

AI FOR RISK-INTELLIGENT JOINTS & SPINE PROGRAMS

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SURGICAL CARE IS AT A PARADIGM SHIFT



Barber Craft



Science



Technology



Artificial Intelligence

AGENDA

1. How does AI enhance Surgical Care?
2. How does AI benefit ASCs (esp. Joints & Spine programs)?
3. What should ASCs look for in digital/ AI programs?

How does AI enhance Surgical Care?

1. PRECISION MEDICINE

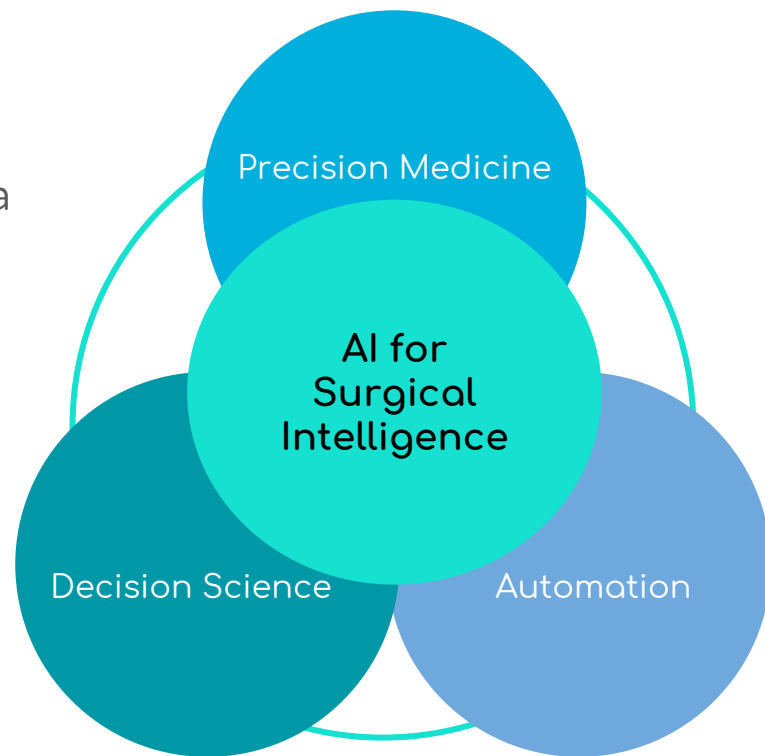
Personalize care with comprehensive rigorous data

2. DECISION SCIENCE

Optimize for risk through objective decisions

3. AUTOMATION


Error-proof entire workflow for consistent quality



1. PRECISION MEDICINE

Personalize care with comprehensive rigorous data

Precision
is already in the OR



The
Human
Genome
Project

National
Human
Genome
Research
Institute, NIH

> 3 BILLION DNA base pairs
comprising ~ 20,000 genes

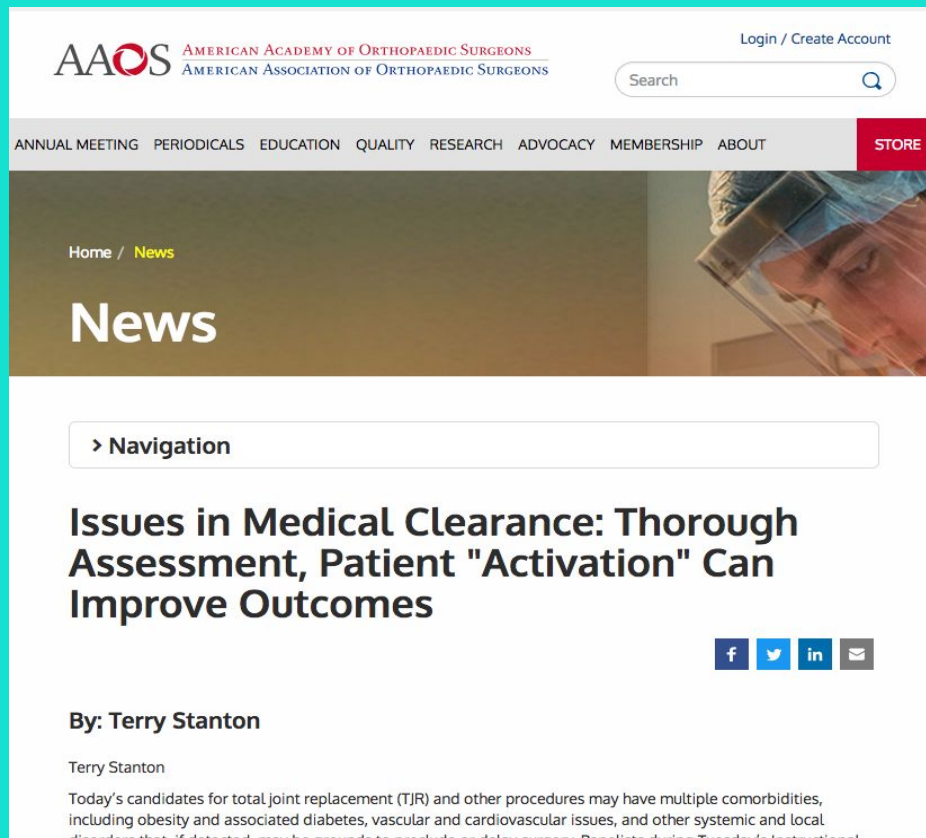


NIH HUMAN
MICROBIOME
PROJECT

10-100 TRILLION
microbial cells

But **personalized care**
demands data-driven AI

Surgery-Specific **Thorough Assessment** with **Personalized** Patient Activation is much better than relying on Medical Clearance.



