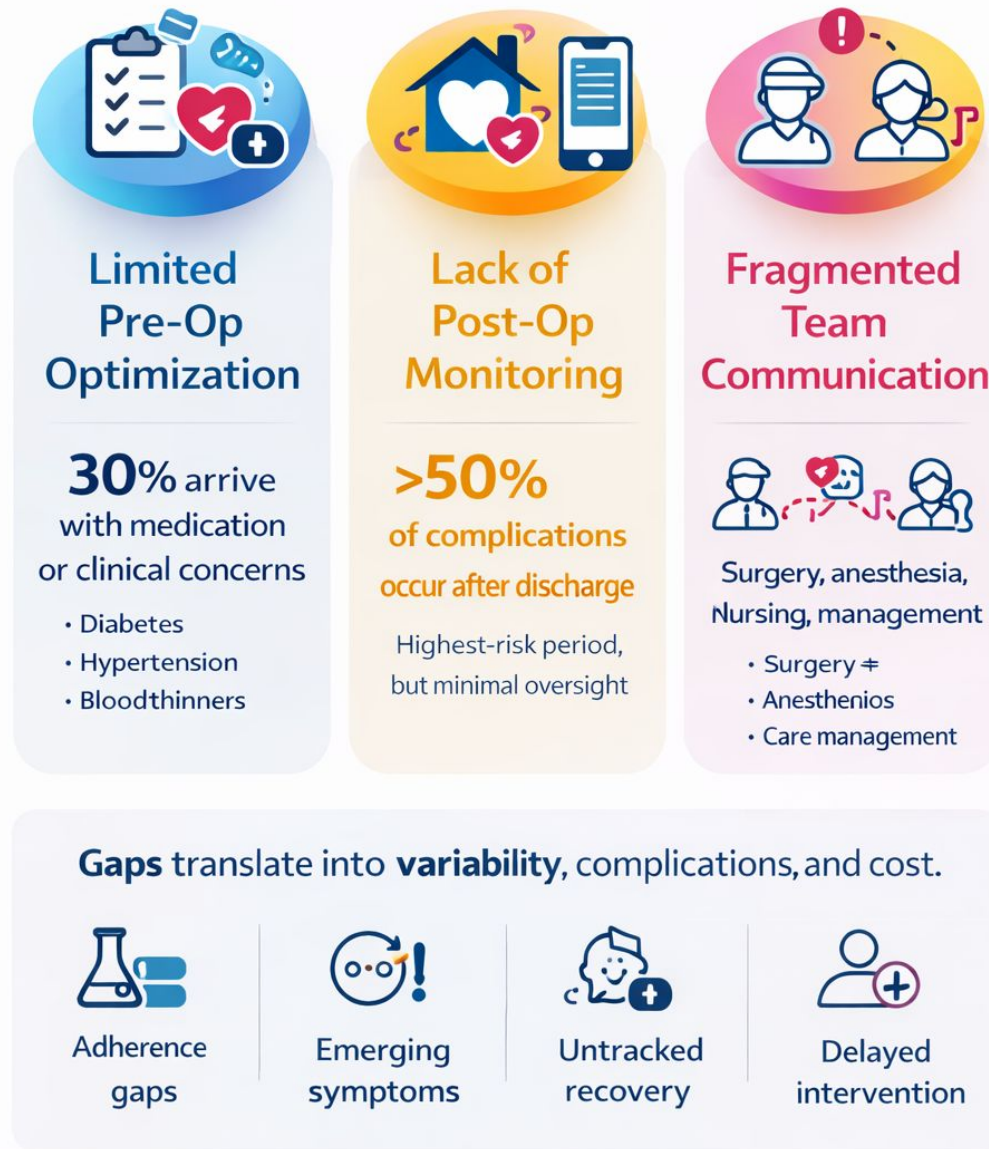


The Gap

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/>



Source: American College of Surgeons, 2021 (facs.org)

