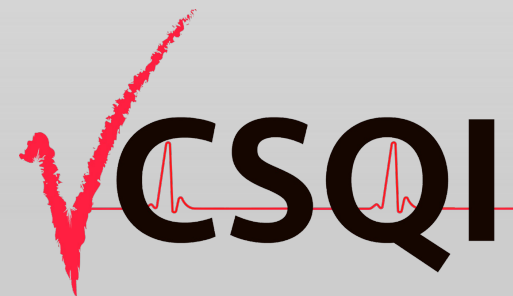


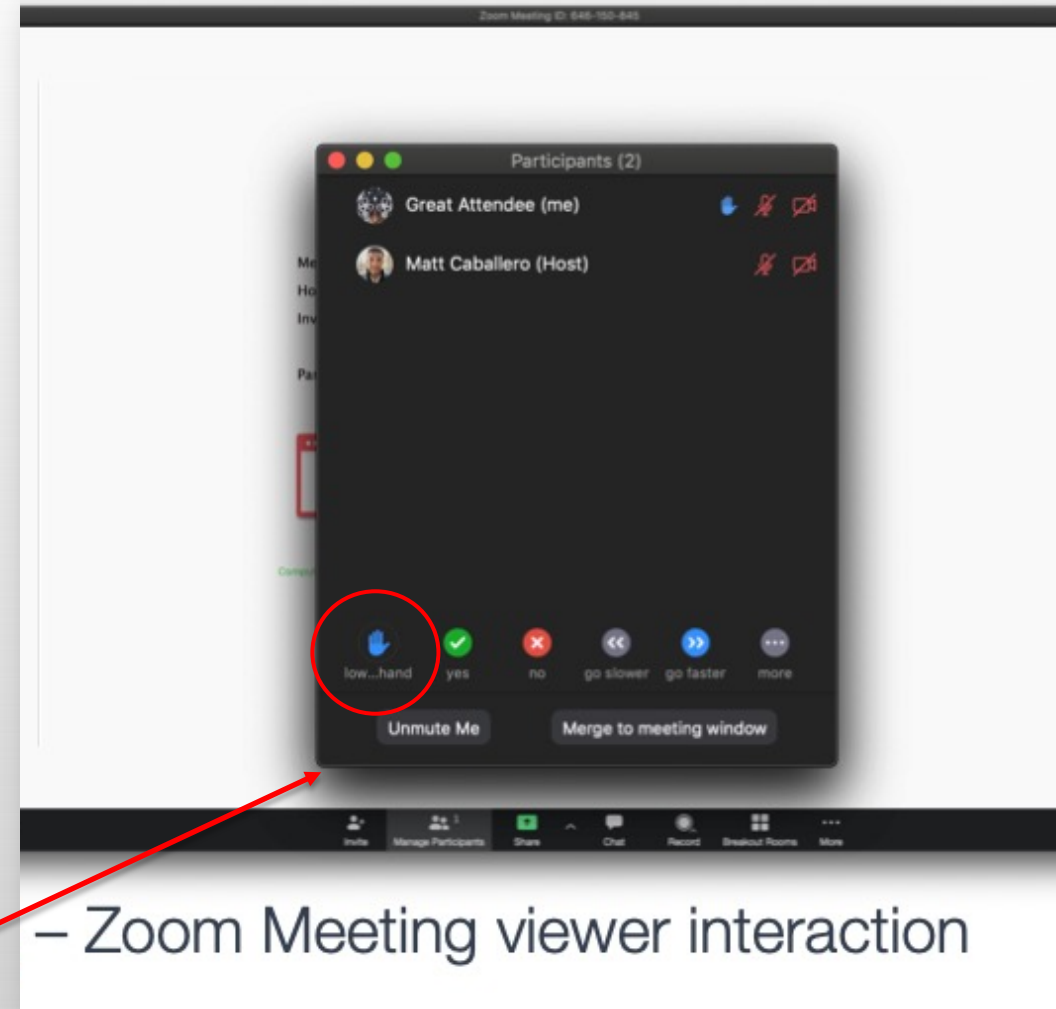
# Virginia Cardiac Services Quality Initiative

Summer 2024 Quarterly Meeting

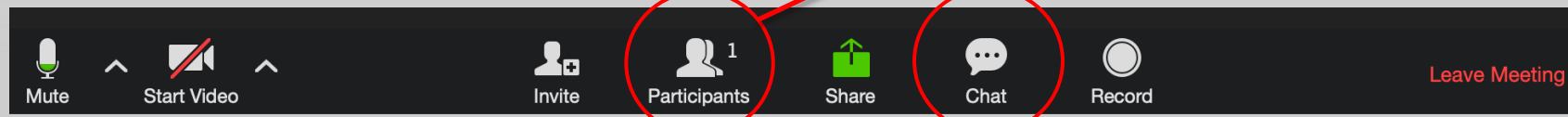


# To ensure a smooth meeting...

- Please mute your lines (phone or audio), until called upon
  - Interactive features available under '**participants**' window
- Hold questions until end of presentation
- Use "Raise Hand" feature for questions or comments
- The Chat Room can also be used to ask questions
- **Call/text Sherri (216) 513-3141** if you need assistance



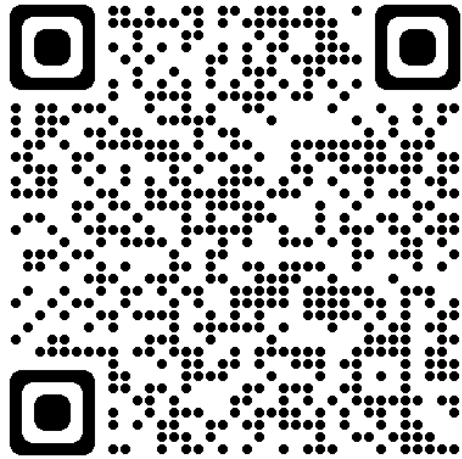
– Zoom Meeting viewer interaction



# New CME Opportunities Available

- Medicine- AMA PRA Category 1
- Nursing- ANCC Contact Hours
- Physician Assistant - AAPA
- IPCE Performance Improvement
- ABMS Maintenance of Certification - MOC II- ABIM





# How to Claim Credit

1. Go to [www.cmevillage.com](http://www.cmevillage.com).
2. Click on the “Learning Portal” button and select “CE Certificate”.
3. Sign in with your email and password or create an account if you are a new user.
4. Enter CE Activity Code **150805** and click “Submit” and “Continue”.
5. Complete the evaluation and click “Done”.
6. Certificate Preparation; indicate number of credits you wish to claim for attending this activity. Click “Submit”
7. Click “Print Certificate” or you can access later by visiting our website, Click “Learning Portal”, Sign in at the top of the page and click “Credit History & Past Certificate”.

For problems, contact the CME office at [uvacme@virginia.edu](mailto:uvacme@virginia.edu)

***PLEASE NOTE: The post activity evaluation will only be available for a 30-day period. Credit will not be issued after the evaluation period has closed.***



# Tonight's Agenda

*Welcome and Highlights from the Board*

*Mohammed Quader, MD; Virginia Commonwealth University*

*QI Updates*

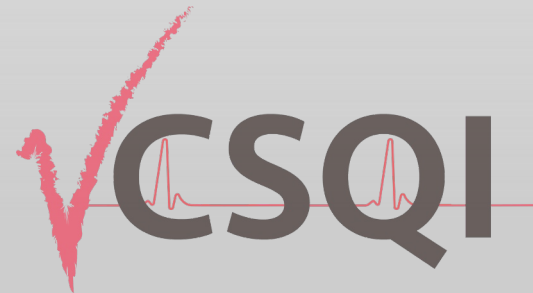
*Sherri White, Quality Improvement Advisor*

*Quality Data Review*

*Eddie Fonner; VCSQI Executive Director*

*ACC 2024 Trials Likely to Affect Clinical Practice*

*Michael Kontos, MD; Virginia Commonwealth University*



# VCSQI Strategic Plan

## Mission

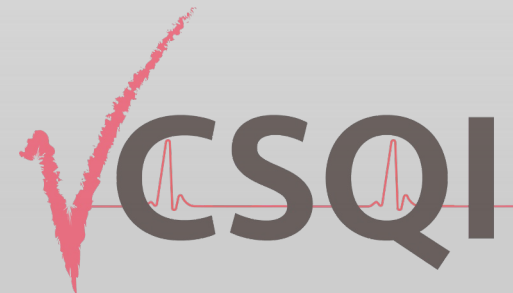
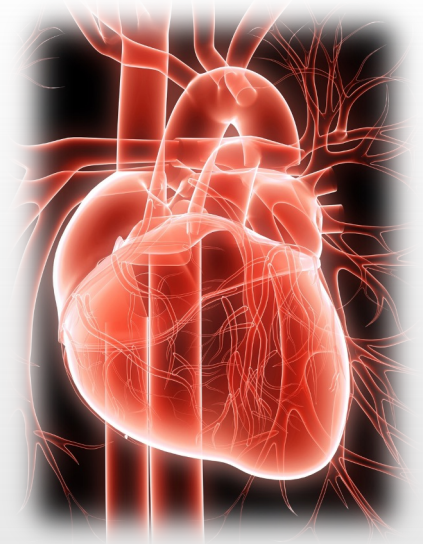
Transform Cardiovascular Care to Improve Patient Experience and Value

## Vision

Optimize Heart Care Outcomes Through National Collaboration, Innovation and Research

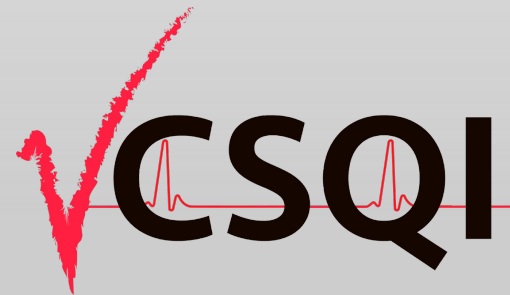
## Core Values

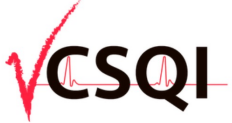


- **V** alue-Based Best Practices
- **C** ollaboration & Transparency
- **S** tewardship of Healthcare & Costs
- **Q** uality and Patient Centered
- **I** nnovation; Data and Analytic-Driven



# QI Updates

Sherri White, MSc, SSGBC  
Quality Improvement Advisor, VCSQI



COLLABORATIVE	WORKGROUPS	CHAMPIONS
	<ul style="list-style-type: none"> <li>• CathPCI (Data Managers)</li> <li>• Quality (STS Data Managers)</li> <li>• Research &amp; Writing</li> <li>• DEI 2.0</li> <li>• Perfusion Group</li>   <li>• AKI</li>   <li>• Readmission</li> </ul>	<p>TBD</p> <p>Judy Smith (UVA)</p> <p>Ourania Preventza, MD (UVA)</p> <p>Halima Walker (UVA), Judy Smith (UVA), Sharmaine McCoy (Inova)</p> <p>Eve Dallas (UVA)</p> <p>Mike Brown (Mary Washington), Shelley Cahalan (Sentara), Judy Smith (UVA), Chris Sytsma (Winchester)</p> <p>Robert Lancey, MD (Sentara) &amp; Andre Tolleris (VHHA)</p>
	<ul style="list-style-type: none"> <li>• Steering Committee</li> <li>• ECG Education</li> <li>• Thrombolytics</li>   <li>• PE Response Team (PERT)</li> <li>• ED Bypass and False Activation</li> <li>• Shock</li> </ul>	<p>Peter O'Brien, MD (Centra) &amp; Michael Kontos, MD (VCU)</p> <p>Bob Page (VA Ed.) &amp; Sheree Emore (Carilion)</p> <p>Robert Konstance, MD (HCA Lewis Gale), John Patterson, MD (LewisGale Montgomery) &amp; Michael Kontos, MD (VCU)</p> <p>Michael Kelley, MD (Carilion) &amp; Jessica Mountjoy (Mary Washington)</p> <p>Peter O'Brien, MD (Centra) &amp; Michael Kontos, MD (VCU)</p> <p>Chalak Berzingi, MD (Carilion) &amp; Michael Joseph, MD (Carilion)</p>
	<ul style="list-style-type: none"> <li>• Goal-Directed Perfusion</li> <li>• Goal-Directed Therapies</li> <li>• Readmission &amp; AKI</li> <li>• Data Integration</li> </ul>	<p>Eve Dallas (UVA) &amp; Terri Haber (MCSQI)</p> <p>Amanda Rae (MCSQI) &amp; Shannon Crotwell (Atrium)</p> <p>Shannon Crotwell (Atrium)</p> <p>Eddie Fonner (VCSQI), Judy Smith (UVA) &amp; Diane Alejo (MCSQI)</p>

For more information or to join a workgroup, contact Sherri via [Sherri@vcsqi.org](mailto:Sherri@vcsqi.org).



# DEI 2.0 Workgroup

## DEI Resource Library



Discovery & Definition

BE PART OF OUR DISCUSSION AT

### DEI 2.0 WORKGROUP MEETING

Join us as we embark on this transformative journey towards a more equitable and just healthcare future.

Guest Speaker:  
**Martha Rodysil**

**UNITE US**  
Unite Us is a shared technology platform that creates a coordinated care network with partners working together to provide a broad range of locally based services.

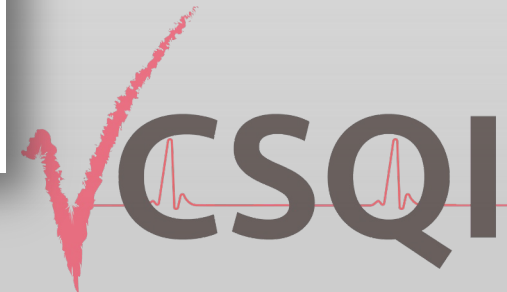
### Inova Leads the Charge in Promoting Health Equity Through Groundbreaking Cardiac Care Initiatives



In an inspiring response to the national call for racial justice and health equity, the Inova Health System established the Inova Schar Heart & Vascular Committee on Equity Education and Outreach. Born out of the tumultuous events following Mr. George Floyd's tragic death in 2020, the committee embodies Inova's commitment to dismantling healthcare disparities and fostering a culture of inclusion within its community.

Under the leadership of Dr. Kelly Epps and Dr. Cleveland Francis, the committee has crafted a multifaceted strategy to address systemic bias, racism, diversity, and

disparities in care. By forming subcommittees dedicated to recruitment, onboarding, community engagement, mentorship, and healthcare disparities, Inova is taking concrete steps towards realizing its mission.





# Goal-Directed Perfusion Workgroup

## Why Join Us?

- **Collaborate:** Work with leading perfusionists and healthcare professionals from multiple states.
- **Innovate:** Develop and implement innovative standards and guidelines.
- **Improve Outcomes:** Use data-driven insights to enhance patient outcomes.
- **Network:** Expand your professional network and share best practice

## How to Join:


1. Email [info@vcsqi.org](mailto:info@vcsqi.org) to confirm your interest.
2. Join Teams: Accept the Microsoft Teams invitation you'll receive after





PERFECT CARE IMPACT NETWORK  
**GOAL-DIRECTED PERFUSION**

**MELINDA COUPER BS, CCP, LP**  
Atrium Health

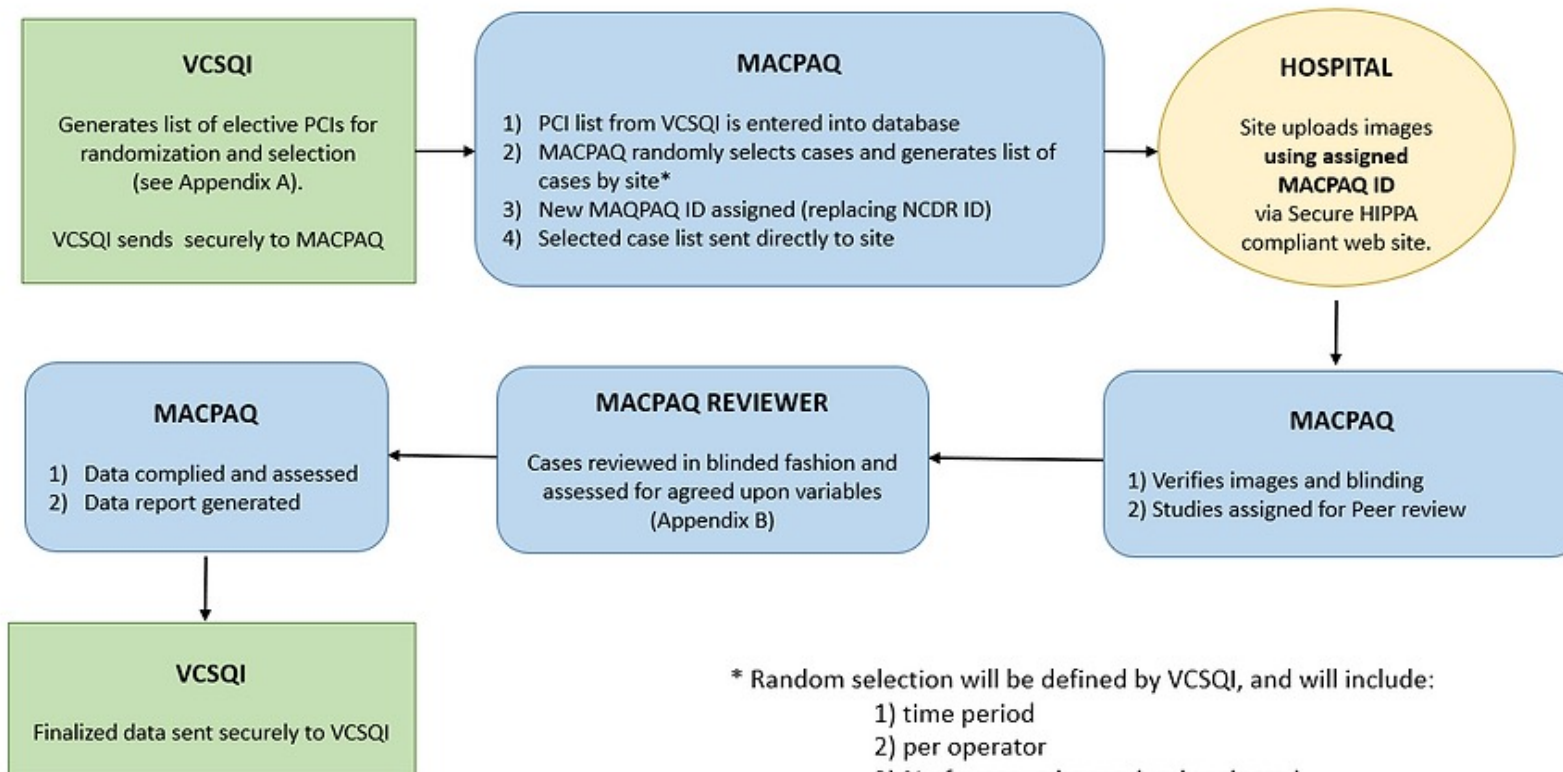
TOPIC OF DISCUSSION  
**Factors Affecting DO2 and AKI  
at Atrium Health**

**TUESDAY**   
2 July 2024

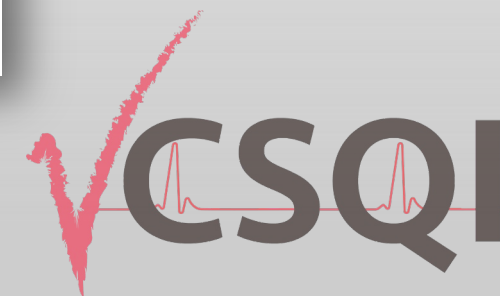
**START AT**   
04:00PM - 5:00PM

 [www.vcsqi.org](http://www.vcsqi.org)

# MACPAQ Angiogram Film Review

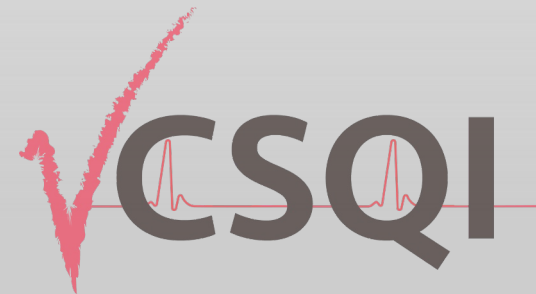
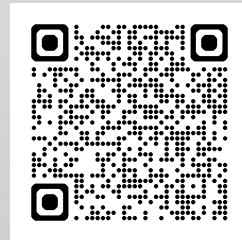


For more information or to signup, contact Sherri via [Sherri@vcsqi.org](mailto:Sherri@vcsqi.org).