The screenshot shows the AAOS website's news section. At the top, the AAOS logo is on the left, and 'Login / Create Account' is on the right. Below the logo is a search bar. A navigation menu includes 'ANNUAL MEETING', 'PERIODICALS', 'EDUCATION', 'QUALITY', 'RESEARCH', 'ADVOCACY', 'MEMBERSHIP', 'ABOUT', and a red 'STORE' button. The main content area features a large image of a surgeon in a mask and a 'News' heading. Below the heading is a 'Navigation' box. The article title is 'Issues in Medical Clearance: Thorough Assessment, Patient "Activation" Can Improve Outcomes'. Social media icons for Facebook, Twitter, LinkedIn, and Email are present. The author is listed as 'By: Terry Stanton'.

AAOS AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS
AMERICAN ASSOCIATION OF ORTHOPAEDIC SURGEONS

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Search

ANNUAL MEETING PERIODICALS EDUCATION QUALITY RESEARCH ADVOCACY MEMBERSHIP ABOUT STORE

Home / News

News

> Navigation

Issues in Medical Clearance: Thorough Assessment, Patient "Activation" Can Improve Outcomes

f t in e

By: Terry Stanton

Terry Stanton

Today's candidates for total joint replacement (TJR) and other procedures may have multiple comorbidities, including obesity and associated diabetes, vascular and cardiovascular issues, and other systemic and local disorders that, if detected early, may lead to more effective management. Data distribution trends in total joint replacement

AI offers both 100X more rigor in risk **assessments** as well as instantaneous **processing** of data with more variables.

Assessments must include factors beyond anesthesia questionnaires

PSYCHOSOCIAL

Caregiver/ Ride to PT
Self-Efficacy
Pain/ Opioids
Home Setup
Dental
PreOp MSK & Fall status
...

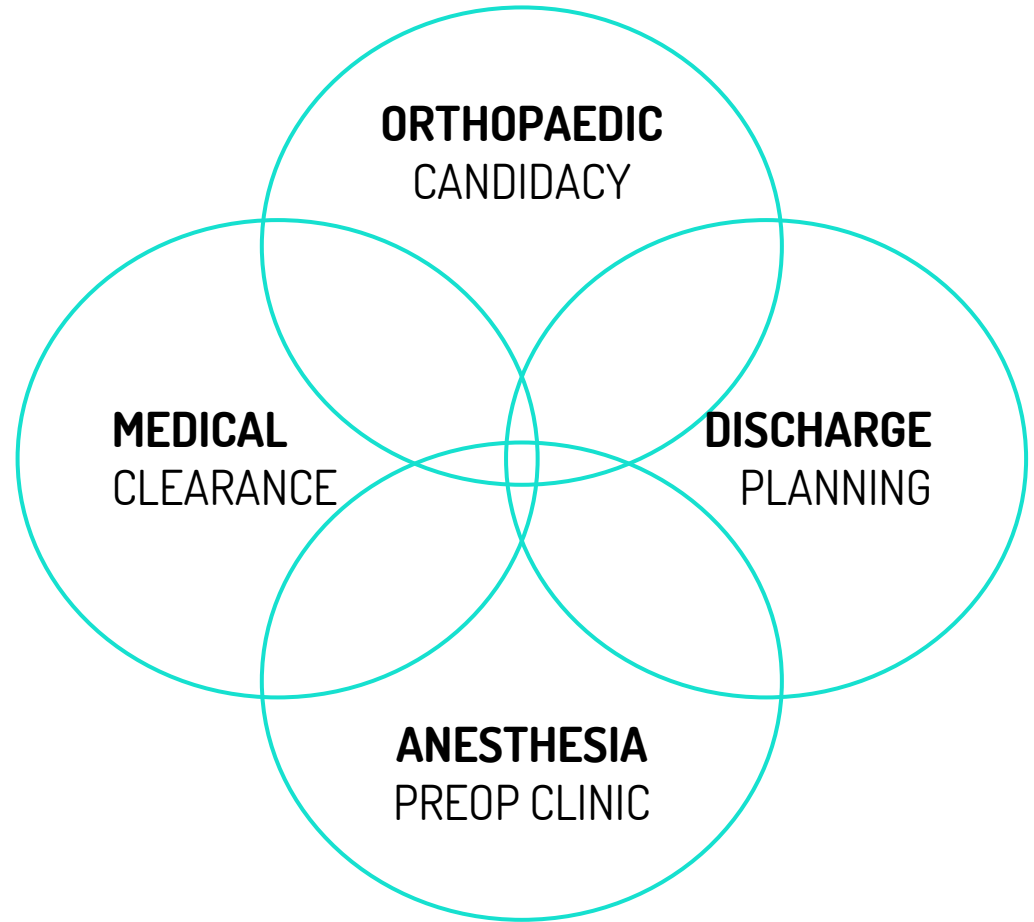
MEDICAL

Metabolic
CardioPulmonary
Family Hx of VTE
Undiagnosed (Diabetes,
OSA, Cardio, Cancer, etc)
Recent Infections
...

SURGICAL

Bilateral/ Spine Levels
Invasiveness
Expected Blood Loss
Incision-Closure Time
Anesthesia Type
Implants/ Equipment
...

AI combines all the variables to provide a comprehensive patient picture for actionable risk intelligence.



