ASPIRE Outcome Measure Design:

Risk adjustment, provider attribution, and healthcare value

http://mpog.org/wp-content/uploads/2018/07/QI-Story_HenryFord_Hightower.pdf

Michael Mathis, MD

Assistant Professor of Anesthesiology

Director, Cardiothoracic Anesthesiology Research

University of Michigan Medical School

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MULTICENTER PERIOPERATIVE
OUTCOMES GROUP

Tenets of the Ideal Outcome Measure for QI

- Variation in the outcome **_exists_** and is **_measurable_**

- Variation is **_attributable to providers_** (at least in part) participating in the QI collaborative

- All remaining variation in the outcome is explained by factors which can be measured and **_risk-adjusted_**
  - Patient characteristics
  - Surgical characteristics

- Providers have an **_opportunity to intervene_**
  - Enables a plan for how to improve

- Outcome has significant **_healthcare value_**, as supported by evidence
  - Ensures focus on the right measures

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How can MPOG achieve these ideals?

- Current outcome measures
  - **AKI 01**: Preventing Acute Kidney Injury
  - **CARD 02**: Avoiding MI (Troponin I <0.6)
  - **TRAN 02**: Post Transfusion Monitoring

Tenet #1: Provider Attribution

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  - Who is responsible?

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Surgeon / Proceduralist	Direct injury, physiologic insult, nephrotoxins

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Provider	AKI Mechanism
Anesthesiologist	Hemodynamics, fluid management, diuretics, glycemic control
Surgeon / Proceduralist	Direct injury, physiologic insult, nephrotoxins
Other	Pre-existing CKD, comorbid conditions, lifestyle factors
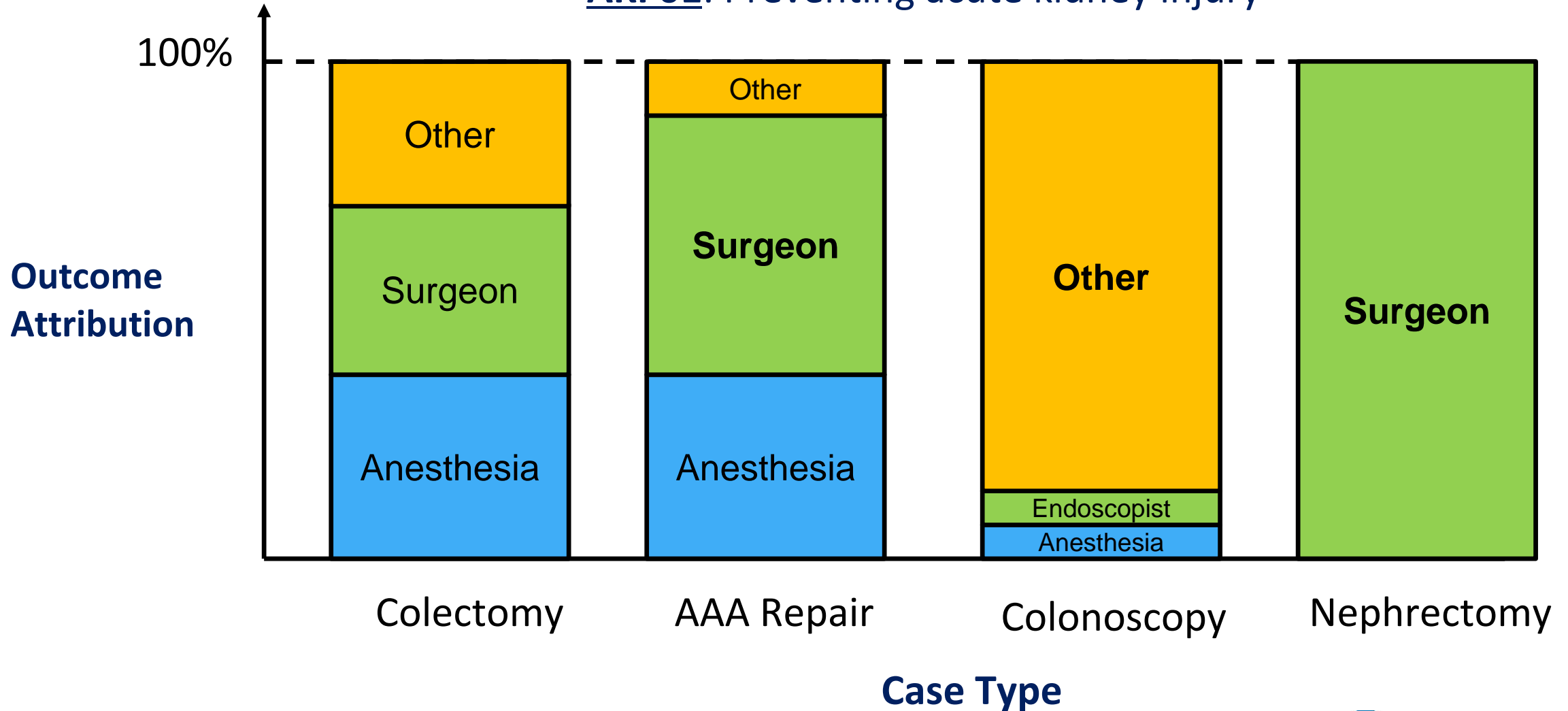
Tenet #2: Risk Adjustment