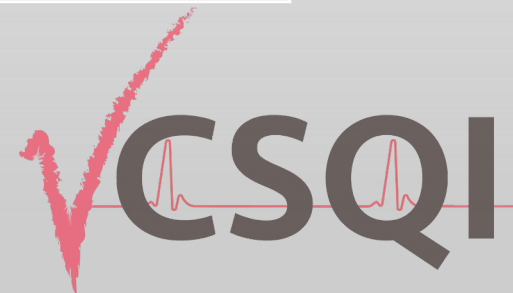
# Planning Committees

- VHAC Statewide Planning Committee
  - Megan Vaughan (Bon Secours)
  - Melanie Johnson (Carilion)
  - Cindi Cole (Centra)
  - Bob Page (VA Ed.)
- VCSQI Quarterly Meetings (currently recruiting)
  - Eve Dallas (UVA)



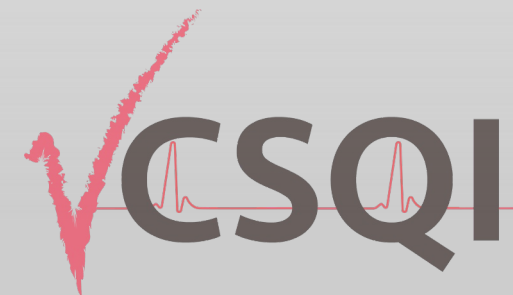
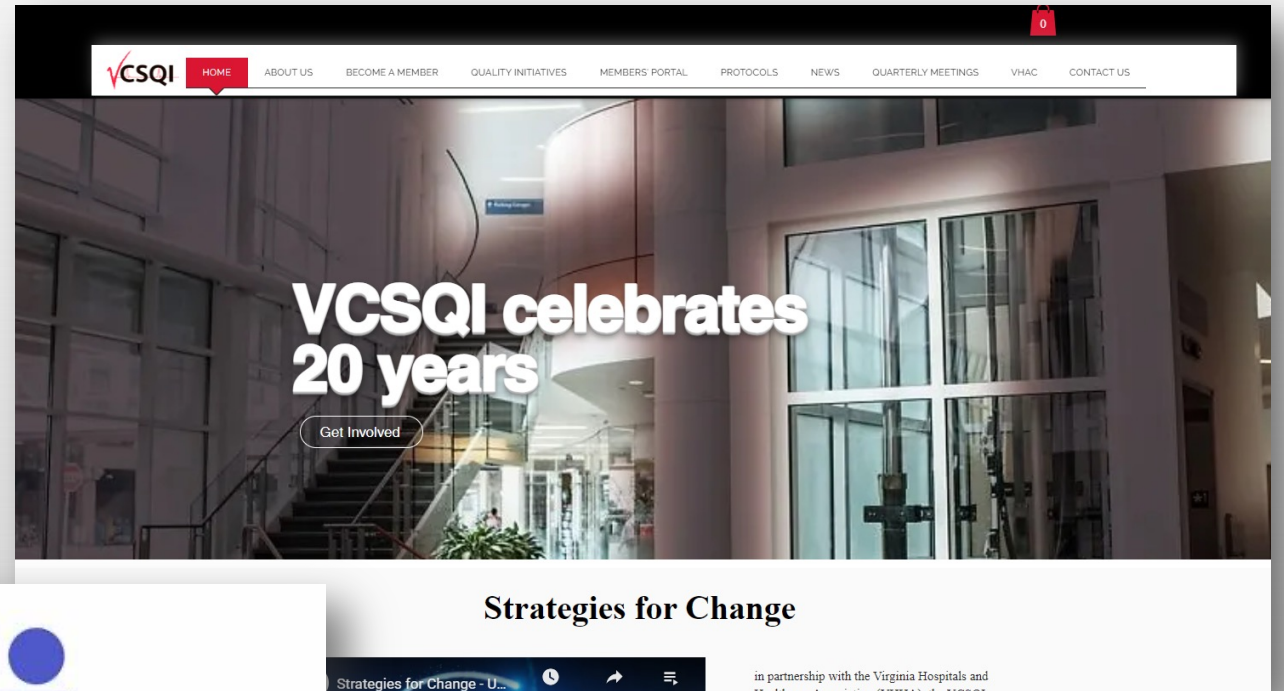
# Surveys

Workgroup	Link
VHAC - Thrombolytics Workgroup	<a href="https://www.surveymonkey.com/r/7CFJDWQ">https://www.surveymonkey.com/r/7CFJDWQ</a>
Perfect Care Impact Network - Drainology	<a href="https://qfreeaccountssjc1.az1.qualtrics.com/jfe/form/SV_29PTduQC8yH0Iho?Q_DL=kO6mu0parPkpKJL_29PTduQC8yH0Iho_CGC_Jq2K3YL04i1DYF2&amp;Q_CHL=email">https://qfreeaccountssjc1.az1.qualtrics.com/jfe/form/SV_29PTduQC8yH0Iho?Q_DL=kO6mu0parPkpKJL_29PTduQC8yH0Iho_CGC_Jq2K3YL04i1DYF2&amp;Q_CHL=email</a>
VHAC - PERT Workgroup	<a href="https://www.surveymonkey.com/r/VHACPERT">https://www.surveymonkey.com/r/VHACPERT</a>
CathPCI/VHAC - Data Managers Resource Allocation	<a href="https://www.cognitofrms.com/VCSQI1/DataManagerForm">https://www.cognitofrms.com/VCSQI1/DataManagerForm</a>



# Teams Conversion & Website Enhancements

- Members Portal - Construction Underway

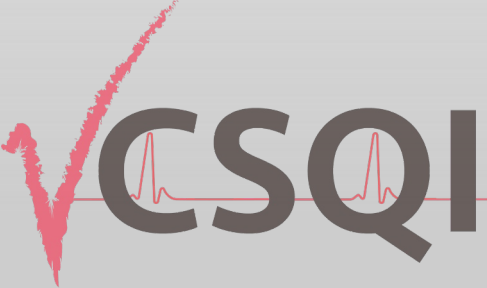


# Update your Profile

The screenshot shows the VCSQI Board Portal website. At the top left, the phone number (913) 909-3140 and the text 'Board Portal' are visible. The user's name 'sheri338' is shown in the top right corner. A navigation menu includes 'HOME', 'ABOUT US', 'BECOME A MEMBER', 'QUALITY INITIATIVES', 'MEMBERS' PORTAL', 'PROTOCOLS', 'NEWS', 'QUARTERLY', and 'CONTACT US'. A large banner in the center reads 'Join the Collaborative...' with a 'Join Now' button. A dropdown menu is open, listing options: Profile, Meetings, Followers, My Orders, My Addresses, My Subscriptions, My Account, Settings, and Log Out. The 'Profile' option is highlighted.

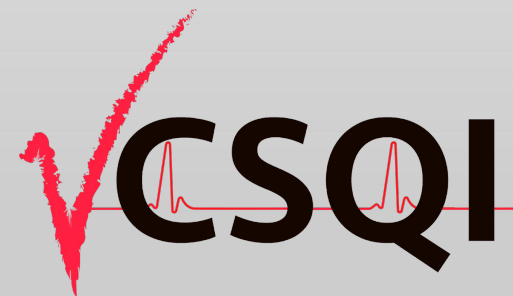
The profile page displays the following information:

- Profile** (with an 'Edit Profile' button)
- Join date: Jul 1, 2021
- Tell us about yourself**
  - Quality Improvent Advisor
- Overview** (with an information icon)
  - Credentials: Not provided
  - Organization: VCSQI
  - Role/Title: Quality Improvement Advisor
  - Registry Used - ACC/STS: Not provided



# Welcome and Highlights from the Board

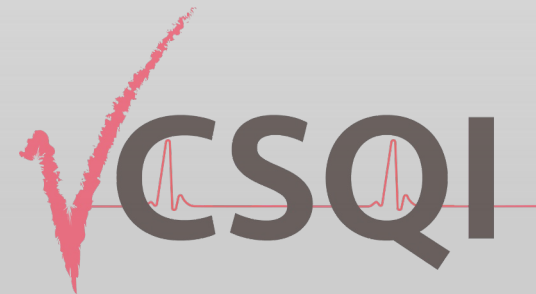
Mohammed Quader, MD  
Virginia Commonwealth University  
VCSQI Chair





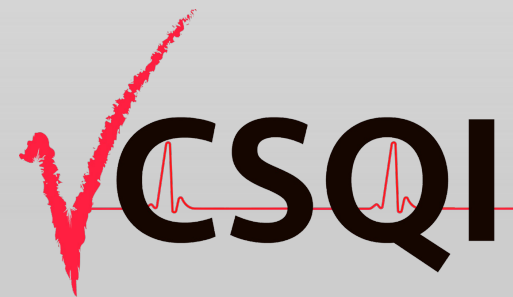
# Board Updates: Summer 2024

- Succession Planning:
  - New Vice Chair and Vice Chair Elect
  - Vice Chair: Dr. Robert Lancey, Sentara Rockingham
  - Vice Chair Elect: Dr. Peter O'Brien, Centra Lynchburg
- New Research & Writing Chair
  - Dr. Ourania Preventza, UVA
- Collaboration with UVA MPH Program



# Impact of Operating Room Times on Postoperative Resource Utilization and Patient Outcomes Following CABG

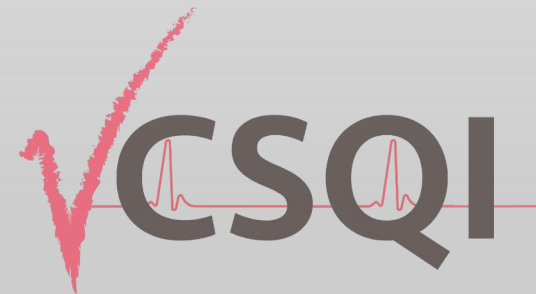
VCSQI Data from 2011 to 2023



# Objective

To investigate the impact of OR times on postoperative resource utilization and patient outcomes following CABG

**HYPOTHESIS:** Longer OR times are associated with increased post-operative complications and resource utilization



# Patient Population

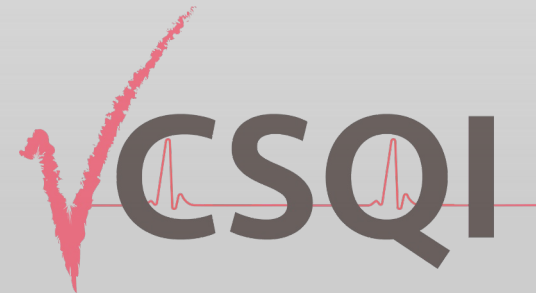
**Data source: VCSQI**

## **Inclusion:**

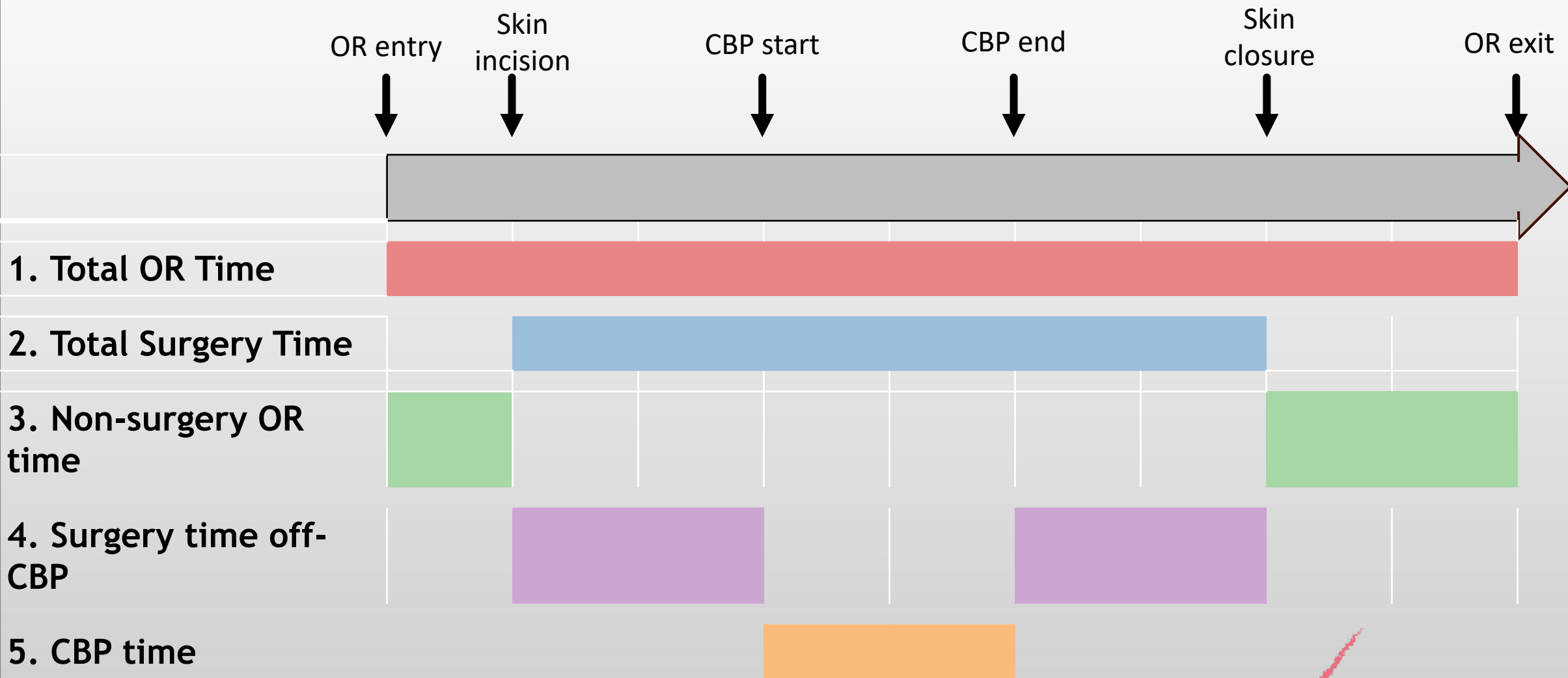
1. Adults (age  $\geq 18$ )
2. Isolated, primary CABG
3. Timeframe: January 2011 - December 2023

## **Exclusion:**

1. Emergent CABG
2. Off-pump CABG
3. Redo sternotomies
4. Outlying times ( $>99$ th percentile or  $<1$ st percentile)



# Definition of OR Times



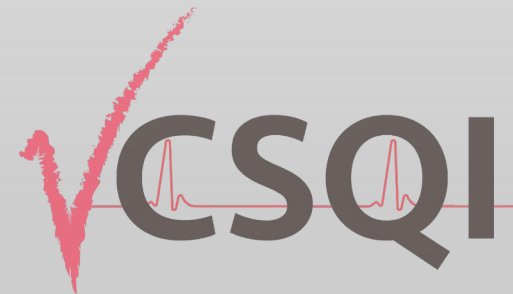
# Outcomes

## Primary Outcomes:

1. All-cause morbidity
2. Time to initial extubation
3. Initial ICU length of stay
4. Hospital length of stay

## Secondary Outcomes:

1. Mortality
2. Sepsis
3. Prolonged ventilation
4. Renal failure
5. Bleeding
6. Pneumonia
7. Stroke
8. Year-adjusted cost



# Analysis

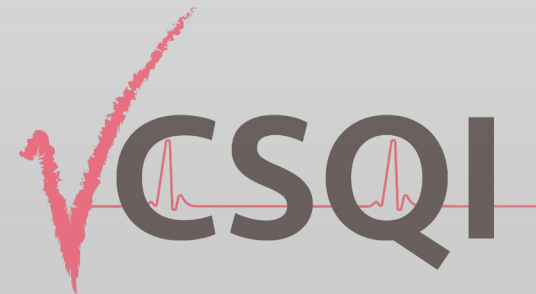
Logistic regression models for categorical outcomes

Linear regression models for continuous outcomes

Hospital of surgery was controlled for as random effect

**Models were adjusted for:**

- (1) STS score for morbidity or mortality (PROM and PROMM)
- (2) Intraoperative blood transfusion
- (3) CBP time
- (4) Cross clamp time
- (5) Teaching institution
- (6) Year of surgery



# Study Summary

## Total OR time-

4 hr 31 mins to 5  
hours 51 minutes  
Median- 5 hours  
8 minutes

## Total surgery

## time-

3 hr 21 minutes  
to 4 hours 34

minutes

Median- 3 hours  
55 minutes

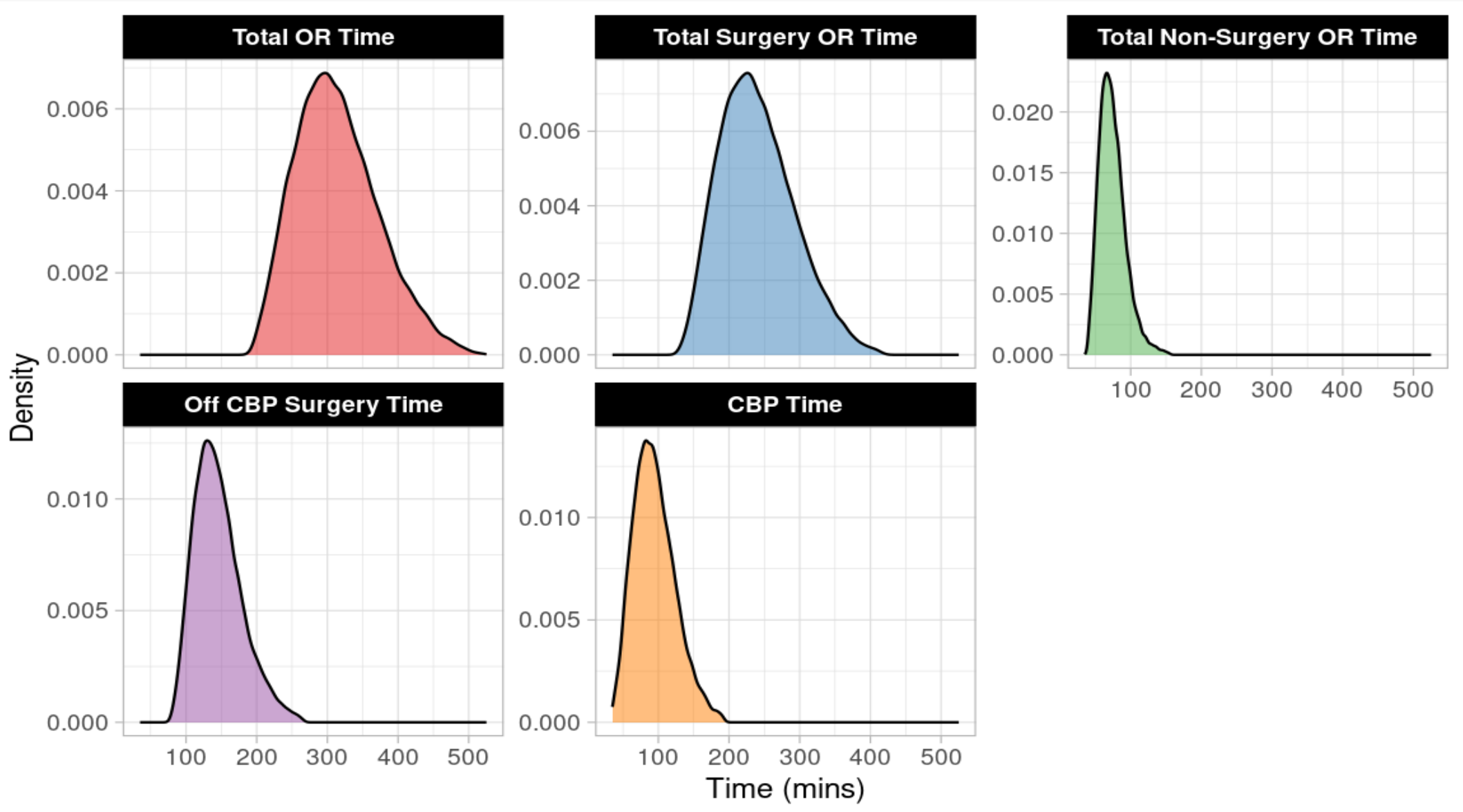
**Significant  
spread across  
the data**

## Distribution of time spent in the OR (in mins)

Percentile	OR Time	Total Surgery Time	Non-Surgery OR Time	Surgery Time Off-CBP
Min	197	131	40	80
1%	209	146	43	88
25%	271	201	61	121.00
50%	308	235	72	141.00
75%	351	274	85	165.00
99%	468	376	132	241.85
Max	525	419	156	265.00

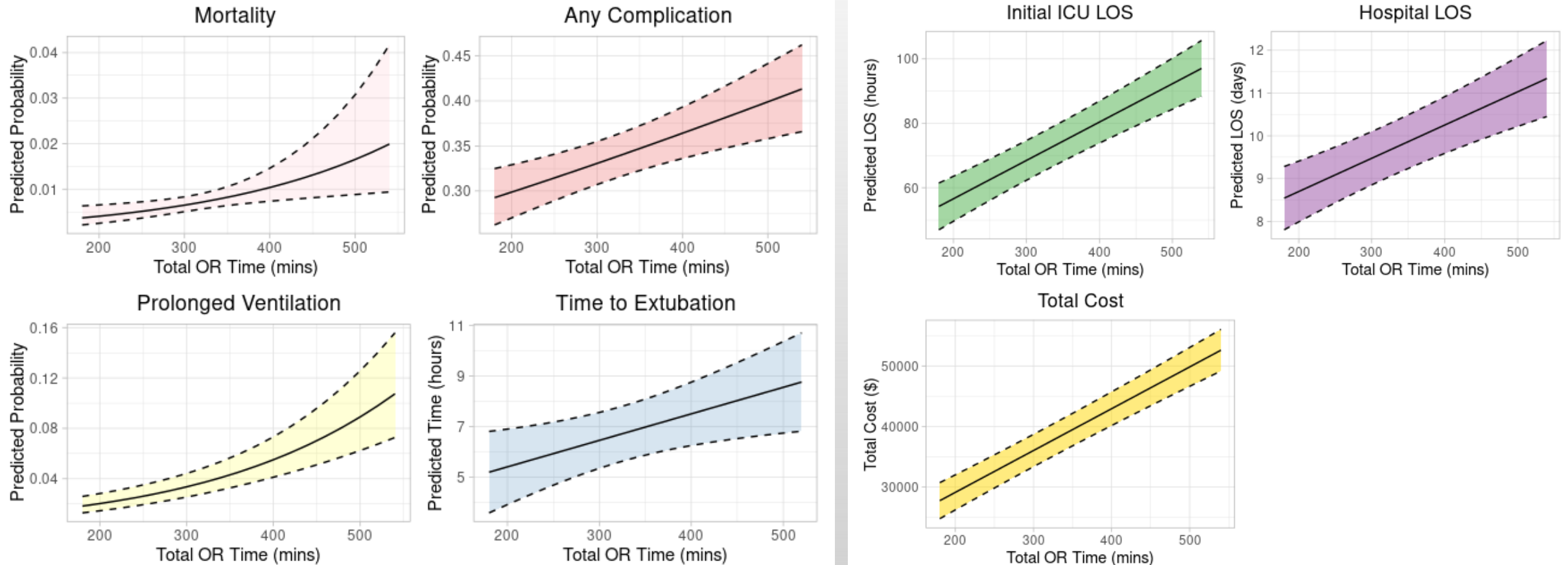


# Distribution of Time Spent in OR

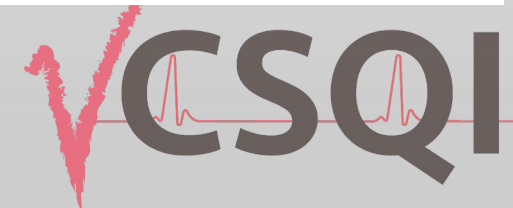


# Total OR Time

Adjusted predictions for postoperative outcomes with increasing **total time spent in the OR**

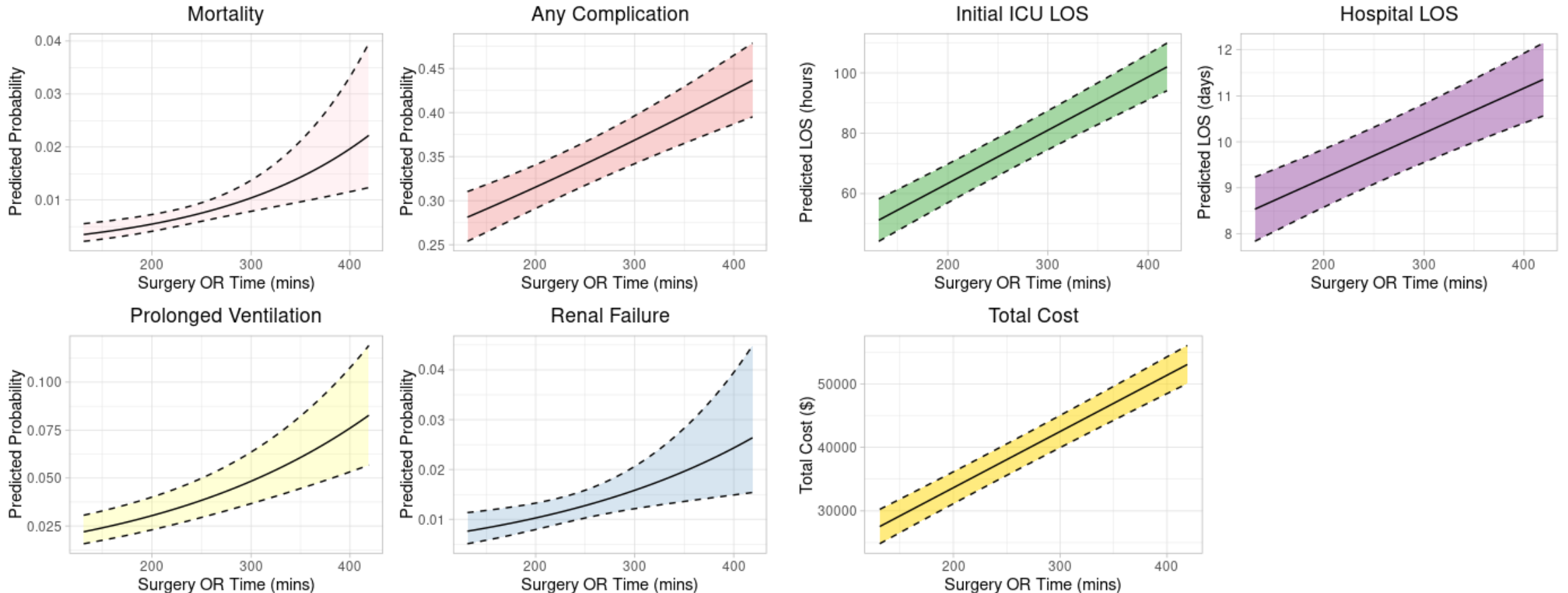


Total OR time had no impact on pneumonia, stroke, sepsis, bleeding, and time to extubation

