A Rose by Any Other Name

(might not be a rose)

Avery Tung, M.D.
Quality Chief for Anesthesia
Department of Anesthesia and Critical Care
University of Chicago

Disclosures

I am the Critical Care section editor for Anesthesia & Analgesia

- The $$ I get reinforces my natural skepticism

I am quality chief for my department

- And am thus very familiar with definitional strategies for meeting quality measures

Outline

Donabedian
- Predicted everything about quality measurement 30 years ago

Structure, Process, and Outcome
- Different metrics, same measurement challenges

An example from the STS Database
- Easily gameable if you know what you are doing

What happens when you play with definitions
- Renal failure and reintubation
- The Pneumothorax
- The HCAPS Survey

“If you can’t measure it you can’t manage it”
- …Really?

The Quality of Care

How Can It Be Assessed?

Avedis Donabedian, M.D. MPH

JAMA 1988;260:1743-8

Special Communication

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Avedis Donabedian, MD, MPH

Before assessment can begin we must decide how quality is to be defined and that depends on whether one assesses only the performance of practitioners or also the contributions of patients and of the health care system; on how broadly health and responsibility for health are defined; on whether the maximally effective or optimally effective care is sought; and on whether individual or social preferences define the optimum. We also need detailed information about the causal linkages among the structural attributes of the settings in which care occurs, the processes of care, and the outcomes of care. Specifying the components or outcomes of care to be sampled, formulating the appropriate criteria and standards, and obtaining the necessary information are the steps that follow. Though we know much about assessing quality, much remains to be known.

(JAMA 1988;260:1743-1748)

THERE was a time, not too long ago, when this question could not have been asked. The quality of care was considered to be something of a mystery: real, capable of being perceived and appreciated, but not subject to measurement.

For editorial comment see p 1759.

The very attempt to define and measure quality seemed, then, to denature and belittle it. Now, we may have moved too far in the opposite direction. Those who have not experienced the intricacies of clinical practice demand measures that are easy, precise, and complete—as if a sack of potatoes was being weighed.

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True, some elements in the quality of care are easy to define and measure, but there are also profundities that still elude us. We must not allow anyone to [illegible] secret and glory of our [illegible]. Therefore, we should avoid claiming for [illegible] capacity to assess quality either too little or too much. I shall try to [illegible] this middle course.

SPECIFYING WHAT QUALITY IS

Level and Scope of Concern

Before we attempt to assess the quality of care, either in general terms or in any particular site or situation, it is necessary to come to an agreement on what the elements that constitute it are. To proceed to measurement without a firm foundation of prior agreement on what quality consists in is to court disaster.[1]

As we seek to define quality, we soon become aware of the fact that several formulations are both possible and legitimate, depending on where we are located in the system of care and on what the nature and extent of our responsibilities are. These several formulations can be envisaged as a progression, for example, as steps in a ladder or as successive circles surrounding the bull's-eye of a target. Our power, our responsibility, and our vulnerability all flow from the fact that we are the foundation for that ladder, the focal point for that family of concentric circles. We must begin, therefore, with the performance of physicians and other health care practitioners.

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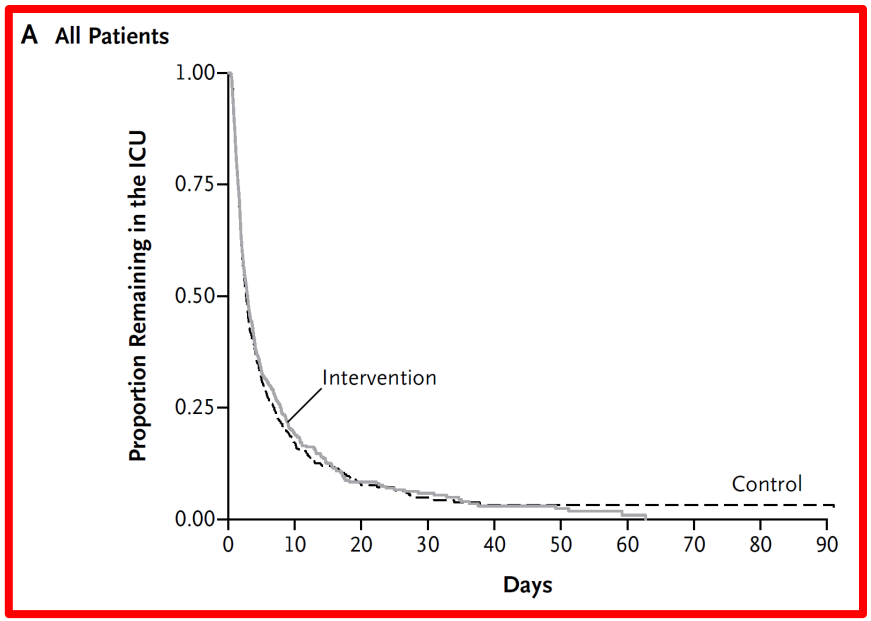
"structure", "process", and "outcome"

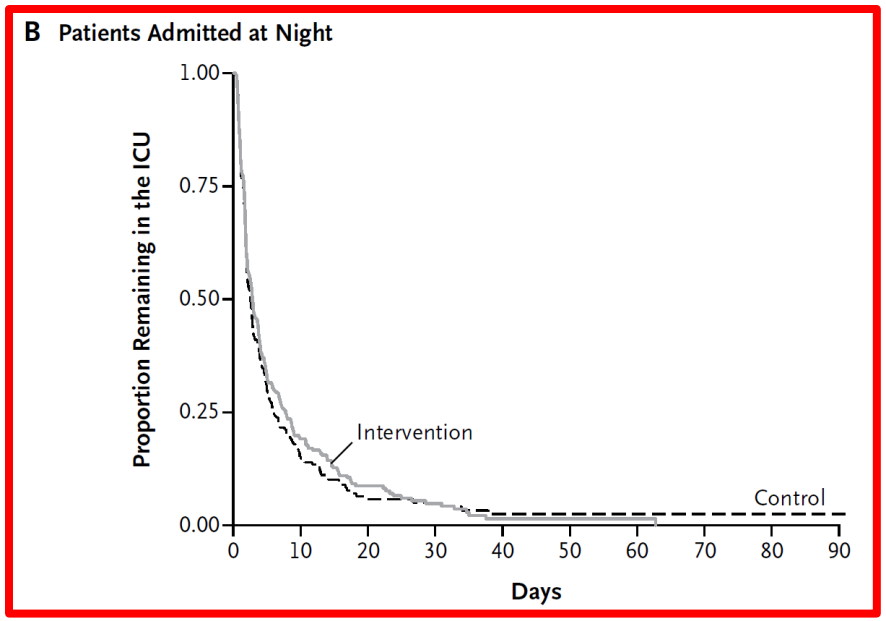
"what we do know suggests that the relationship between structural characteristics and the process of care is rather weak"

A Randomized Trial of Nighttime Physician Staffing in an Intensive Care Unit

Meeta Prasad Kerlin, M.D., M.S.C.E., Dylan S. Small, Ph.D., Elizabeth Cooney, M.P.H., Barry D. Fuchs, M.D., Lisa M. Bellini, M.D., Mark E. Mikkelsen, M.D., M.S.C.E., William D. Schweickert, M.D., Rita N. Bakhru, M.D., Nicole B. Gabler, Ph.D., M.H.A., Michael O. Harhay, M.P.H., John Hansen-Flaschen, M.D., and Scott D. Halpern, M.D., Ph.D.

1 year randomized trial with 1,598 patients





N Engl J Med 2013;368:2201-9

But what IS a “nighttime ICU attending”, anyway?

- Is it someone who normally works in that unit?
  - Or a cross cover from the in-house Trauma surgeon?
- Does that person have decision capability?
  - Or are they consultants in an open ICU
- Does that person have staff to help?
  - Or is she alone at night
- Are there evening rounds?
  - Or is it “call me if you have a question tonight?”

The Association Between Daytime Intensivist Physician Staffing and Mortality in the Context of Other ICU Organizational Practices: A Multicenter Cohort Study*

Deena Kelly Costa, PhD, RN[1]; David J. Wallace, MD, MPH[2,3]; Jeremy M. Kahn, MD, MS[2,4]

49 ICUs in 25 US hospitals
27 (55%) with "high intensity daytime staffing"

- No association between daytime intensivist staffing and in-hospital mortality (OR = 0.86, 95% CI 0.65-1.14)
- Even less association after adjustment for protocols** and interprofessional rounds*** (OR = 0.90, 95% CI 0.70-1.17)

*Mandatory consult or closed ICU model
**Ventilation & LIberation
***RT, Pharmacy, Nurse, Physician

Crit Care Med 2015;43:2275-82

Mortality Among Older Adults Before Versus After Hospital Transition to Intensivist Staffing

Myura Nagendran, MA, BMBCh, Justin B. Dimick, MD, MPH,† Andrew A. Gonzalez, MD, MPH, JD,† John D. Birkmeyer, MD,† and Amir A. Ghaferi, MD, MS†*

2,916,801 Medicare patients at 488 hospitals

(a) completed training before availability of subspecialty certification in critical care in their specialty [1987 for (Internal) Medicine, Anesthesiology, Pediatrics and Surgery], who were board certified in 1 of these 4 specialties, and who had provided at least 6 weeks of full-time ICU care annually since 1987; or (b) were board certified in (Internal) Medicine, Anesthesiology, Pediatrics or Surgery and had completed training programs required for certification in the subspecialty of *Critical Care Medicine* but were not yet certified.

No improvement in mortality

Med Care 2016;54: 67-73

Process

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JAMA, Sept 23/30, 1988—Vol 260, No. 12

Quality of Care—Donabedian 1743

"…Knowledge about the relationship between technical care and outcome derives, of course, from the health care sciences. Some of that knowledge is pretty detailed and firm. Some if it is of dubious validity. Our assessments about the quality of technical care vary accordingly"

Tips for Safer Surgery

What you should know • What you can do

Courtesy of the Surgical Care Improvement Project Partnership

Millions of people have surgery each year. Every surgery has risks, but we know there are some that can be prevented. What does this mean to you as a patient? If your doctors and nurses follow some simple steps, you will have a shorter and safer hospital stay.

Questions to Ask Your Doctors and Nurses Before Surgery

One way you can help lower your risk for problems from your surgery is to talk with a member of your surgical care team before surgery about the type of care you should receive. Your care team includes your surgeon, your anesthesiologist and your nurses. Ask your doctor or nurse who you should discuss this tip sheet with and when. This tip sheet will help you know what to ask.

To avoid infection–

If I need antibiotics before surgery, when will I

Antibiotics should given within 60 minutes before surgery and should be stopped within 24 hours in most cases. Given properly, antibiotics can greatly lower your chances of getting an infection after surgery.

If hair needs to be removed from the part of my body that is having surgery, what will you use?
Your doctor or nurse should use clippers to remove hair if needed at the site of your surgery. Using a razor to remove hair before surgery can cause infections because of the risk of leaving small cuts on the skin.

To avoid blood clots–

What will you do to prevent blood clots?
Blood clots can lead to heart attacks and strokes. When you have surgery, you are at risk of getting blood clots because you do not move while under anesthesia. The more complicated your surgery, the higher your risk. Your doctor will know your risk for blood clots and steps that will help prevent them, such as giving you the right medicine before surgery.

To avoid heart attacks–

If I take medicine for heart disease, should I keep taking it?
Taking certain medicines together can cause problems. Tell your doctor about all the medicines you are taking, including over-the-counter things like aspirin and herbal remedies. Your doctor or nurse will tell you which medicines you should continue to take and which medicines you should stop taking before surgery.

This “Tips for safer surgery” sheet was released in late 2006 by CMS

“Antibiotics should be given within 60 minutes before surgery and should be stopped within 24 hours in most cases. Given properly, antibiotics can greatly lower your chances of getting an infection after surgery.”