Timing Problem

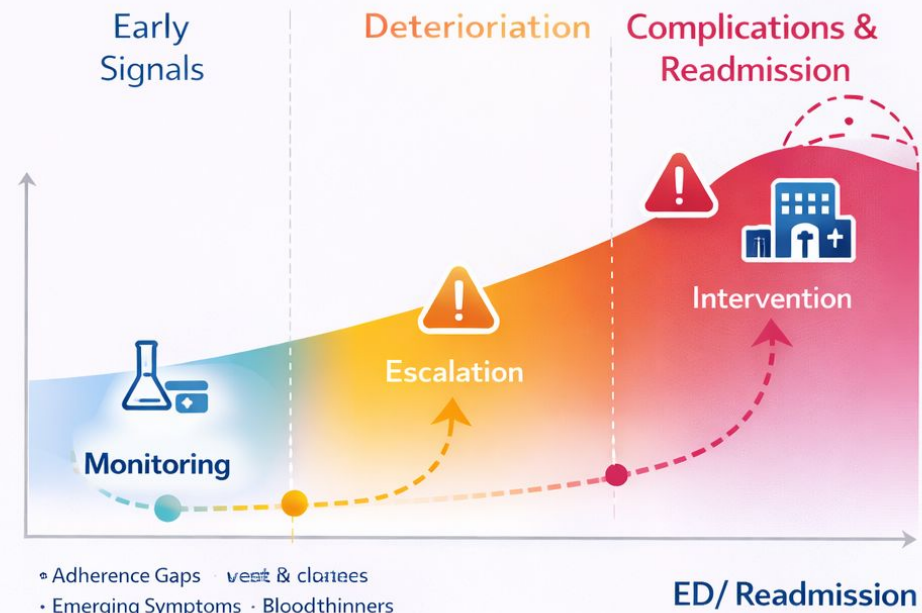
Complications rarely appear suddenly—they follow a progression.

There is an early signal phase:

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

