# Reduce the Risk: PCI Bleed

## A Campaign of the American College of Cardiology

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# Shared Best Practices

## Implementing a Bleeding Risk Tool Into Your EHR

November 6, 2019

12:00 – 1:00 pm ET

Webinar #6

AMERICAN COLLEGE of CARDIOLOGY

**Hosted by**:

Andrea Price MS, CPHQ, RCIS, AACC

Reduce the Risk PCI Bleed Steering Committee Chair

**Special Guests**:

Cornelia Anderson, BSN, RN, CPHQ, AACC

Product Manager CathPCI Registry

Jennifer Varner, BSN, RN, C4

STEMI Coordinator/Clinical Manager

West TN Heart and Vascular Center

Dylan Wilson, Pharm D

West TN Heart and Vascular Center

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# Agenda

1. Welcome and Introductions
2. Overview of Metric #40 PCI In-Hospital Risk Standardized Bleeding
3. Shared Best Practices – How a Risk Model Tool was Successfully Integrated into an EMR
4. Q&A
5. Announcements

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# Performance Measure #40:

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NCDR REPORT

## An Updated Bleeding Model to Predict the Risk of Post-Procedure Bleeding Among Patients Undergoing Percutaneous Coronary Intervention

### A Report Using an Expanded Bleeding Definition From the National Cardiovascular Data Registry CathPCI Registry

Sunil V. Rao, MD,* Lisa A. McCoy, MS,* John A. Spertus, MD, MPH,† Ronald J. Krone, MD,‡
Mandeep Singh, MD,§ Susan Fitzgerald, MS, RN,‖ Eric D. Peterson, MD, MPH*
*Durham, North Carolina; Kansas City and St. Louis, Missouri; Rochester, Minnesota; and Washington, DC*

**Objectives** This study sought to develop a model that predicts bleeding complications using an expanded bleeding definition among patients undergoing percutaneous coronary intervention (PCI) in contemporary clinical practice.

**Background** New knowledge about the importance of periprocedural bleeding combined with techniques to mitigate its occurrence and the inclusion of new data in the updated CathPCI Registry data collection forms encouraged us to develop a new bleeding definition and risk model to improve the monitoring and safety of PCI.

**Methods** Detailed clinical data from 1,043,759 PCI procedures at 1,142 centers from February 2008 through April 2011 participating in the CathPCI Registry were used to identify factors associated with major bleeding complications occurring within 72 h post-PCI. Risk models (full and simplified risk scores) were developed in 80% of the cohort and validated in the remaining 20%. Model discrimination and calibration were assessed in the overall population and among the following pre-specified patient subgroups: females, those older than 70 years of age, those with diabetes mellitus, those with ST-segment elevation myocardial infarction, and those who did not undergo in-hospital coronary artery bypass grafting.

**Results** Using the updated definition, the rate of bleeding was 5.8%. The full model included 31 variables, and the risk score had 10. The full model had similar discriminatory value across pre-specified subgroups and was well calibrated across the PCI risk spectrum.

**Conclusions** The updated bleeding definition identifies important post-PCI bleeding events. Risk models that use this expanded definition provide accurate estimates of post-PCI bleeding risk, thereby better informing clinical decision making and facilitating risk-adjusted provider feedback to support quality improvement. (J Am Coll Cardiol Intv 2013;6:897–904) © 2013 by the American College of Cardiology Foundation

From the *Duke Clinical Research Institute, Durham, North Carolina; †Saint Luke's Mid America Heart Institute/UMKC, Kansas City, Missouri; ‡Washington University, St. Louis, Missouri; §Mayo Clinic, Rochester, Minnesota; and the ‖American College of Cardiology Foundation, Washington, DC. This research was supported by the American College of Cardiology Foundation's National Cardiovascular Data Registry (NCDR). The views expressed in this manuscript represent those of the author(s), and do not necessarily represent the official views of the NCDR or its associated professional societies identified at www.ncdr.com. Dr. Rao is a consultant for The Medicines Company and Terumo Medical. Dr. Spertus has received grants from Eli Lilly, Genentech, Bristol-Myers Squibb, and Sanofi-Aventis; a research contract from the American College of Cardiology Foundation; and an equity interest in Outcomes Sciences. Dr. Peterson has received research funding from Eli Lilly and Janssen. Pharmaceuticals. All other authors have no relevant to the contents of this paper to disclose.

Manuscript received April 18, 2013, accepted April 18, 2013.

## PCI in-hospital risk standardized rate of bleeding events (all patients)

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# Risk Standardized Bleeding

- Hierarchical risk model
- Predictive patient variables
- Hospitals factors
  - Universal (performance measures, guidelines)
  - Specific (volume, location, academic)

# PCI Bleeding Outcome

Any **ONE** of the following:

1. Bleeding event w/in 72 hours **OR**
2. Hemorrhagic stroke **OR**
3. Tamponade **OR**
4. Transfusion for patients with a pre-procedure Hgb >8 g/dL and pre-procedure Hgb not missing; **OR**
5. Absolute Hgb decrease from pre-PCI to post-PCI of ≥ 4 g/dL for patients with pre-procedure Hgb ≤ 16 g/dL or mechanical ventricular support device not used

# Patient Eligibility

1. Patient's with PCI performed during the Episode of Care
2. Patient risk variables are obtained from the index PCI procedure
3. Exclude patients who died on the same day of the procedure
4. Exclude patients with CABG