The effect of Surgical Care Improvement Project measures on national trends on surgical site infections in open vascular procedures

Anahita Dua, MD, MS, MBA,[a] Sapan S. Desai, MD, PhD, MBA,[b] Gary R. Seabrook, MD,[a] Kellie R. Brown, MD,[a] Brian D. Lewis, MD,[a] Peter J. Rossi, MD,[a] Charles E. Edmiston, PhD,[a] and Cheong J. Lee, MD,[a] *Milwaukee, Wisc; and Springfield, Ill*

- 311,900 patients from the NIS 2000-2010

…no significant effect on the incidence of in-hospital SSIs in open vascular operations…

*p<0.001

J Vasc Surg 2014;60:1635-9

You are administering prophylactic Cefoxitin for your AAA repair

- You know you must give it <1 hour before incision*
- You start it at 7:38am
- At 8am, the surgeon says she won't arrive until 8:45a
  - A flat tire on her bicycle
- Your heart sinks
  - That's more than an hour later!
  - Have you already failed SCIP Inf-1?

*For those too young to remember, we used to do it this way in the name of quality

No way!

- You could start something else
  - SCIP only required that 1 eligible antibiotic be given. Starting a second, or even third eligible antibiotic would meet the measure
- You could give another dose of the same drug
  - SCIP did not care about dose. A second dose would allow you to “reset the clock” by documenting a new start time
- You could stop and start the same dose
  - Restarting the same dose would also “reset the clock”. This strategy could be repeated over and over until the surgeon appeared

The infamous “stop start” method for meeting SCIP-1

Step 1

Step 2

Step 3
Chart new start time

Outcome

"Touchdown!"

"Oh you gotta be kidding!"

"Fail Mary"

9/24/2012

SEA 14, GB 12

https://www.youtube.com/watch?v=wXGFZkIEMK0

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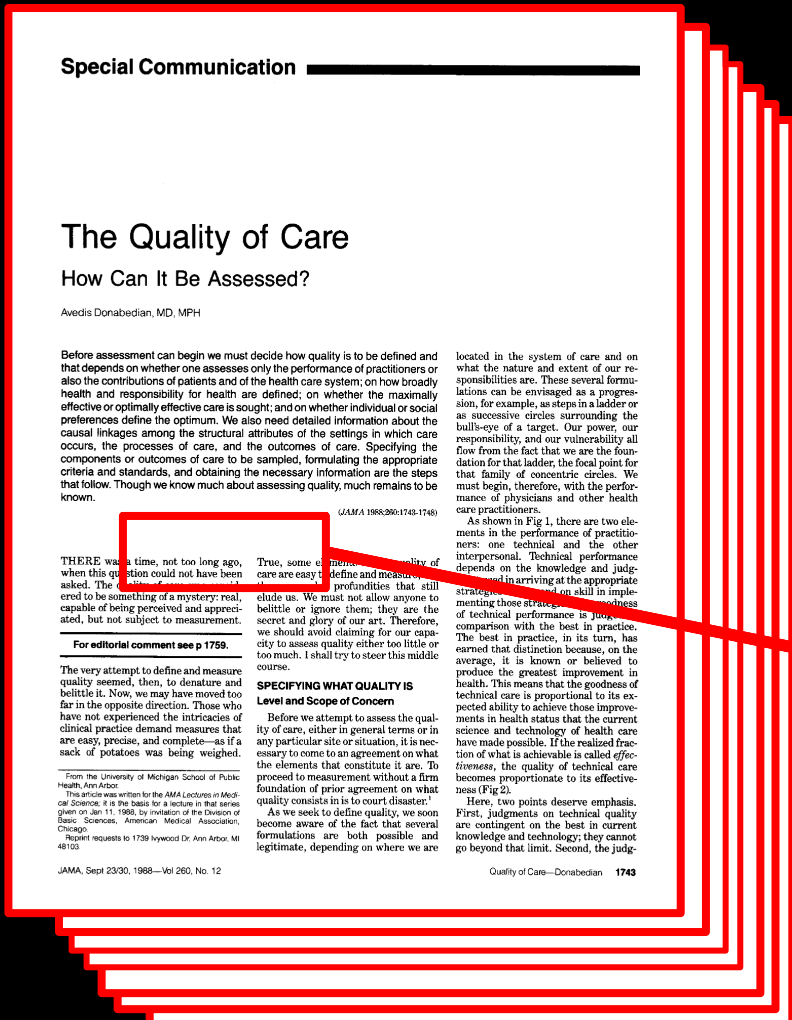

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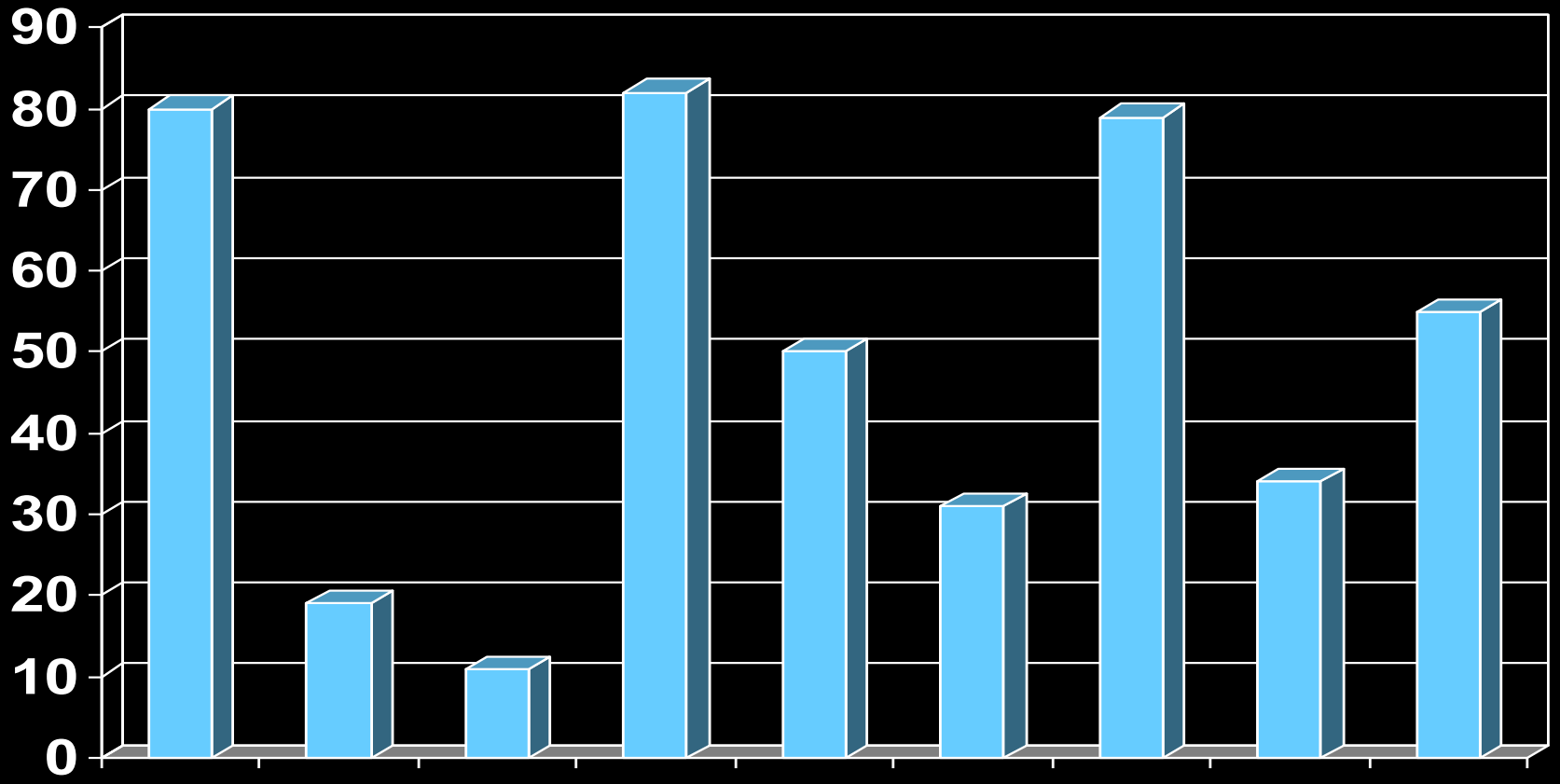
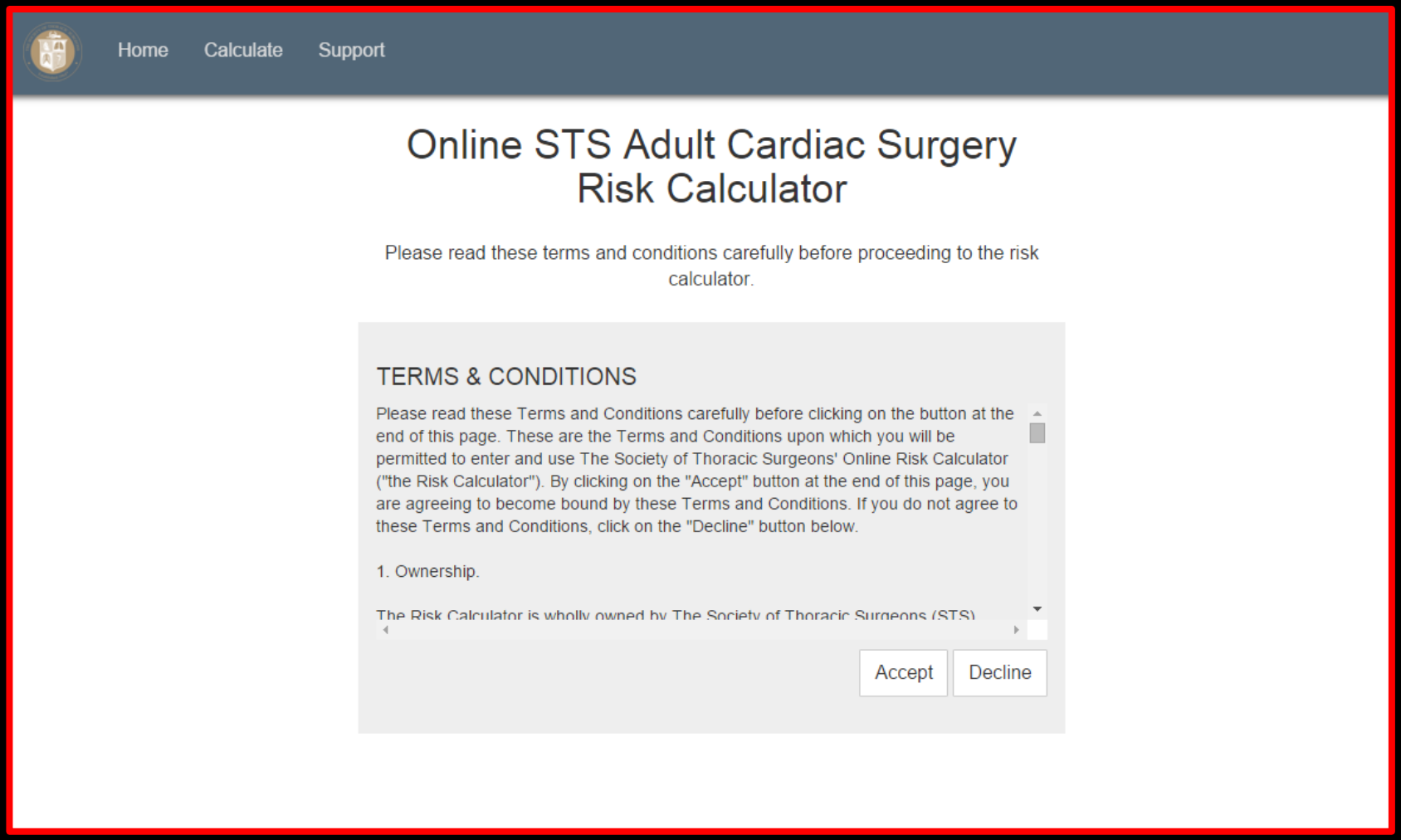
"…there are those who believe that direct assessment of the outcome of care can free us from the limitations imposed by the imperfections of the clinical sciences. I do not believe so"

What's a reasonable delirium rate?