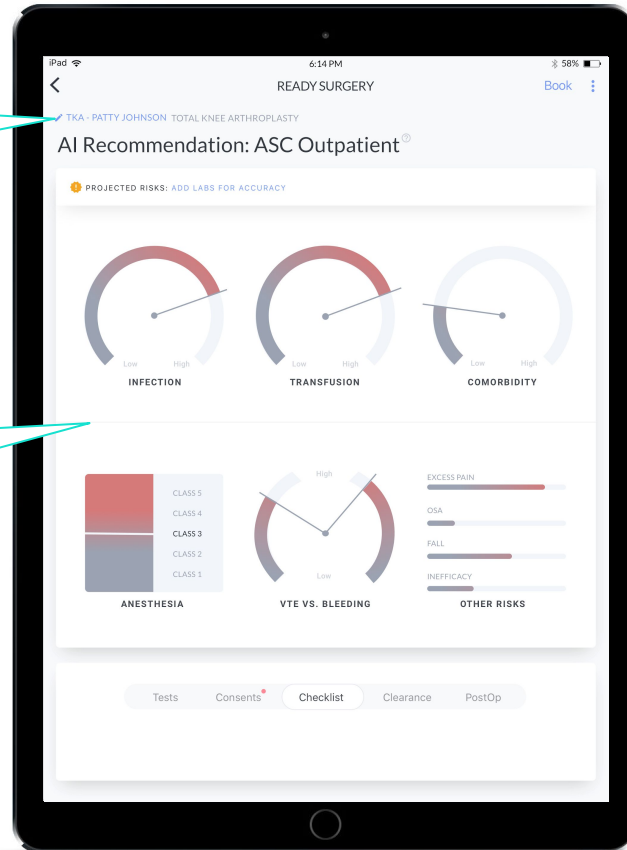


More data should not have to mean more paperwork to review or **data obesity!**

Intelligence is “data” that has been analyzed to provide insights.

Surgery-specific and patient-personalized

Risk breakdown by dimensions

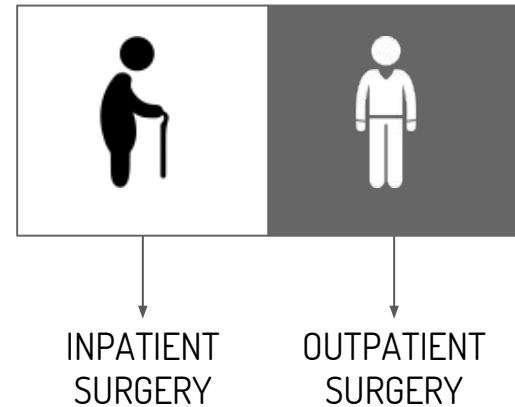
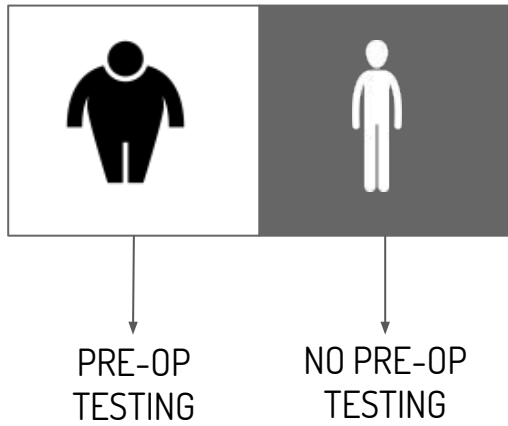


A personalized risk profile like this is closest to **augmented reality** in clinical decision making!

2. DECISION SCIENCE

Optimize for risk through objective decisions

Relying on simple **heuristics** for decision support, such as BMI and Age cut-offs, does not adequately optimize for **risk**.



Surgical candidates are getting **increasingly riskier** even as surgical demands, volume and expectations rise.

We need to address a riskier populace with better access and lower costs but **without compromising quality**

- **OLDER:** Every day 10K people turn 65
- **SICKER:** ~50% of adults have major risk factor for heart disease/ stroke
- **HIGHER ACUITY:** Higher life expectancy means more revision surgeries

Risk is no longer just a surgeon's problem!

Risk is inherently **difficult for human minds** to process consistently (experts-included) without objective data.

COGNITIVE LIMITS: experts fail with heuristics without data-driven objectivity

- Prospect Theory (Dr. Kahneman & Dr. Tversky); How humans choose between probabilistic alternatives that involve **risk**: Limited by cognitive biases (Optimism Bias, Ambiguity Effect, Availability Heuristic, Recency Bias, etc.)



That's a Nobel Prize winning concept already applied successfully in other industries!

COMPLEXITY: volume of & constantly evolving evidence require sophisticated analysis

- ~ 25-40K journals; >50M published articles, and growing (2.2M articles in 2016 alone)

TIME CONSTRAINTS: last minute review covers only immediate operative risks

- No time allotted for episode-level patient risks & mitigation actions when complete picture is unavailable

Over half of joints expected to transition to ASC.

Risk intelligence is required to capture that volume for ASC growth.

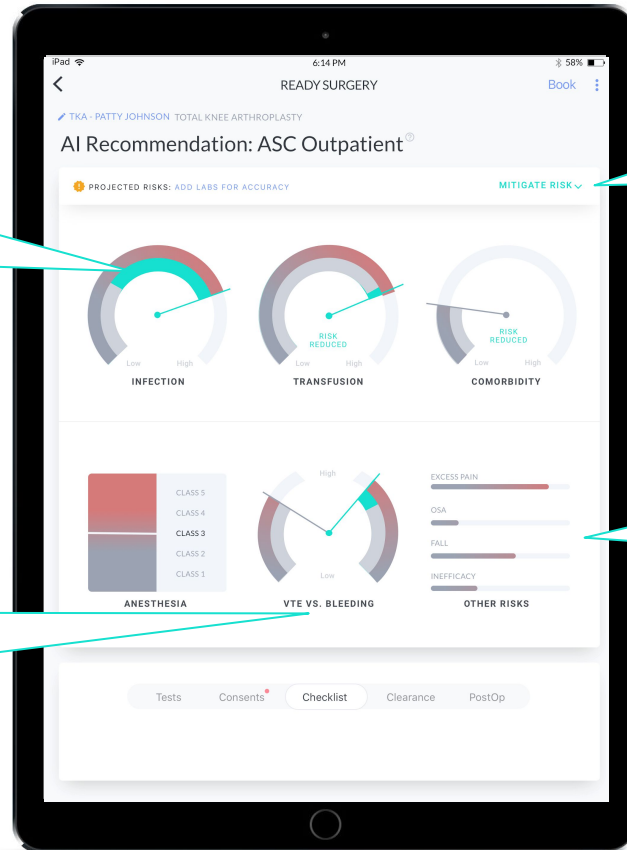
Offering **intelligent patient selection** gives your ASC first dibs at cases to avoid loss of appropriate cases & inefficient ASC utilization

- Outdated/ subjective criteria misdirect cases to 'Hospital'
- ASCs currently blind to potential opportunities
- Avoid surgeon-to-surgeon variability in patient selection
- Uncertainty or disagreements in anesthesia requirements cause friction for surgeons and deter ASC utilization
- Safety imperative requires nuanced criteria over heuristics

Risk Intelligence places the focus on risk mitigation

How much of this patient's Infection risk can be modified?