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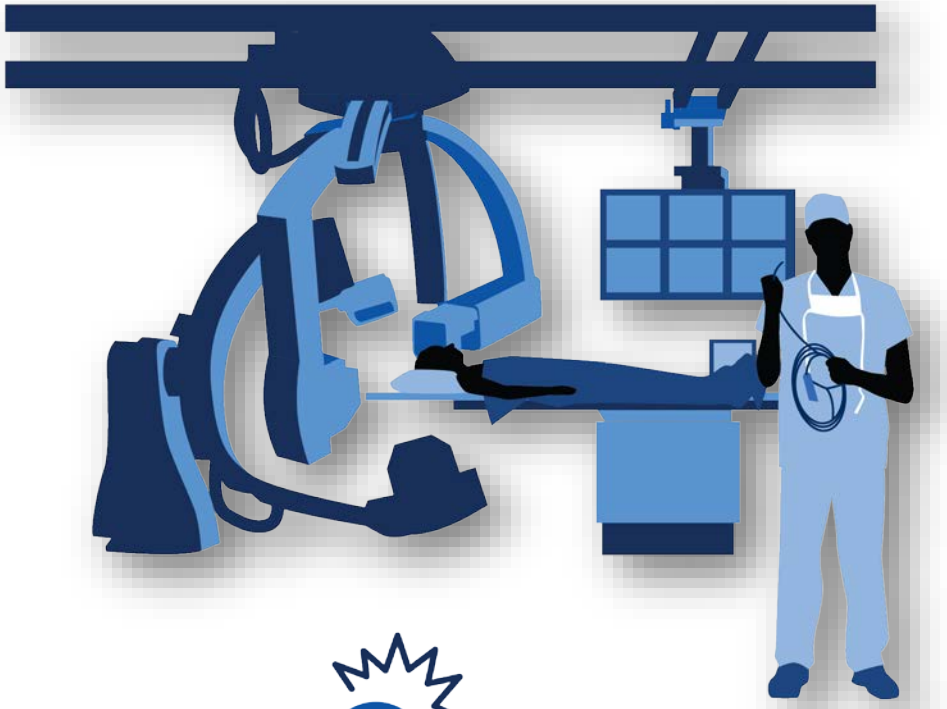
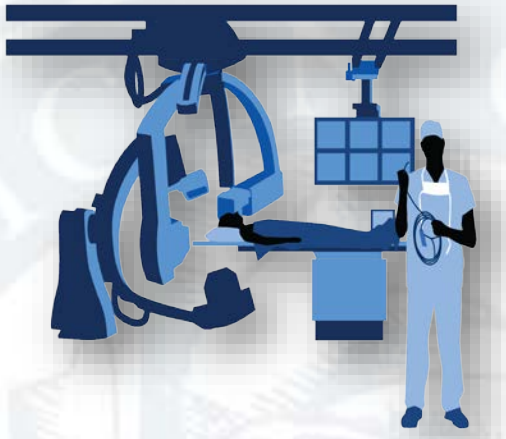
# Index PCI Procedure





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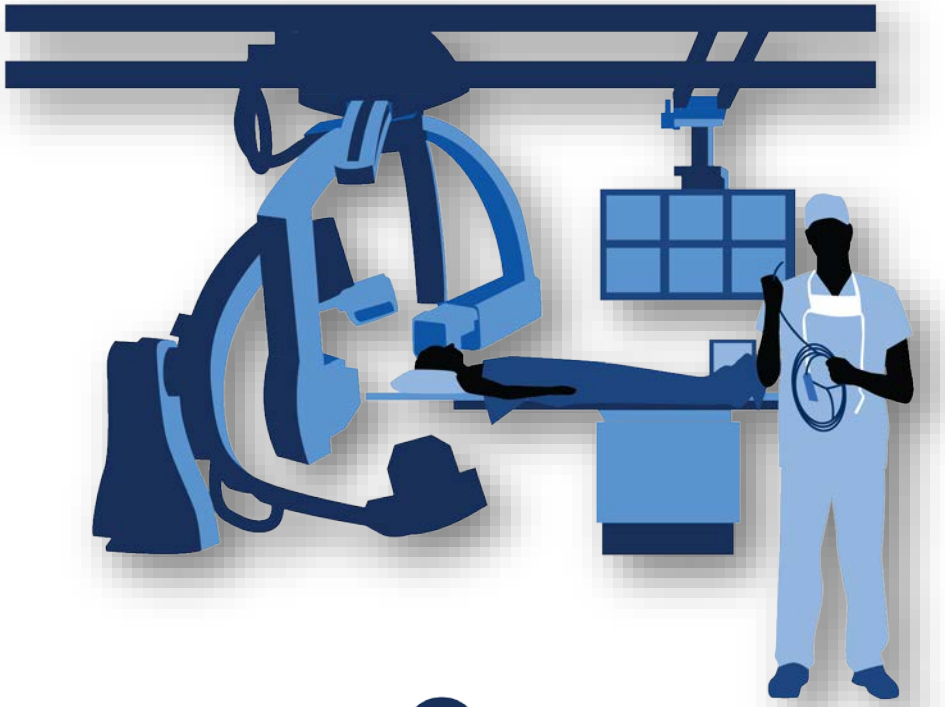
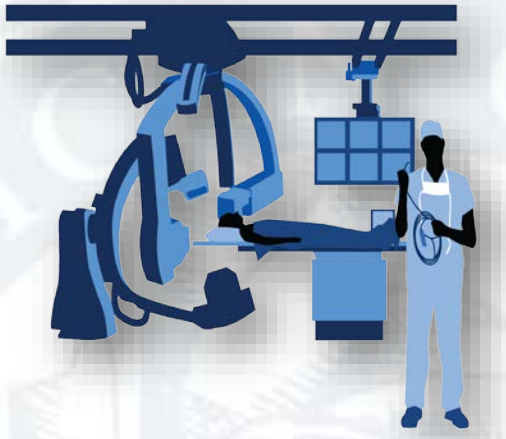
# Index PCI Procedure