JAMA 2001;286:2703-10
Int Care Med 2001;27:1297-1304
Crit Care 2001;5:265-70
JAMA 2004;291:1753-62
J Am Geriatr Soc 2005;53:495-500

Int Care Med 2007;33:66-73
Crit Care Med 2009;37:177-83
J Crit Care 2010;25:136-43
Anesth Analg 2010;111:451-63



Risk adjusted for over 20 years!

http://riskcalc.sts.org/,
accessed 9/29/16

Overheard in our cardiac OR

(me): "Hey [surgeon] did you know our patient today has a 7% risk of dying in 30 days*?"

(surgeon): "7%? That's too low! What did you put for his EF?"

(me): 40%

(surgeon): "40%? No way! Try 20%"

(me): "OK now the risk is 13%"

(surgeon): "That's better!"

Every cardiac surgeon wants the highest possible expected mortality!

*30 day mortality by STS version 2.71

A 65 yr M with HTN undergoes AVR/CABG

- His EF = 45%, and on recent CT for abdominal pain his abdominal aorta was 3.1cm
- He has a 80% LAD lesion
- He is admitted to the ICU Friday afternoon for monitoring due to a brief episode of SOB after physical therapy
- His surgery is scheduled for Monday

~~1.11%~~

2.188%

RISK SCORES

About the STS Risk Calculator

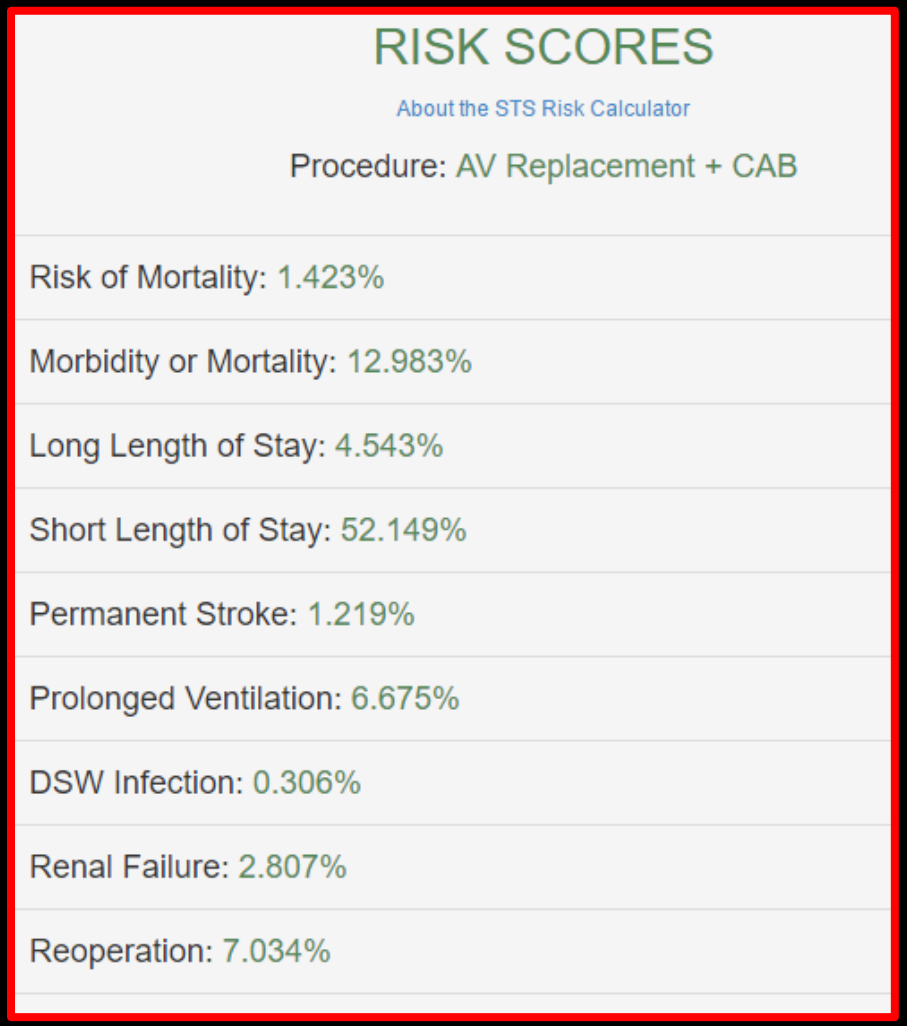
Procedure: AV Replacement + CAB

Risk of Mortality:	1.11%
Morbidity or Mortality:	11.075%
Long Length of Stay:	3.941%
Short Length of Stay:	52.149%
Permanent Stroke:	1.064%
Prolonged Ventilation:	5.713%
DSW Infection:	0.306%
Renal Failure:	2.426%
Reoperation:	6.153%

1. Leverage the incidental aortic finding

- His EF = 45%, and on recent CT for abdominal pain his aorta was 3.1cm
  - 3.1 qualifies for “peripheral arterial disease”
- He has a 80% LAD lesion
- He is admitted to the ICU Friday afternoon for monitoring due to a brief episode of SOB after physical therapy
- His surgery is scheduled for Monday

1.11% → 1.423%



STS data element 505: PVD

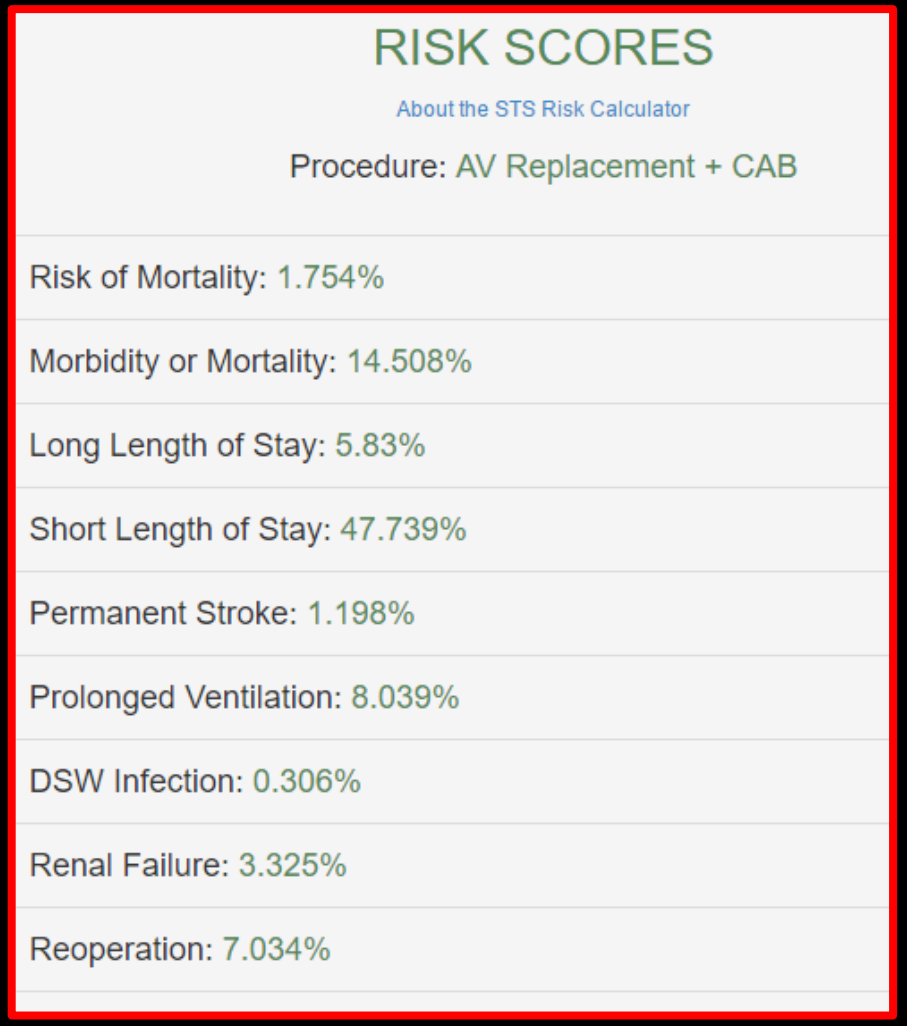
"Indicate whether the patient has a history of peripheral arterial disease. This can include a documented AAA with or without repair"

(Excludes disease in carotid, cerebrovascular arteries, or thoracic aorta
Does not include DVT)

2. Find some edema on CXR

- His EF = 45%, and on recent CT for abdominal pain his aorta was 3.1cm
- He has a 80% LAD lesion
- He is admitted to the ICU Friday afternoon for monitoring due to a brief episode of SOB after physical therapy
  - Along with EF=45%, pulmonary edema qualifies the patient for heart failure< 2 weeks
- His surgery is scheduled for Monday

1.11% → 1.423 → 1.754%



RISK SCORES

About the STS Risk Calculator

Procedure: AV Replacement + CAB

Risk of Mortality: 1.754%

Morbidity or Mortality: 14.508%

Long Length of Stay: 5.83%

Short Length of Stay: 47.739%

Permanent Stroke: 1.198%

Prolonged Ventilation: 8.039%

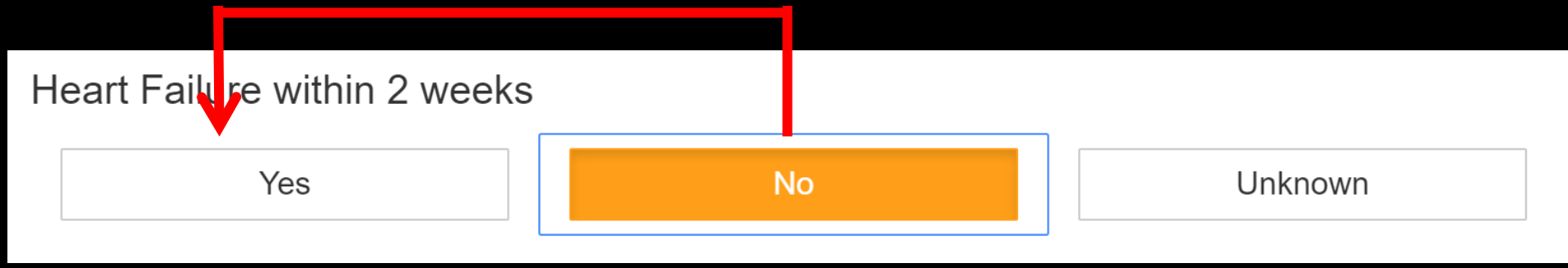
DSW Infection: 0.306%

Renal Failure: 3.325%

Reoperation: 7.034%

STS data element 920: CHF

"Indicate if there is physician documentation or report that the patient has been in a state of heart failure within the past 2 weeks"



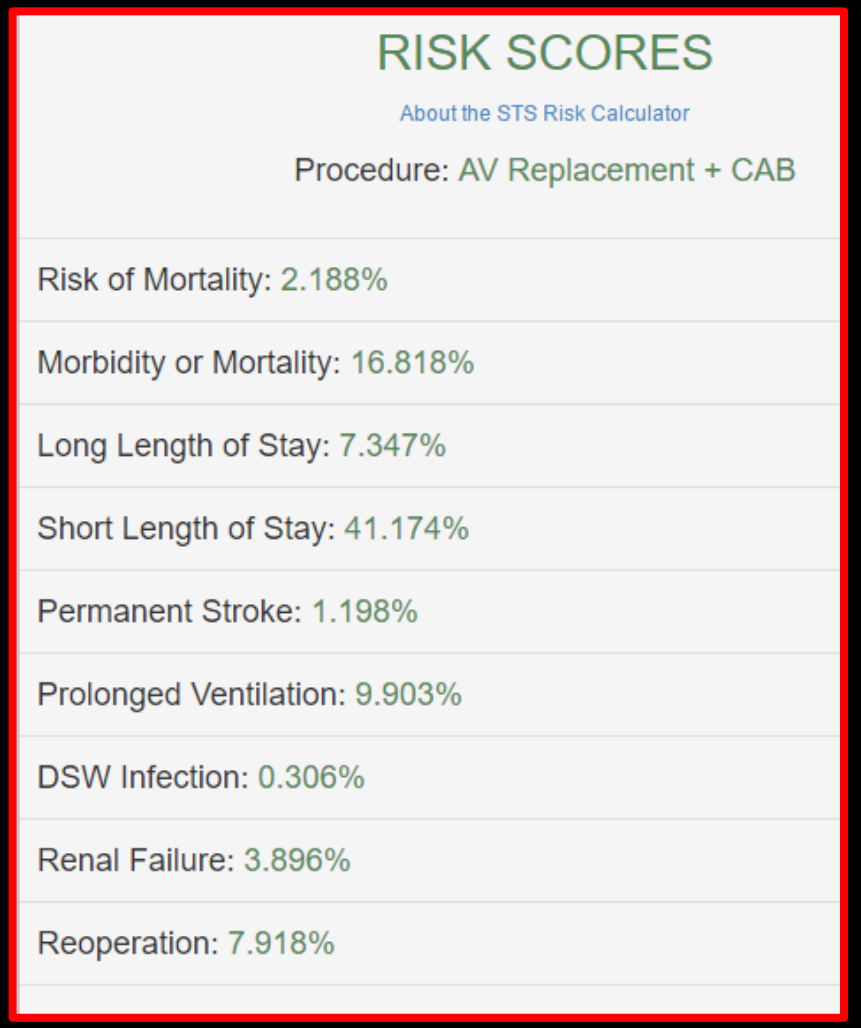
CHF is:

Heart failure is defined as physician documentation or report of any of the following clinical symptoms of heart failure described as unusual dyspnea on light exertion, recurrent dyspnea occurring in the supine position, fluid retention; or the description of rales, jugular venous distension, pulmonary edema on physical exam, or pulmonary edema on chest x-ray presumed to be cardiac dysfunction

3. Call it “Urgent”

- His EF = 45%, and on recent CT for abdominal pain his aorta was 3.1cm
- He has a 80% LAD lesion
- He is admitted to the ICU Friday afternoon for monitoring due to a brief episode of SOB after physical therapy
- His surgery is scheduled for Monday
  - Urgent status increases expected mortality

1.11% → 1.423 → 1.754% → 2.188%



RISK SCORES

About the STS Risk Calculator

Procedure: AV Replacement + CAB

Risk of Mortality:	2.188%
Morbidity or Mortality:	16.818%
Long Length of Stay:	7.347%
Short Length of Stay:	41.174%
Permanent Stroke:	1.198%
Prolonged Ventilation:	9.903%
DSW Infection:	0.306%
Renal Failure:	3.896%
Reoperation:	7.918%

STS data element 1975: Status

"Indicate the clinical status of the patient prior to entering the operating room."

Urgent is:

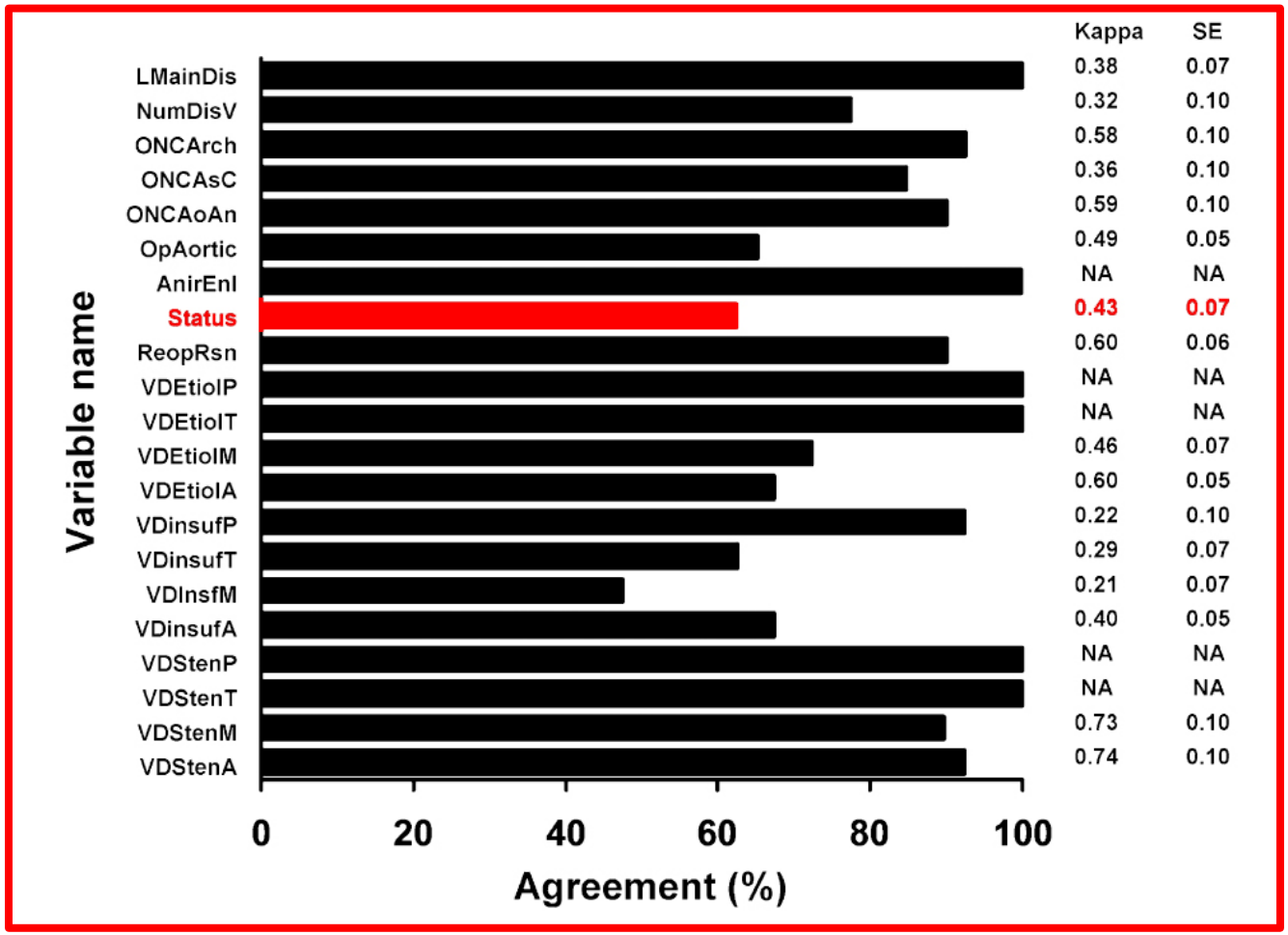
Procedure required during same hospitalization to minimize chance of further clinical deterioration. Examples include but are not limited to: Worsening sudden chest pain, CHF, acute myocardial infarction (AMI), anatomy, IABP, unstable angina (USA) with intravenous (IV) nitroglycerin (NTG) or rest angina

Variability in data: The Society of Thoracic Surgeons National Adult Cardiac Surgery Database

Morgan L. Brown, MD,[a] Judy R. Lenoch,[b] and Hartzell V. Schaff, MD[b]

30 patients abstracted by residents, fellows, and professionals

"As our study has demonstrated, however, there remains some confusion regarding definitions"



J Thorac Cardiovasc Surg 2010;140:267-73

Perioperative AKI

1. Increase in serum creatinine (Cr) > 0.3 mg/dl within 48 hours
2. Increase in Cr to > 1.5 times baseline, which is known or presumed to have occurred within the prior 7 days

Development and Validation of an Acute Kidney Injury Risk Index for Patients Undergoing General Surgery

Results from a National Data Set

Sachin Kheterpal, M.D., M.B.A., Kevin K. Tremper, Ph.D., M.D.,† Michael Heung M.D.,‡ Andrew L. Rosenberg, M.D.,* Michael Englesbe, M.D.,§ Amy M. Shanks, M.S.,‖ Darrell A. Campbell, Jr., M.D.#*

152,244 patients from the 2005-2006 NSQIP database

"Approximately 1% of general surgery cases are complicated by AKI"

AKI = NSQIP definition
(Cr>2 or new HD)

Anesthesiology 2009;110:505-15

M. E. O'Connor
C. J. Kirwan
R. M. Pearse
J. R. Prowle

Incidence and associations of acute kidney injury after major abdominal surgery

Meta-analysis of 19 articles and 82,514 patients

"Acute kidney injury* (AKI) affects around 13% of patients undergoing major abdominal surgery

AKI = RIFLE/AKIN criteria
150% or 0.3mg/dl ↑ in Cr
UO<0.5 cc/kg/hr x6h

Intensive Care Med 2016;42:521-30

National Surgical Quality Improvement Program Underestimates the Risk Associated With Mild and Moderate Postoperative Acute Kidney Injury

Azra Bihorac, MD, MS[1]; Meghan Brennan, MStat[1]; Tezcan Ozrazgat-Baslanti, PhD Stat[1]; Shahab Bozorgmehri, MPH[1]; Philip A. Efron, MD[2]; Frederick A. Moore, MD[2]; Mark S. Segal, MD, PhD[3]; Charles E. Hobson, MD, MHA[4]

27,841 patients undergoing noncardiac surgery

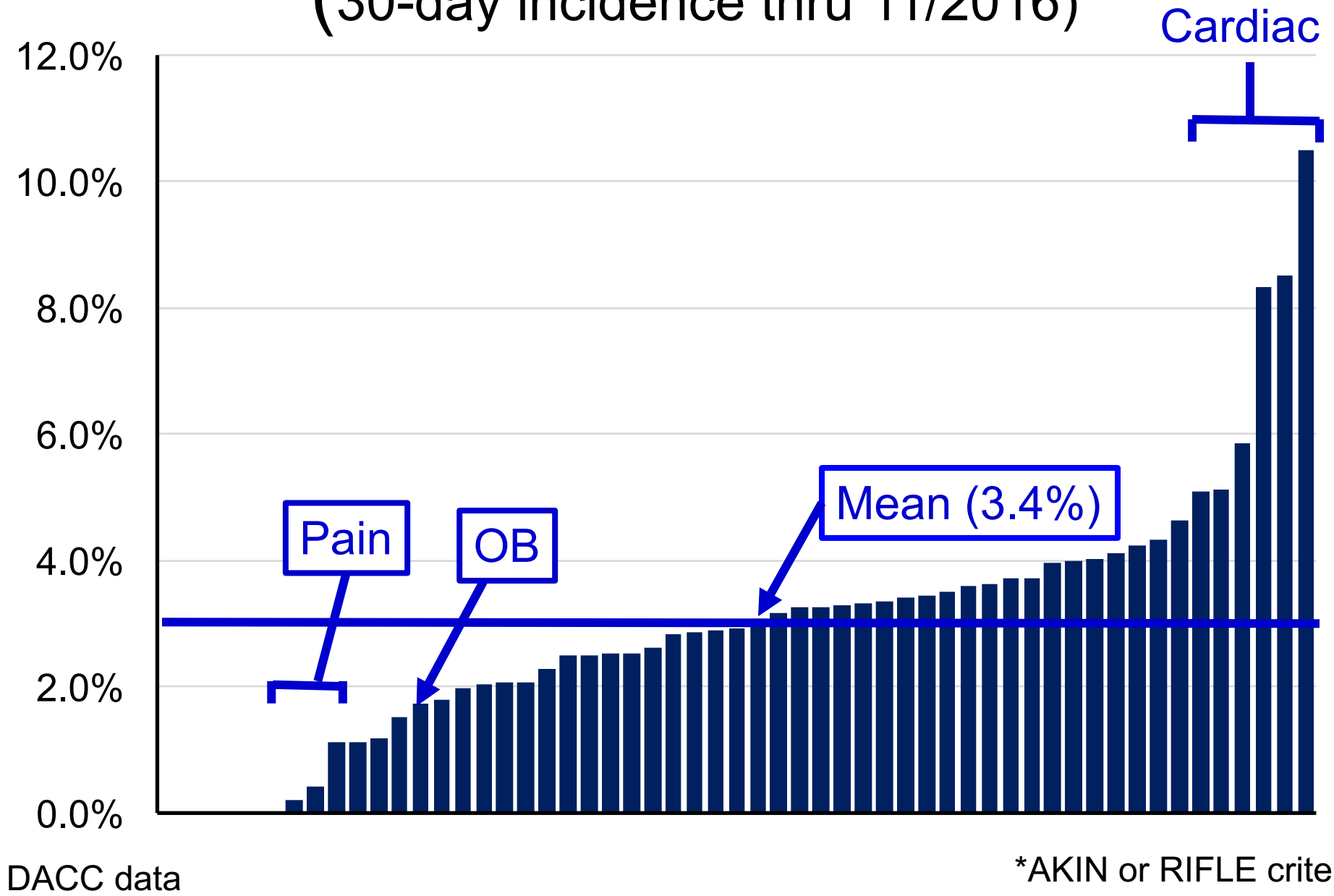
Results:

- 10,228 patients (37%) had AKI by RIFLE criteria
- Only 3% had AKI by the NSQIP definition

Crit Care Med 2013;41:2570-83

AKI by provider: UCMC

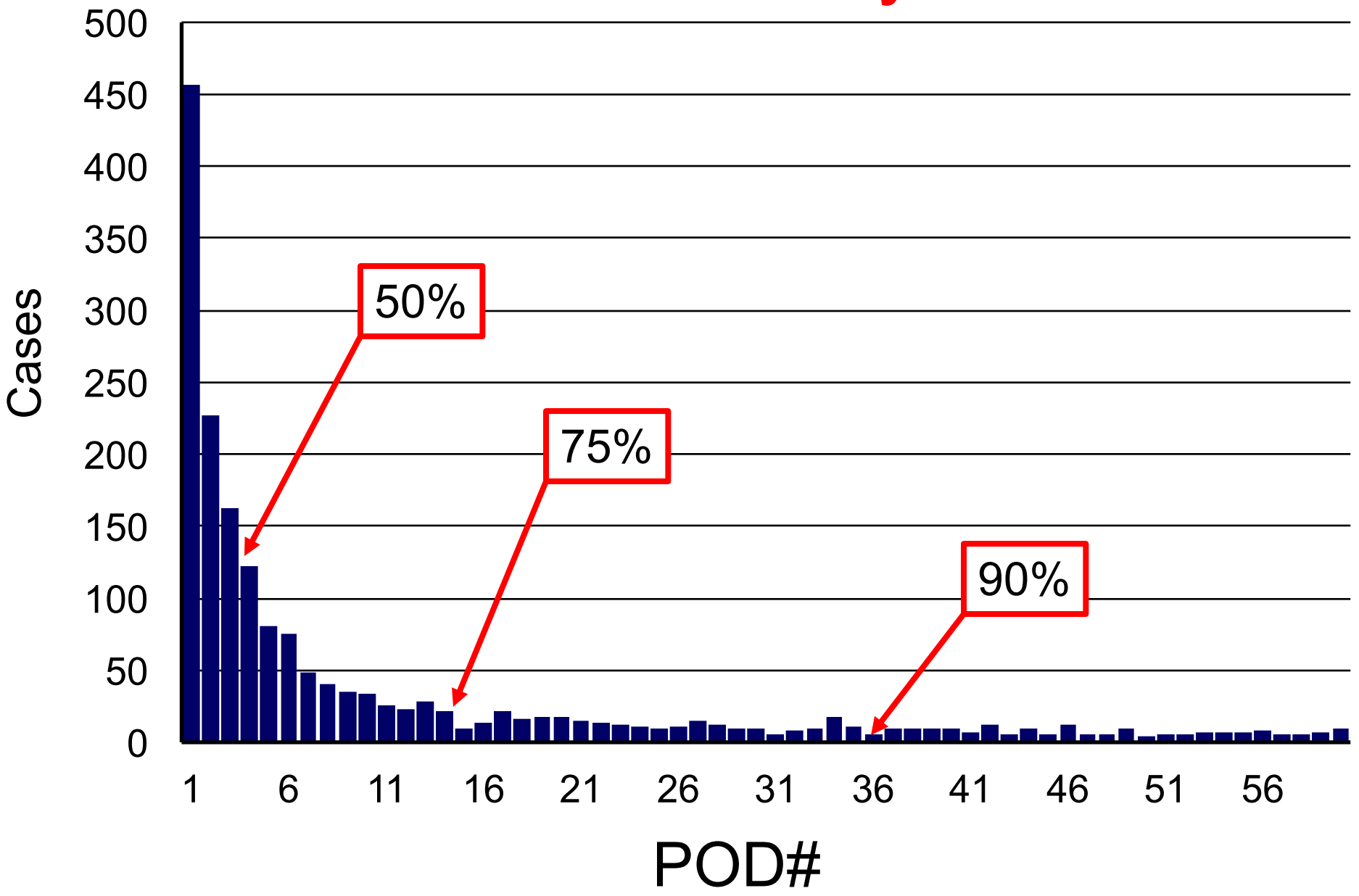
(30-day incidence thru 11/2016)