Should VTE Prophylaxis be adjusted in this case because of the *relative* Bleeding risk?



What specific actions can be taken to mitigate risks?

Pain/ Addiction, OSA (STOPBANG), Fall. risks for decision support

Risk Intelligence distills data into actionable recommendations

CANCELLATION AVOIDANCE

Wait for Work-Up vs. Proceed to Book

FACILITY

Surgery Center vs. Hospital

ADMISSION

Outpatient vs. 23 hour vs. Inpatient

DISPOSITION

Home vs. Home Health vs. Facility

BILATERAL SIMULTANEOUS SURGERY

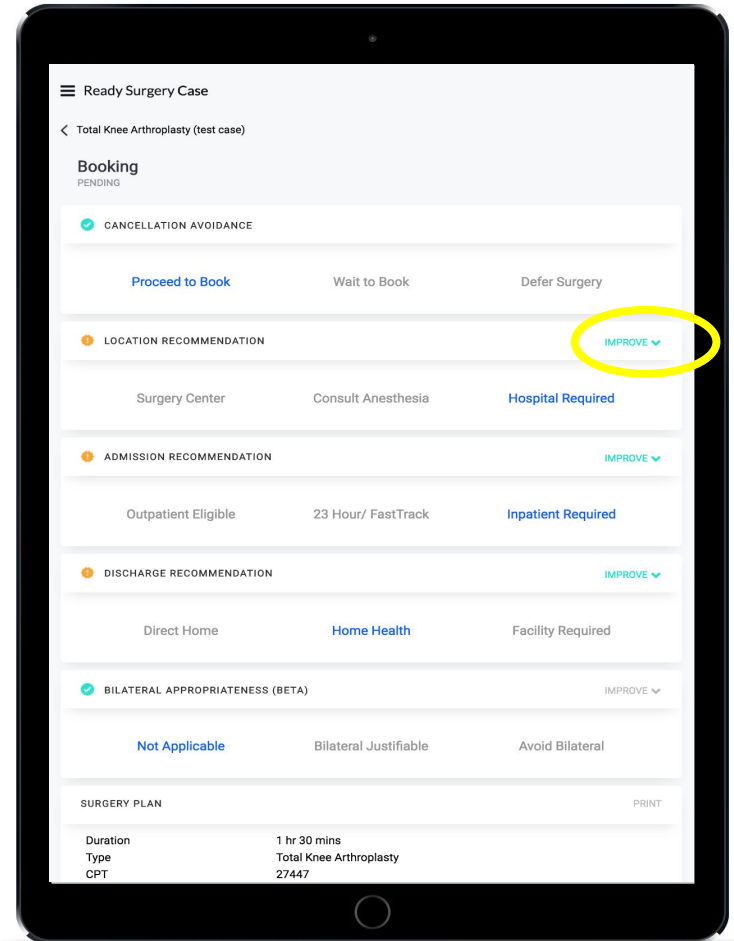
Appropriate vs. Avoid

TESTS & CLEARANCES

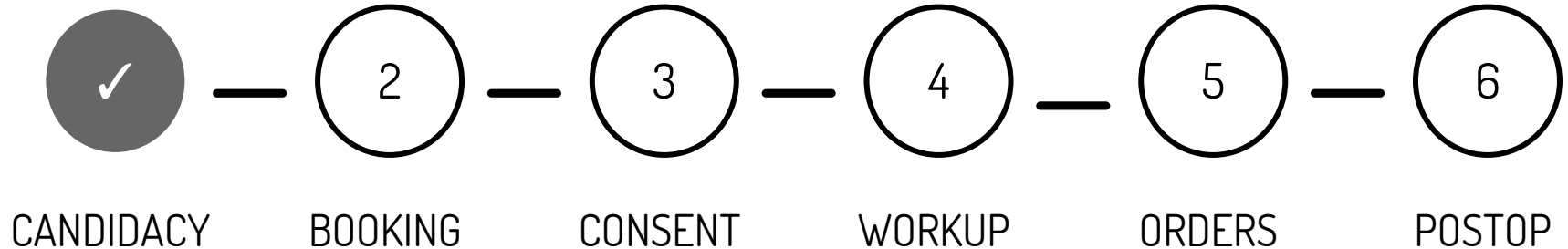
PT/INR, Metal allergy testing, EKG, Cardio/ Hematology consult, etc.