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| Pre-Procedure RISK Predictive Variables | | PCI RISK Predicative Variables |
|---|---|---|
| **Age (spline at 70)** | **Female** | PCI Status |
| Cerebrovascular Disease | **STEMI** | Pre-PCI LVEF |
| Peripheral Arterial Disease | Thrombolytics | **Cardiogenic Shock start of PCI** |
| Chronic Lung Disease | Diabetes | Stenosis Immediately Prior to Rx |
| Heart Failure w/in 2 weeks | Diabetes Therapy | Pre-PCI TIMI Flow |
| NYHA Scale | **Currently on Dialysis** | Chronic Total Occlusion |
| **Prior PCI** | **Cardiogenic Shock w/in 24hrs** | Lesion Complexity |
| Cardiac Arrest w/in 24hrs | **Calculated BMI** | PCI of Left Main or Proximal LAD |
| **Pre Procedure Hemoglobin (spline at 13)** | Coronary Territory (number of diseased vessels) | Previously Treated Lesion<br>•Treated w/ stent<br>•In-stent restenosis<br>•In-stent thrombosis |
| | **Calculated GFR** | |

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# Hierarchical Risk Model

Patient Variables

Hospital Variables

$$(x+a)^n = \sum_{k=0}^{n} \binom{n}{k} x^k a^{n-k}$$ MATH

Outcome: **Bleeding Rate**

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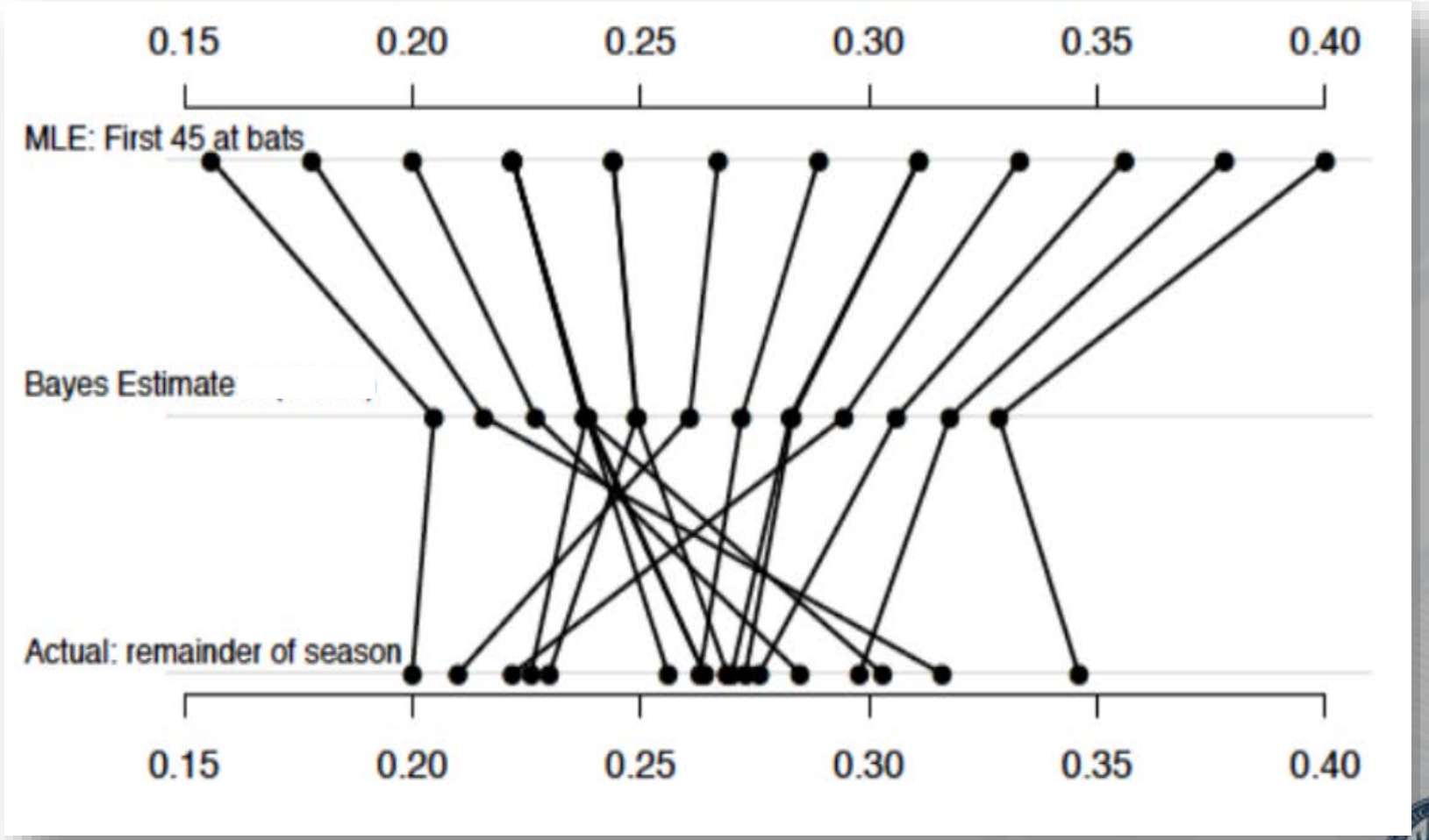
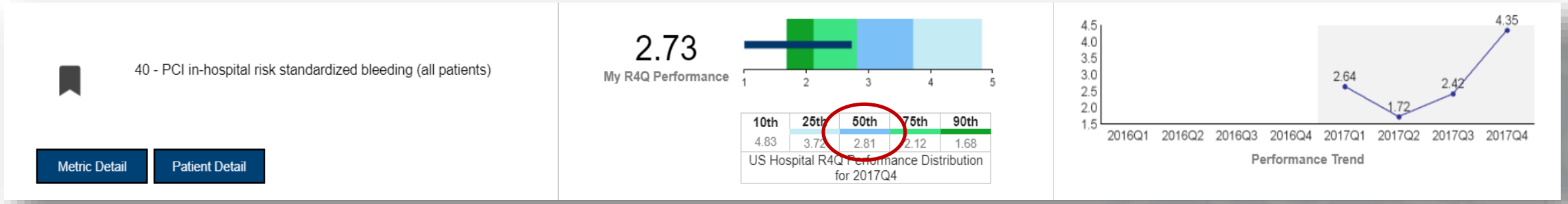
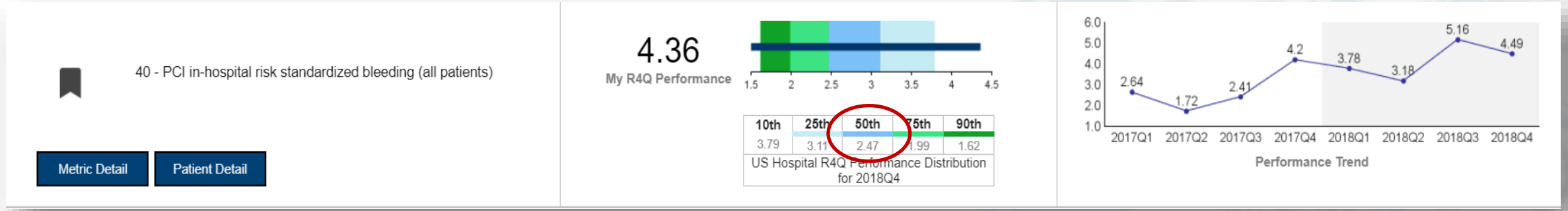
# Regression to the Mean