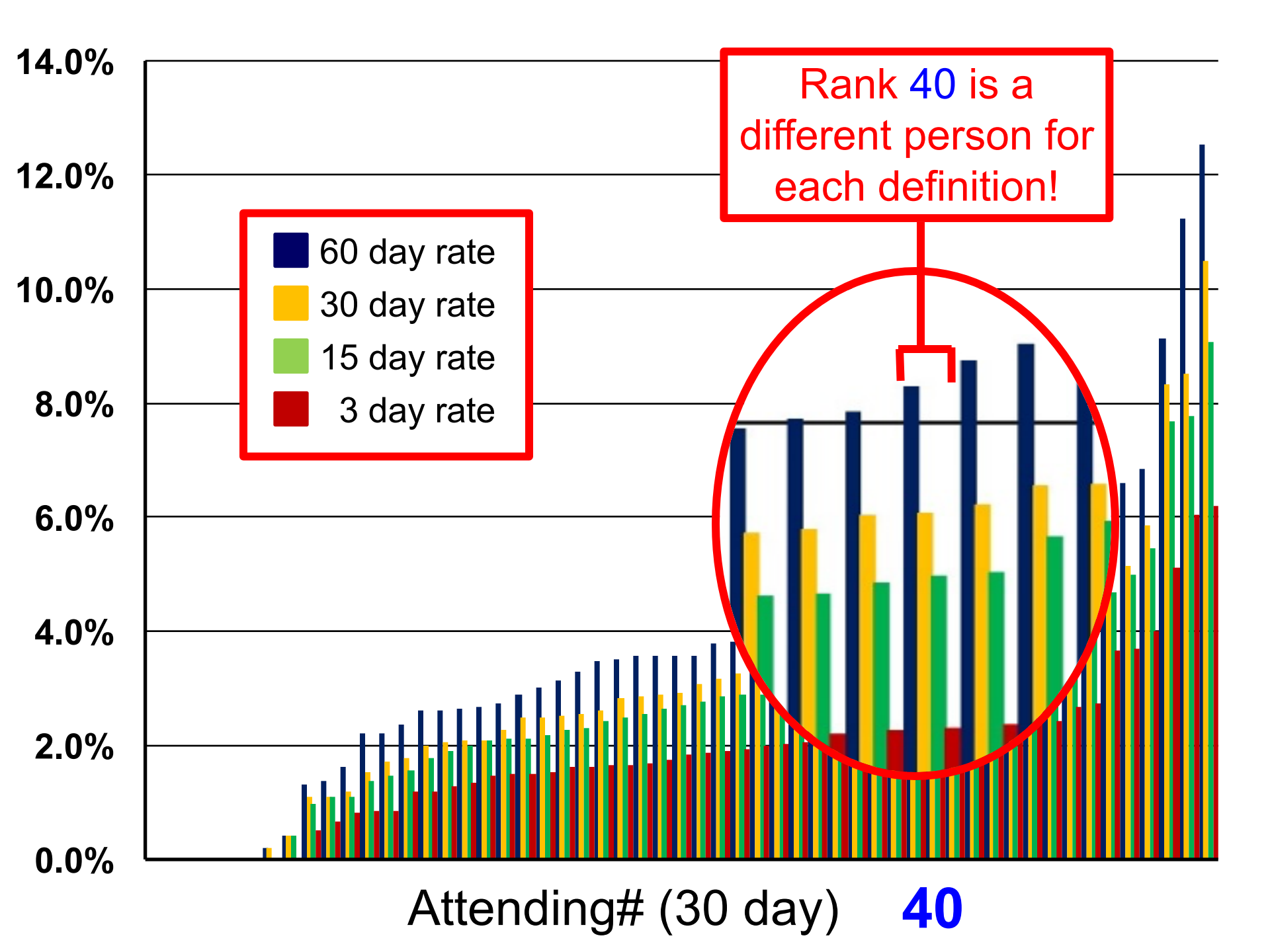


DACC data

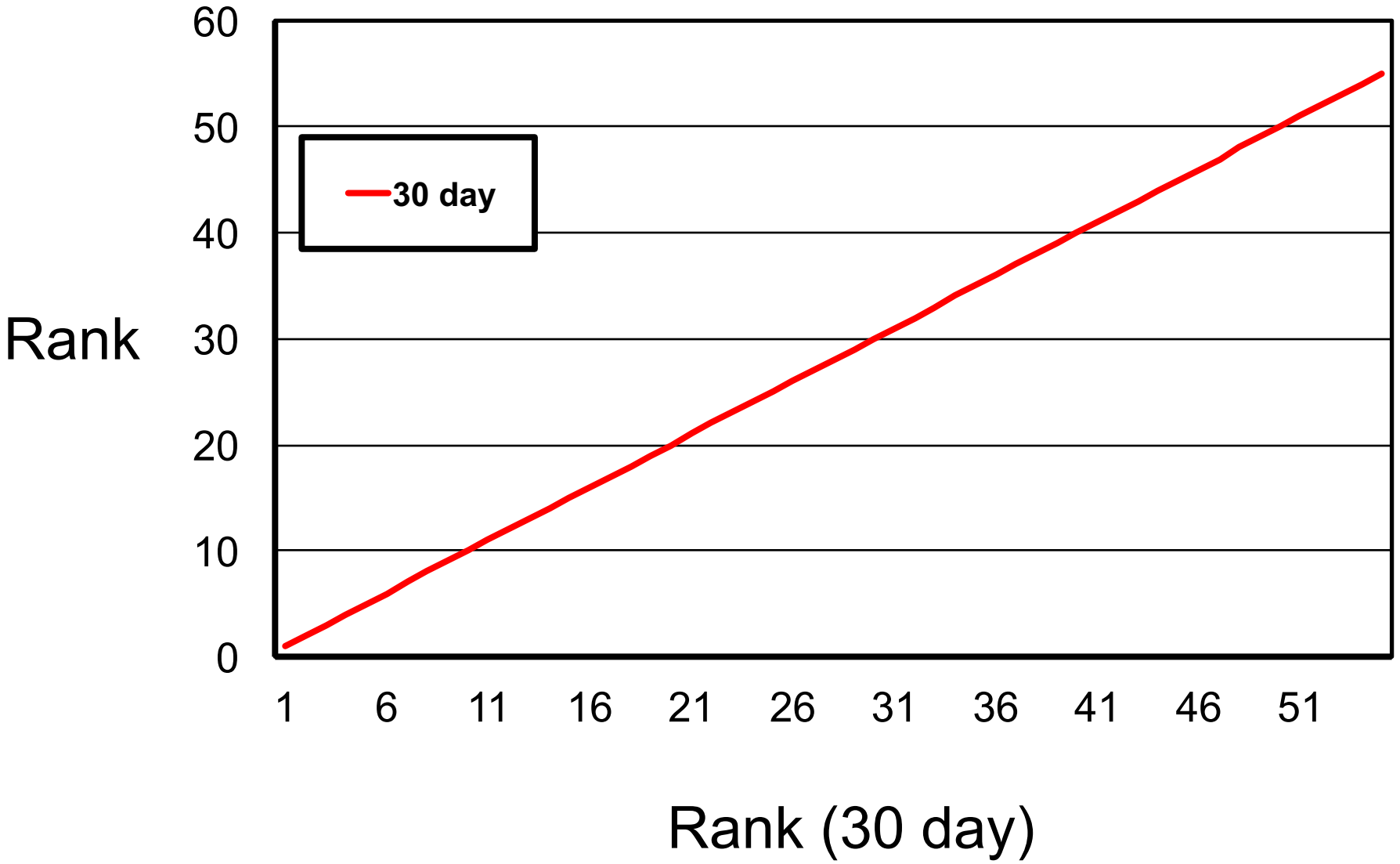
*AKIN or RIFLE criteria

AKI: Incidence by POD#

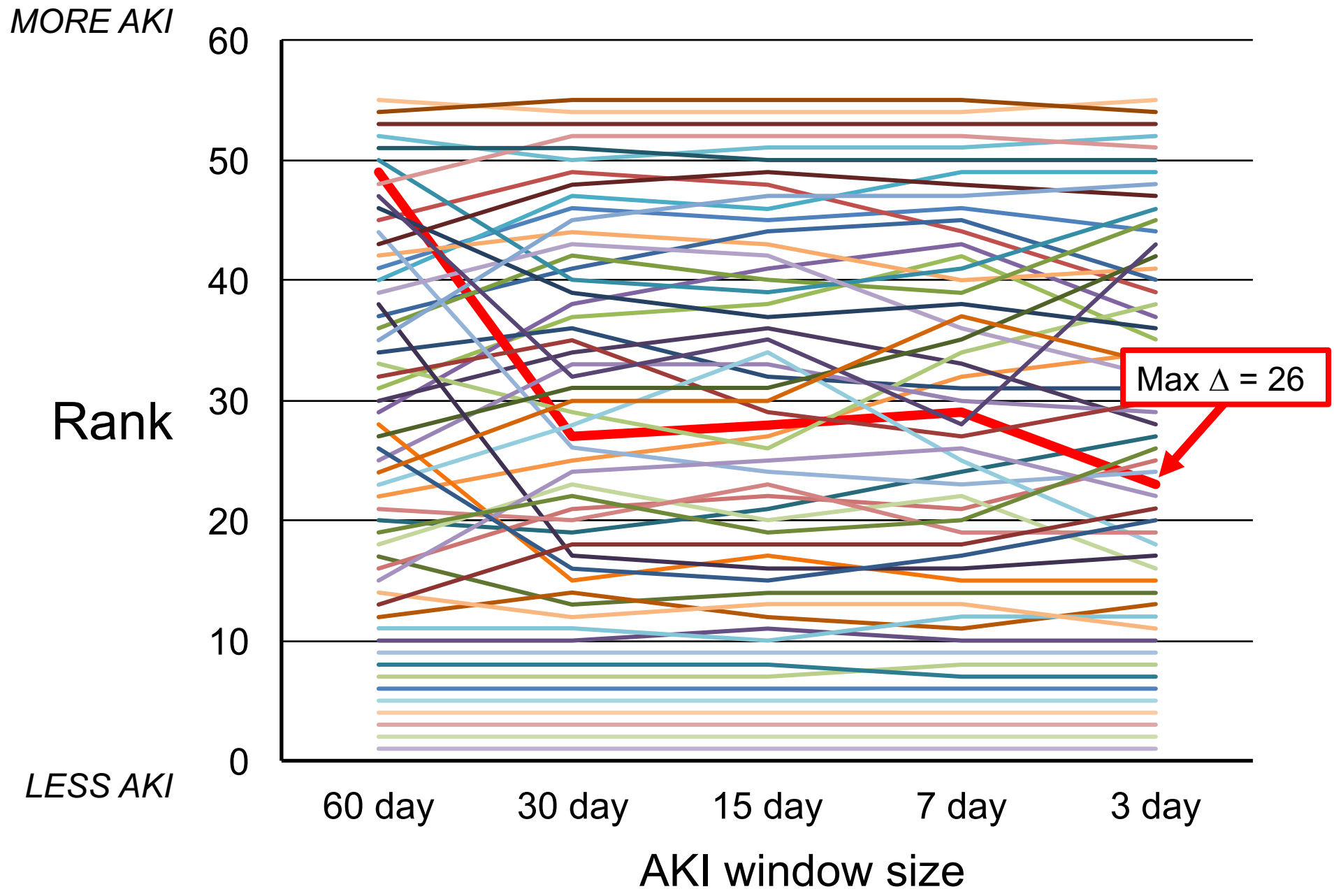



14.0%
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
60 day rate
30 day rate
15 day rate
3 day rate
Rank 40 is a different person for each definition!
Attending# (30 day)
40

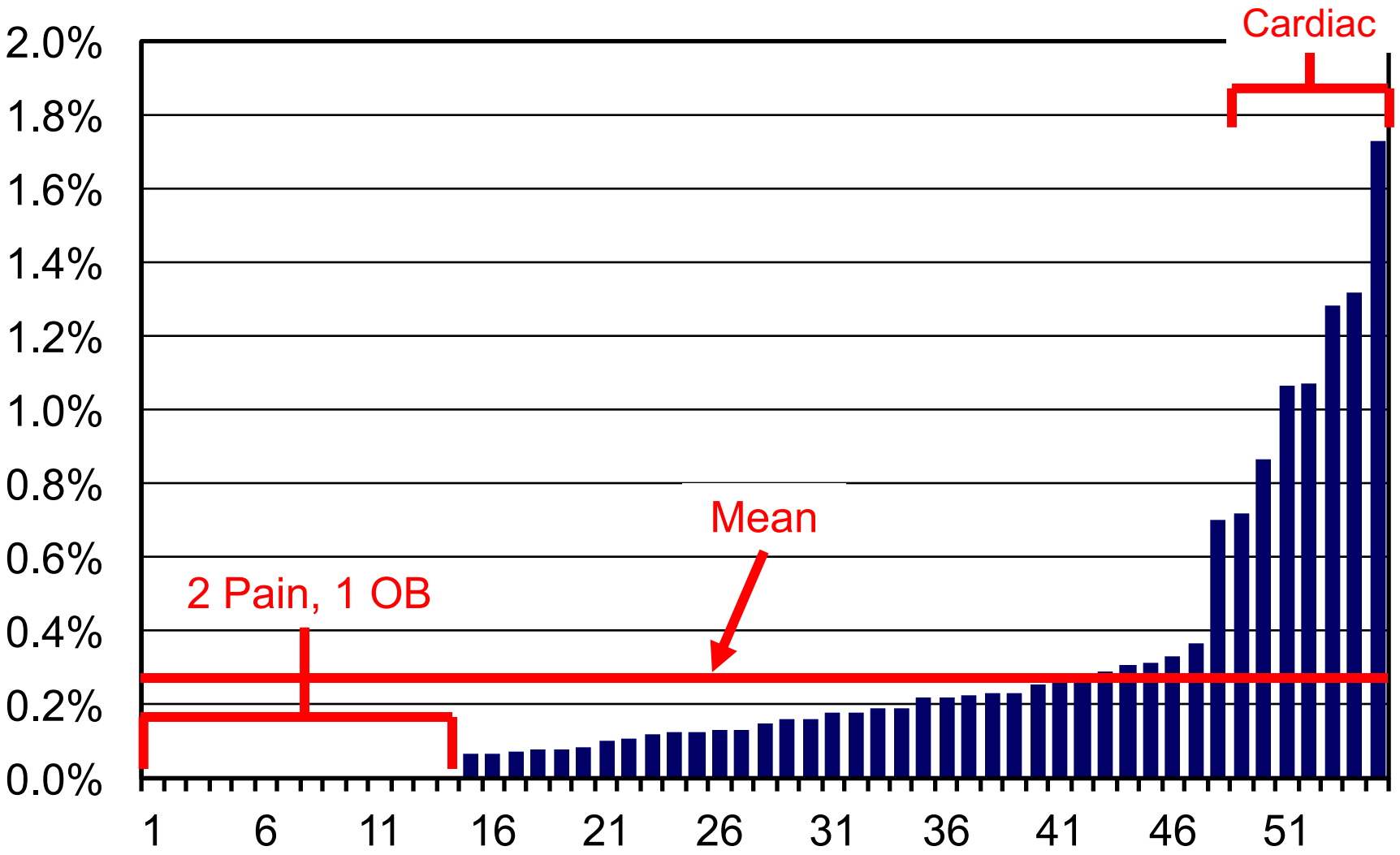
A “Rank-Rank” plot for 5 definitions of AKI



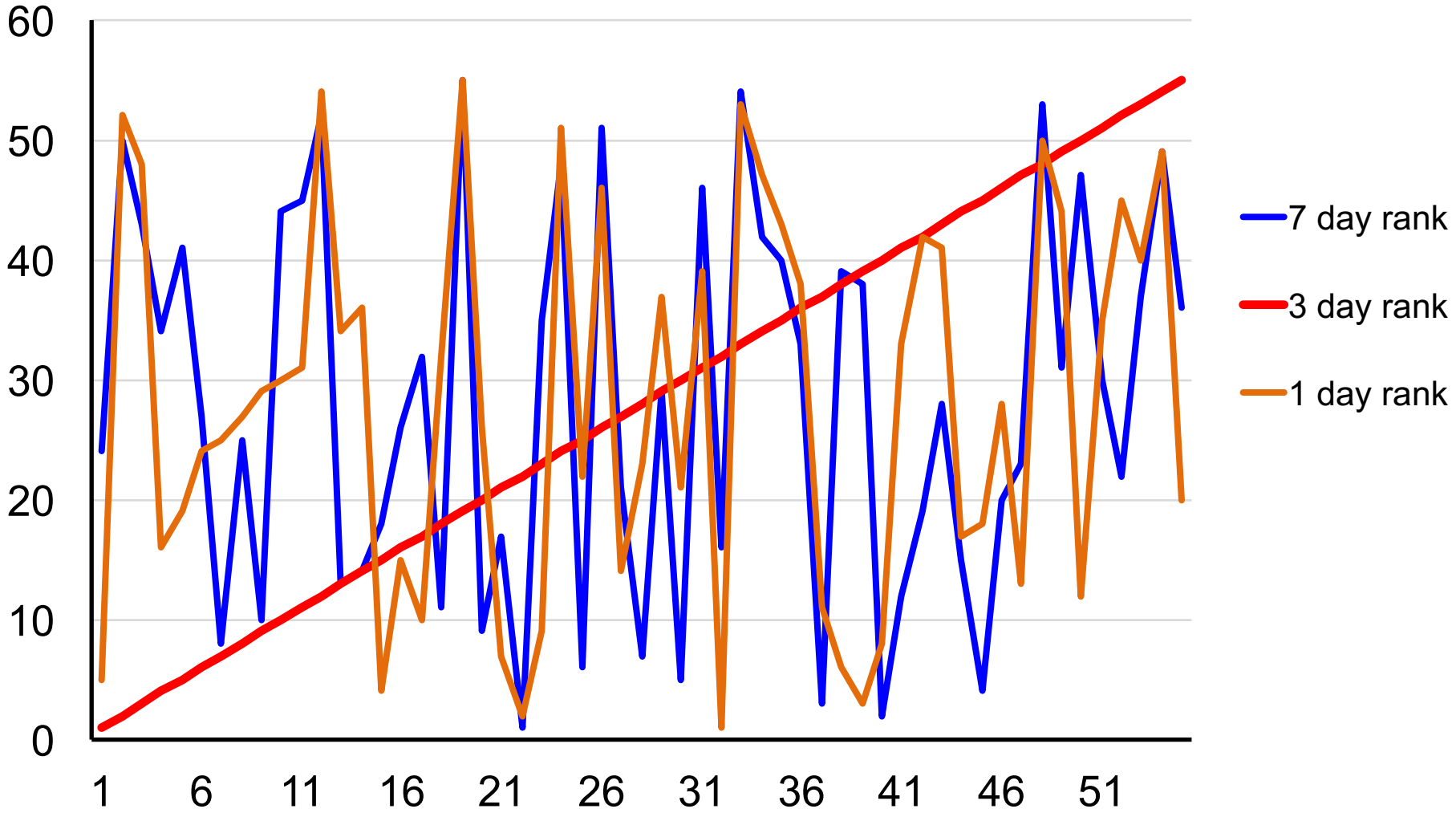
AKI by provider: effect of definition on rank