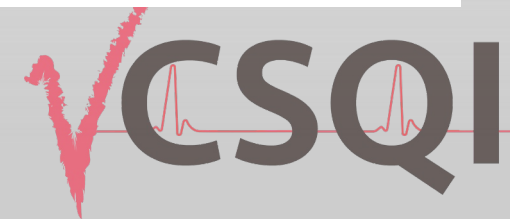


# Total Surgery Time

Adjusted predictions for postoperative outcomes with increasing **total surgery time**

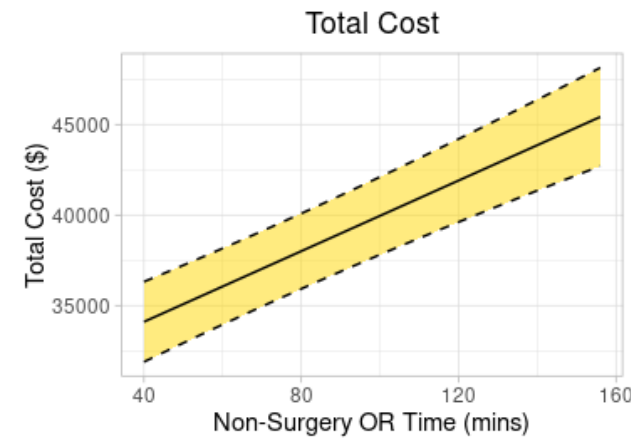
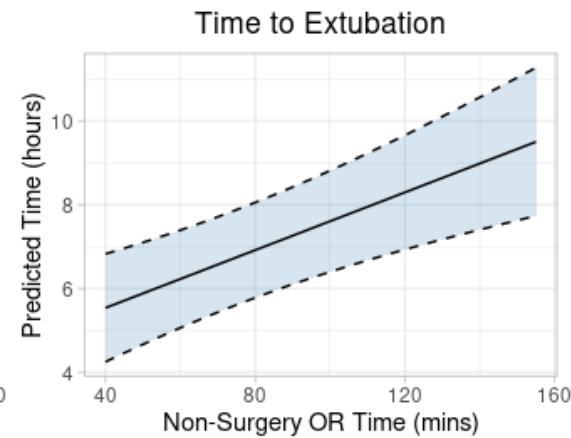
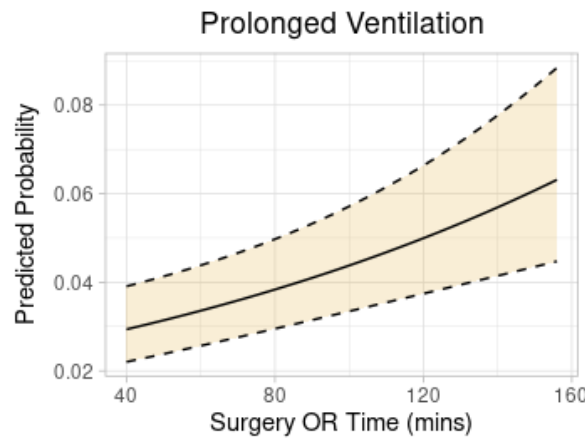
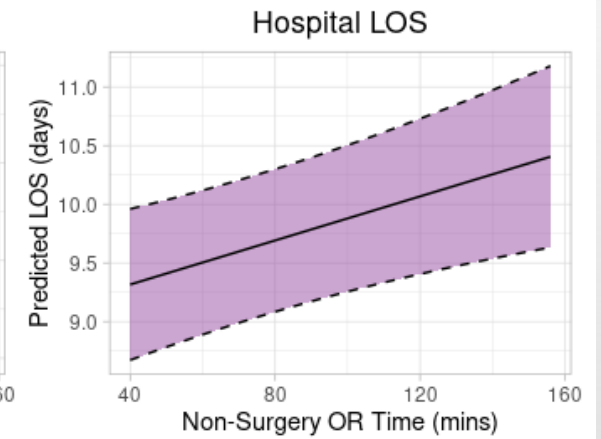
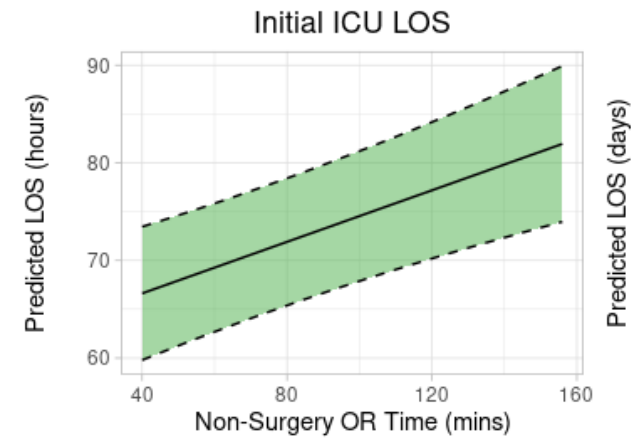
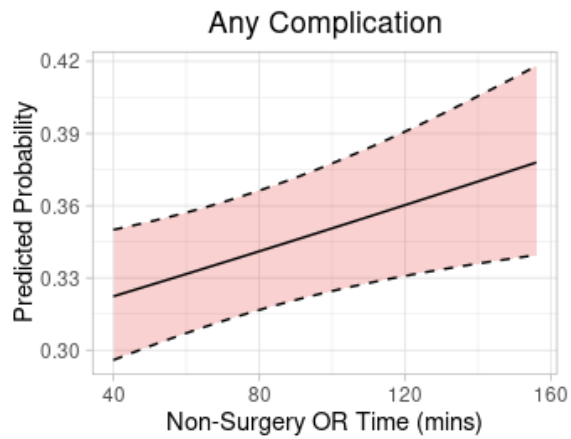
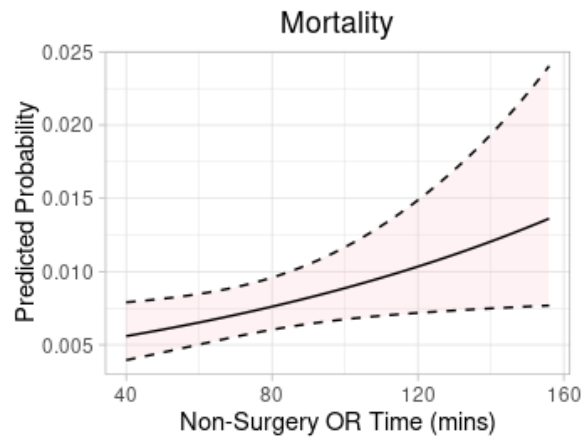


Total surgery time had no impact on pneumonia, stroke, sepsis, bleeding, and time to extubation

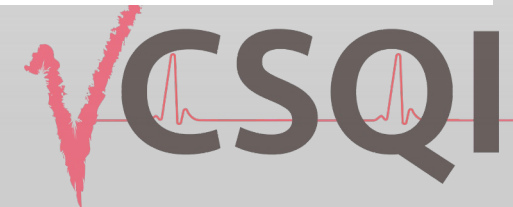


# Non-Surgery OR Time

Adjusted predictions for postoperative outcomes with increasing **non-surgery OR time**

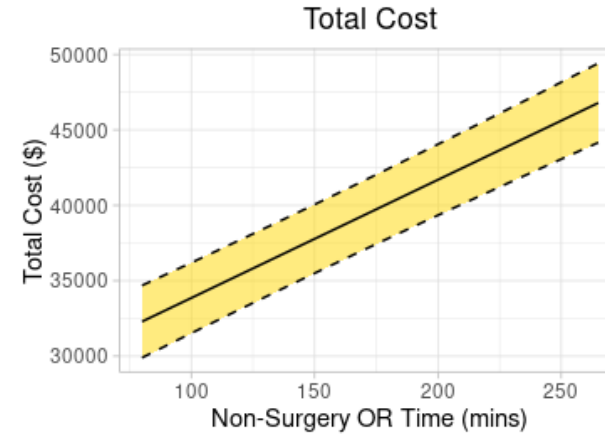
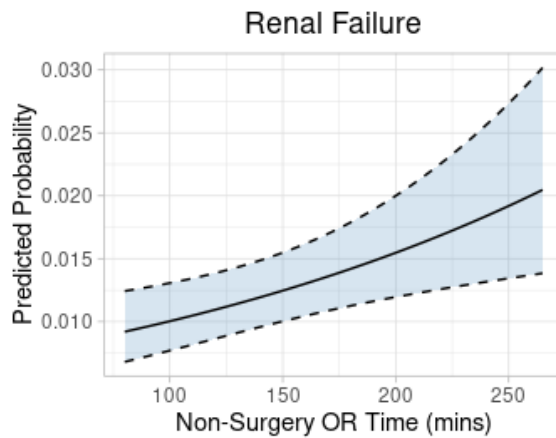
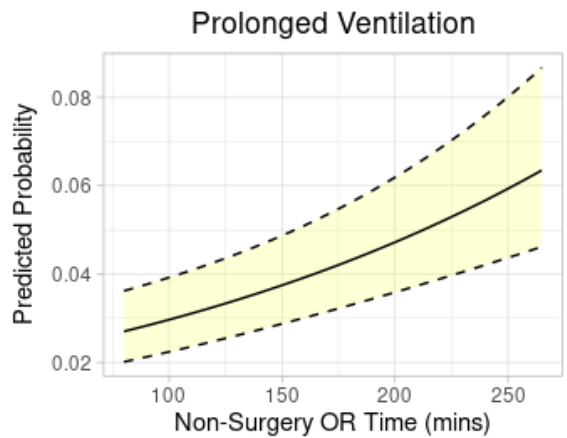
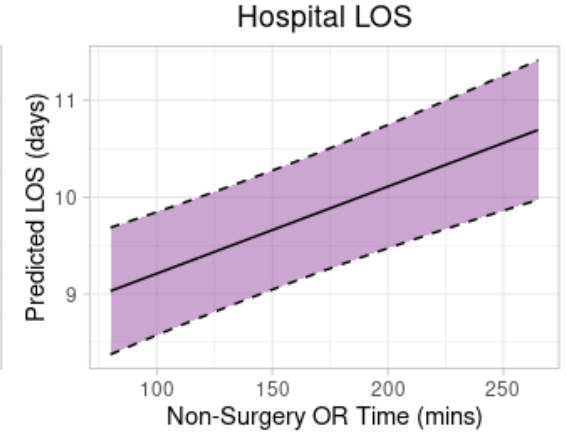
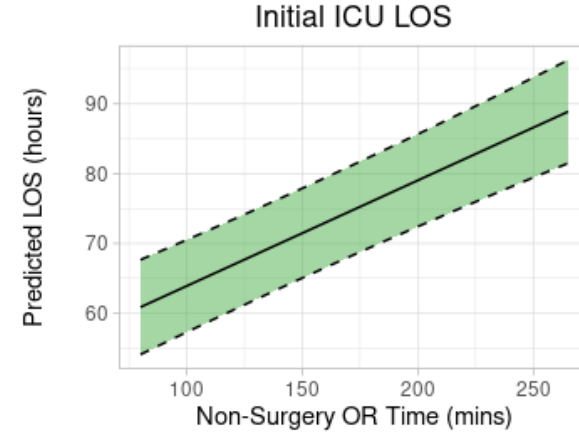
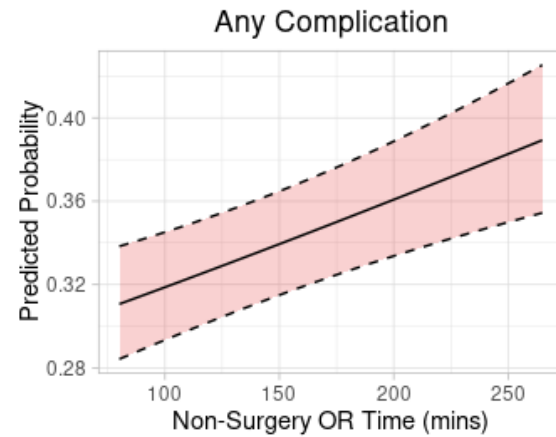
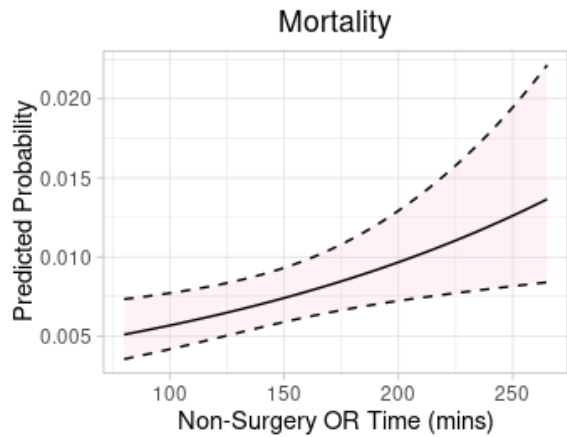


Non-surgery OR time had no impact on pneumonia, stroke, renal failure, and sepsis.



# Surgery Time minus-CPB time

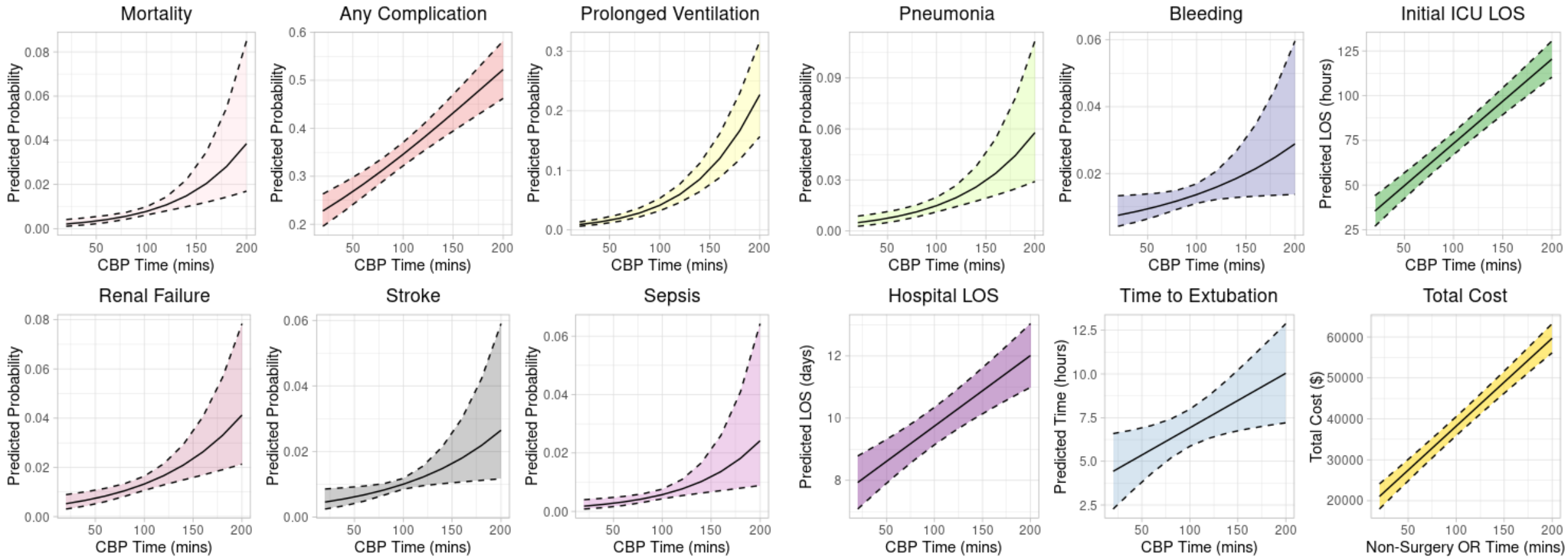
Adjusted predictions for postoperative outcomes with increasing **off-CPB surgery time** in the OR



CPB OR time had no impact on pneumonia, stroke, sepsis, bleeding, and time to extubation.

# CPB Time

Adjusted predictions for postoperative outcomes with increasing **CPB time** in the OR



# Impact of CT fellowship training on OR time

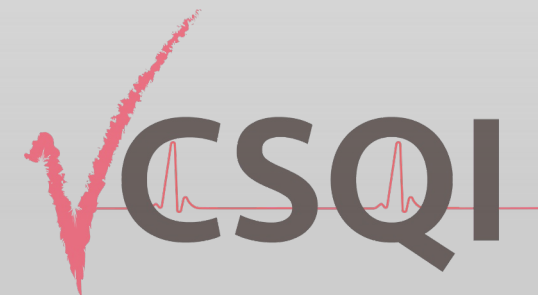
Linear regression models looking at the impact of CT fellowship training on OR times

Adjusted for:

- Intraoperative blood products
- PROMM
- Year of surgery

Time	Estimate	p-value
Total OR time	32.29 [-14.86, 79.45]	0.165
Surgery time	16.97 [-23.52, 57.46]	0.386
Non-surgery OR time	15.32 [2.69; 27.97]	0.021
Surgery time off CBP	15.85 [-4.48; 36.17]	0.117
CBP time	1.13 [-21.63; 23.90]	0.917

CT fellowship training was associated with longer non-surgery OR time only.



# Recent ACC Trials Likely to Affect Clinical Practice

Michael C. Kontos, MD

Medical Director, Coronary Intensive Care Unit

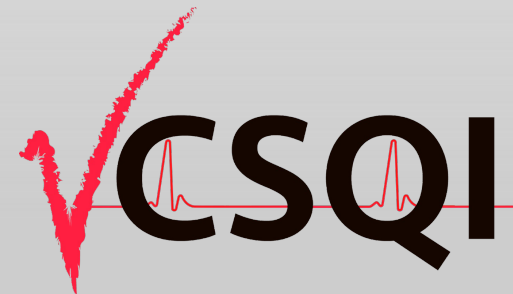
Director, Chest Pain Evaluation Center

Professor

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# Disclosures

- Consultant:
  - Beckman Coulter (not relevant)

# Trials That Will Be Discussed

- DEDICATE DZHK6
  - TAVI vs TAVR in Low-Intermediate risk patients with severe AS
- REDUCE MI
  - Beta blockers after MI with preserved LVEF
- DanGer Shock
  - Microaxial flow pump in cardiogenic shock after STEMI

# Additional Important Trials

- ULTIMATE-DAPT -- One-month Ticagrelor Monotherapy After PCI in Acute Coronary Syndromes
  - ACS treated with PCI with contemporary DES free from ischemic and bleeding events after 1 month on DAPT
  - Ticagrelor alone for 1-12 months decreased major bleeding with no difference in MACCE vs Ticagrelor + ASA
- The EMPACT-MI--Empagliflozin after Acute Myocardial Infarction
  - Patients with acute MI at risk for HF (sx or LVEF < 45%)
  - No significant reduction in the risk of time to first HHF or death
  - However, there was a significant 23% and 33% RRR of first HHF and total HHF
- AEGIS-II--CSL 112 (Apolipoprotein A-I) Infusions and Cardiovascular Outcomes in Patients With Acute Myocardial Infarction (ApoA-I Event ReducinG in Ischemic Syndromes)
  - AMI patients with multivessel disease and additional cardiovascular risk factors
  - No significant reduction in 90 day CV death, MI, or CVA treated with 4 weekly infusions of CSL112
  - However, there was significant reduction in MI and Death/MI in those with LDL > 100 mg/dL

## ***DEDICATE-DZHK6 Trial***

# **Transcatheter Aortic Valve Implantation vs. Surgical Aortic Valve Replacement In Patients At Low To Intermediate Risk**

ORIGINAL ARTICLE

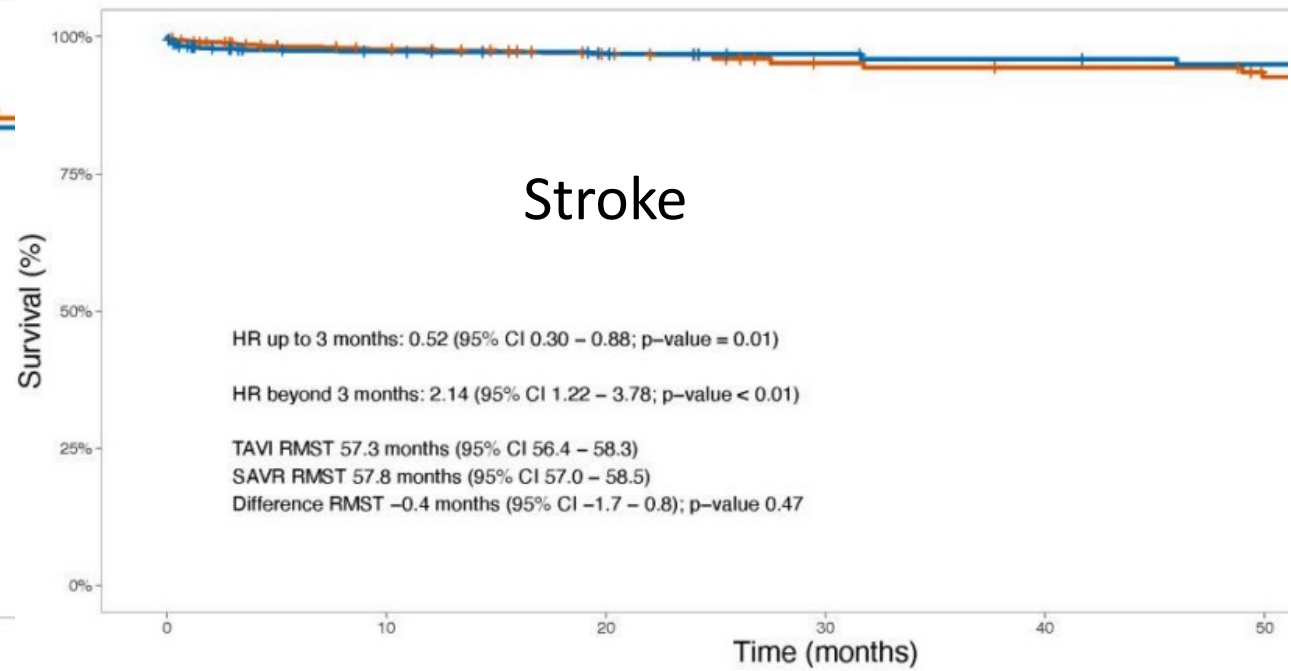
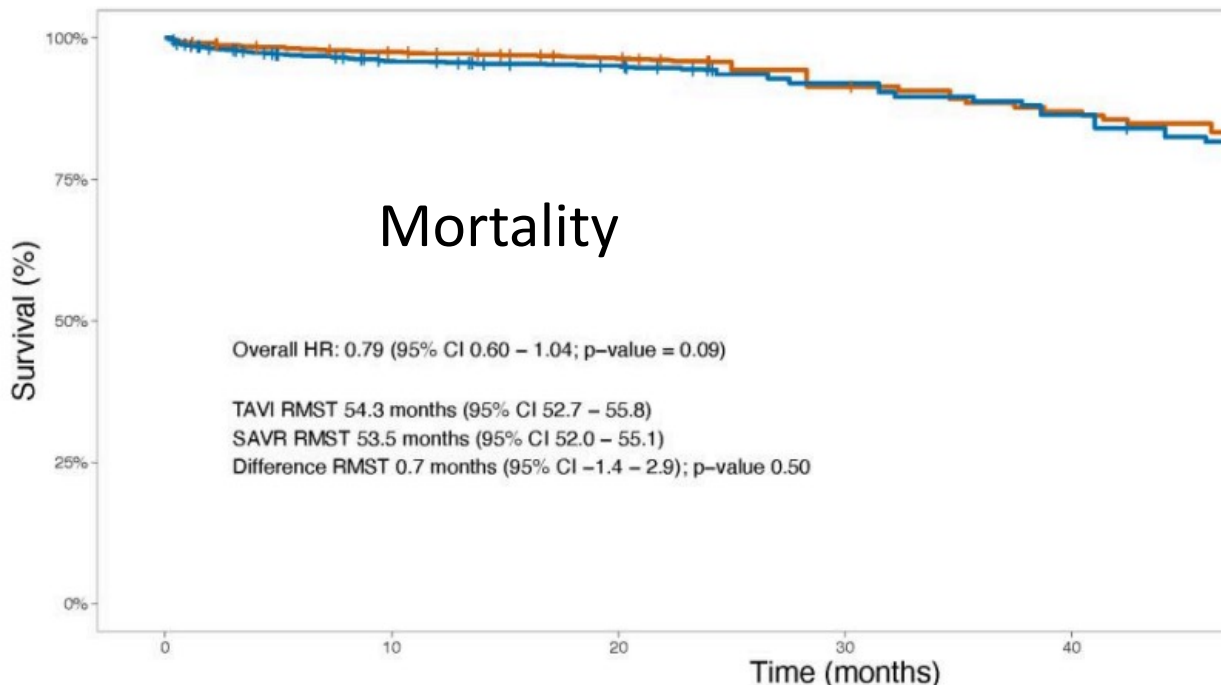
## **Transcatheter or Surgical Treatment of Aortic-Valve Stenosis**