# Where are we now?




2017Q4 benchmark 2.81




2018Q4 benchmark 2.47

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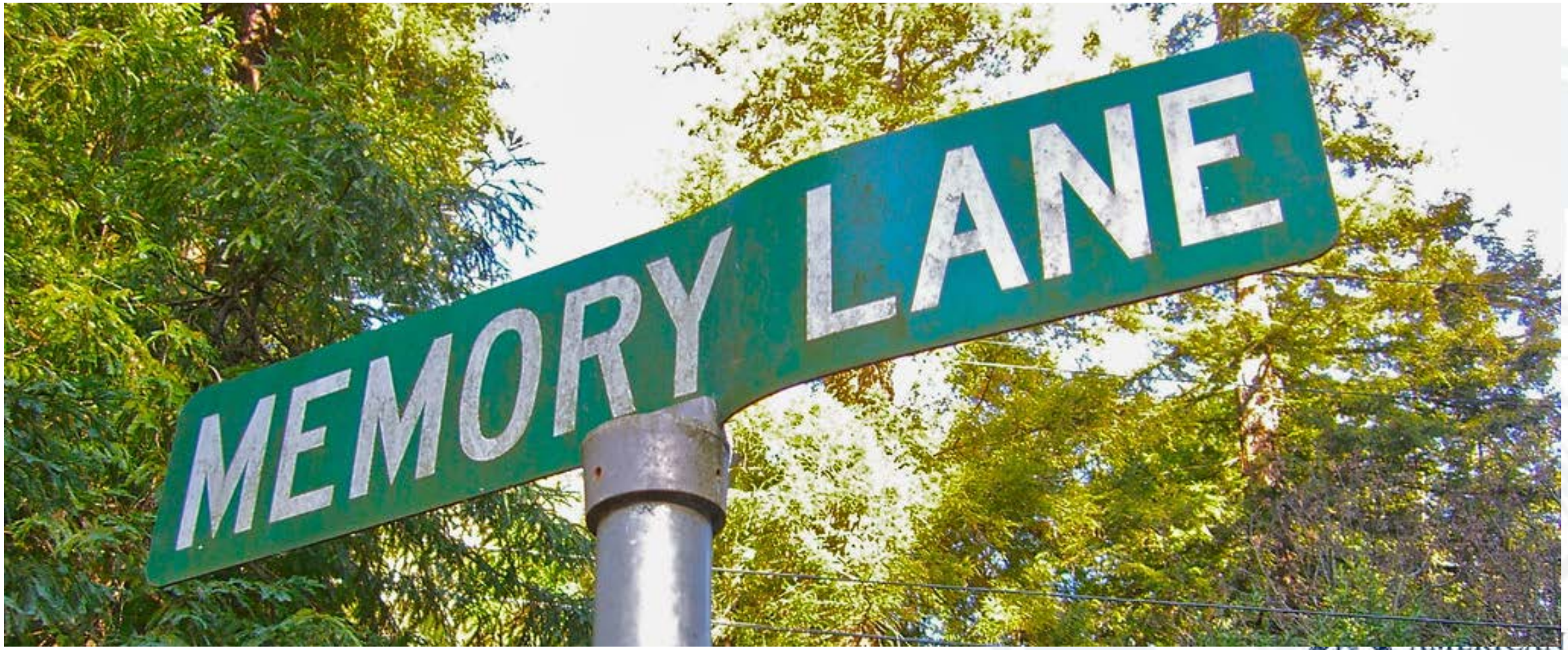
# Bleeding Risk Modeling



# RAB vs RSB

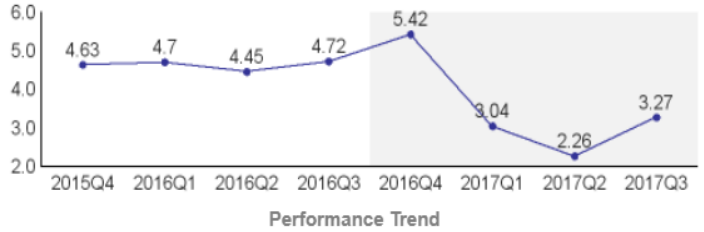
37 - PCI in-hospital risk adjusted rate of bleeding events (all patients)

Metric Detail | Patient Detail

3.56
My R4Q Performance


| 10th | 25th | 50th | 75th | 90th |
|---|---|---|---|---|
| 6.9 | 5.33 | 3.89 | 2.76 | 1.67 |