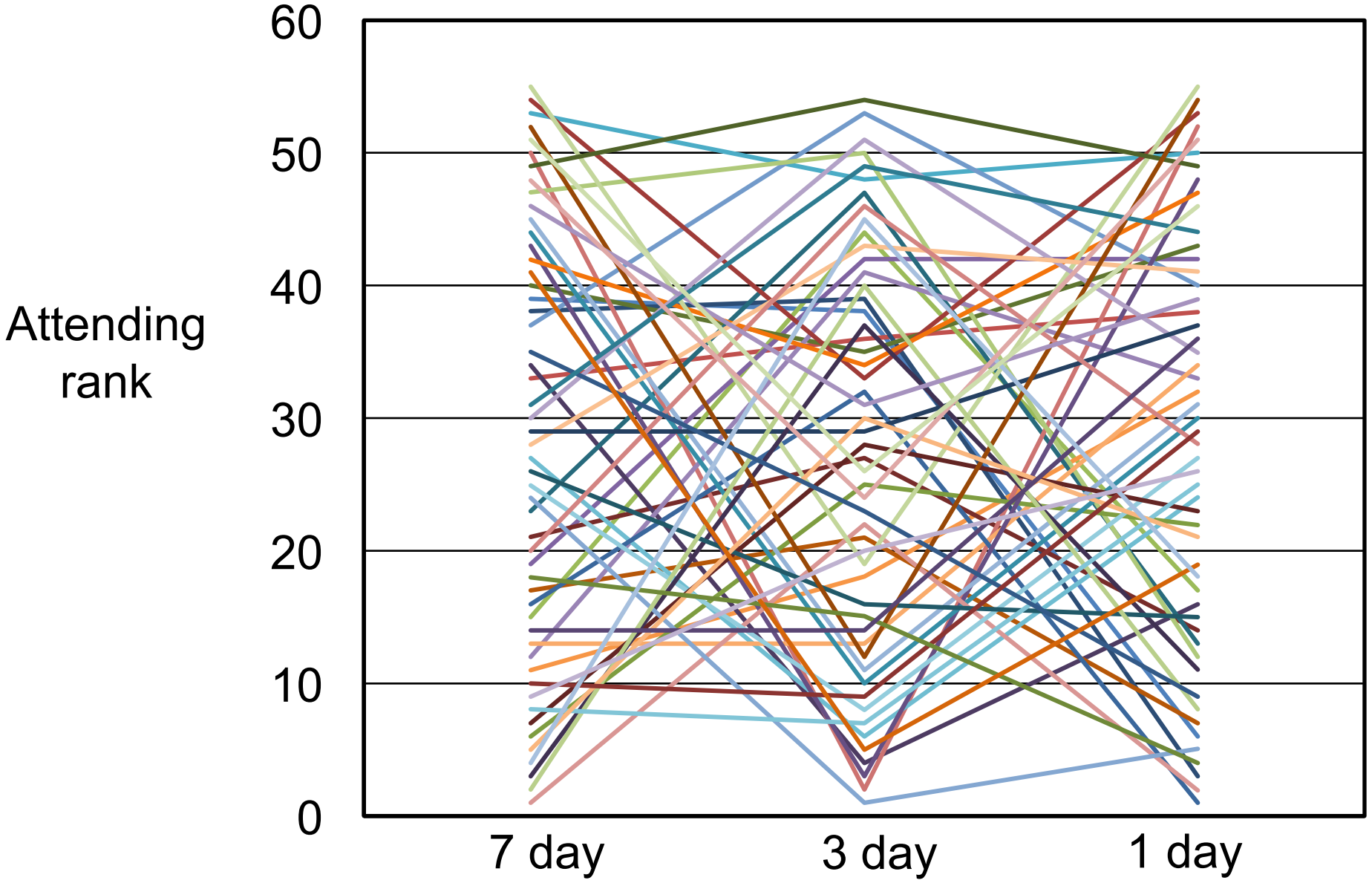
DACC 7 day reintubation rates by attending



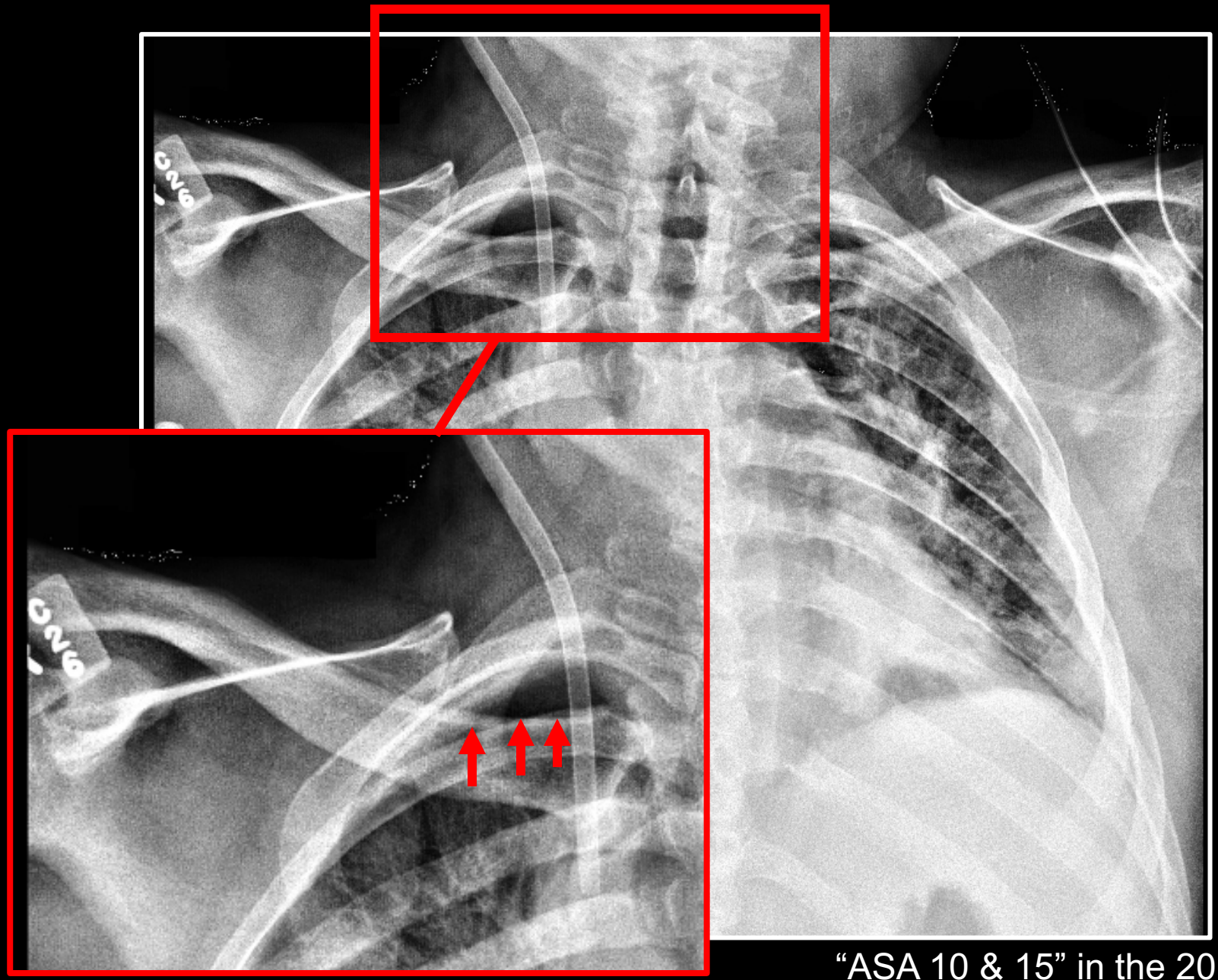
The “Rank-Rank” plot for Reintubations at UCM



Reintubations in 2016 by attending: Effect of definition



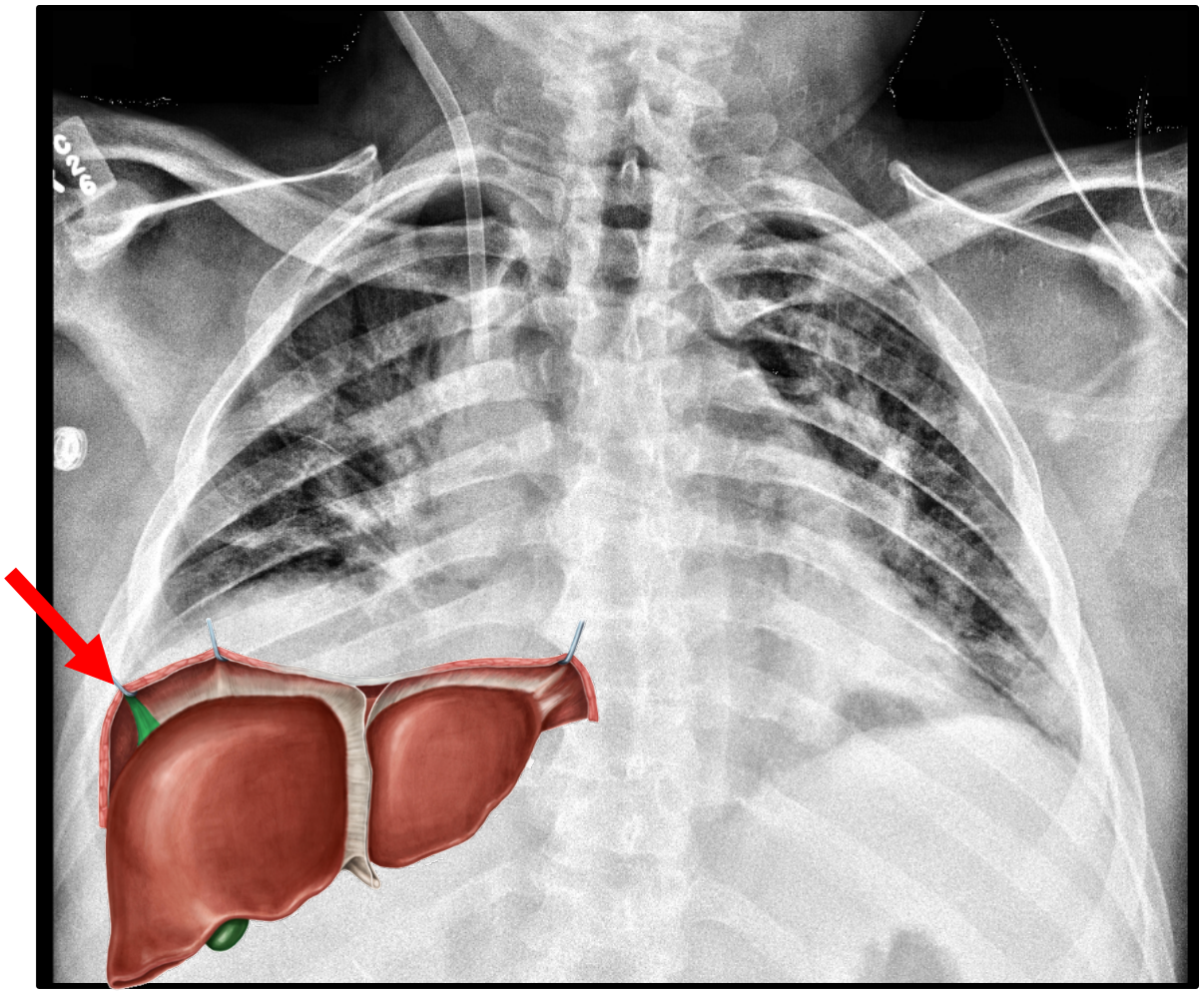
A 61 yr M after repeat R pheochromocytoma resection



"ASA 10 & 15" in the 2015 AQI QCDR

"There were noted to be multiple adhesions up to the right upper quadrant and retroperitoneum. These took approximately 1 hour to lyse"

"Once the adhesions were lysed, the right triangular ligament was incised with Bovie electrocautery"



So whose pneumothorax is it??

That &%$ HCAHPS report

Is patient satisfaction greater with GA or RA?

- We hypothesized that patients who receive RA would overall be more satisfied with their experience

HCAHPS survey data

- ☑ How likely are you to recommend our hospital to others?
- ☑ What is your overall rating for our hospital?