Then deterioration begins.

The **Timing Problem** in Surgical Care



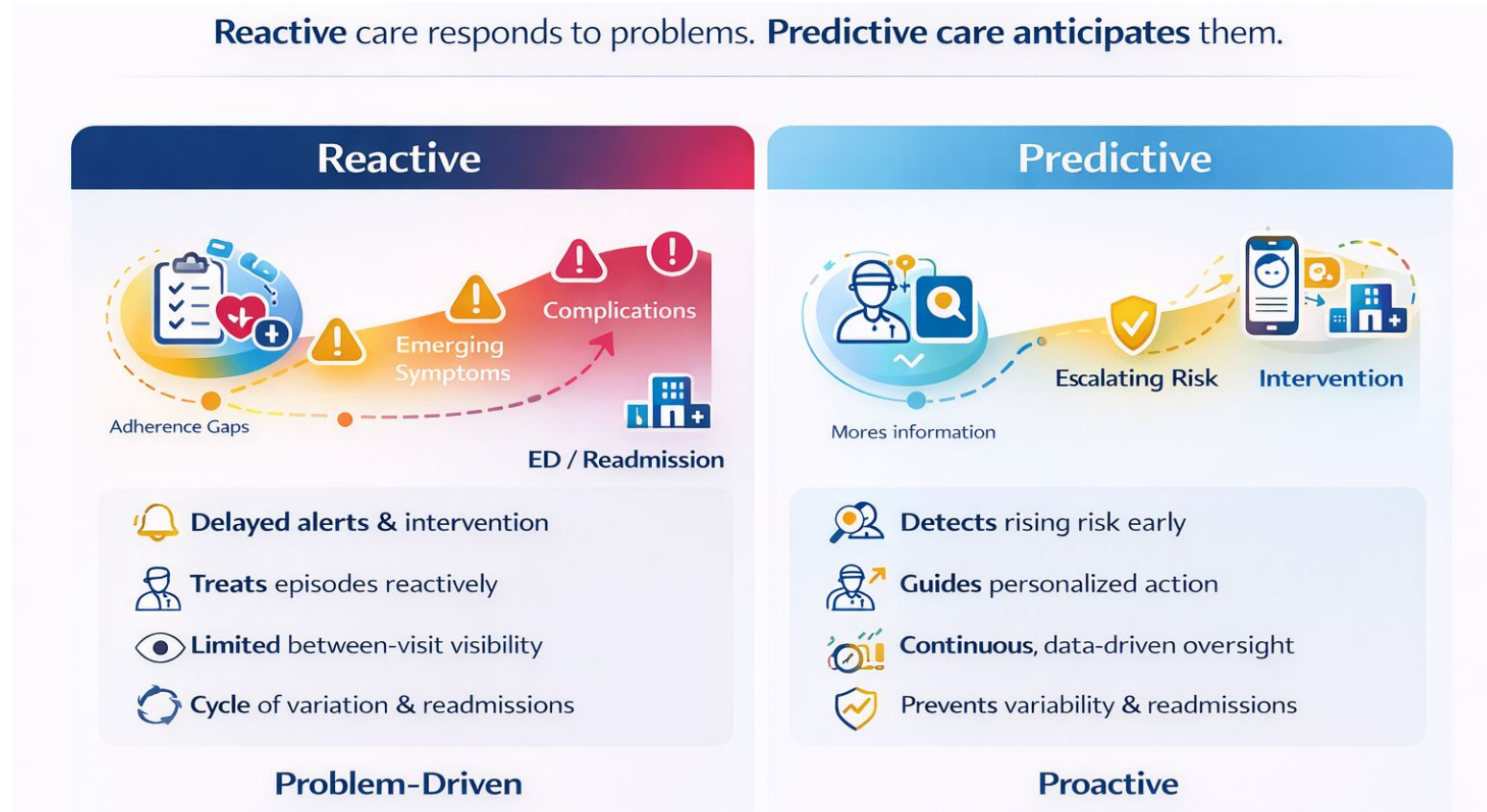
>50% readmissions occur **after discharge**