S. Blankenberg, M. Seiffert, R. Vonthein, H. Baumgartner, S. Bleiziffer, M.A. Borger, C. Yeong-Hoon, P. Clemmensen, J. Cremer, M. Czerny, N. Diercks, I. Eitel, S. Ensminger, D. Frank, N. Frey, A. Hagendorff, C. Hagl, C. Hamm, U. Kappert, M. Karck, W.-K. Kim, I.R. König, M. Krane, U. Landmesser, A. Linke, L.S. Maier, S. Massberg, F.-J. Neumann, H. Reichenspurner, T.K. Rudolph, C. Schmid, H. Thiele, R. Twerenbold, T. Walther, D. Westermann, E. Xhepa, A. Ziegler, and V. Falk, for the DEDICATE-DZHK6 Trial Investigators\*

# Introduction

- Prior studies demonstrated similar outcomes between TAVI and SAVR in low-risk patients (STS < 4%)
- Studies limited by:
  - Restricted to device specific TAVI
  - Industry sponsored trials

## Meta Analysis (4 trials, N=3,557)



# Inclusion and Exclusion Criteria

## Main Inclusion Criteria

- ✓ Severe symptomatic aortic stenosis
- ✓ Age: **65-85 years**
- ✓ **Low or intermediate operative risk\***
- ✓ Eligible for both **TAVI** and **SAVR\***

\* According to Heart team assessment

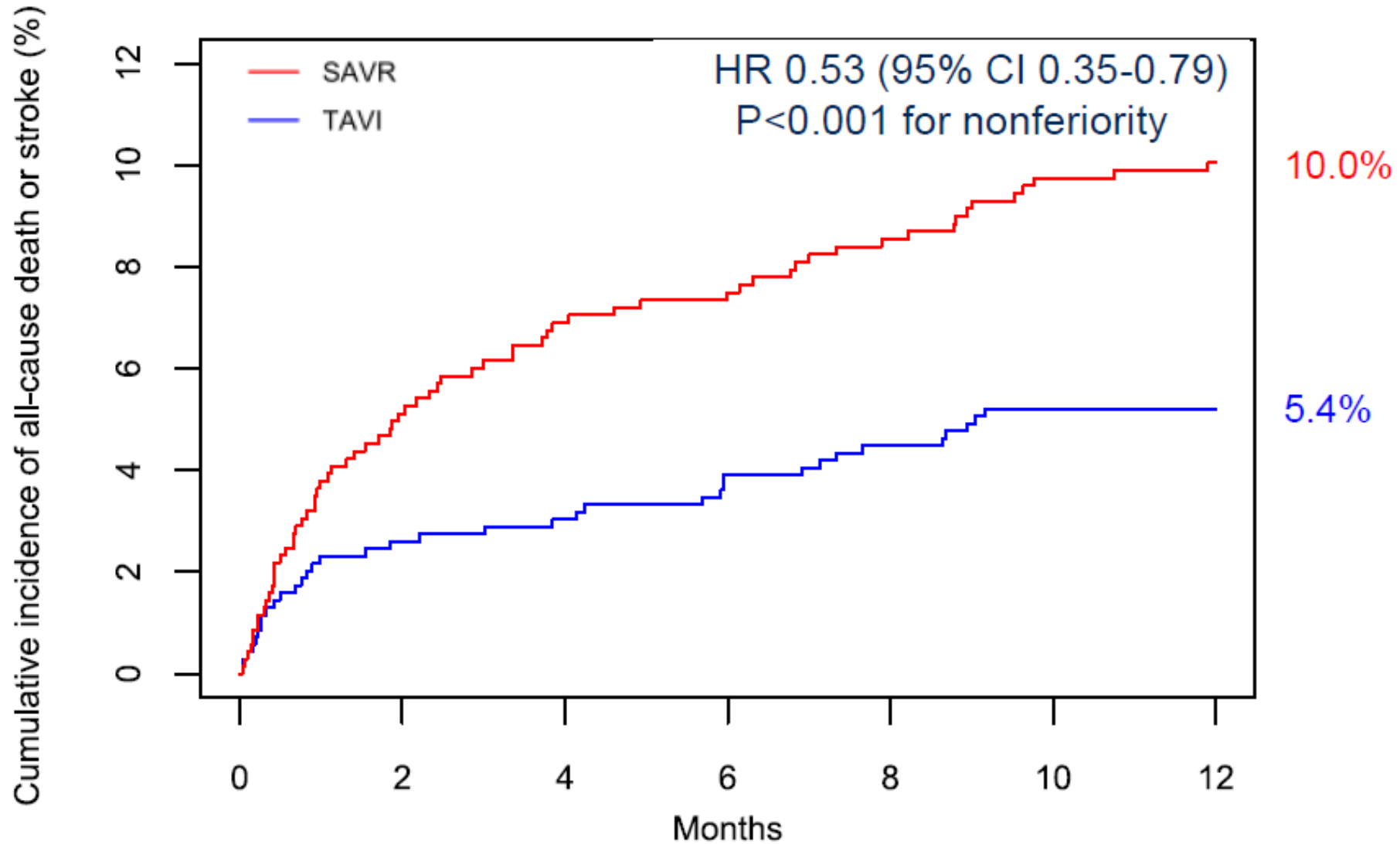
## Main Exclusion Criteria

- ✗ Congenital **bicuspid/unicuspid** or non-calcified aortic valve, endocarditis
- ✗ **Cardiac reoperation**
- ✗ **Relevant CAD** or PCI w/in 1 month
- ✗ **Severe mitral or tricuspid valve disease**
- ✗ Severely impaired LV function (**LVEF <20%**)
- ✗ **Stroke/ICB** w/in 1 month
- ✗ Contraindication for **isolated aortic valve procedure**

# Baseline Characteristics

	<b>TAVI (n=701)</b>	<b>SAVR (n=713)</b>
<b>Age (years)</b>	74.3 ± 4.6	74.6 ± 4.2
<b>Male sex (%)</b>	56.0%	57.3%
<b>BMI (kg/m<sup>2</sup>)</b>	28.1 (25.3 - 31.9)	28.1 (25.4 - 31.2)
<b>STS-PROM (%)</b>	1.8 (1.2 - 2.4)	1.9 (1.2 - 2.5)
<b>EuroSCORE II (%)</b>	2.1 ± 1.4	2.1 ± 1.8
<b>NYHA Class III/IV</b>	46.2%	45.6%
<b>LV-EF (%)</b>	57.8 ± 9.8	57.7 ± 9.3
<b>Diabetes mellitus</b>	33.8%	32.8%
<b>Coronary artery disease</b>	34.3%	38.2%

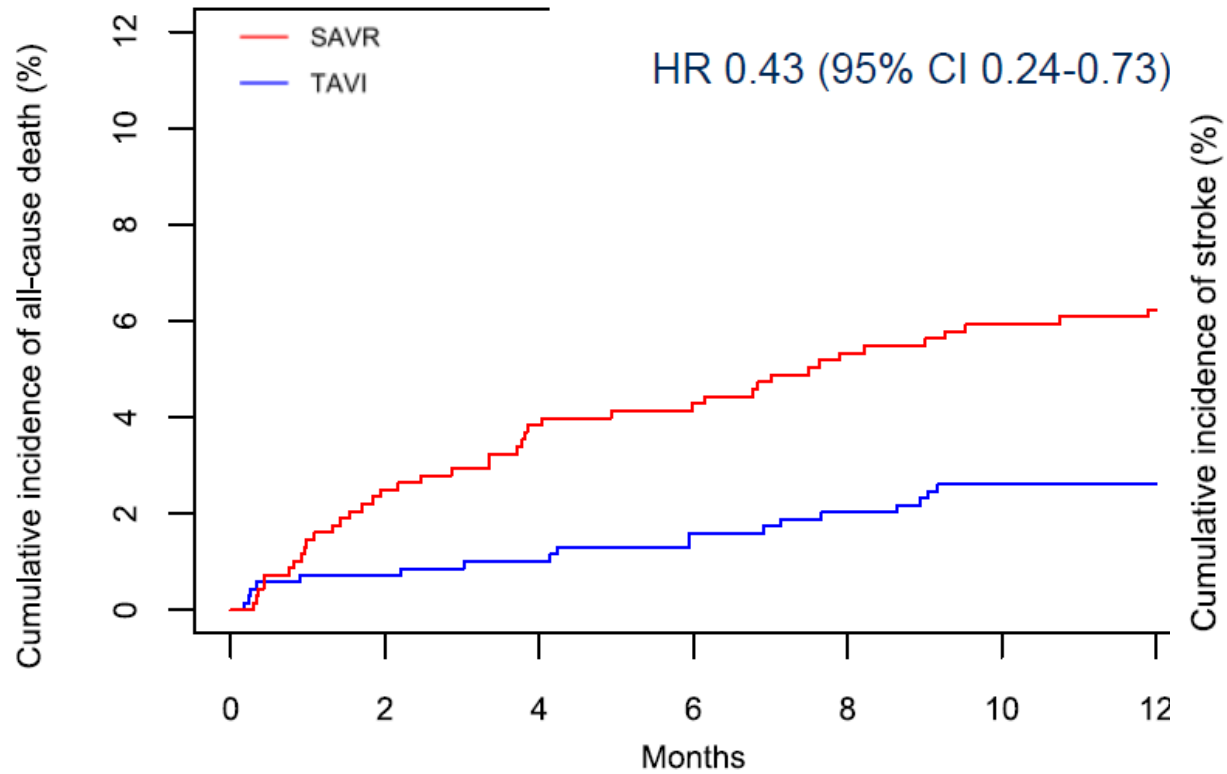
# Primary Outcome: Death or Stroke



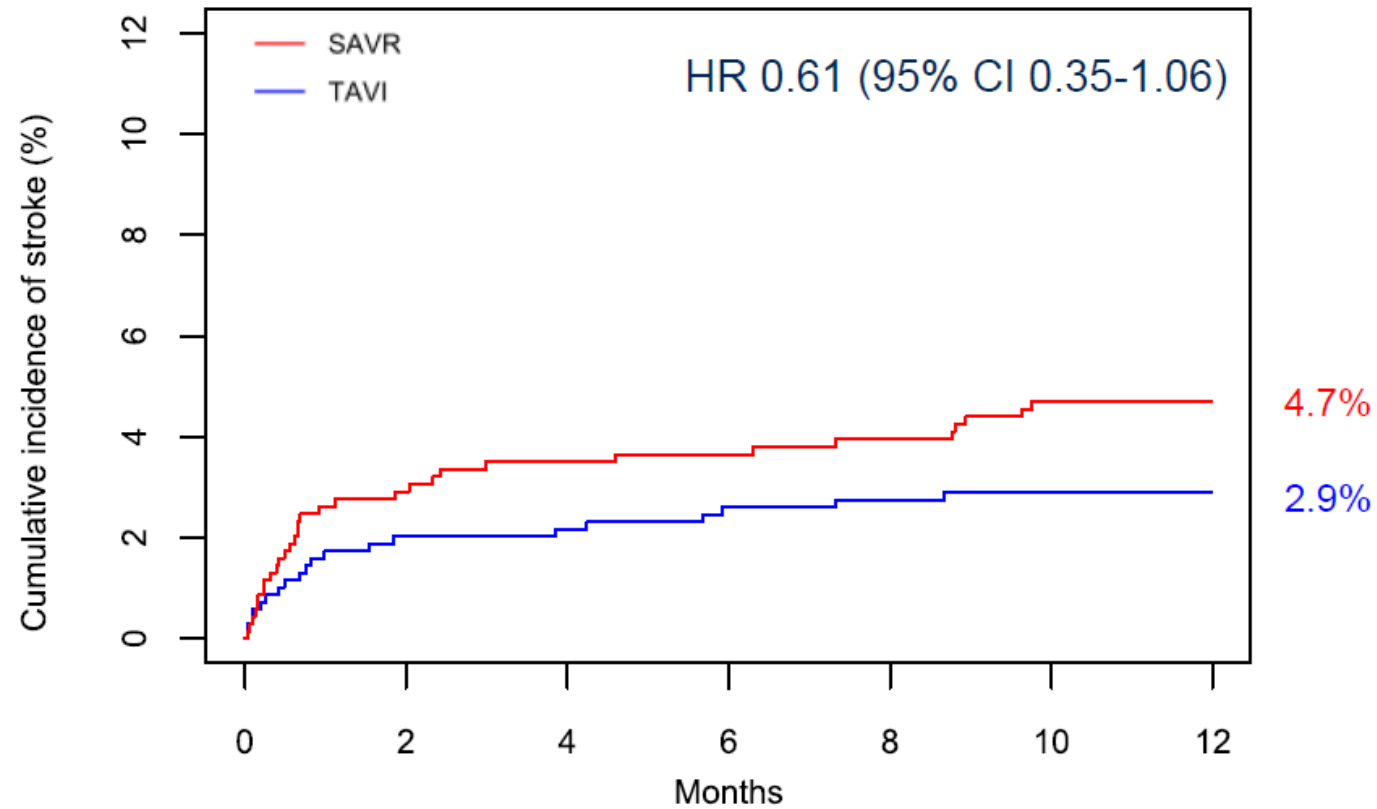


# Secondary Outcomes

## Death



## Stroke



# Secondary Outcomes

Outcomes at 1 year	TAVI (n=701)	SAVR (n=713)	HR (95% CI)
Disabling stroke	1.3%	3.1%	<b>0.42 (0.19-0.88)</b>
Cardiovascular death	2.0%	4.4%	<b>0.47 (0.24-0.86)</b>
Vascular access site complication (minor or major)	7.9%	0.7%	<b>10.64 (4.84-28.94)</b>
Bleeding (major or life-threatening/disabling)	4.3%	17.2%	<b>0.24 (0.16-0.35)</b>
AKI stage II/III	1.3%	2.5%	0.56 (0.24-1.21)
Myocardial infarction	1.0%	2.1%	0.51 (0.20-1.19)
New-onset atrial fibrillation	12.4%	30.8%	<b>0.36 (0.28-0.46)</b>
New-onset LBBB	32.0%	17.5%	<b>2.03 (1.63-2.54)</b>
New permanent pacemaker implantation	11.8%	6.7%	<b>1.81 (1.27-2.61)</b>
Prosthetic valve dysfunction	1.6%	0.6%	2.44 (0.87-8.15)
Prosthetic valve endocarditis	0.6%	0.9%	0.66 (0.18-2.19)
Prosthetic valve thrombosis	0.7%	0.3%	2.09 (0.50-11.64)
Aortic-valve reintervention	0.6%	0.3%	1.70 (0.38-9.78)
Rehospitalization (Cardiovascular)	12.2%	13.3%	0.89 (0.66-1.20)

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# Conclusion

Among patients with severe aortic stenosis at low or intermediate surgical risk, TAVI with prosthesis selection based on operator description was not inferior to SAVR for death or stroke 1 year

# Caveats/Limitations

- Analysis limited to 1 year follow-up (although will be evaluated at 5 years)
- Excluded patients with bicuspid aortic stenosis, concomitant coronary disease or valve disease
- Potentially impacted by the COVID-19 pandemic
- Data on long term outcomes needed (but coming)

## REDUCE AMI Trial

# Beta-blockers after myocardial infarction and preserved ejection fraction

ORIGINAL ARTICLE

## Beta-Blockers after Myocardial Infarction and Preserved Ejection Fraction

T. Yndigeegn, B. Lindahl, K. Mars, J. Alfredsson, J. Benatar, L. Brandin, D. Erlinge, O. Hallen, C. Held, P. Hjalmarsson, P. Johansson, P. Karlström, T. Kellerth, T. Marandi, A. Ravn-Fischer, J. Sundström, O. Östlund, R. Hofmann, and T. Jernberg, for the REDUCE-AMI Investigators\*

# Background: Pre-Reperfusion Era

- Previous studies involved large MIs, often with LV systolic dysfunction predating contemporary treatment
- Performed before:
  - routine early revascularization with PCI
  - potent antithrombotic agents
  - high intensity statins
  - angiotensin blockade

# Study Aim

- To determine whether long-term oral beta-blocker treatment in patients with acute MI and preserved ejection fraction improves outcomes



# Inclusion Criteria

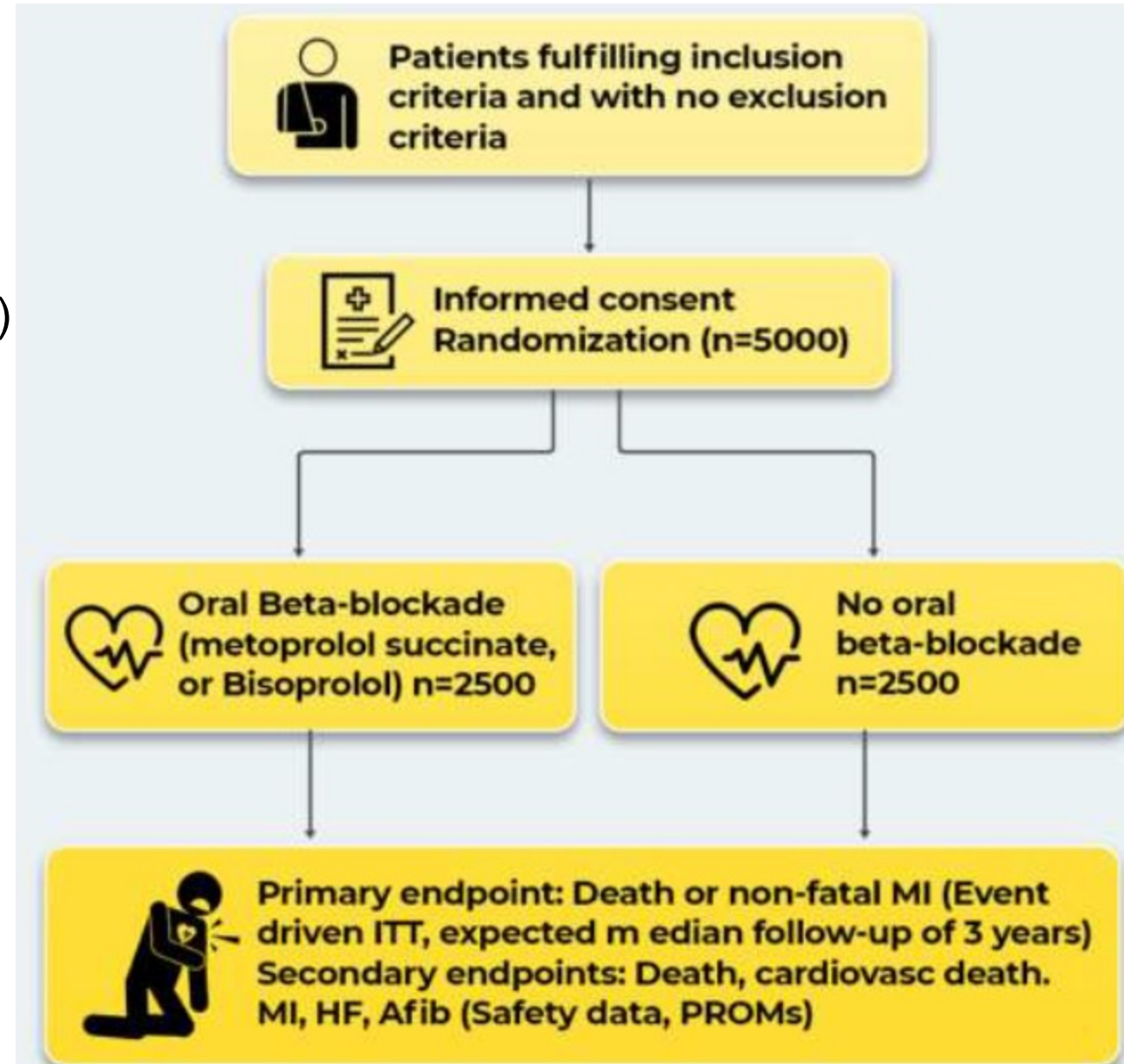
- Type 1 MI within 1 to 7 days
- Coronary angiography with obstructive coronary disease
- LVEF  $\geq 50\%$

# Study protocol

Not placebo controlled

Target doses: Metoprolol 100 mg daily (62%)  
Bisoprolol 5 mg daily (39%)