ORDERS

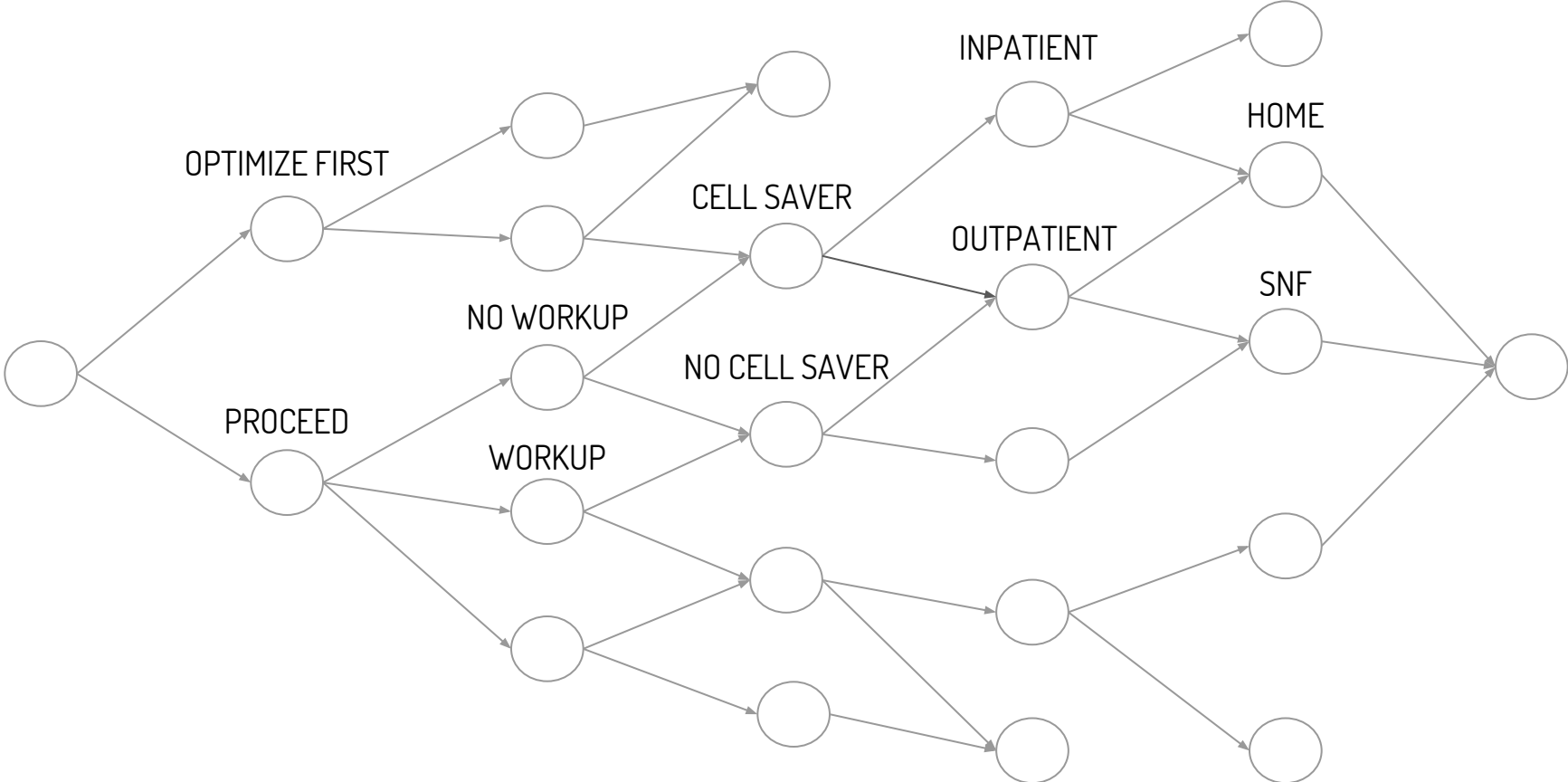
Anesthesia Type, ABX, VTE Prophylaxis, Demand-match implant, etc.



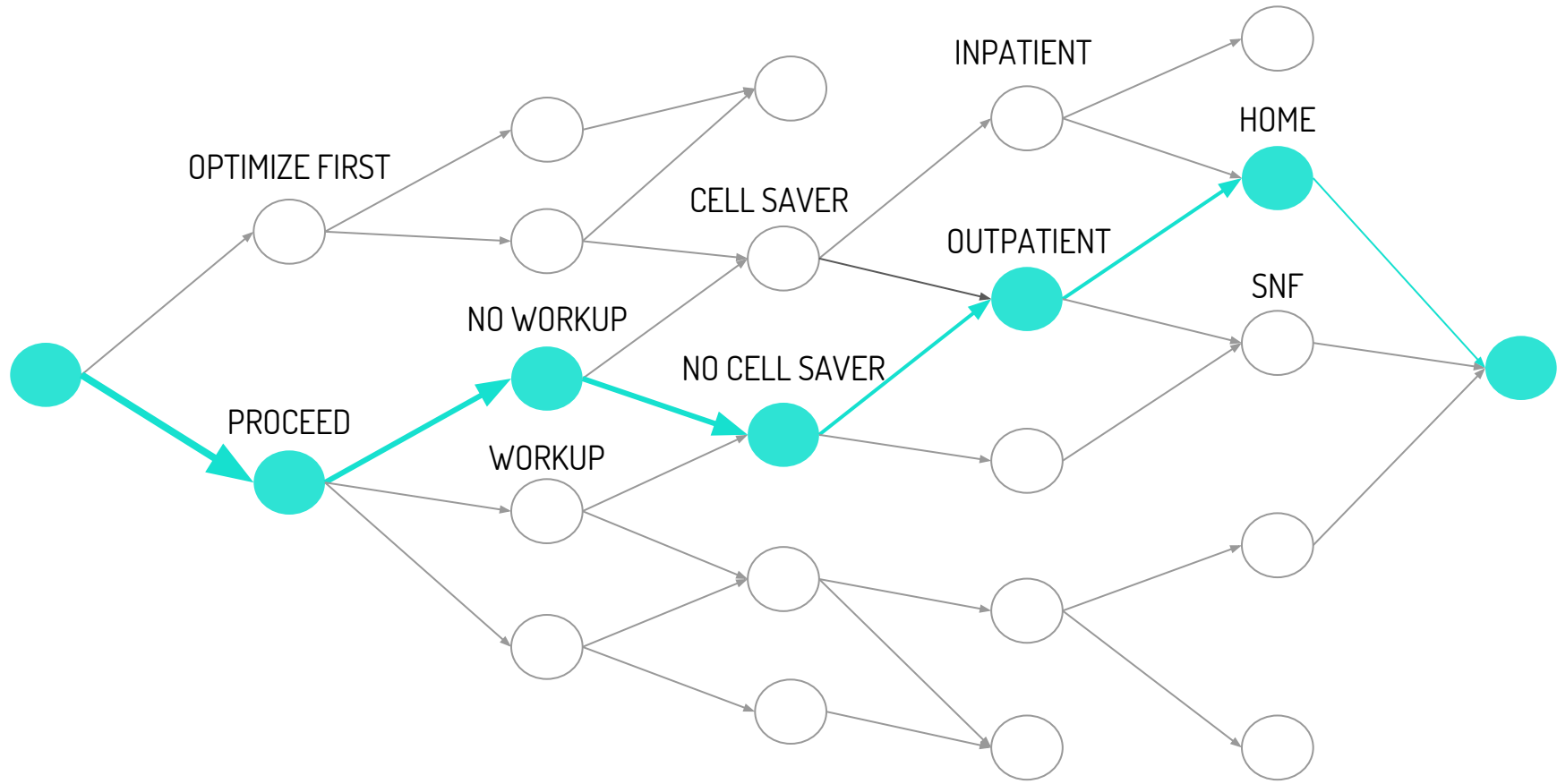
The current paradigm approaches surgery as a **decision point** followed by a series of operational steps