Traditional care models intervene when it's already too late.

Source: American College of Surgeons, 2021 (facs.org)

Reactive vs Predictive

Reactive care responds to problems. Predictive care anticipates them.



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

We Can Predict Much More

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

What We Can Predict

Predicting surgical risk with increasing accuracy—



 **Complications**

 **Treats** episodes reactively

 **Limited** between-visit visibility

 **Cycle** of variation & readmissions

Problem-Driven

 **Detects** rising risk early

 **Guides** personalized action

 **Continuous**, data-driven oversight

 **Prevents** variability & readmissions

Proactive

360° Health Data Sources

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

- Medication adherence
- Patient engagement
- Social determinants of health



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

The subtle signals that often precede complications,



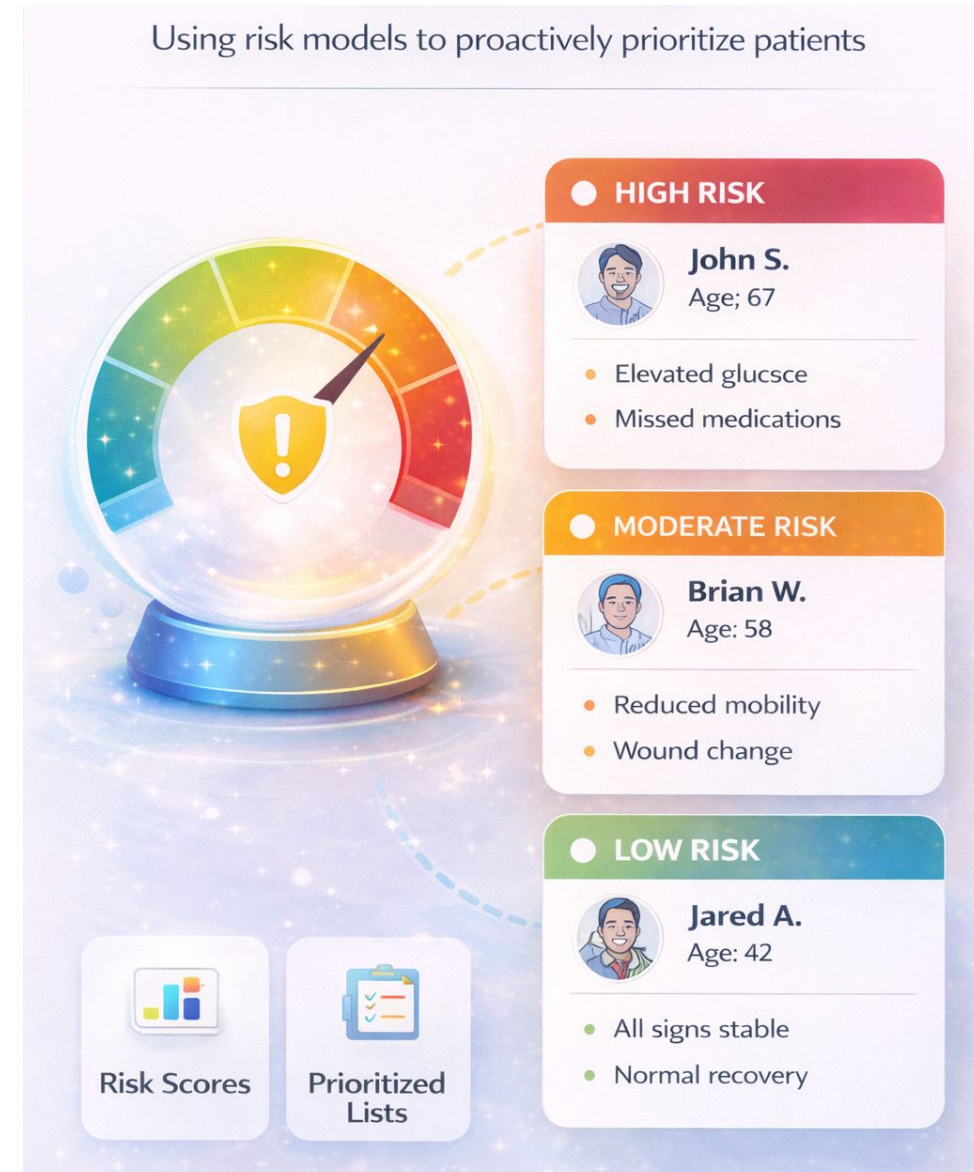
Poll Question 2

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

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

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



But Prediction Isn't Enough



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/jama-networkopen/fullarticle/2820097>

Pre-Op Optimization

Ensuring patients are optimized for surgery

Basic Checklist

Standardized Pre-Op Pathway

- 1 Control Diabetes
✓ Manage blood sugar levels
- 2 Review Medications
✓ Reconcile all prescriptions
- 3 Follow Pre-Op Instructions
✓ Perform breathing exercises