- What is it?
  - Method to more accurately assess performance, accounting for baseline risk

- Why do we need it?
  - Establishes basis for comparison across providers/institutions with varying baseline risk
  - Isolates component of outcome *attributable to the anesthesiologist*

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Tenet #2: Risk Adjustment

- How does it work?
  - Compares a provider's _observed_ performance to what was _expected_

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  - Compares a provider's _observed_ performance to what was _expected_
  - Two example providers:

	Case Type Performed	# Cases _observed_ to have AKI
Provider A	100 AAA repairs	20
Provider B	100 colonoscopies	3

  - Who is doing better?
  - Incidence of AKI:
    - Provider A → 20%
    - **Provider B → 3%**

Tenet #2: Risk Adjustment

- Using Risk Adjustment:

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Tenet #2: Risk Adjustment

- Using Risk Adjustment:

	Case Type Performed	# Cases *observed* to have AKI	# Cases *expected* to have AKI
Provider A	100 AAA repairs	20	80
Provider B	100 colonoscopies	3	2

- – Incidence of AKI:
  - – Provider A → 20%
  - – **Provider B → 3%**
  - – Comparing provider's *observed* performance to what was *expected*:

Tenet #2: Risk Adjustment

- Using Risk Adjustment:

	Case Type Performed	# Cases *observed* to have AKI	# Cases *expected* to have AKI	Observed / Expected (O/E) Ratio
Provider A	100 AAA repairs	20	80	20/80 = 0.25
Provider B	100 colonoscopies	3	2	3/2 = 1.50

  - Incidence of AKI:
    - Provider A → 20%
    - **Provider B → 3%**
  - Comparing provider's *observed* performance to what was *expected:*
    - **Provider A → 0.25**
    - Provider B → 1.50

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Tenet #2: Risk Adjustment

- Analogous to Degree of Difficulty:

- **Execution**: 9 out of 10

- **Degree of Difficulty**: x1.0 (cakewalk)

Colonoscopy

- **Execution**: ? out of 10

- **Degree of Difficulty**: x5.0 (extremely challenging)