Patients on BB (10%) were weaned off



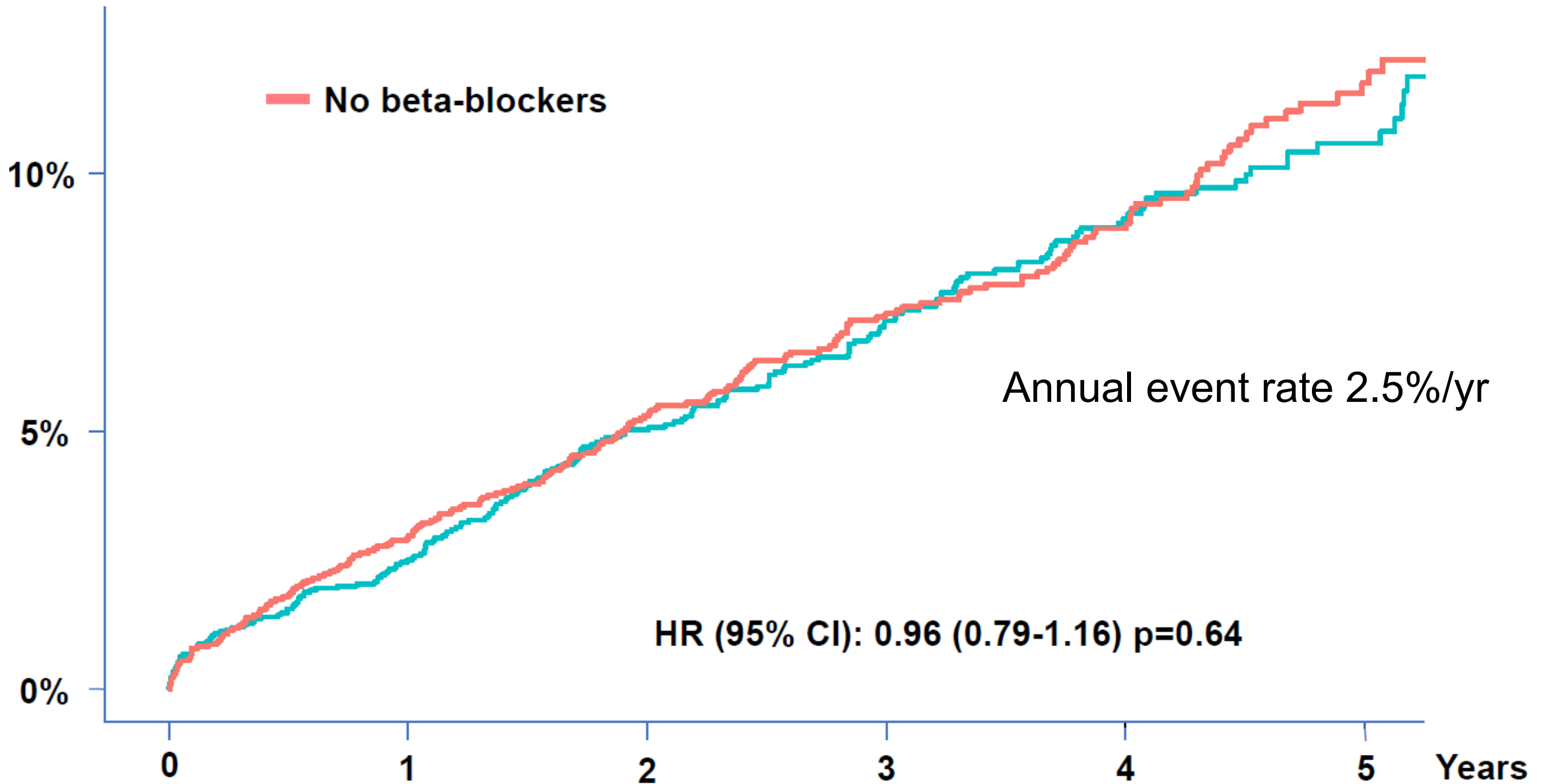
# Baseline Characteristics

Characteristic	Beta-blockers (n=2508)	No Beta-blockers (n=2512)
<b>Demography</b>		
Median age (IQR) – year	65 (57-73)	65 (57-73)
Female sex, no (%)	563 (22.4)	568 (22.6)
<b>Risk Factors</b>		
Current smoker, no (%)	478 (19.4)	530 (21.3)
Hypertension, no (%)	1155 (46.1)	1163 (46.3)
Diabetes mellitus, no (%)	346 (13.8)	354 (14.1)
<b>Prior cardiovascular disease</b>		
Prior myocardial infarctions, no (%)	165 (6.6)	192 (7.7)
Prior PCI, no (%)	147 (5.9)	175 (7.0)
Prior CABG, no (%)	33 (1.3)	36 (1.4)
Prior Stroke, no (%)	52 (2.1)	67 (2.7)
Prior Heart failure, no (%)	13 (0.5)	22 (0.9)
<b>Presentation characteristics</b>		
Chest pain as main symptoms, no (%)	2421 (96.6)	2417 (96.2)
CPR before hospital, no (%)	10 (0.4)	11 (0.4)
Pulmonary rales, no (%)	29 (1.2)	42 (1.7)
Atrial fibrillation, no (%)	21 (0.8)	23 (0.9)
ST-elevation MI, no (%)	877 (35.0)	892 (35.5)
On oral beta-blocker treatment, no (%)	269 (10.9)	302 (12.2)

# Treatment and Medications

Characteristic	Beta-blockers (n=2508)	No Beta-blockers (n=2512)
<b>In-hospital Course</b>		
Coronary angiography		
1-vessel disease, no (%)	1378 (55.5)	1378 (55.3)
2-vessel disease, no (%)	676 (27.2)	668 (26.8)
LM or 3-vessel disease, no (%)	404 (16.3)	420 (16.9)
Percutaneous coronary intervention, no (%)	2387 (95.8)	2376 (95.2)
Coronary artery by-pass grafting, no (%)	92 (3.7)	103 (4.1)
<b>Medication at discharge</b>		
Aspirin, no (%)	2450 (97.7)	2440 (97.1)
P2Y12-rec blockade, no (%)	2411 (96.2)	2398 (95.5)
Beta-blockade, no (%)	2399 (95.8)	247 (9.8)
ACEI or ARB, no (%)	1985 (79.2)	2040 (81.2)
Statins, no (%)	2481 (99.0)	2461 (98.0)
Diuretics, no (%)	211 (8.4)	191 (7.6)
Calcium channel blocker	416 (16.6)	496 (19.8)

# Primary Outcome (Death and MI)



# Primary and Secondary Outcomes

Outcome	Beta-blockers (n=2508)	No Beta-blockers (n=2512)	Hazard ratio (95% CI)	p-value
<b>Primary endpoint</b>				
All-cause death or myocardial infarction, no (%)	199 (7.9)	208 (8.3)	0.96 (0.79-1.16)	0.64
<b>Secondary endpoints</b>				
All-cause death, no (%)	97 (3.9)	103 (4.1)	0.94 (0.71-1.24)	0.66
Cardiovascular death, no (%)	38 (1.5)	33 (1.3)	1.15 (0.72-1.84)	0.55
Myocardial infarction, no (%)	112 (4.5)	117 (4.7)	0.96 (0.74-1.24)	0.74
Admission to hospital because of atrial fibrillation, no (%)	27 (1.1)	34 (1.4)	0.79 (0.48-1.31)	0.37
Admission to hospital because of heart failure, no (%)	20 (0.8)	22 (0.9)	0.91 (0.50-1.66)	0.76

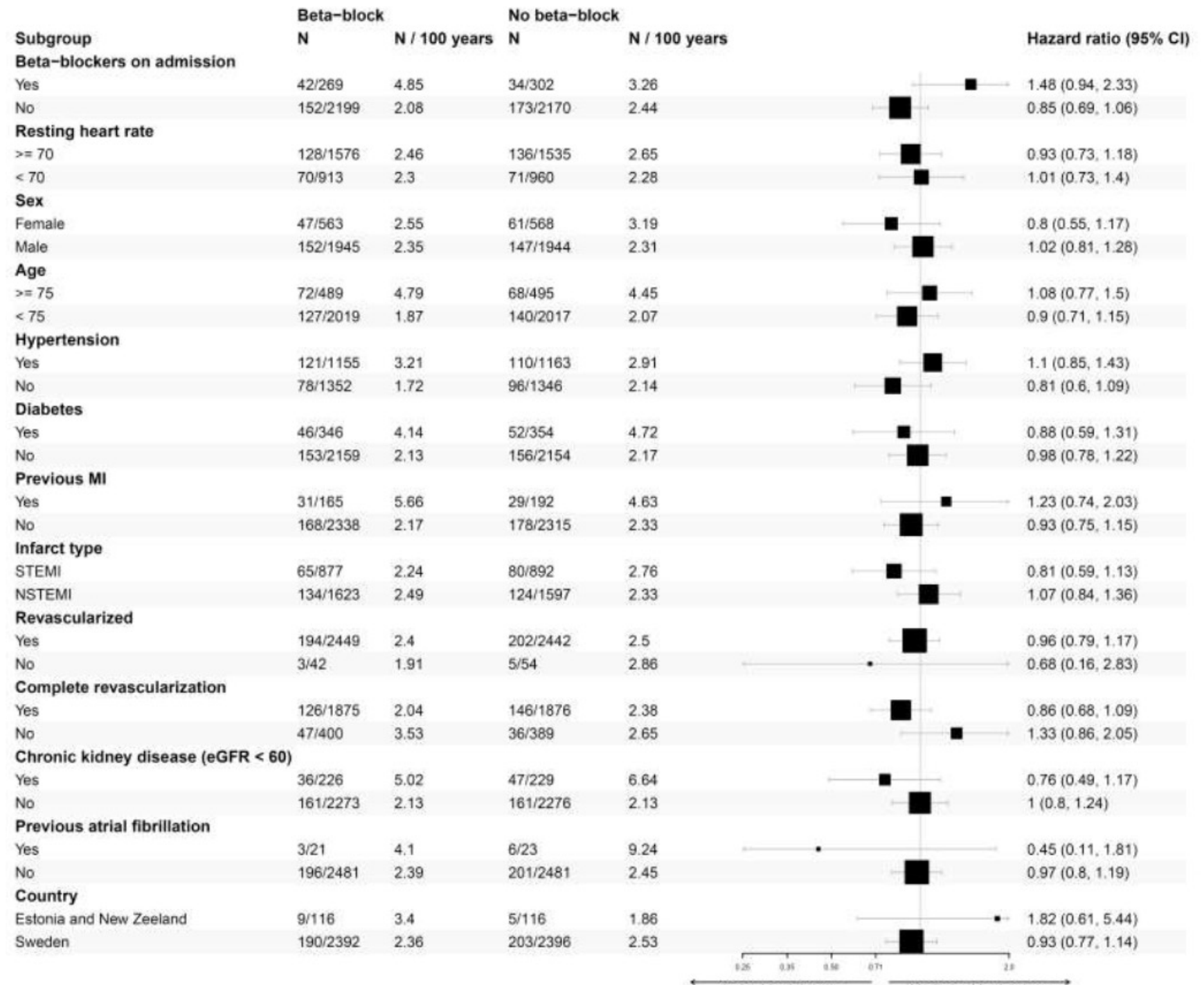
82% of BB group taking them at 12 months

13% of the no BB group taking them at 12 months

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# Subgroup Analysis





# Conclusions

- In patients with acute MI with preserved left ventricular EF, long-term treatment with beta-blockers did not reduce the risk of death or MI

# Caveats/Limitations

- Some treatment overlap:
  - 82% of BB group taking them at 12 months
  - 13% of the no BB group taking them at 12 months
- Not a placebo-controlled trial
- No information on ventricular arrhythmias, sudden death
- Potential for 21% benefit up to 16% harm
- “Evidence of absence is not the same as absence of evidence.”
  - Event rates substantially lower than predicted at only 2.5%/yr
  - However, no signals in the secondary outcomes for benefit
  - Event rate so low would be difficult to show benefit
- At least 3 ongoing trials evaluating post MI beta blockers with NL LVEF

# Percutaneous Transvalvular Micro-axial Flow Pump in Infarct Related Cardiogenic Shock

## Results of The DanGer-Shock Trial

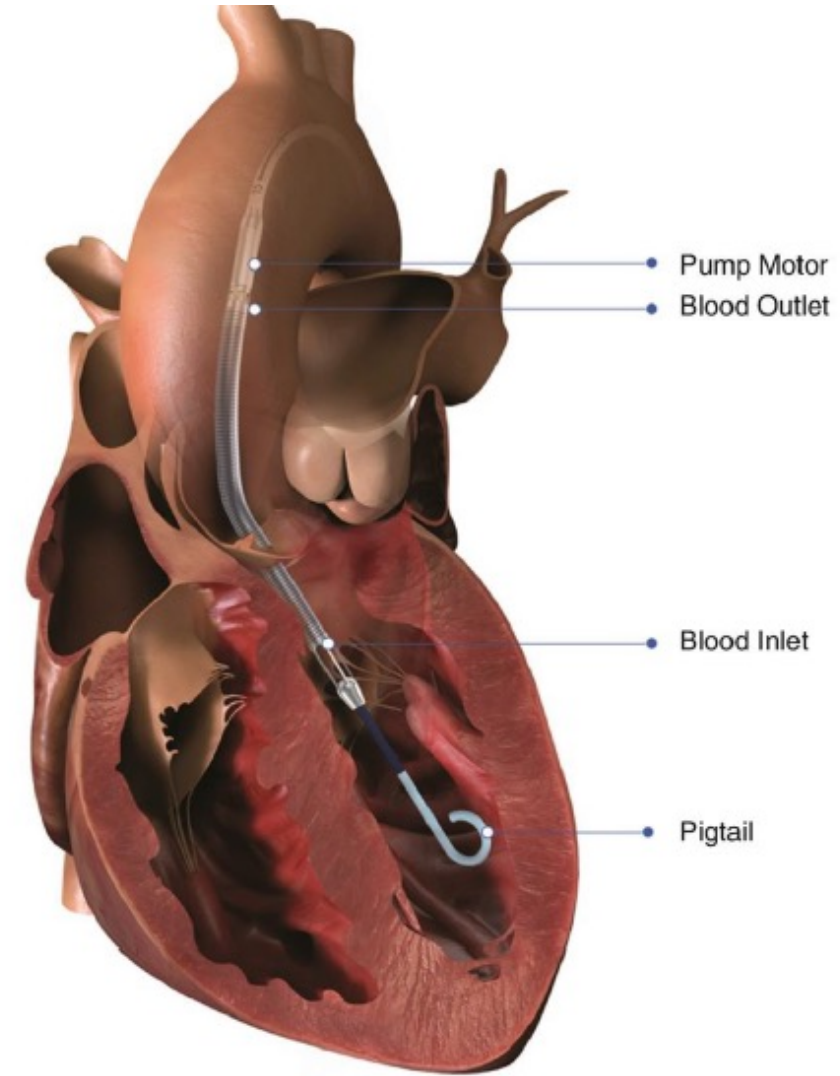
ORIGINAL ARTICLE

### Microaxial Flow Pump or Standard Care in Infarct-Related Cardiogenic Shock

J.E. Møller, T. Engstrøm, L.O. Jensen, H. Eiskjær, N. Mangner, A. Polzin, P.C. Schulze, C. Skurk, P. Nordbeck, P. Clemmensen, V. Panoulas, S. Zimmer, A. Schäfer, N. Werner, M. Frydland, L. Holmvang, J. Kjærgaard, R. Sørensen, J. Lønborg, M.G. Lindholm, N.L.J. Udesen, A. Junker, H. Schmidt, C.J. Terkelsen, S. Christensen, E.H. Christiansen, A. Linke, F.J. Woitek, R. Westenfeld, S. Möbius-Winkler, K. Wachtell, H.B. Ravn, J.F. Lassen, S. Boesgaard, O. Gerke, and C. Hassager, for the DanGer Shock Investigators\*

# Hypothesis

Routine use of the micro axial flow pump Impella CP on top of standard guideline directed care in patients with STEMI and cardiogenic shock result in a lower mortality compared with standard care alone



Micro Axial Flow Pump

# Background

- Cardiogenic shock is a severe complication in STEMI patients
  - Occurs in 8-10% of STEMI patients
  - Is associated with the mortality of 40 to 50%
- Prior studies with mechanical support have not demonstrated improvement in outcomes
  - IABP in 2 randomized trials: no benefit
  - ECMO in 1 randomized trial: no benefit
  - Microaxial trials
    - 3 small randomized trials did not show a benefit
    - Data potentially skewed by high numbers of patients with cardiac arrest
    - Registry studies have consistently shown excess bleeding

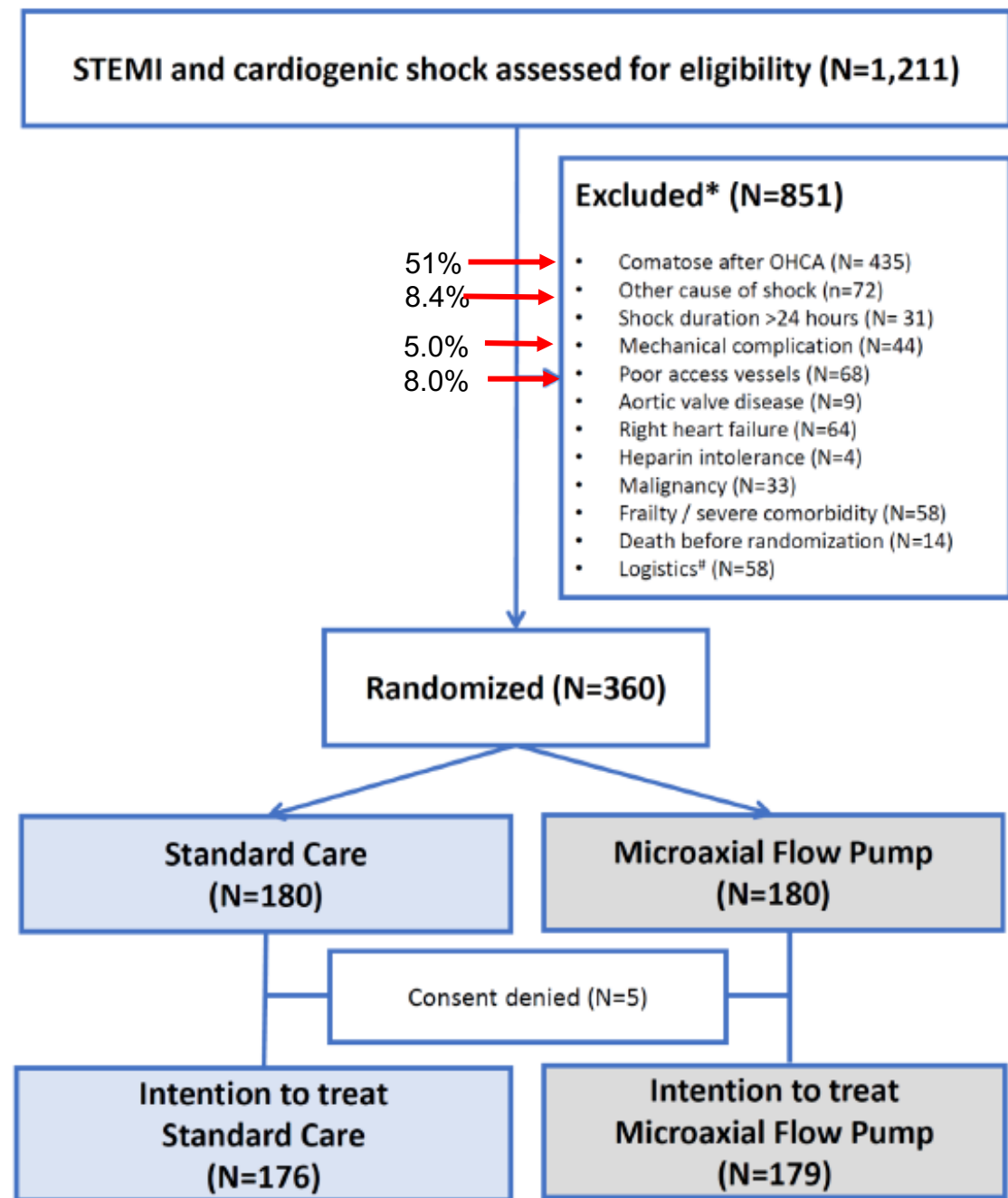
# Patient Flow

Inclusion criteria:

STEMI within 36 hrs

Shock < 24 hr

LVEF < 45%



# Baseline Characteristics

Characteristic	Microaxial Flow Pump plus Standard Care (N = 179)	Standard Care Alone (N = 176)
Median age (IQR) — yr	67 (58–76)	69 (61–76)
Male sex — no. (%)	142 (79.3)	139 (79.0)
Medical history — no. (%)		
Hypertension	89 (49.7)	94 (53.4)
Diabetes	33 (18.4)	47 (26.7)
Myocardial infarction	29 (16.2)	28 (15.9)
Heart failure	16 (8.9)	17 (9.7)
Chronic kidney disease	17 (9.5)	18 (10.2)
Median systolic blood pressure (IQR) — mm Hg	84 (72–91)	82 (72–91)
Median of the mean arterial blood pressure (IQR) — mm Hg	63 (55–72)	64 (55–73)
Median heart rate (IQR) — beats/min	94 (77–110)	95 (76–111)
Median arterial lactate level (IQR) — mmol/liter	4.6 (3.4–7.1)	4.5 (3.2–6.9)
Median left ventricular ejection fraction (IQR) — %	25 (20–31)	25 (15–30)
Resuscitation before randomization — no. (%)	39 (21.8)	33 (18.8)
Intubation before randomization — no. (%)	35 (19.6)	28 (15.9)
Transfer from outside hospital — no. (%)	51 (28.5)	48 (27.3)
Anterior myocardial infarction — no. (%)	126 (70.4)	129 (73.3)
SCAI-CSWG stage at admission — no. (%) <sup>†</sup>		
C	100 (55.9)	97 (55.1)
D	51 (28.5)	50 (28.4)
E	28 (15.6)	29 (16.5)