In Reality, Surgery is a **Decision Tree**



AI can identify the **Path Optimized for Quality + Cost.**



AI helps mind detractors of NET Value by **optimizing** every aspect of the surgical workflow **for risk**.

PATIENT HRQOL CHANGED

OUTCOME (Pain Reduced, Activity Restored)

- **COMPLICATIONS (Infection, Stroke, Pain Rx Addiction, PONV)**

RESOURCES UTILIZED

**Tests + Staff, OR & PACU Time + Equipment, Meds + ER Visits,
Readmissions, Transfusion, Revision + Hospital, SNF Stay**

NET VALUE =
OF SURGERY

3. AUTOMATION

Error-proof entire workflow for consistent quality

Current Workflow Inefficiencies

- Over-reliance on medical clearances
- Last minute cancellations
- Patient non-compliance
- Variable anesthesiologist expectations
- Anesthesia-Surgeon acrimony
- Stale EMR data & static sharing via fax
- Redundant testing
- Pre-op clinic visits
- Same day testing and delays
- Multiple patient touchpoints
- Duplicative data collection
- Blind contract negotiations
- ...

**AI can help an ASC create
Joint & Spine Programs
without hospital-like staffing,
bureaucracy and budgets.**

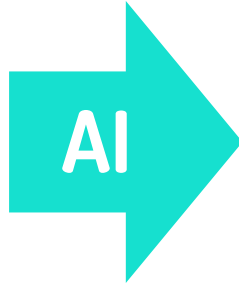
(disjointed PAT clinics, joint classes,
data collectors, nurse navigators, joint
coordinators, surgeon inefficiency...)

Automation delivers consistent outcomes with **reduced overhead** through intelligent process **simplification**

- ✓ Staff can focus on clinical quality rather than operational steps
- ✓ Team work is easier when avoiding redundancy through a single shared platform
- ✓ Personalized care can use less resources (staff time, calls, coordination) than standardization
- ✓ Digitizing fax, orders etc simultaneously gathers granular data for process improvement
- ✓ ASCs expected to deliver quality & management on par with hospitals. Automation keeps it lean.
- ✓ Operational efficiency critical in value-based payments. Don't under-serve; also don't over-serve!

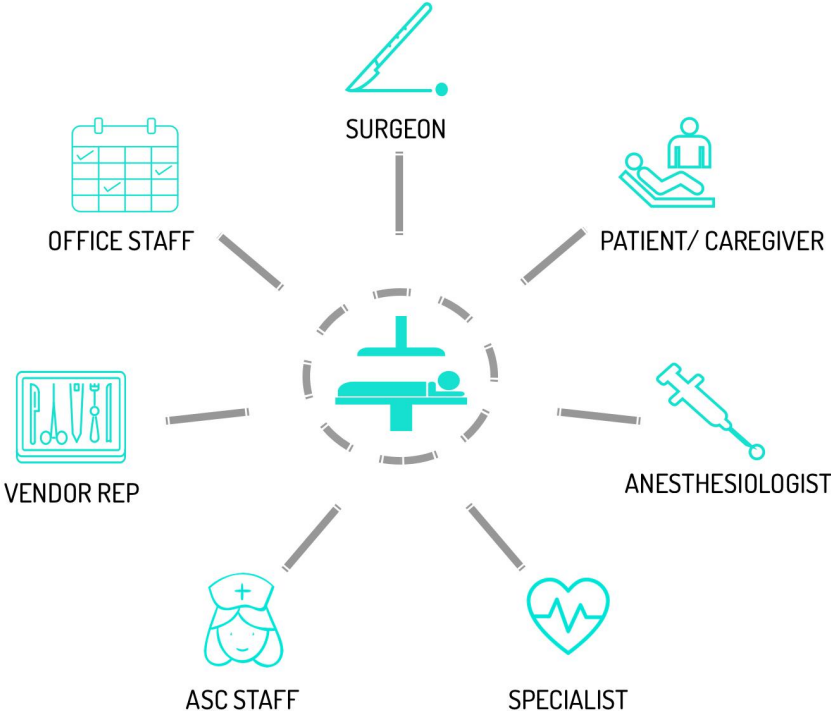
Overworked staff, paper & process → AI, mobile & automation: Paradigm Shift needs a digital **platform approach**, not one-off apps.