AAA Repair

Tenet #2: Risk Adjustment

- **Variables considered in risk adjustment**
  - **Patient characteristics**
    - Demographics: age, gender, BMI
    - ASA status
    - Comorbidities: renal insufficiency, HTN, HF, diabetes, CAD, liver disease, etc.
    - Labs: hemoglobin, creatinine
  - **Surgical characteristics**
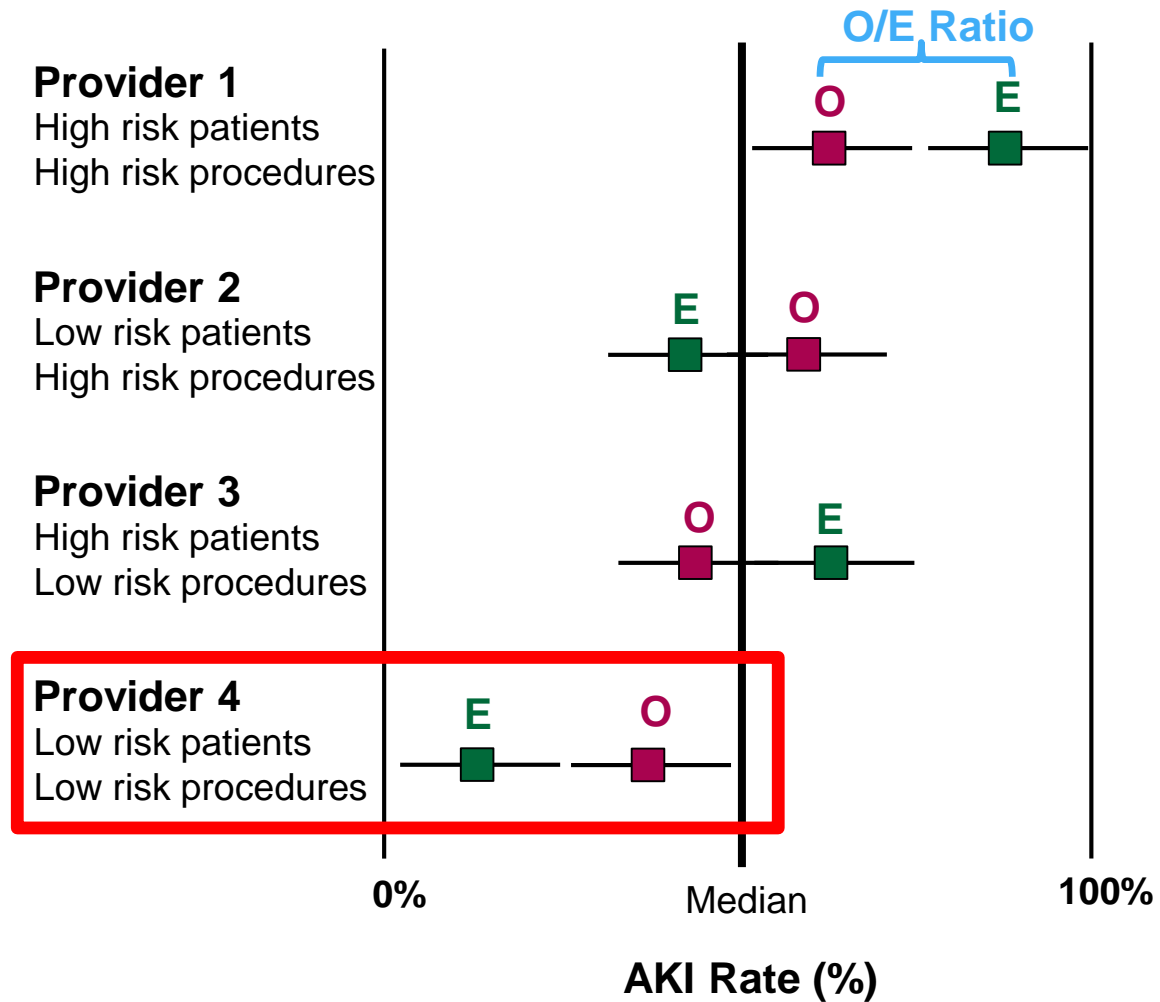   - Procedure type (anesthesia CPT code)
    - Emergent / elective
  - **Center characteristics**
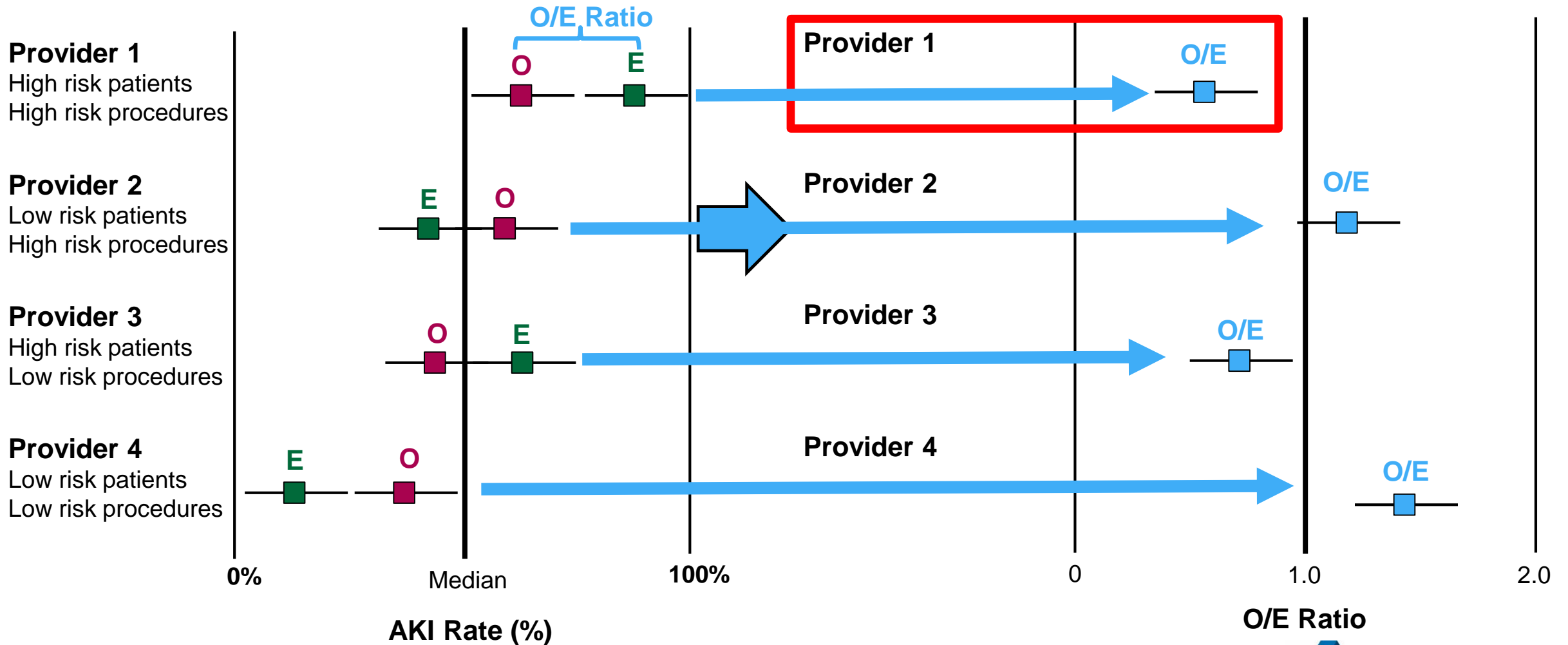   - Teaching vs. private hospital