# Treatment Characteristics

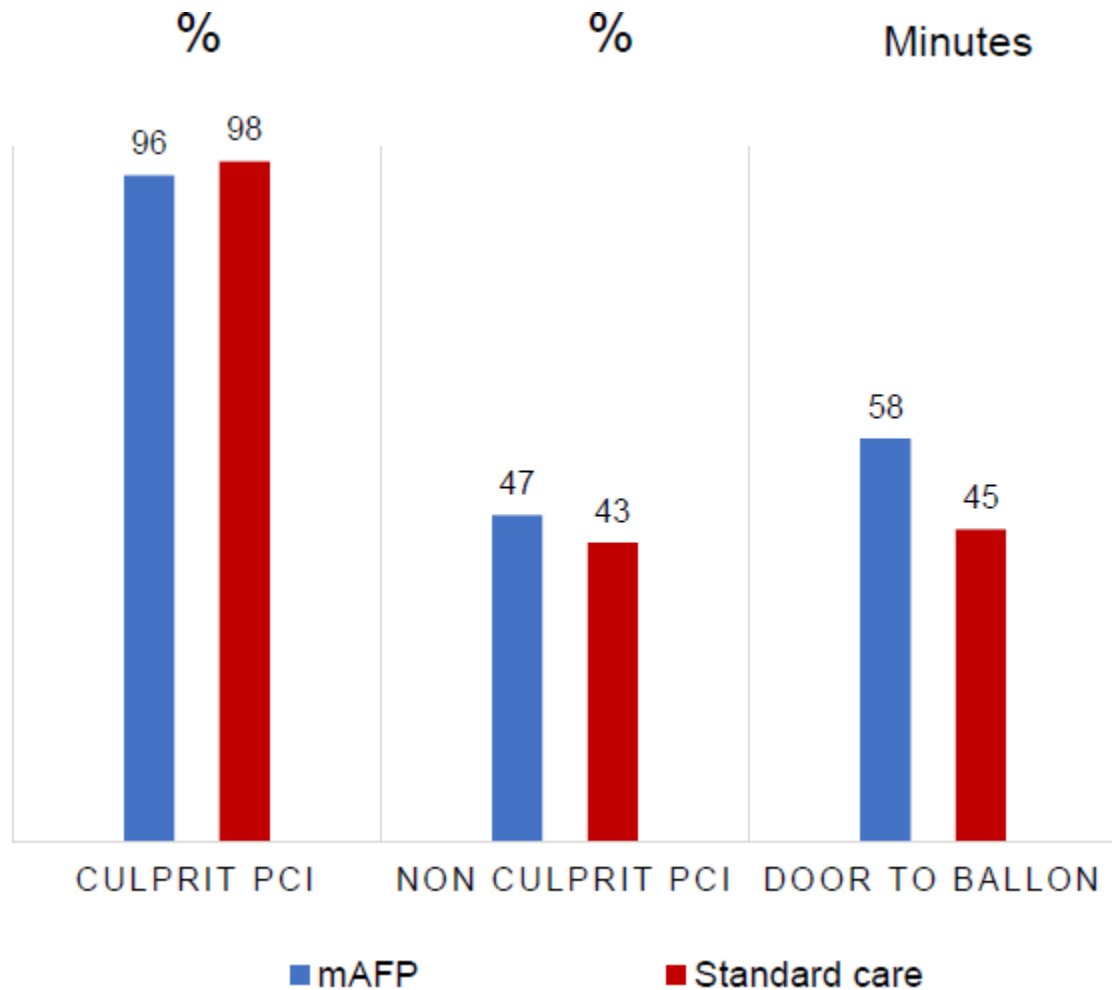
	Microaxial Flow Pump plus Standard Care (N = 179)	Standard Care Alone (N = 176)
<b>Intensive care management</b>		
Mechanical ventilation — no. (%)	133 (74.3)	116 (65.9)
Median duration of mechanical ventilation (IQR) — days	5 (2–10)	3 (1–10)
Medication use — no. (%)		
Any vasopressor	159 (88.8)	146 (83.0)
Norepinephrine	156 (87.2)	142 (80.7)
Dopamine	51 (28.5)	41 (23.3)
Epinephrine	67 (37.4)	66 (37.5)
Any inotrope	124 (69.3)	109 (61.9)
Dobutamine	62 (34.6)	59 (33.5)
Milrinone	63 (35.2)	58 (33.0)
Levosimendan	40 (22.3)	39 (22.2)
<b>Escalation to additional mechanical circulatory support</b>		
Placement of Impella 5.0 device — no. (%)	7 (3.9)	5 (2.8)
Placement of Impella CP for venting during venoarterial ECMO therapy — no. (%)	0	4 (2.3)
Placement of Impella 2.5 device — no. (%)	0	1 (0.6)
Placement of Impella RP device — no. (%)	0	0
Venoarterial ECMO — no. (%)	21 (11.7)	33 (18.8)
Median time from randomization to placement of venoarterial ECMO (IQR) — hr	14 (4–54)	2 (1–5)
Placement of permanent LVAD — no. (%)	10 (5.6)	4 (2.3)
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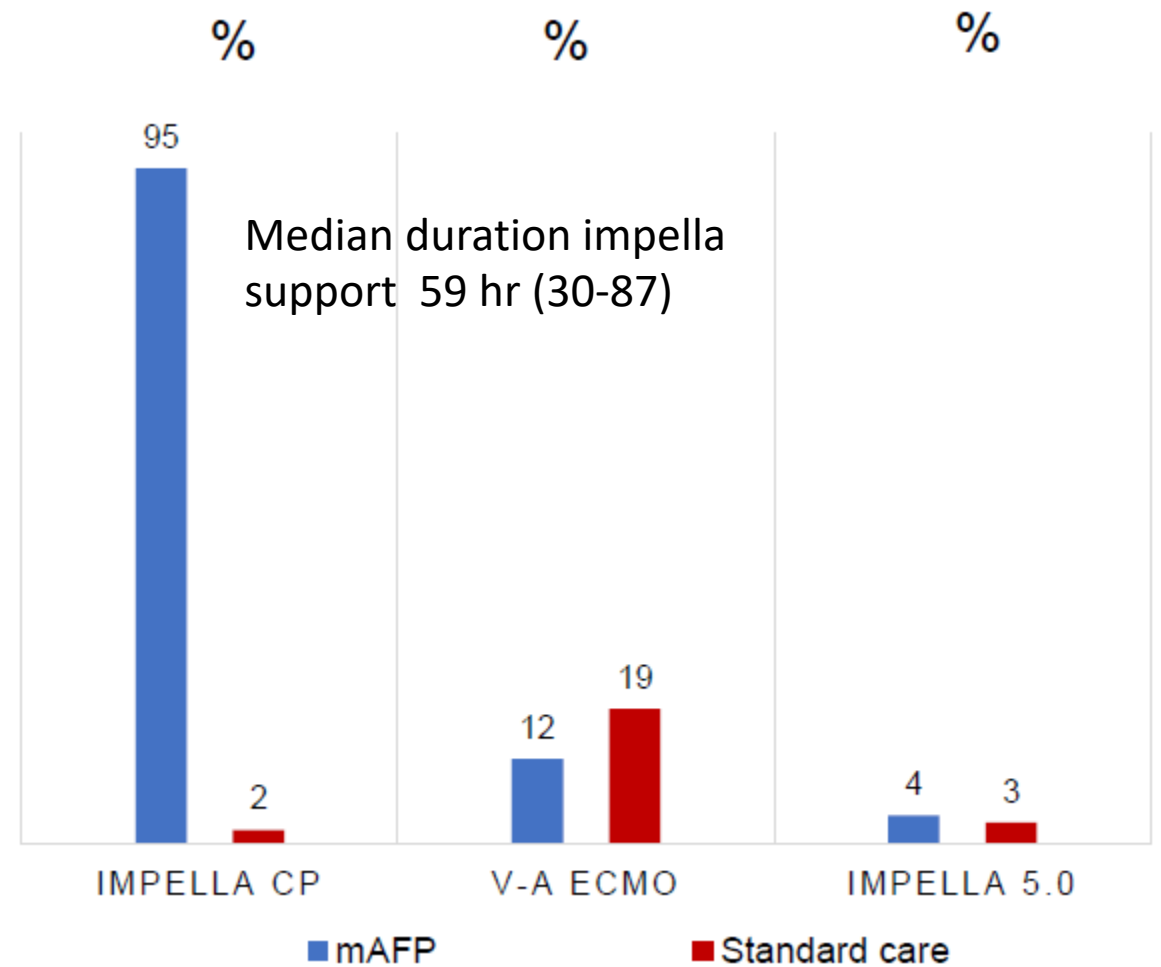
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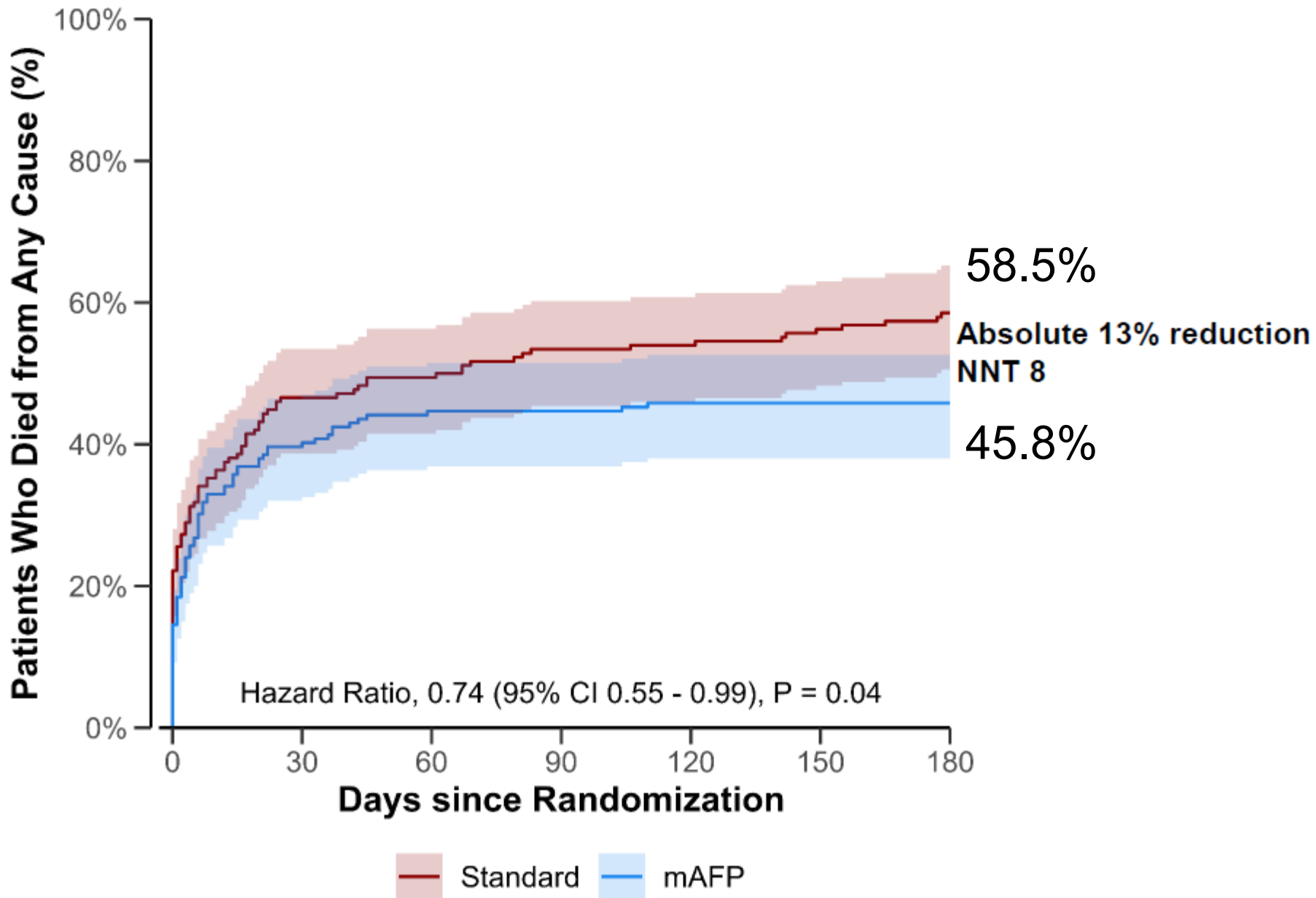
# Revascularization



# Mechanical Support

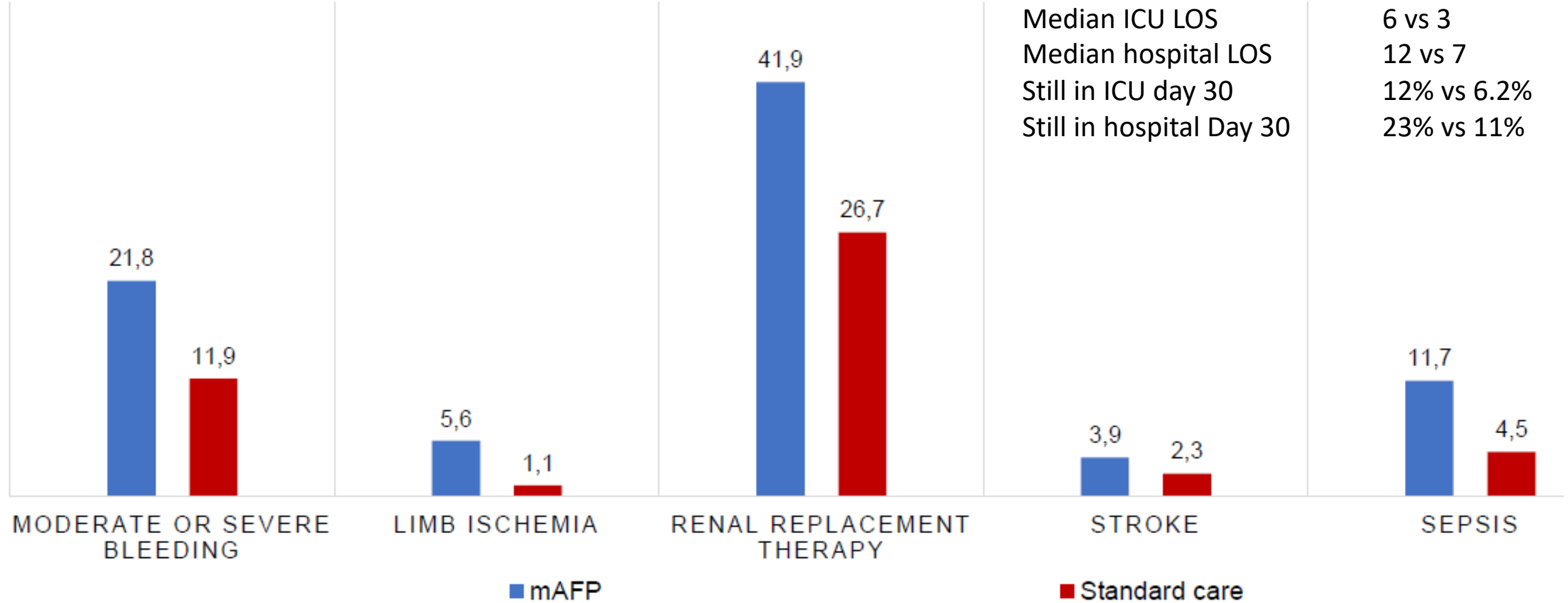


# Primary Endpoint



# Adverse Events

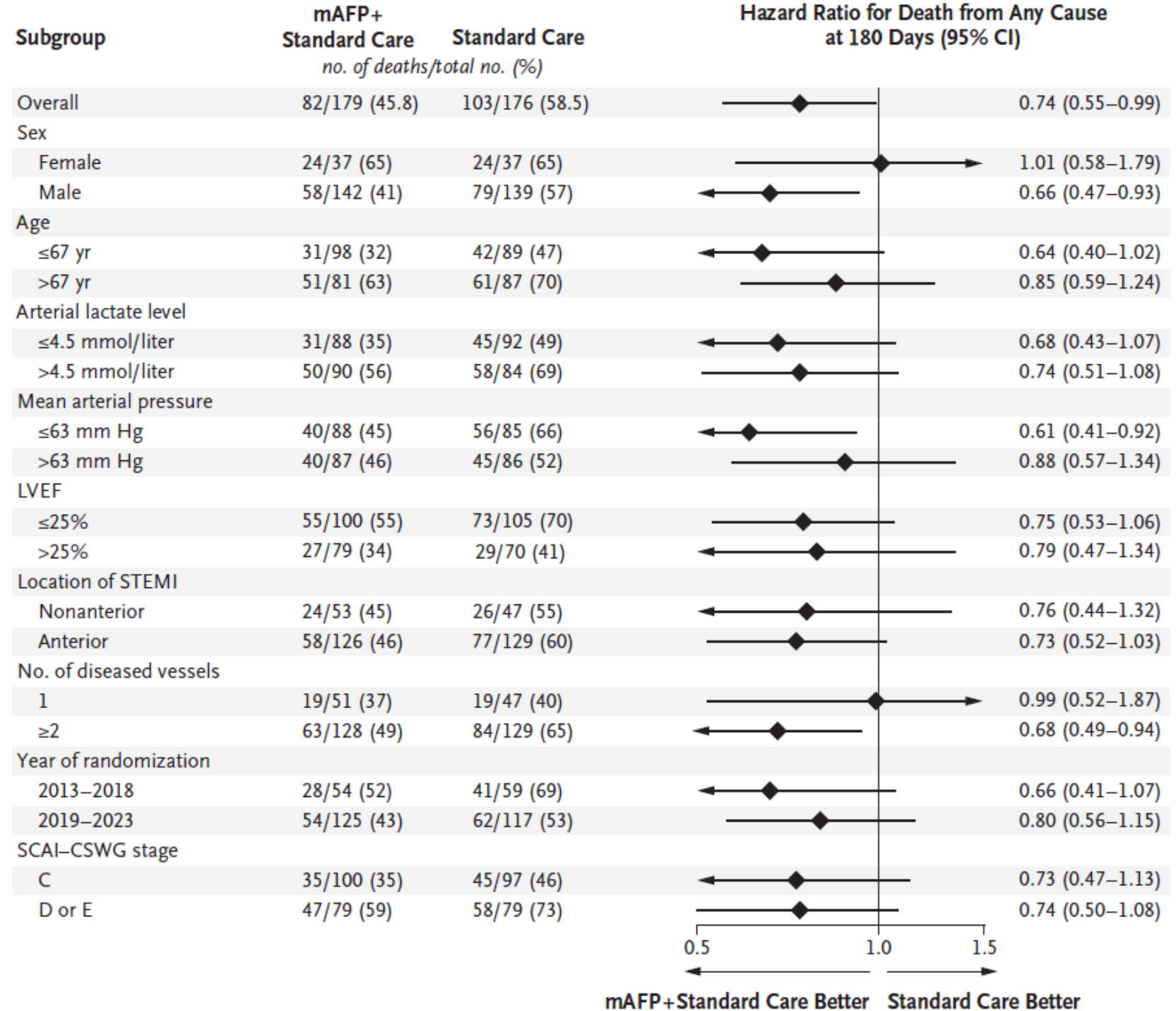
Number Needed To Harm = 6



Median ICU LOS  
Median hospital LOS  
Still in ICU day 30  
Still in hospital Day 30

6 vs 3  
12 vs 7  
12% vs 6.2%  
23% vs 11%

# Subgroup Analysis



# Conclusions

- The routine use of Impella in addition to standard of care reduced death from any cause in patients with STEMI and cardiogenic shock
- This was associated with an increased risk of adverse events
- The study cannot be extrapolated to other causes of cardiogenic shock such as cardiac arrest, non-STEMI and nonischemic cardiogenic shock

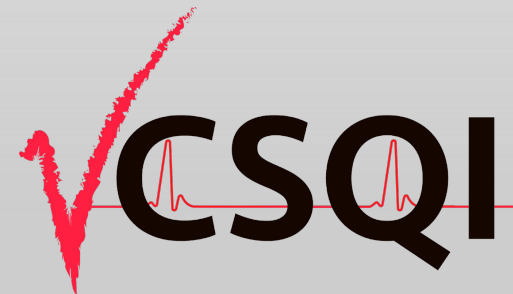
# Caveats/Limitations

- Doesn't inform on shock patients with OHCA, NICM, NSTEMI (trials with high rates OHCA showed no benefit)
- Took 10 years to perform (although no change in mortality over that time period)
- Small number of select centers
- High rate of complications (control group may not have had time to have complications)
- Impella placed prior to revascularization in majority randomized early (n=84 of 99)

# Quality Data Review

Eddie Fonner

Executive Director, VCSQI





# VCSQI Database Summary

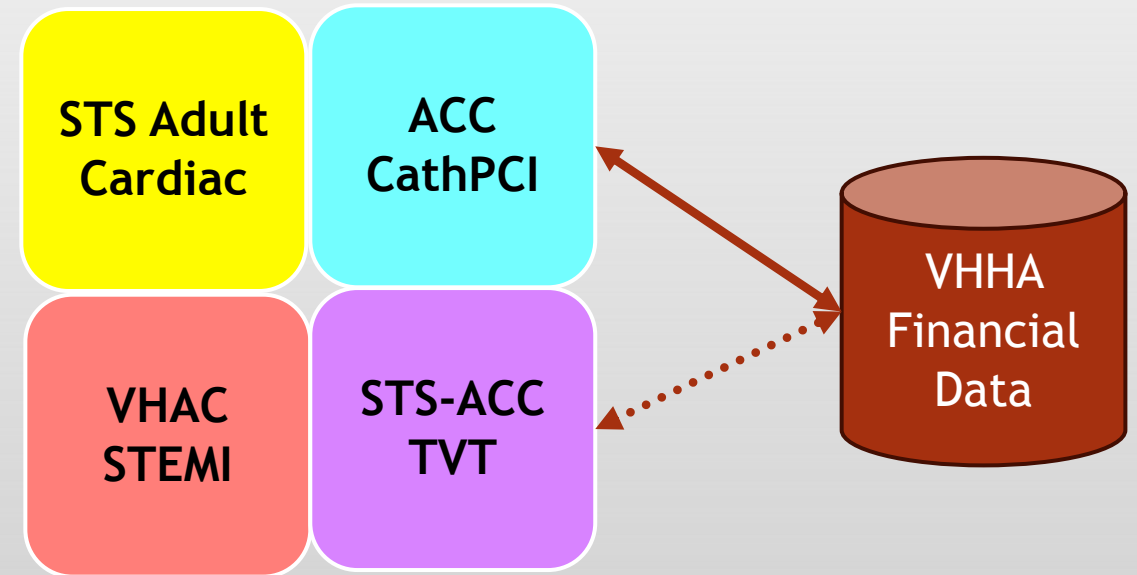
## ➤ Extensive Database

- 146,000+ STS Adult patients from 2001-2024
- 76,000+ ACC CathPCI procedures
- 38,000+ ACC CP-MI episodes
- 5,000+ TVT operations

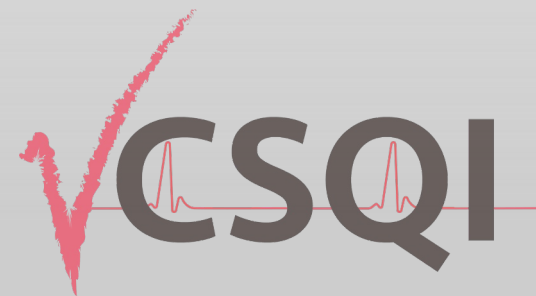
## ➤ Quarterly and Ad Hoc Reports

## ➤ Scientific Publishing

- 80+ manuscripts & presentations

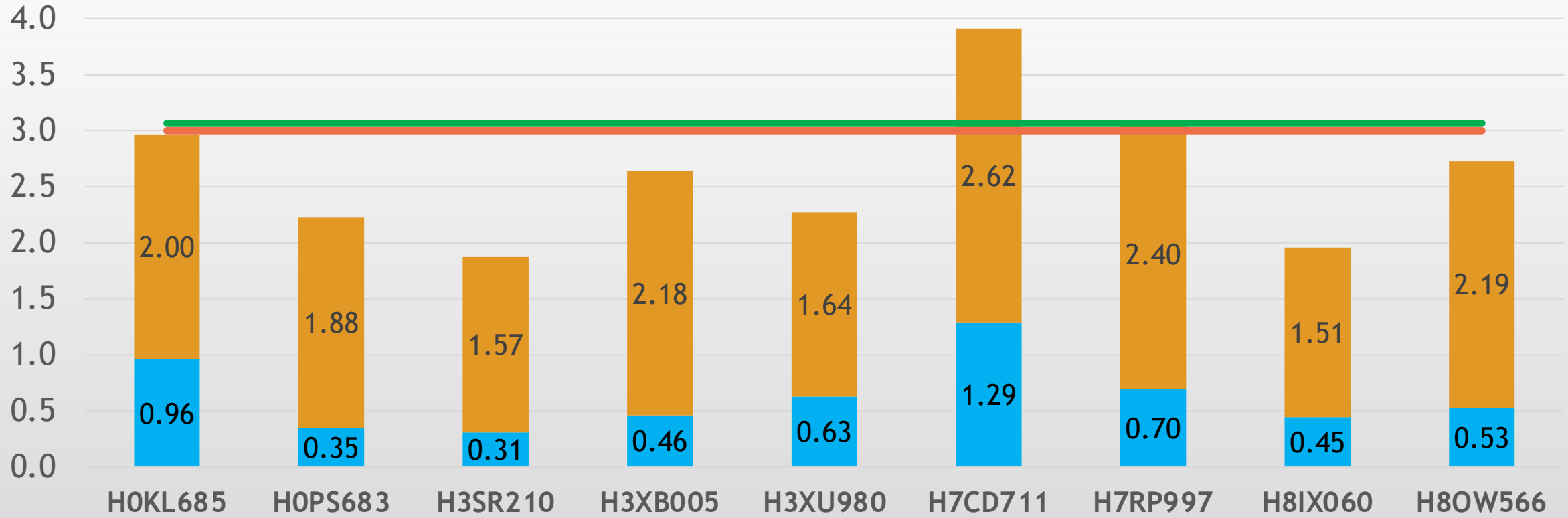


**STS-ACC TVT**



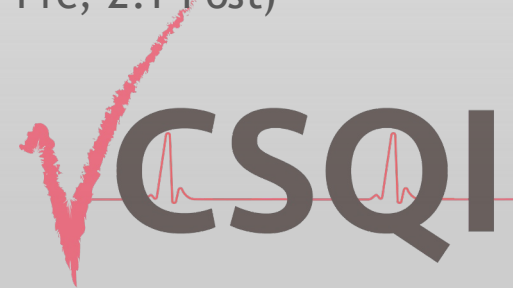
# Average Length of Stay by Hospital: All TAVR Procedures, Q1 2021 - Q4 2023 (N=4,607)

Average LOS (Days)