US Hospital R4Q Performance Distribution for 2017Q3

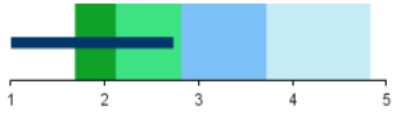



2017Q3 benchmark 3.89

40 - PCI in-hospital risk standardized bleeding (all patients)

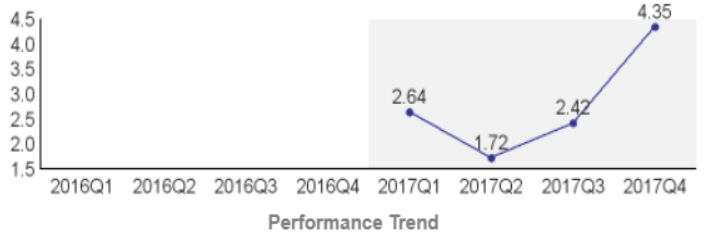
Metric Detail | Patient Detail

2.73
My R4Q Performance




| 10th | 25th | 50th | 75th | 90th |
|---|---|---|---|---|
| 4.83 | 3.72 | 2.81 | 2.12 | 1.68 |

US Hospital R4Q Performance Distribution for 2017Q4




2017Q4 benchmark 2.81

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# What's next?

- Develop hierarchical risk modeling for mortality & AKI
- Continue to report all traditional risk models in the detail lines

# PCI Bleeding Outcome

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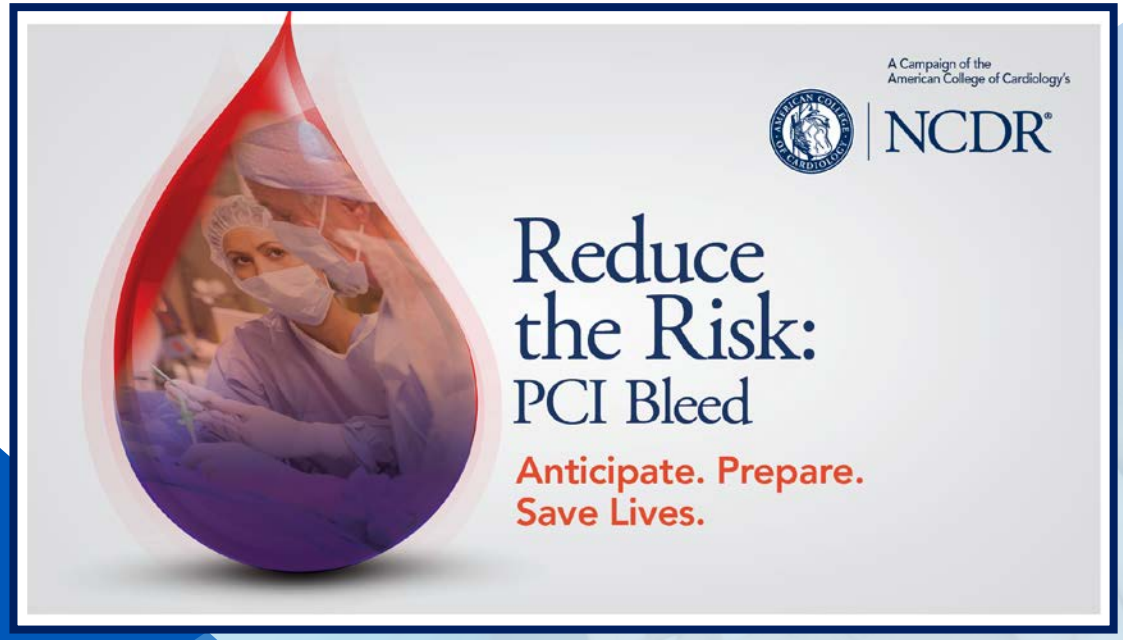
# REDUCE THE RISK: PCI BLEED CAMPAIGN

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Heart & Vascular

# WEST TENNESSEE HEALTHCARE

- Public, Not-for-Profit
- Serve 500,000 across 19 Counties
- Offer several clinics throughout Region
- 7 Emergency Departments
- Treat over 185,000 people per year
- EMS serves 5 Counties
- 3 Acute Care Facilities that hold Chest Pain Center Accreditation
- Jackson General, Dyersburg Hospital and Volunteer Hospital in Martin

# WEST TENNESSEE HEALTHCARE

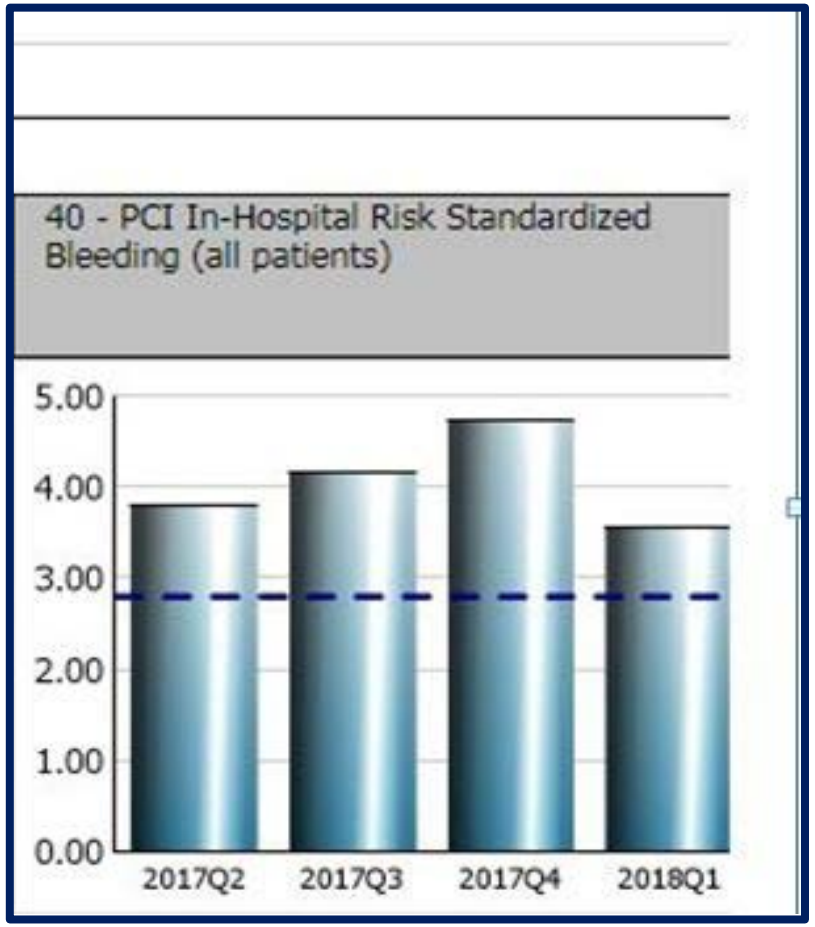
- Jackson Madison County General Hospital is considered the “flag-ship”
- Operates about 700 beds
- Includes Cardiovascular Surgery
- Serve over 9,000 heart patients a year
- State’s leader in treating heart attacks
- Received the Chest Pain MI Platinum Award