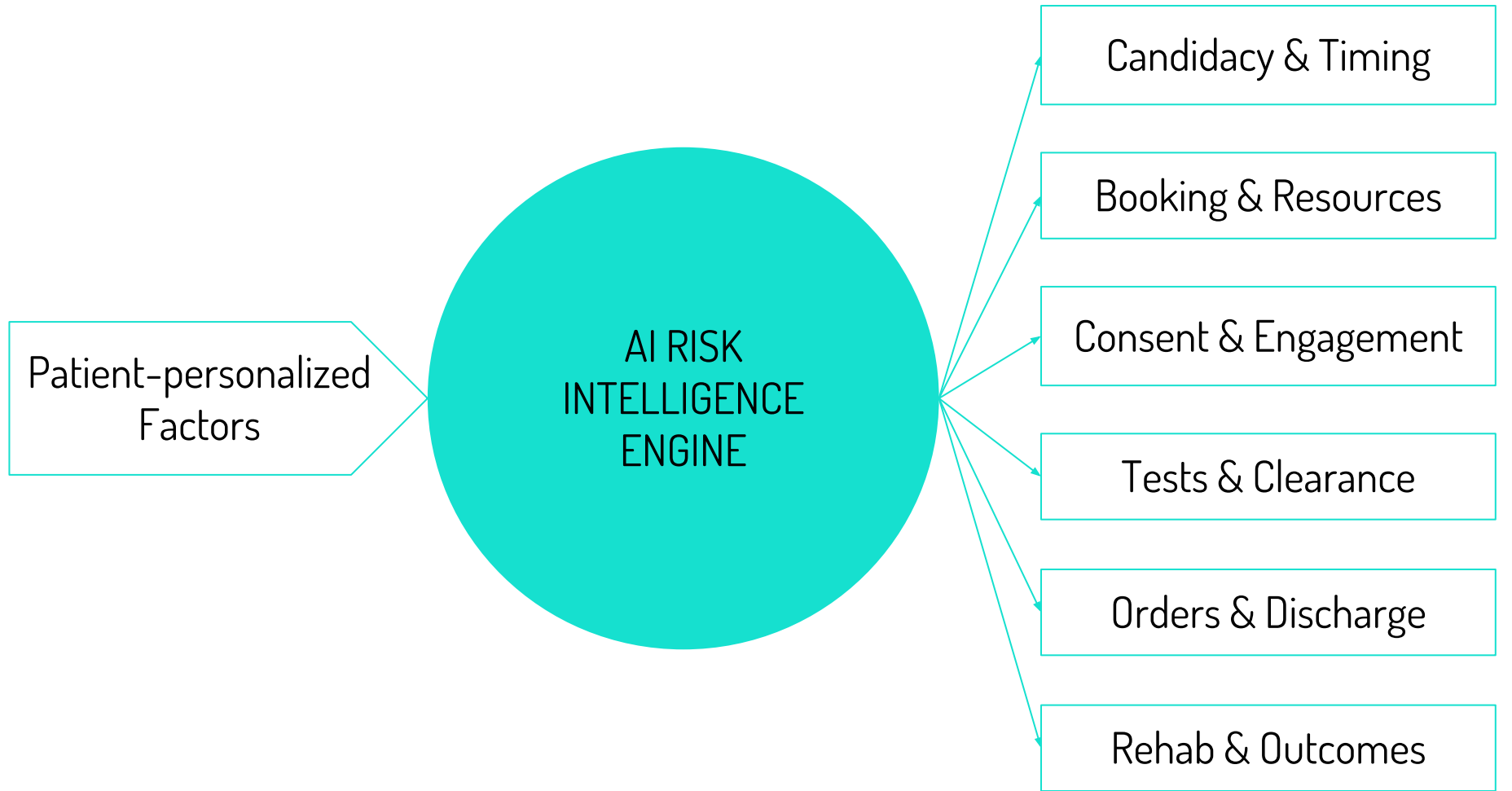
- Anesthesia Chart Review/ Clearance
- Preadmission Testing Clinic
- Preop Nurse Phone Call
- Joint Replacement or Spine Class
- Manual Instrument Ordering / Rep Coordination
- Booking Papers Faxed
- Standardized Protocols
- EMRs or Paper Charts
- Last minute paper consent
- Variable Outcomes - Increased Liability
- Manual Data Collection by Clinical Staff
- Limited ASC Quality Reporting
- Process based care delivery
- Manual Care Coordination
- ...



- AI Enhanced Risk Intelligence
- Efficient Preop optimization
- Patient Engagement Mobile App/ Text/ Email
- Video on-demand immersive education
- Automated Instrument / Rep Coordination
- Data-Driven Digital Booking
- Personalized Protocols
- Mobile Patient Risk Profiles
- Shared decision making/ risk based e-consent
- Risk-Adjusted Outcomes - Decreased Liability
- Workflow automation
- Outcome Reporting & Analysis
- Outcome based Care Delivery
- Cloud-based Care Coordination
- ...

A shared AI platform can **align the care team** with relevant insights and coordination for ALL stakeholders.





Patient-personalized
Factors

AI RISK
INTELLIGENCE
ENGINE

Candidacy & Timing

Booking & Resources

Consent & Engagement

Tests & Clearance

Orders & Discharge

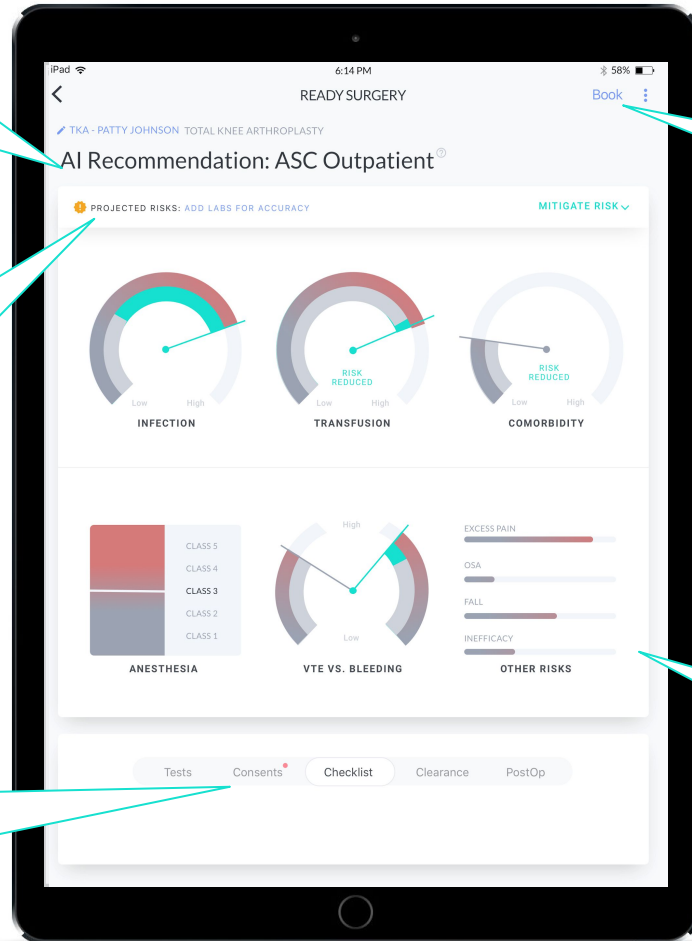
Rehab & Outcomes

Risk Intelligence fosters workflow integration via a shared experience

Is patient Outpatient Eligible?