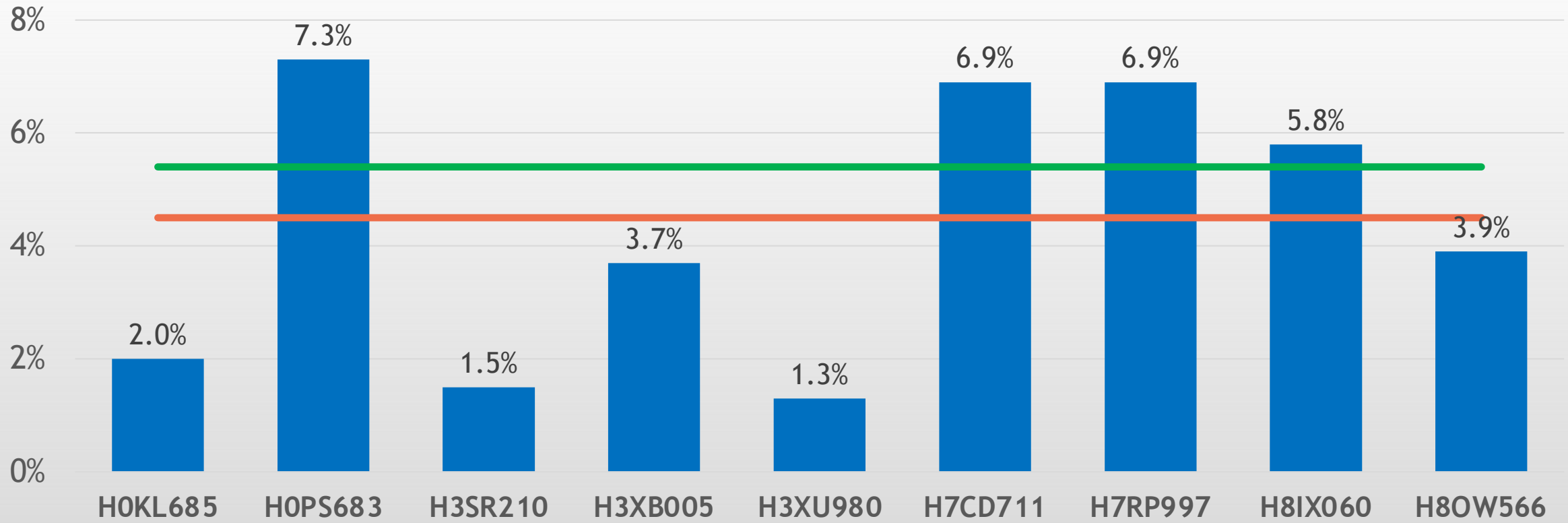
Pre-Procedure  
VCSQI: 3.07 (0.83 Pre, 2.24 Post)

Post-Procedure  
TVT 50th Percentile: 3.0 (0.9 Pre, 2.1 Post)



# Major or Minor Vascular Complication by Hospital: All TAVR Procedures, Q1 2021 - Q4 2023 (N=4,607)

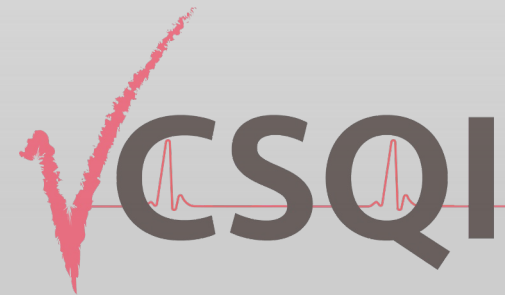
% Vascular Complications



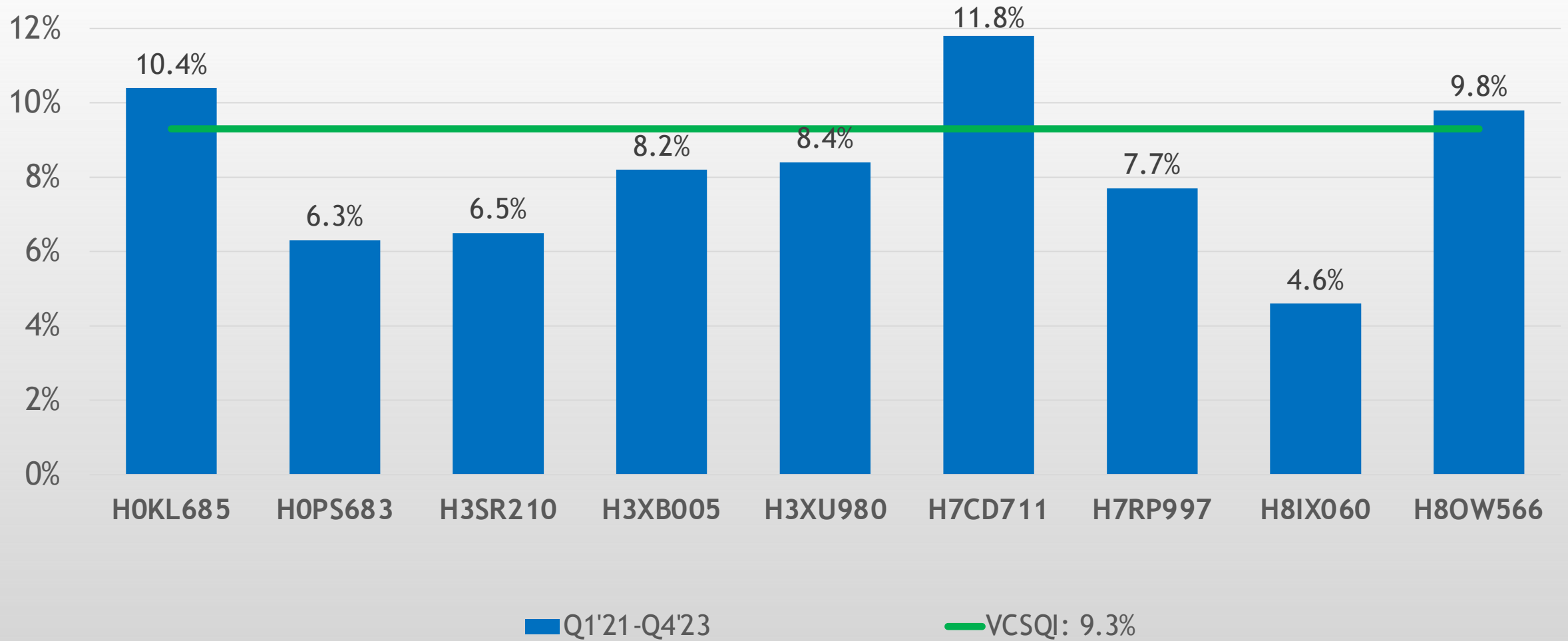
■ Q1'21-Q4'23

— VCSQI: 5.4%

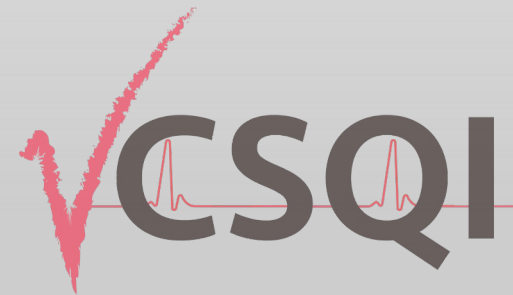
— TVT National 50th Percentile: 4.5%



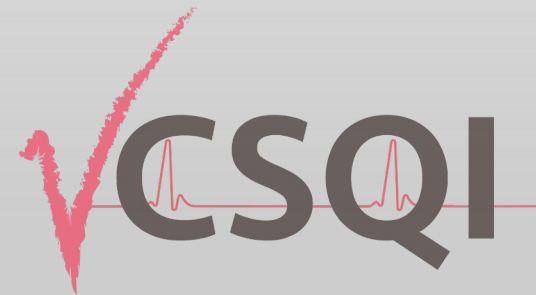
# Stage 1 AKI by Hospital: All TAVR Procedures, Q1 2021 - Q4 2023 (N=4,587)



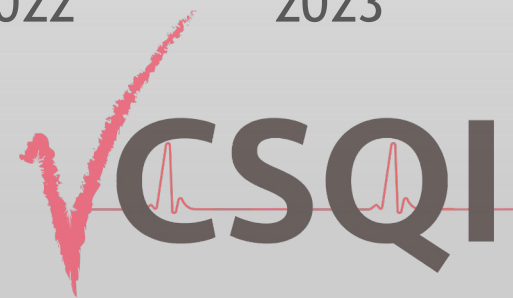
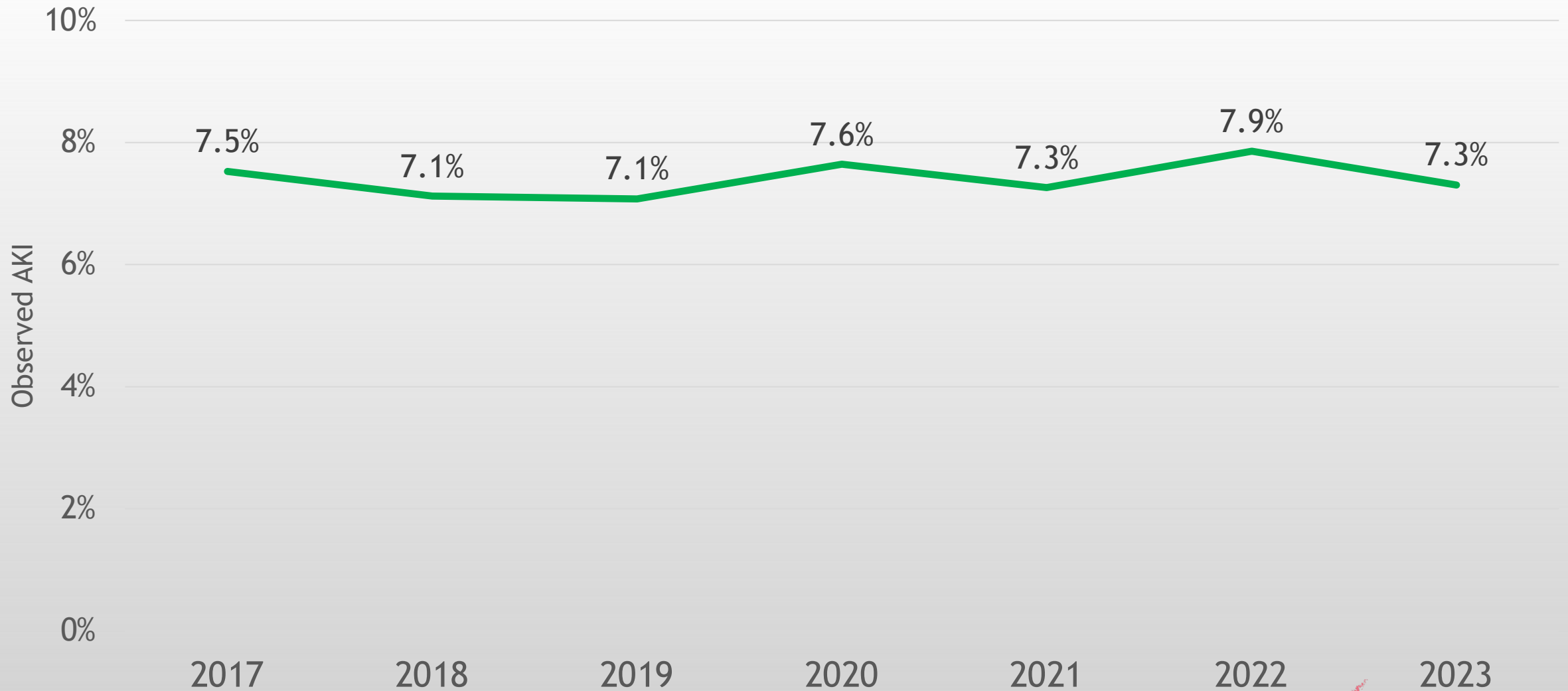
% Stage 1 AKI



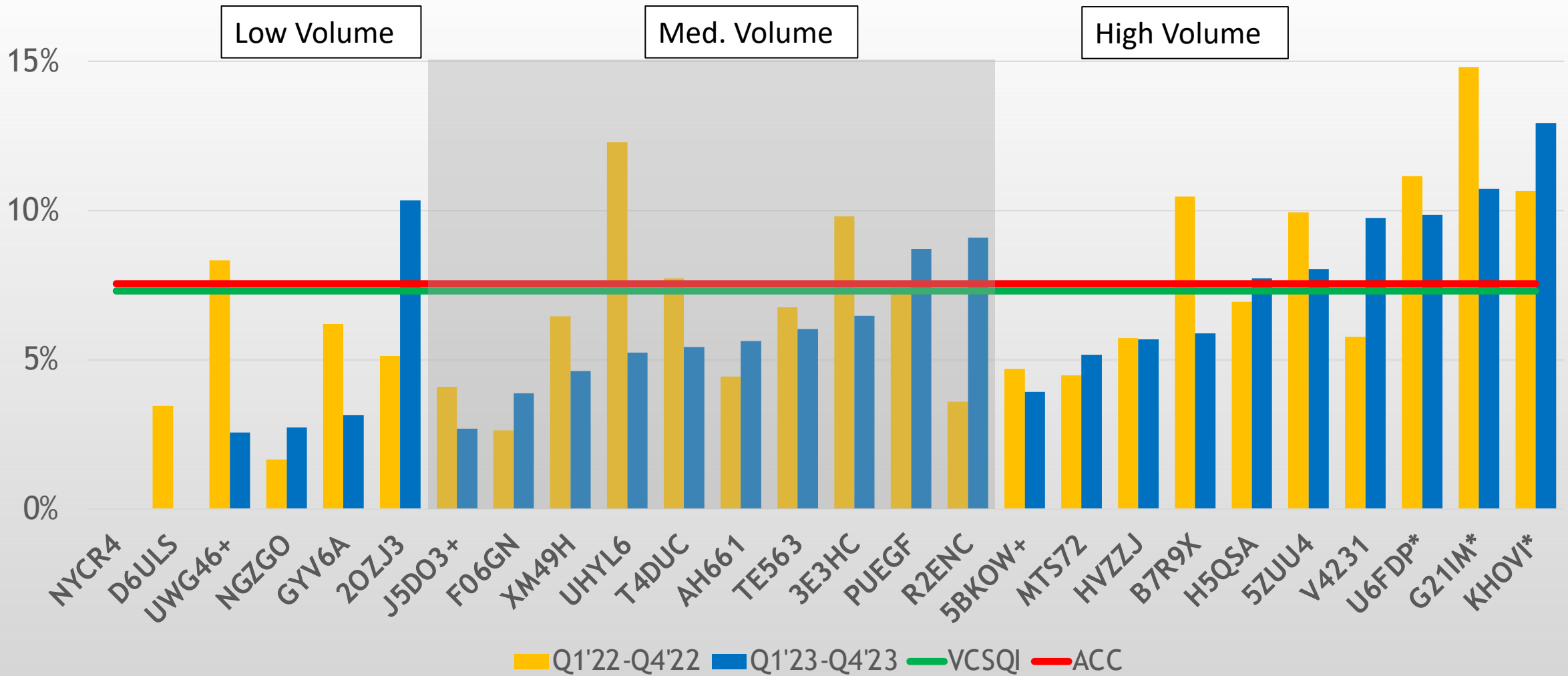
**ACC CathPCI**



# Observed Acute Kidney Injury: All PCI Procedures, CY 2017–2023



# Observed AKI by Hospital: All PCI Procedures, Q1 2022 - Q4 2023 (N=14,490)



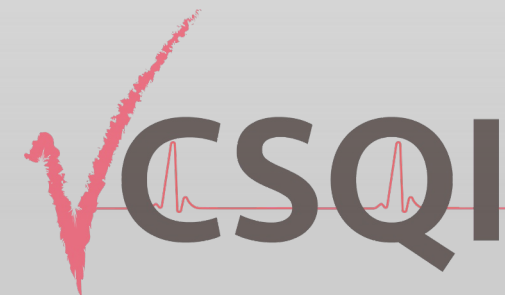
**ACC: 7.55%**

**VCSQI: 7.3%**

For the latest 4 quarter period:

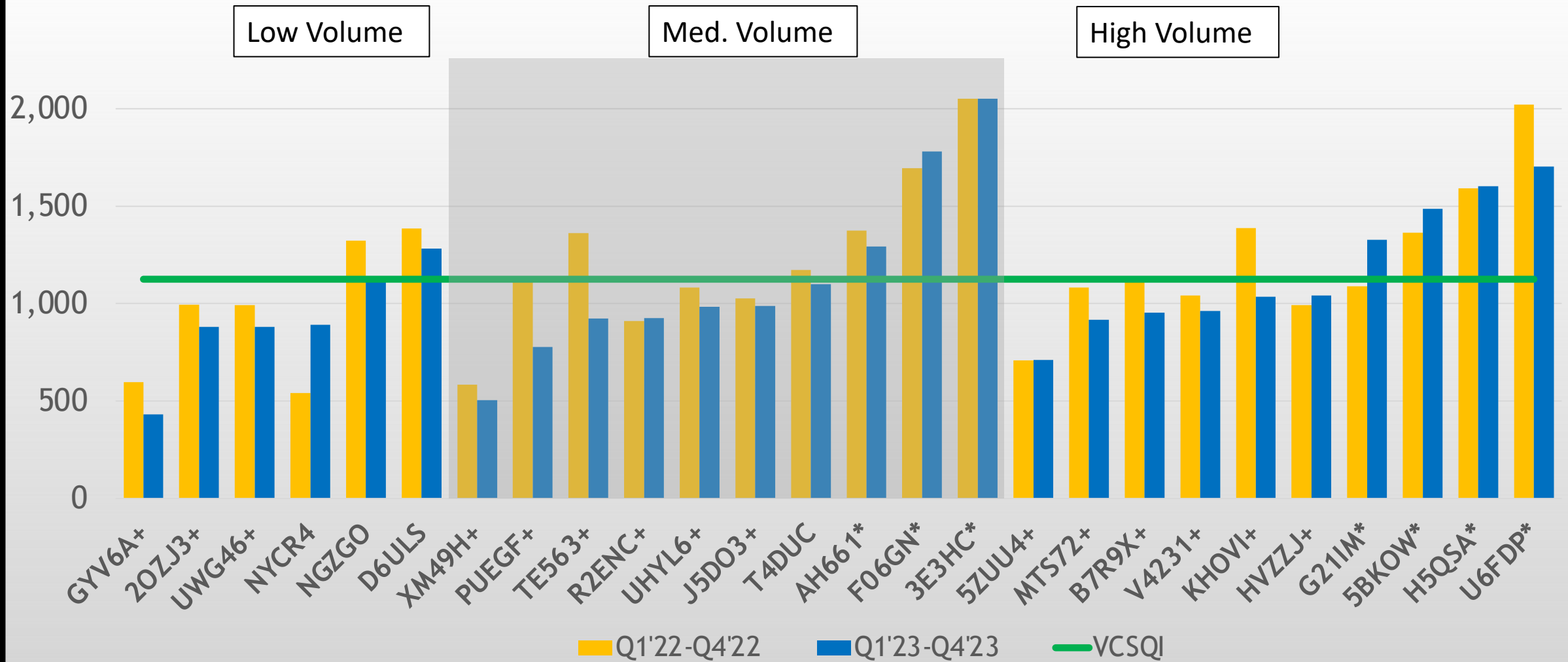
A plus (+) following the hospital code indicates the hospital is statistically better than the rest of VCSQI

An asterisk (\*) following the hospital code indicates the hospital is statistically poorer than the rest of VCSQI





# Average Cumulative Air Kerma (mGy): All PCI Procedures, Q1 2022 - Q4 2023 (N=23,778)

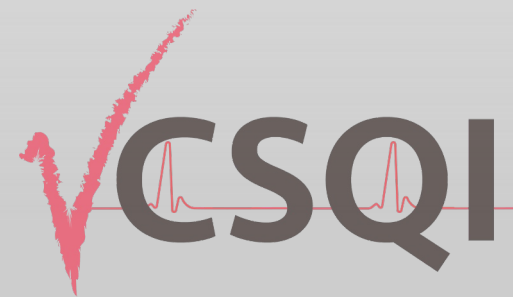


VCSQI: 1,125 mGy

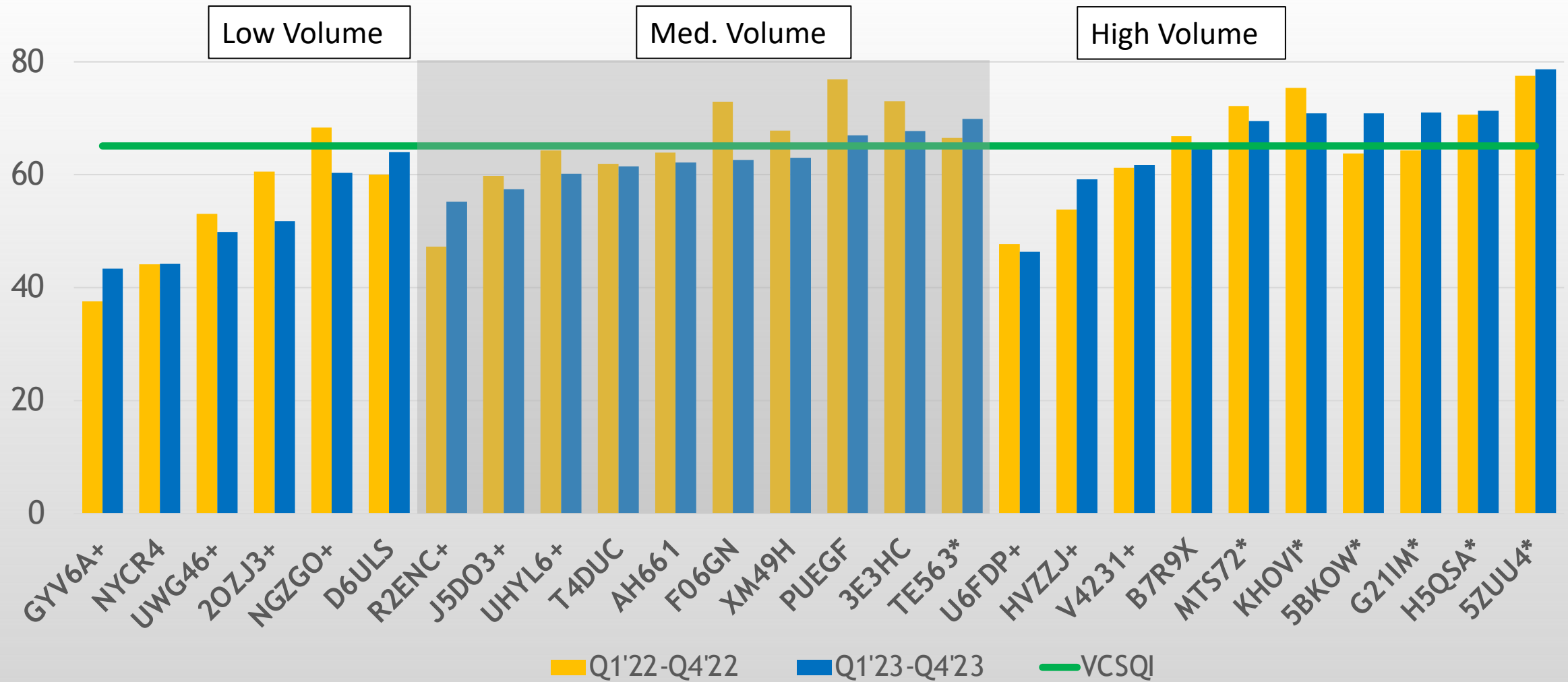
For the latest 4 quarter period:

A plus (+) following the hospital code indicates the hospital is statistically better than the rest of VCSQI