# PCI REDUCE THE RISK BLEED CAMPAIGN

- Opted into the Campaign in October of 2018
- Presented to administration for approval
- Incorporated the Campaign into already existing Cardiac Interventional Modality Group
- Advantages
  - Intravascular Cardiology, IT, CCL Director, Pharmacy, Administration and Nursing

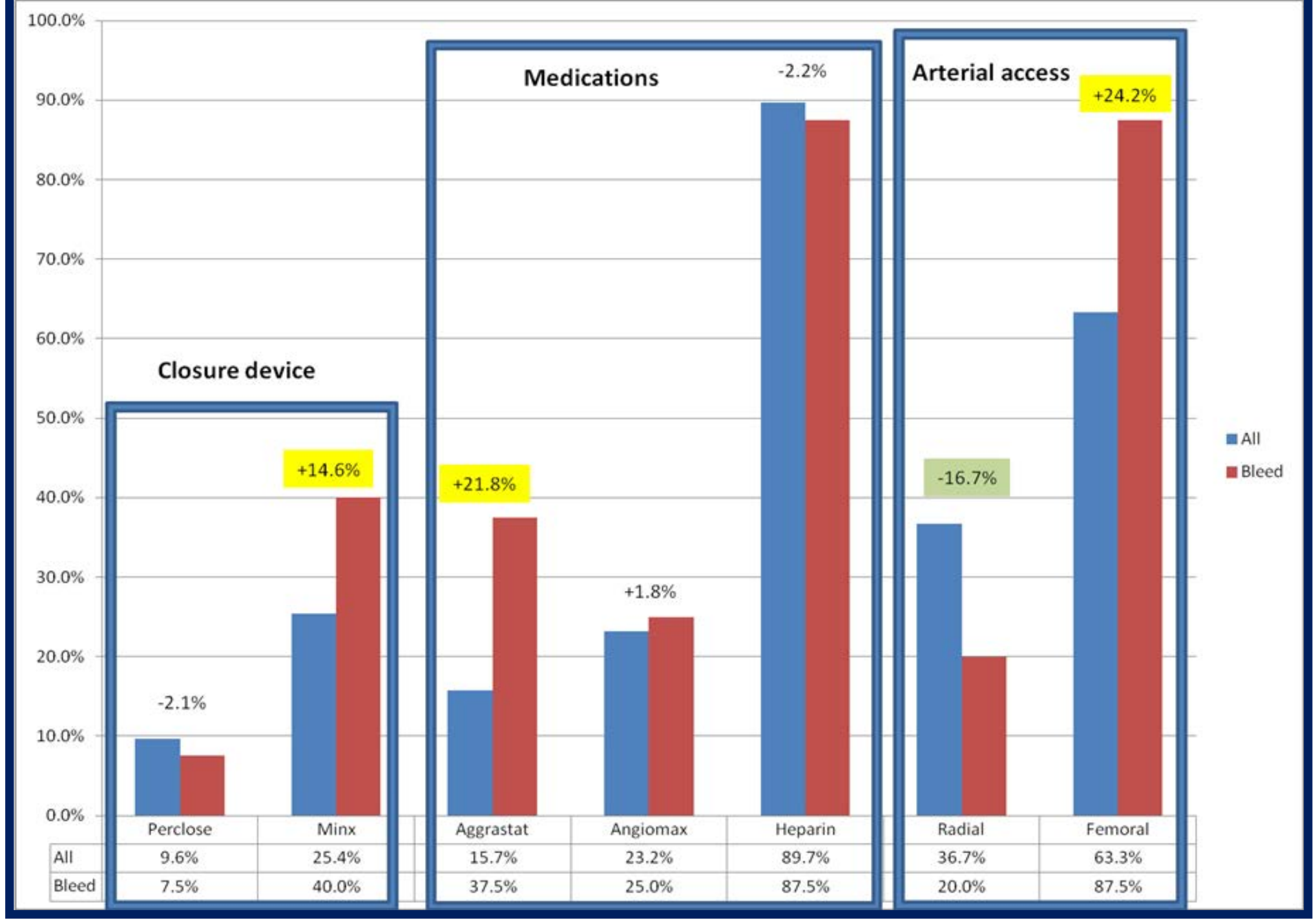
# METRIC # 40

- We educated the team on Metric #40 and the definitions for a “bleeding event”



# DRILL DOWN DATA

- Reviewed individual patients that had a bleed during those quarters
- Reviewed several key elements
- Reviewed data from different angles
- Recommended next steps
- Added the Bleed Risk Calculator




| | Perclose | Minx | Aggrastat | Angiomax | Heparin | Radial | Femoral |
|---|---|---|---|---|---|---|---|
| All | 9.6% | 25.4% | 15.7% | 23.2% | 89.7% | 36.7% | 63.3% |
| Bleed | 7.5% | 40.0% | 37.5% | 25.0% | 87.5% | 20.0% | 87.5% |