Steps Completed 3 of 3

-30%
FEWER COMPLICATIONS

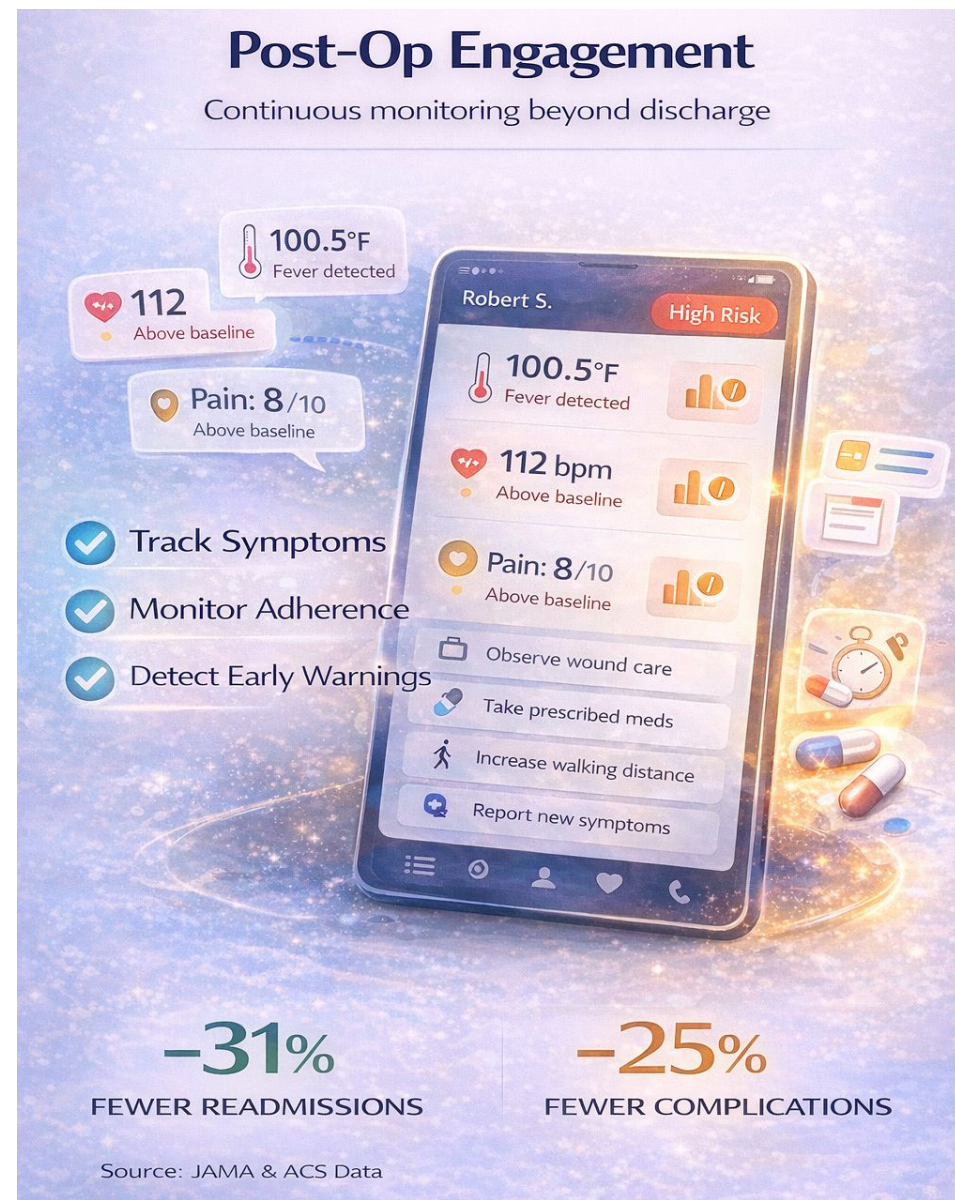
-1.8 days
SHORTER HOSPITAL STAY

Patients on enhanced recovery pathways*

JAMA • JAMA Study / JAMA Network Open, 2024

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



Digital Care Pathways

Digital pathways turn care plans into executable workflows—
guiding patients daily through recovery.

The image displays three smartphone screens, each representing a different digital care pathway. Each screen shows a personalized daily plan with tasks, progress indicators, and a 'View Full Pathway' button. The pathways are: 1. Knee Replacement Recovery (blue header), 2. Diabetes Management (green header), and 3. Heart Health & Hypertension (purple header). Each screen also includes a 'Good Morning' greeting and a progress gauge.

EXAMPLE: **Knee Replacement Recovery**
Stay on track and get back to doing the things you love.

EXAMPLE: **Diabetes Management**
Build healthy habits and improve your numbers.

EXAMPLE: **Heart Health & Hypertension**
Protect your heart and feel your best.

Example Includes:

- ✓ Pre-op preparation checklist
- ✓ Medication reminders
- ✓ Guided exercises and activity goals
- ✓ Symptom & wound tracking

One Plan. Daily Guidance. Better Outcomes.
Personalized pathways keep patients engaged, informed, and recovering stronger.

Example Includes:

- ✓ BP monitoring and trends
- ✓ Medication & appointment reminders
- ✓ Exercise and nutrition guidance
- ✓ Risk factor education and mindfulness

Poll Question 3



How automated is your patient engagement today?