Tenet #2: Risk Adjustment

- Observed/Expected (O/E) Ratio

Tenet #2: Risk Adjustment

- Observed/Expected (O/E) Ratio

Tenet #3: Opportunity to Intervene

- Necessary for:
  - Identifying cases for which provider has a plausible means to improve outcome

- Ideally, tied to process of care measures
  - Example: Intraoperative hypotension (process of care) associated with AKI (outcome)
  - Creates ability to refine **_provider attribution_**, and guide how to improve

Tenet #3: Opportunity to Intervene

- **AKI 01**: Preventing acute kidney injury
  - **Exclusions**
    - Pre-existing renal failure
    - ASA 5 & 6
    - Surgeries with direct kidney injury (e.g. nephrectomy)
    - Short, extremely low risk procedures (ECT, pain, obstetric non-operative)
  - **Process of care measures**
    - Low MAP prevention
    - (Others)? → fluids, glycemic control, transfusion

Tenet #4: Healthcare Value

- Necessary for:
  - Allocating anesthesiologist attention & resources to solve the right problems

- **Benefits of a quality measure:**
  - Improves patient care
  - Reduces downstream costs associated with complications

- **Costs of a quality measure:**
  - Distracts providers from other *unmeasured* important care processes
 - Produces upstream implementation costs

Tenet #4: Healthcare Value

- **Maximizing Anesthesiologist Value**
  - Outcomes with **_high healthcare value_** tend to:
    - Be more distant from intraoperative period
    - Be less directly associated with intraoperative anesthesiology care
  - Outcomes with **_high anesthesiology provider attribution_** tend to:
    - Be more proximal to the intraoperative period
    - Be less directly associated with long-lasting healthcare value

  - **Anesthesiologist Value** = (Overall healthcare value) x (Anesthesiology attribution)

Tenet #4: Healthcare Value

- **Outcome time horizon** – provider attribution / healthcare value tradeoff
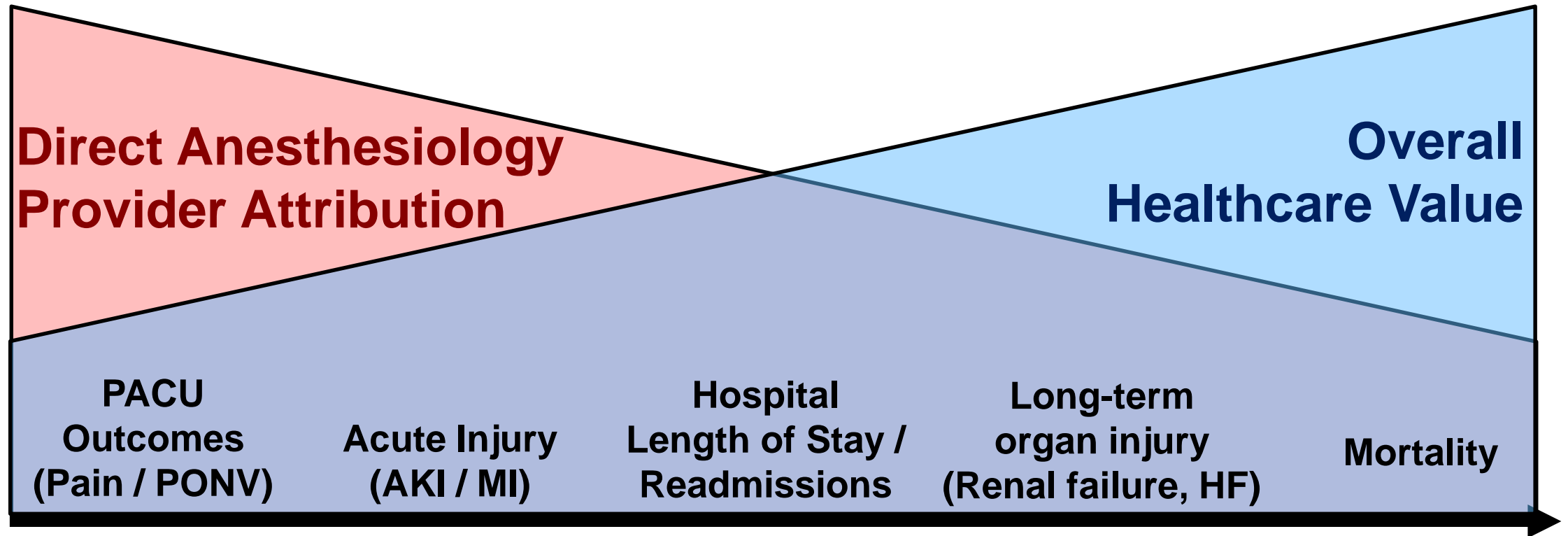
Moving Forward

- **Upcoming outcomes sources**
  - Surgical registries: NSQIP, MSQC, STS
  - PACU/ICU data
  - Cost data (MVC)
  - Patient reported outcomes

- **Transparent & enhanced risk adjustment**
  - O/E dashboard
  - Additional patient & surgical risk factors
  - Surgical case type (CPT) prediction

- **Linkage of process-of-care → outcomes measures**

Thank you