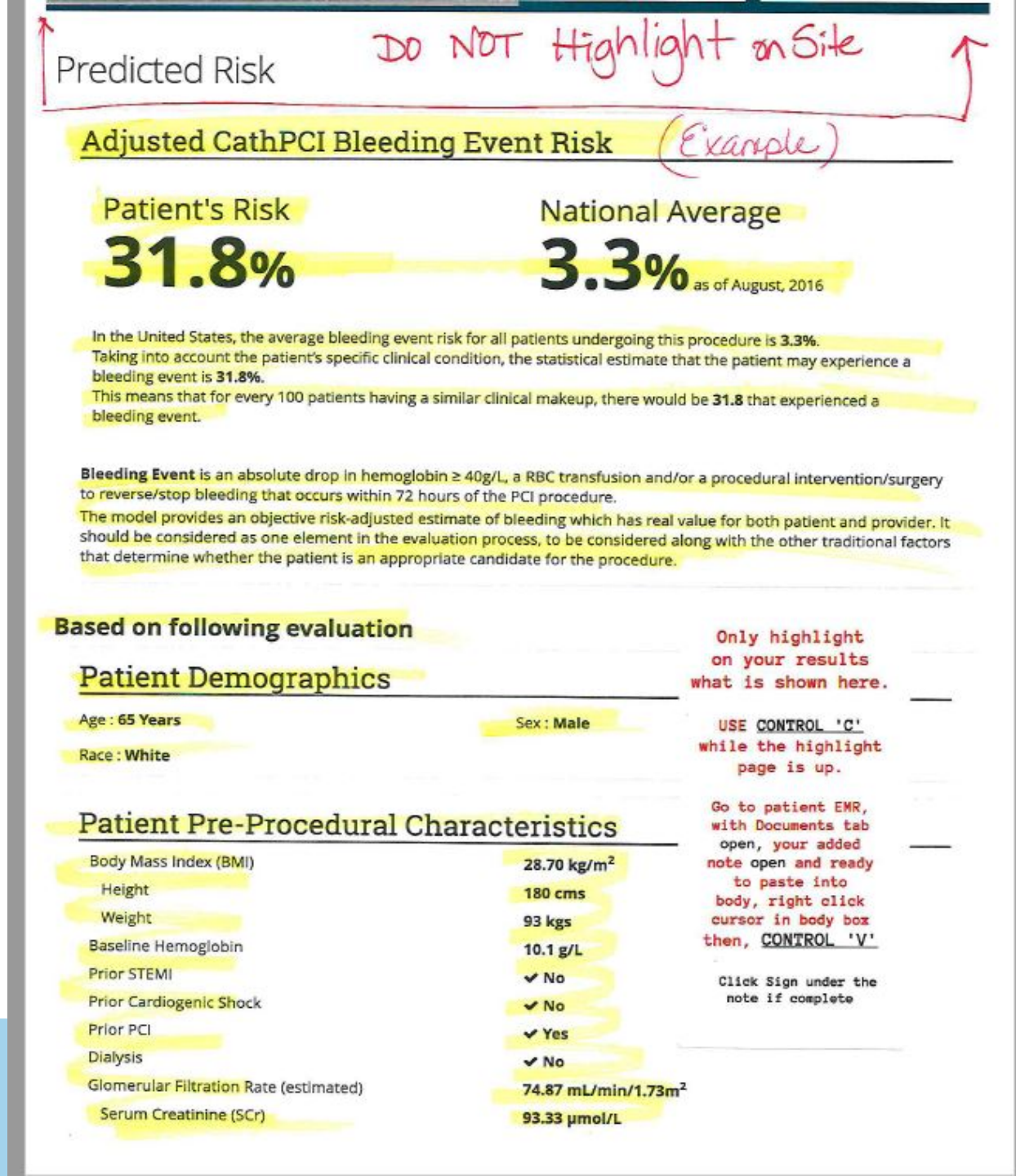
# IMPLEMENTING A BLEED RISK TOOL IN THE EMR

- Agreement to use the Cath PCI Bleeding Risk Calculator
- IT department was on a build freeze
- Use the internet tool
- Provided education
- Internet access made available

# AFTER THE IT BUILD FREEZE

- IT collaboration
- Building algorithms
- Making it work
- Next steps….

- Go Live was 2/25/2019
- Highlight, Copy and Paste
- Score was added to the CCL documentation
- Communicated at the Time Out



Predicted Risk

DO NOT Highlight on Site

## Adjusted CathPCI Bleeding Event Risk (Example)

| Patient's Risk | National Average |
|---|---|
| **31.8%** | **3.3%** as of August, 2016 |

In the United States, the average bleeding event risk for all patients undergoing this procedure is **3.3%**.
Taking into account the patient's specific clinical condition, the statistical estimate that the patient may experience a bleeding event is **31.8%**.
This means that for every 100 patients having a similar clinical makeup, there would be **31.8** that experienced a bleeding event.

**Bleeding Event** is an absolute drop in hemoglobin ≥ 40g/L, a RBC transfusion and/or a procedural intervention/surgery to reverse/stop bleeding that occurs within 72 hours of the PCI procedure.

The model provides an objective risk-adjusted estimate of bleeding which has real value for both patient and provider. It should be considered as one element in the evaluation process, to be considered along with the other traditional factors that determine whether the patient is an appropriate candidate for the procedure.