4,808 surveys out of 33,121 anesthetics in 14 months

- **9%** Regional (11%), **74%** GA (67%), **17%** MAC (22%)

HCAPS = Hospital Consumer Assessment of Healthcare Providers and Systems

We found that…

- Patients who received RA rated their care HIGHER than those who received GA
  - 17.8 vs 17.1
- Patients who received RA were LESS LIKELY to recommend UCH than those who received GA
  - 18/20 vs 19/20

So what does THAT mean?

An Ounce of Evidence | Health Policy

The blog of Ashish Jha – physician, health policy researcher, and advocate for the notion that an ounce of data is worth a thousand pounds of opinion.

"If you really want hospitals and other provider organizations to change behavior, put real money at risk"

"Hospitals need to feel the financial consequences of providing unsafe care"

http://blogs.sph.harvard.edu/ashish-jha/

Accessed 1/18/15

"It is wrong to suppose that if you can't measure it, you can't manage it – a costly myth"

-W Deming
"The New Economics"
Deming Institute, 1994

You can't measure how good looking you are…

…but you can make yourself better looking

From “Beauty and the Geek”
(Reality TV, 2005-2010)

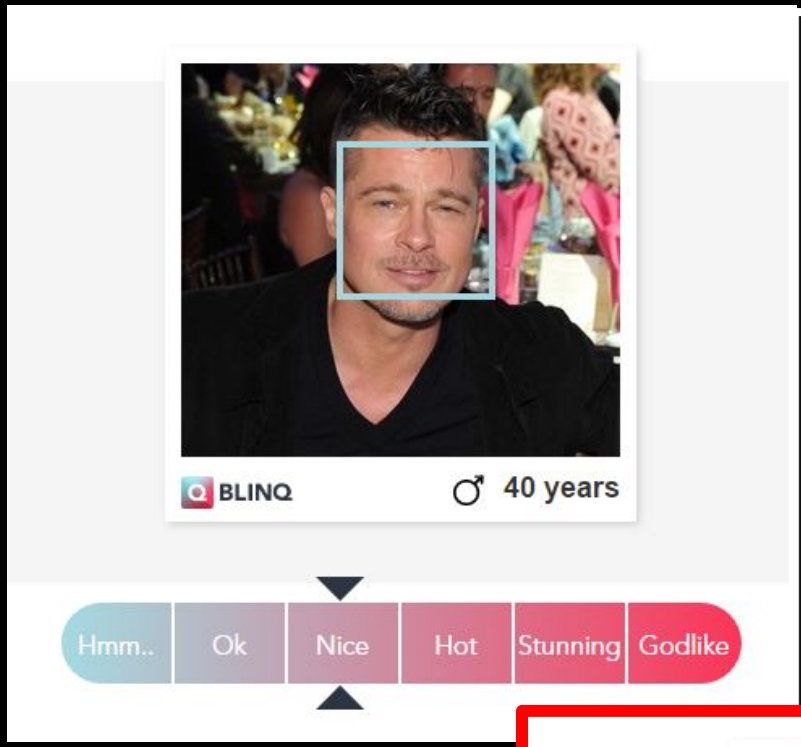
BLINQ ♂ 37 years

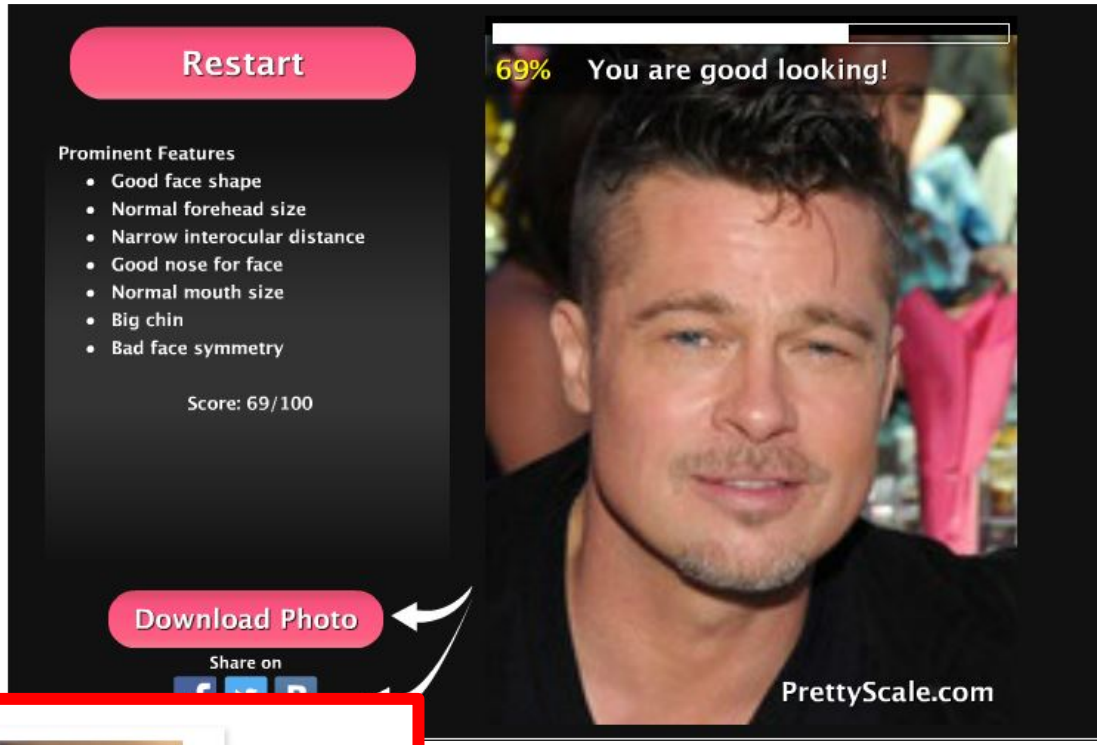
Hmm.. | Ok | Nice | Hot | Stunning | Godlike

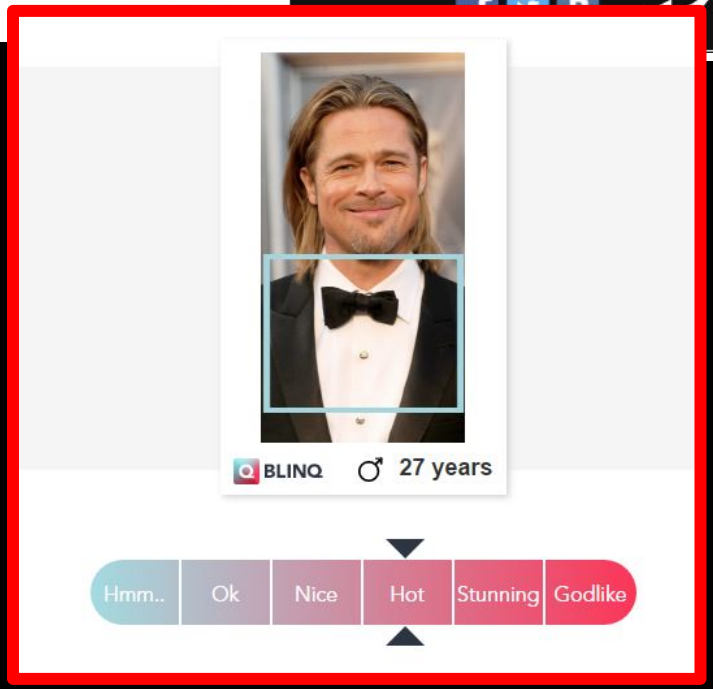
BLINQ ♂ 47 years

Hmm.. | Ok | Nice | Hot | Stunning | Godlike

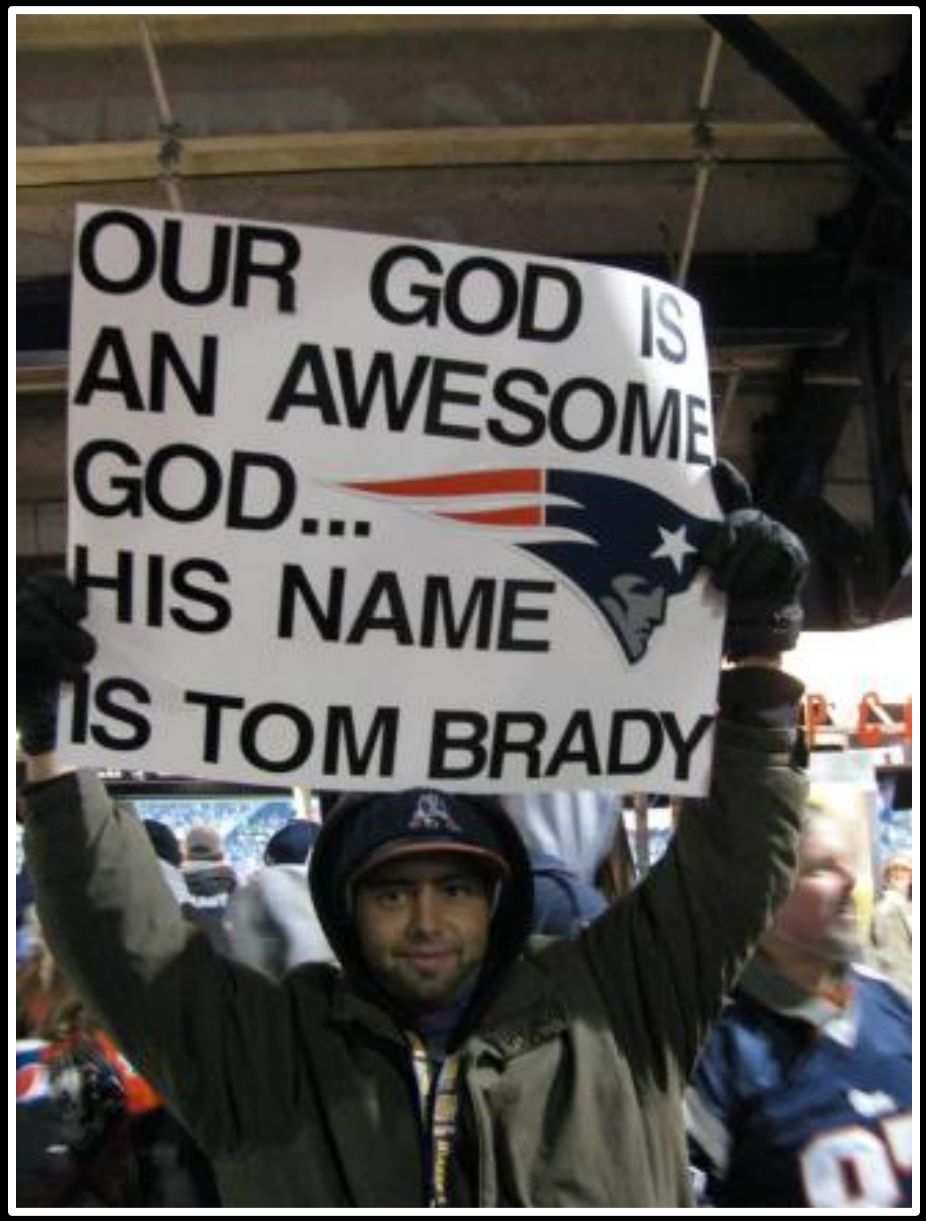
faces.ethz.ch







faces.ethz.ch
Prettyscale.com



*I too am a Patriots fan

Summary

- Defining quality metrics is challenging at all levels of quality measurement
  - Whether structure, process, or outcome
- Although definitions exist, sufficient space between the lines exists to significantly affect measurement
  - Say you want to measure antibiotic redosing in the OR
- While such definitions may hold up in non-pressured environments, monetization may test their robustness
  - Nobody really wants to “feel the consequences” of perceived poor care
- The depth and breadth of what can be gamed is huge
  - Even a 3 day change in the time window for postoperative events can mean a 50% change in provider rankings

Summary II

- At the root is an outcome complexity that is hard to categorize
  - Do you know the difference between ICD9 518.5 and 518.8?
- Nevertheless, even if measurement is difficult, improvement is clearly possible
  - “Beauty and the Geek” ran for 5 years in 3 countries!
- And the act of measurement itself drives incremental improvement
  - Whether 518.5 or 518.8 at least we’re reviewing those cases!