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

Key Takeaways



The image displays four key takeaways in a grid format, each with a distinct icon and color scheme. The first card (orange) features a clipboard icon and discusses predictable surgical outcomes. The second (purple) features a shield icon and discusses prevention. The third (teal) features a heart icon and discusses continuous care. The fourth (blue) features a bar chart icon and discusses improved margins. Each card includes a title, a brief explanation, and a list of specific actions or features.

Icon	Key Takeaway	Explanation	Actions/Features
Clipboard	Surgical outcomes are predictable	Complications are not random—they follow patterns.	<ul style="list-style-type: none">Pre-op preparation checklistLabor-intensive, limited scale
Shield	Prevention is possible	We now have the tools to intervene earlier.	<ul style="list-style-type: none">Daily glucose trackingMedication adherenceGuided exercises and activity goals
Heart	Continuous care is required	Episodes don't end at discharge.	<ul style="list-style-type: none">Episodes don't end at discharge.Education tailored to you
Bar Chart	This model improves margins	This is not just better care—it is better business.	<ul style="list-style-type: none">BP monitoring and trendsMedication & appointment remindersExercise and nutrition guidanceStress reduction and mindfulness

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.

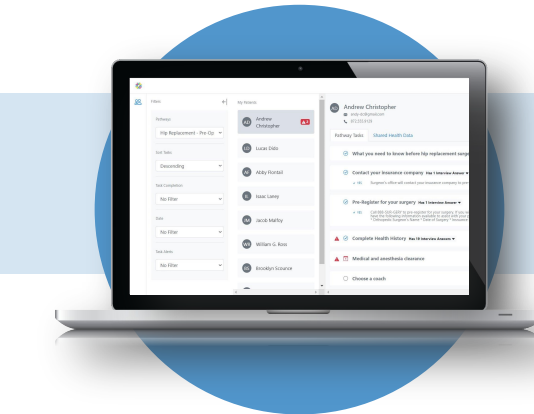
The Calcium Platform

For Organizations



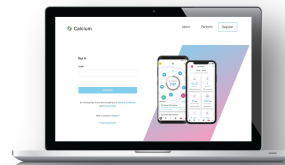
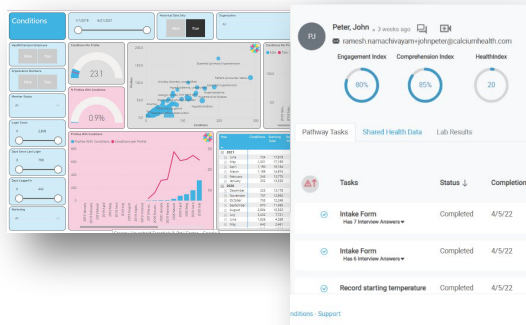
Calcium Core

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



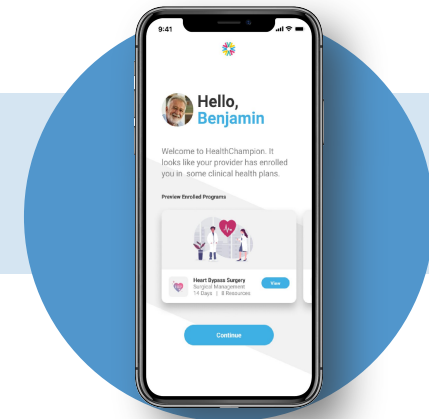
Calcium AI Studio

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



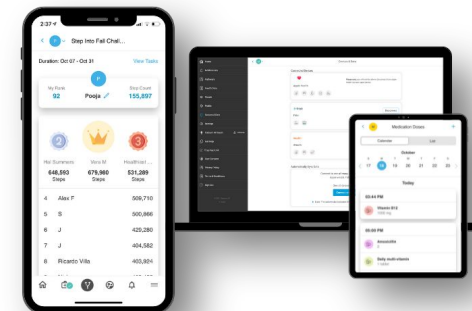
Easily sign-in to Calcium Core and Calcium Studio via desktop browser.

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)



Q&A

Stop by our VBCExhibitHall.com Virtual Booth:



Contact Information & Follow-Up

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