**Based on following evaluation**

### Patient Demographics

Age : **65 Years**

Sex : **Male**

Race : **White**

### Patient Pre-Procedural Characteristics

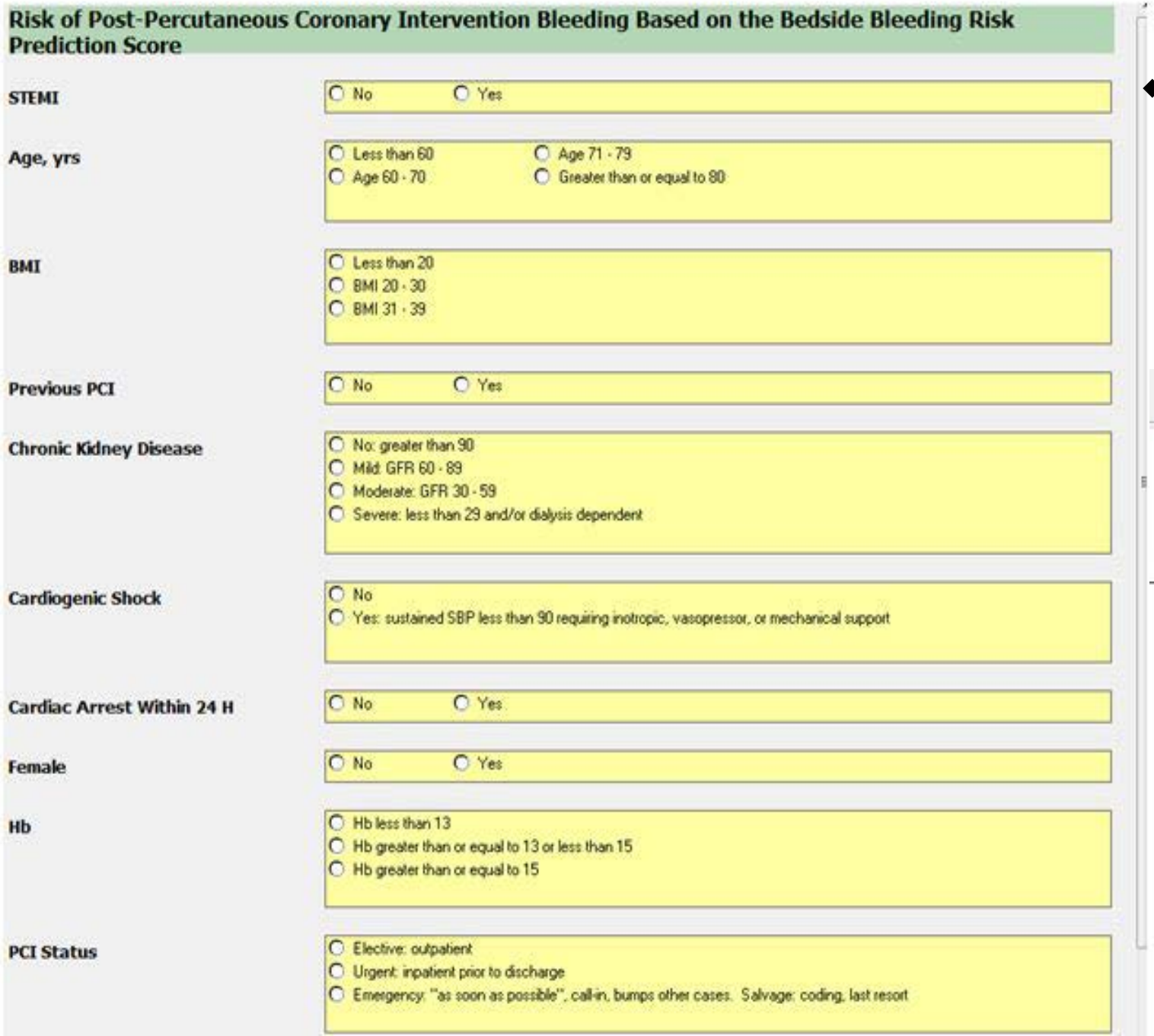
| | |
|---|---|
| Body Mass Index (BMI) | **28.70 kg/m²** |
| Height | **180 cms** |
| Weight | **93 kgs** |
| Baseline Hemoglobin | **10.1 g/L** |
| Prior STEMI | ✔ **No** |
| Prior Cardiogenic Shock | ✔ **No** |
| Prior PCI | ✔ **Yes** |
| Dialysis | ✔ **No** |
| Glomerular Filtration Rate (estimated) | **74.87 mL/min/1.73m²** |
| Serum Creatinine (SCr) | **93.33 µmol/L** |

Only highlight on your results what is shown here.

USE CONTROL 'C' while the highlight page is up.

Go to patient EMR, with Documents tab open, your added note open and ready to paste into body, right click cursor in body box then, CONTROL 'V'

Click Sign under the note if complete




- PCI Bleed Risk calculator built in the EMR

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# CathPCI Bleed Risk Assessment

**Step 1**
Assess bleed risk

| | |
|---|---|
| Low: ≤ 25 | **Consider 1 bleed avoidance strategy** |
| Mod: 26-65 | **Implement 1 bleed avoidance strategy** |
| High: > 65 | **Implement 2 bleed avoidance strategies** |

**Step 2**
Choose BAS

## Bleed Avoidance Strategies (BAS)

| Access site | GPIIb/IIIa inhibitor | Closure device |
|---|---|---|
| **#1 Radial** | **#2 No GPI or bolus-only GPI** | **#3 Perclose** |

**For Impella, implement #2 and #3 above**

# METRIC #40 HISTORICAL DATA

# QUESTIONS?

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# Team Roster

- Multidisciplinary Team
- Identify Champion and Roles
- Contact Information
- Submit to NCDR within 45 days
- ncdr@acc.org or ncdrmail@acc.org

| **Contact Name** (*First & Last Name*) | **Position Title** |
|---|---|
| | Physician Medical Director |
| | Team Facilitator |
| | Hospital Administration Sponsor |
| | Team Member |
| | Team Member |
| | Team Member |
| | Team Member |
| | Team Member |
| | Team Member |

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# Webinars

- All Webinars are archived and available for review
- Webinar #7 January 22, 2020

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