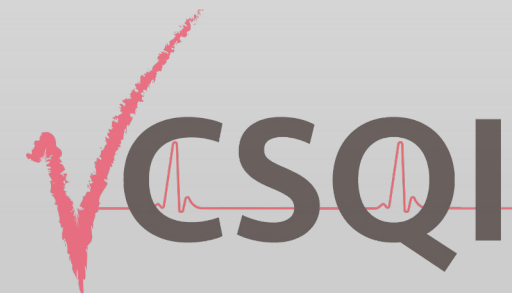
An asterisk (\*) following the hospital code indicates the hospital is statistically poorer than the rest of VCSQI



# Average Procedure Time (Minutes): All PCI Procedures, Q1 2022 - Q4 2023 (N=23,952)



VCSQI: 65.1 minutes

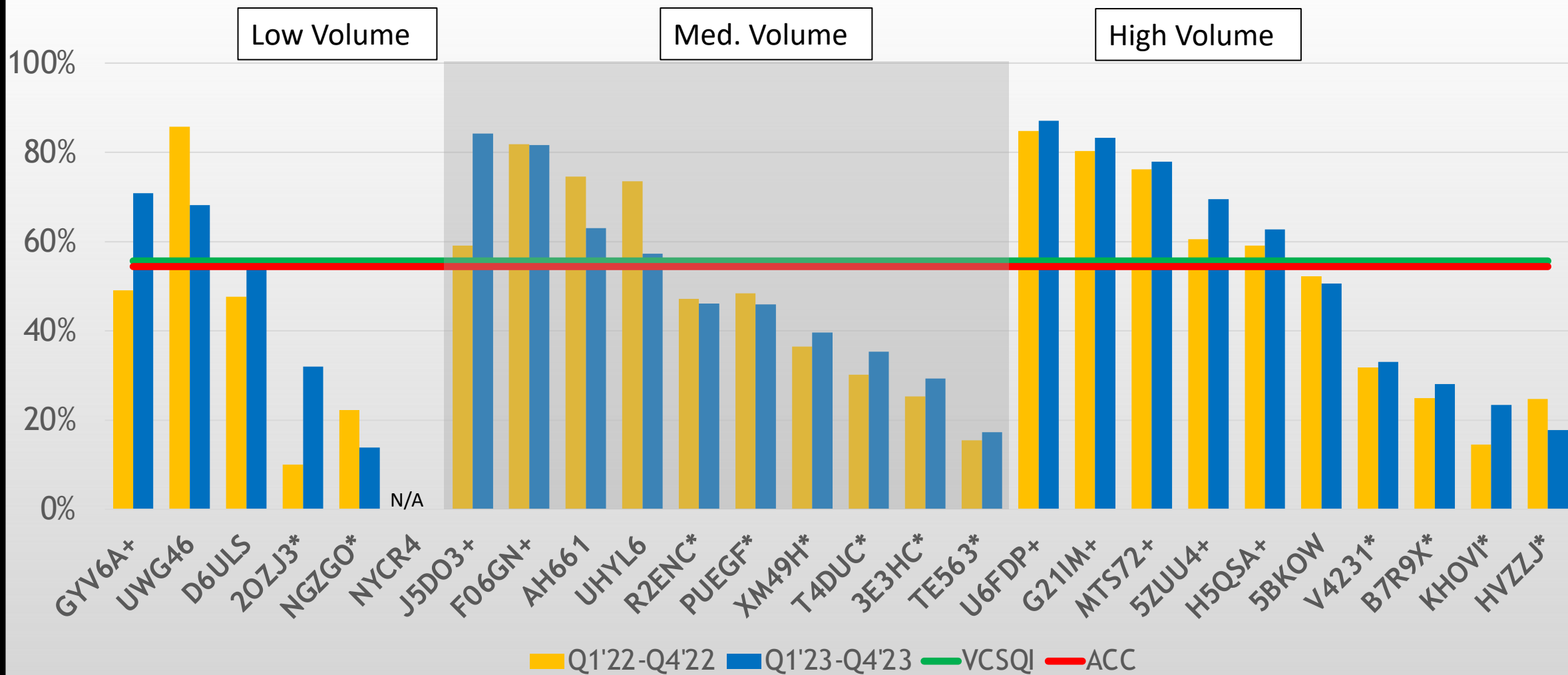


For the latest 4 quarter period:

A plus (+) following the hospital code indicates the hospital is statistically better than the rest of VCSQI

An asterisk (\*) following the hospital code indicates the hospital is statistically poorer than the rest of VCSQI

# Same Day Discharge by Hospital: Elective PCI Procedures\*, Q1 2022 - Q4 2023 (N=8,467)



**ACC: 54.4%**

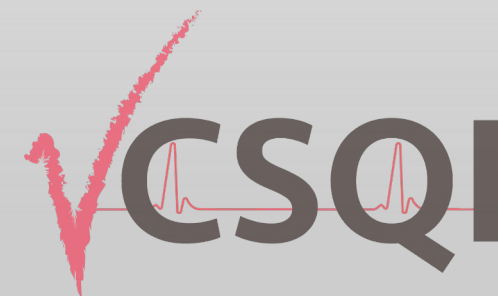
**VCSQI: 55.7%**

\* Denominator Excludes Deceased, Transfer, and DC AMA

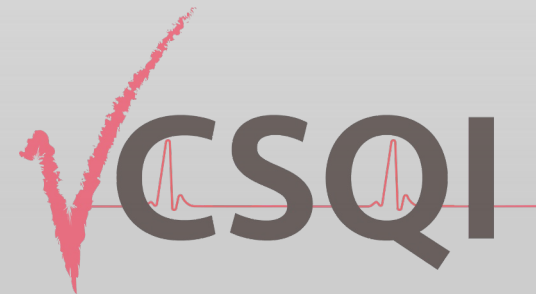
For the latest 4 quarter period:

A plus (+) following the hospital code indicates the hospital is statistically better than the rest of VCSQI

An asterisk (\*) following the hospital code indicates the hospital is statistically poorer than the rest of VCSQI

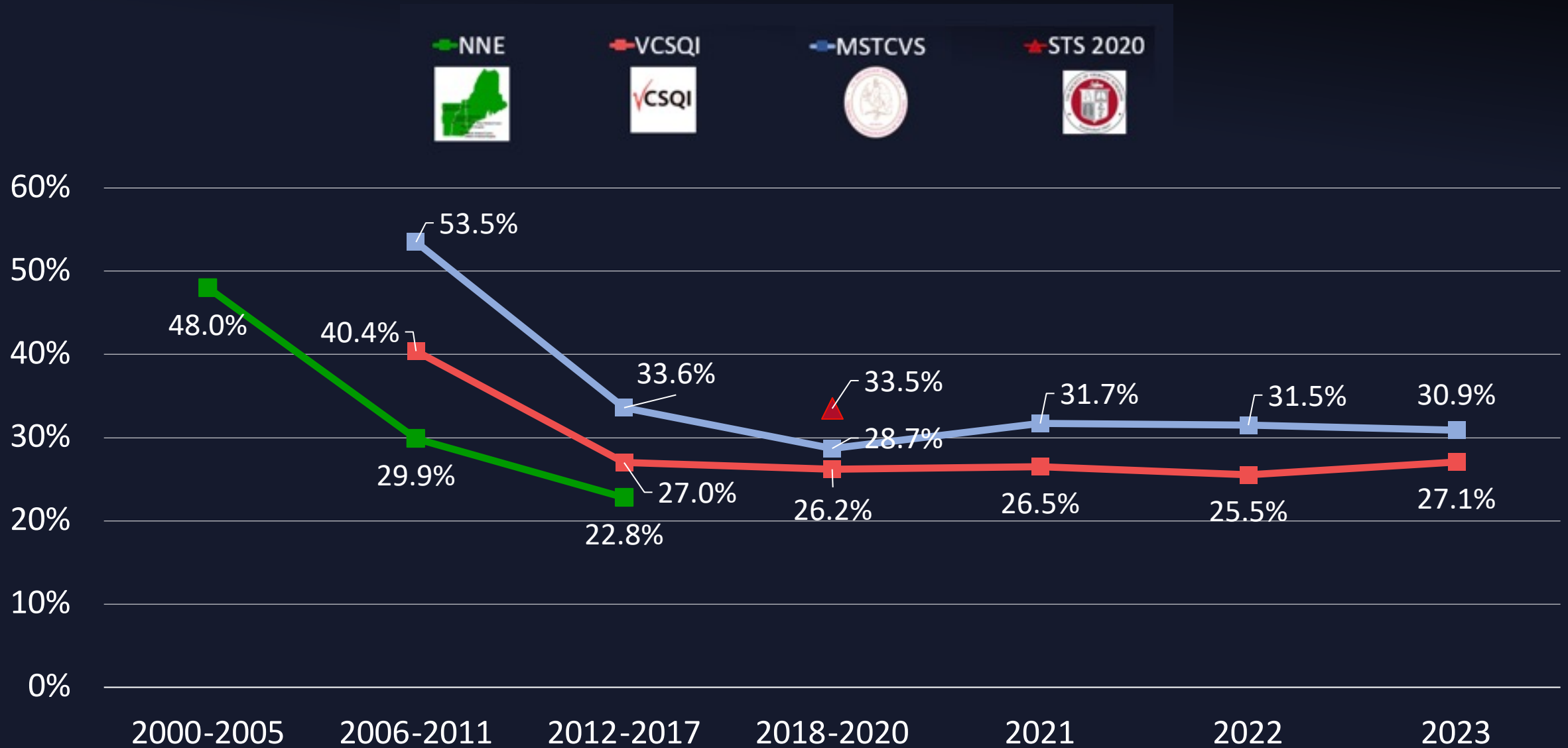


# STS Adult Cardiac



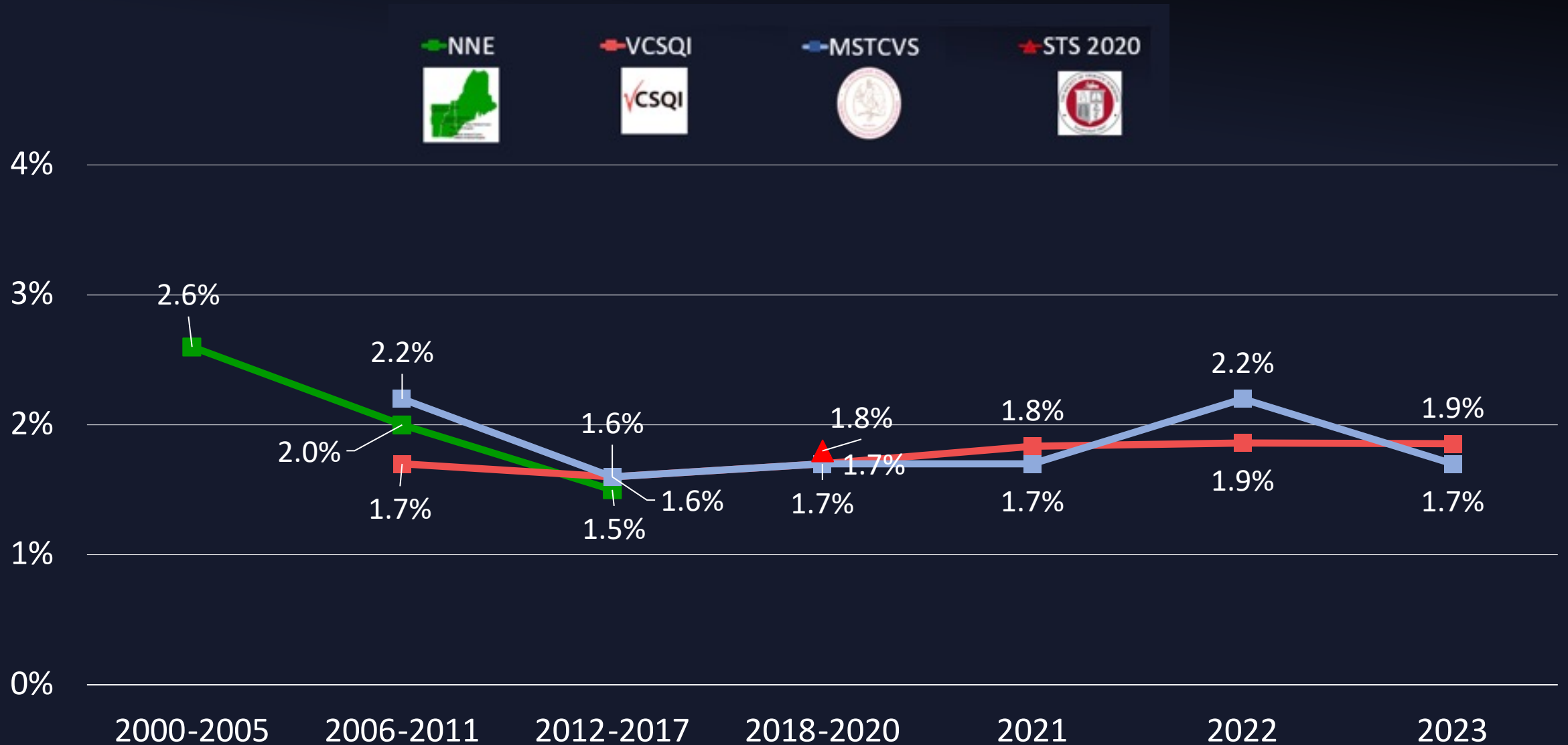
# Isolated CAB

## *Red Blood Cell Transfusion Over Time*



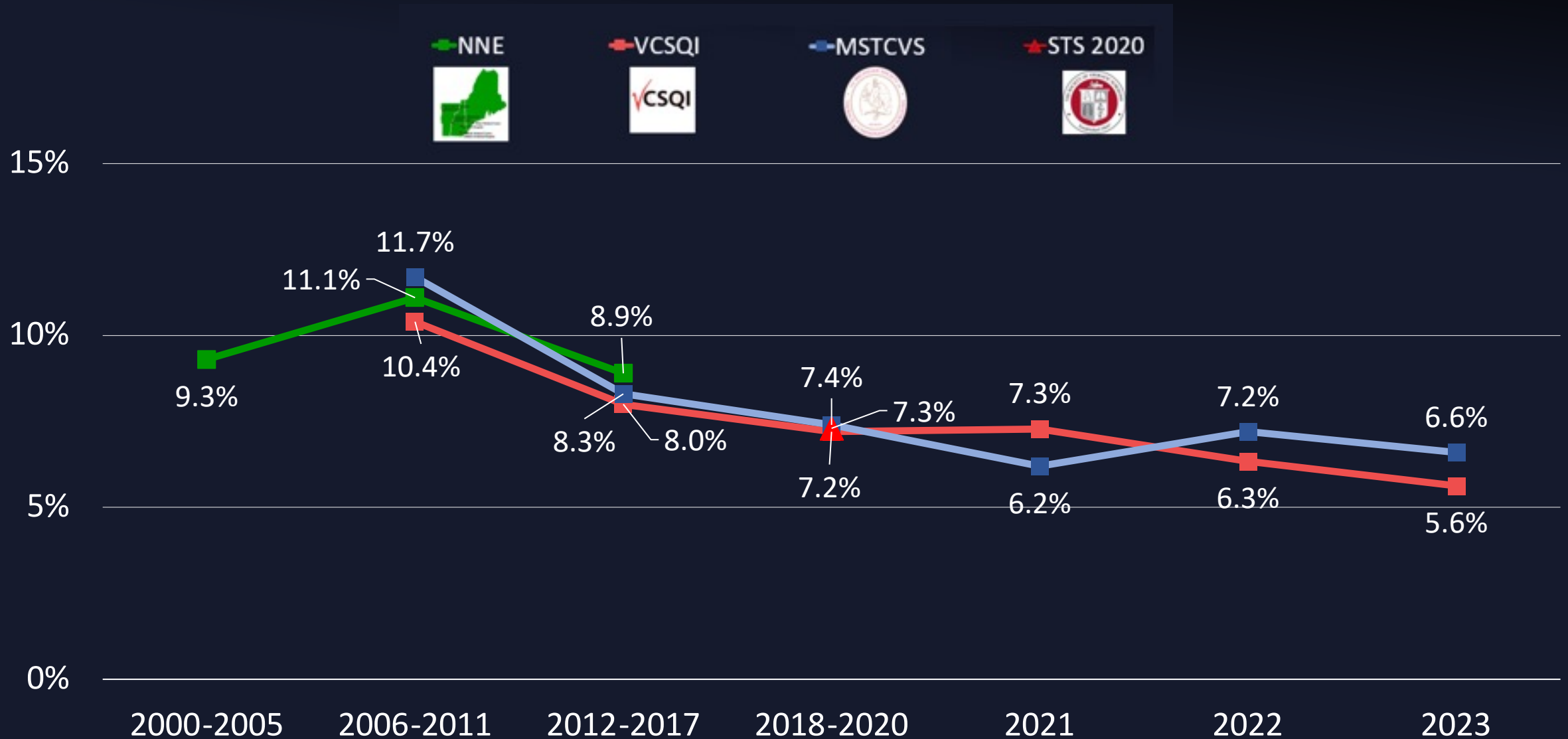
# Isolated CAB

## *Reoperation for Bleeding Over Time*



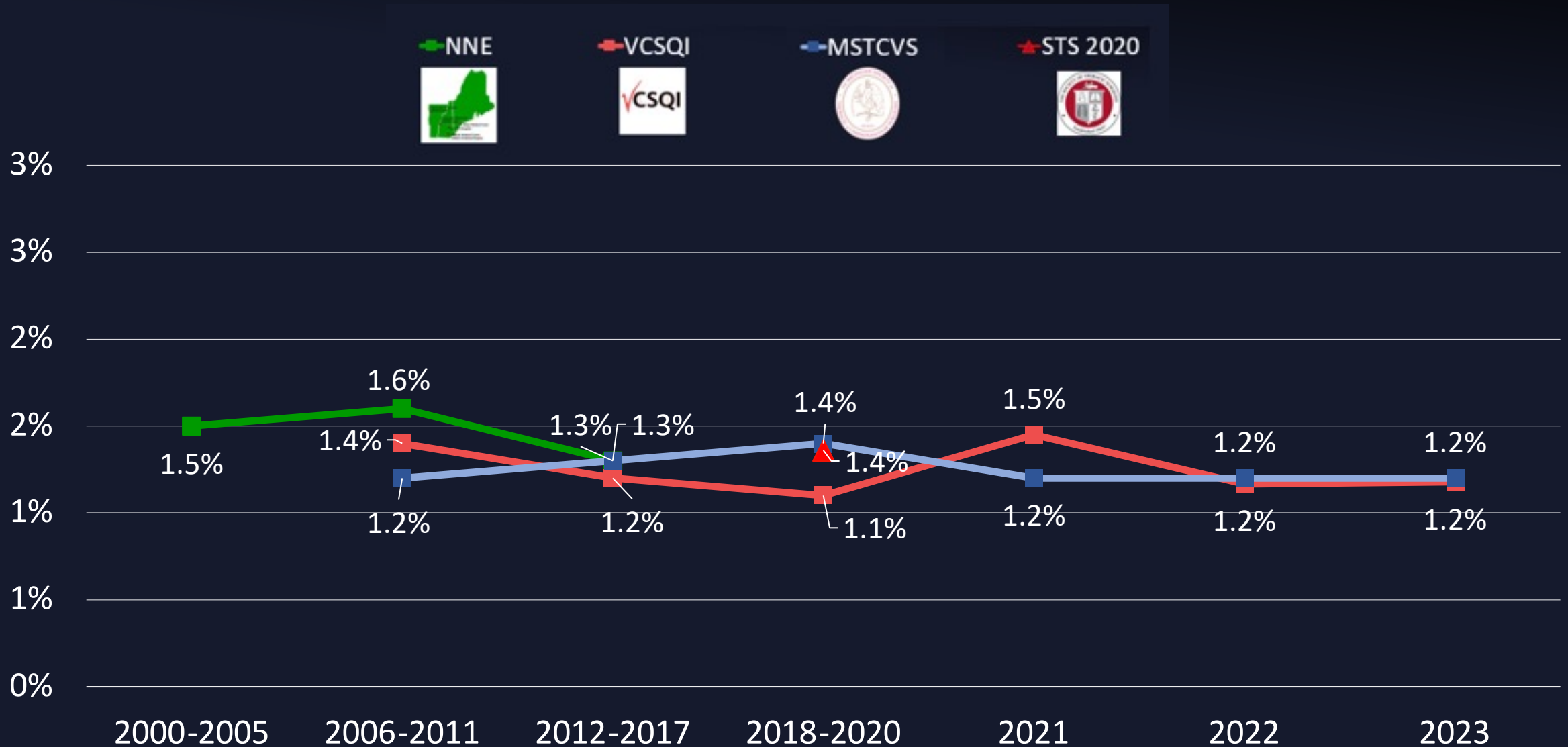
# Isolated CAB

## *Prolonged Ventilation Over Time*



# Isolated CAB

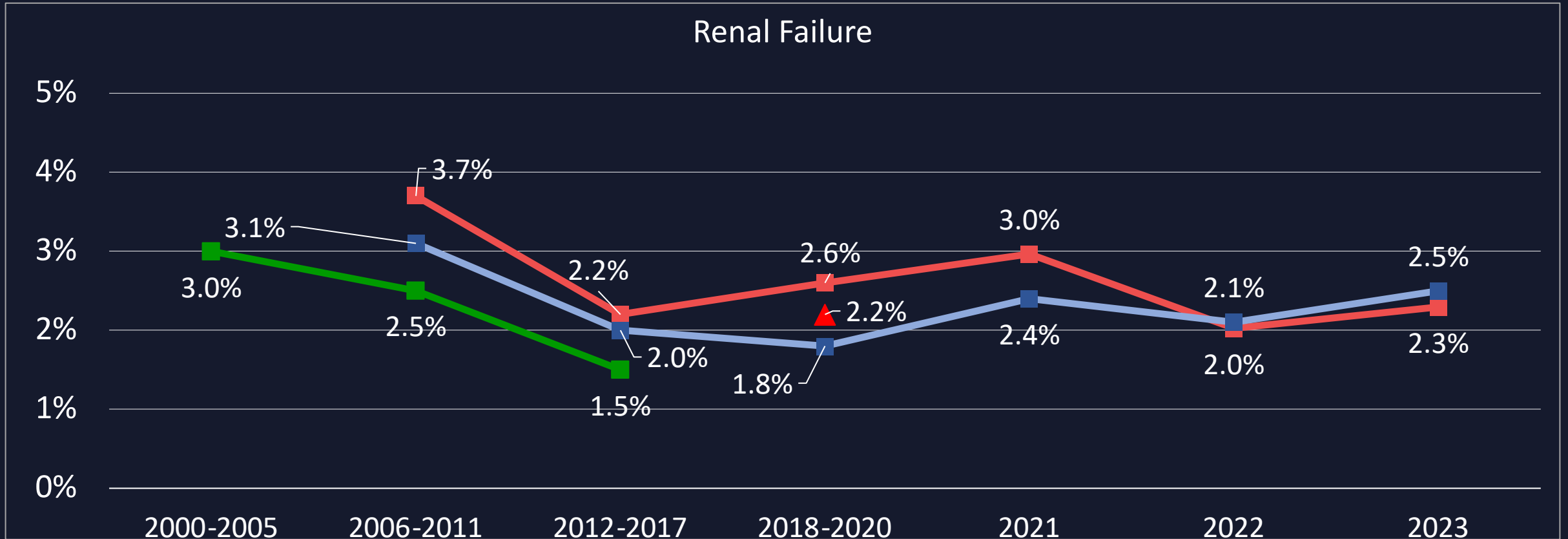
## *Postoperative CVA Over Time*





# Isolated CAB

## *Postoperative Renal Failure Over Time*



# Thank You!

## Questions / Suggestions?

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Thank You!

Have a Safe  
and Happy  
Summer!