Preliminary risk before labs;
refined if labs are added

Seamlessly integrate full
workflow in one place



Automation enables easy
implementation of
recommendations in workflow

Target patient engagement/
rehab efforts with nuanced
intelligence on inefficacy

**HOW DOES AI BENEFIT AN ASC
(ESP. JOINTS & SPINE PROGRAMS)?**

WHAT CAN AN AI PLATFORM HELP ASCS WITH?

1. **Select** safe patients for outpatient joints & spine
2. **Grow** ASC volume with maximal access to cases
3. **Align** anesthesiologists & surgeons to avoid cancellations
4. **Reduce** practice & ASC staff overhead using automation
5. **Benefit** from bundles, value-based and risk contracting

AI simplifies work to refocus team on consistent clinical quality.

Individual medical heroics are for the TV shows!
Surgical Care is a team sport.

- Shared **dashboard** promotes working together on a quality-focused common mission
- **Automation** provides process consistency & frees up staff for higher-order tasks

AI IS A-POLITICAL.
No opinions. Pure intelligence.

Nurses: Less work

Surgeons: Less complications

Patients: More personalization

Anesthesia: Less surprises

ASC: More cases

ALL OF US: BETTER OUTCOMES

AI Platform helps you own your numbers.

As care transitions to ASCs, so will hospital-level quality reporting:

- Complications rates already publicly available
- Payers measuring & nudging patients based on “value”
- Prepare to transition to risk-managed care. Leverage your quality and “value” data to negotiate contracts.
- Own your before and after (Risk-adjusted numbers)

**Transparency and Accountability means
ASCs need to manage their own “numbers”.**

The screenshot displays the Medicare.gov Hospital Compare interface. At the top, there are navigation links for 'Español', 'Print', 'About Us', 'Glossary', 'CMS.gov', and 'Medicare.gov'. The main header reads 'Medicare.gov | Hospital Compare' and 'The Official U.S. Government Site for Medicare'. Below this are tabs for 'Hospital Compare Home', 'About Hospital Compare', 'About the data', and 'Resources'. The breadcrumb trail shows 'Home > Hospital Results > Hospital Profile'. The 'Hospital profile' section includes tabs for 'Back to Results', 'General information', 'Survey of patients' experiences', 'Timely & effective care', 'Complications & deaths', 'Unplanned hospital visits', and 'Use of medical imaging'. The 'Complications & deaths' tab is active, showing details for Sequoia Hospital (170 ALAMEDA DE LAS PULGAS, REDWOOD CITY, CA 94062). It includes an overall rating of 4.5 stars, a distance of 5.8 miles, and a link to 'Surgical complications'. Below this, there is a section for 'This Surgeon's Procedures' with tabs for 'Knee Replacement' and 'Hip Replacement'. A detailed explanation follows: 'How we calculated these rates: Guided by top researchers and doctors, ProPublica used Medicare data from 2009-2013 to identify cases who died in the hospital or had to be readmitted within 30 days for a problem related to one of these elective procedures. We then calculated complication rates for each surgeon, carefully accounting for differences in patient health, age and hospital quality. These rates are calculated using data from Medicare reports that do not include patients with private insurance or in another program like Medicaid. A surgeon's rate spans all hospitals at which he or she operates unique to a given hospital. Read our methodology >'. A note says 'Hover over underlined items to see details.' The 'Knee Replacement' section shows a total of 277 times performed, 26 complications, and a 9.4% raw complication rate. A bar chart compares this to other surgeons, with the 'This Surgeon' bar at 4.6%. The 'Hip Replacement' section is partially visible at the bottom.

WHAT SHOULD ASCS LOOK FOR IN DIGITAL/ AI PROGRAMS?

HINT: Don't simply digitize with apps. Insist on risk intelligence!

What should ASCs look for in digital AI programs?

- ✓ **Intelligent Assessment:** Thorough, adaptive & pre-processed; not just collecting answers. AI algorithms can process data into insightful breakdown of risk throughout the episode.
- ✓ **Visualizations:** have impact while saving time; provide clarity to make risk mitigation actionable
- ✓ **Personalized Patient engagement:** With checklists & shared understanding of risk; not just reminders
- ✓ **Modular:** Base platform must help identify risk. Then add risk-intelligent modules: consent, engagement...
- ✓ **One-click Reports:** Number of ASC-eligible cases, cancellations/ delays due to risk, risk-adjusted complication rates/ adverse events, PROs/ custom measures for certifications like Blue Distinction, etc
- ✓ **Mobile friendly:** iPads in office or ASC, iPhone for surgeons & anesthesiologists with Fingerprint ID
- ✓ **Machine learning:** Risk predictions and recommendations keep improving as you add more cases

SUMMARY TAKE AWAY POINTS

1. AI-enhanced Risk Intelligence is required both to avoid complications as well as to give all stakeholders the **confidence** to do more high acuity cases safely at the ASC.
2. AI-driven Automation attracts more surgeons with a **frictionless workflow** avoiding hospital-level overhead.
3. Personalized AI-based **risk & value optimization** is the next frontier in allocating appropriate resources without compromising quality - that's where reimbursements are headed.

Questions?

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