2023 ANNUAL REPORT

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The Maryland Cardiac Surgery Quality Initiative's (MCSQI) Annual Report is a confidential report detailing the activities and achievements of MCSQI. It is intended for use by physicians, administrators, data managers and the cardiac surgery community for development and evaluation of quality improvement plans.

The source of statewide outcome metrics and calculations are from the MCSQI data warehouse. MCSQI member hospitals submit Society of Thoracic Surgeons (STS) Adult Cardiac Surgery data on a quarterly basis. STS exclusion criteria and Observed-to-Expected recalibration coefficients are applied.

All data in this report is protected from disclosure pursuant to the provisions of Maryland statutes as may be applicable.

Unauthorized disclosure or duplication is absolutely prohibited.

Comments and questions may be directed to:

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https://mcsqi.org

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Letter from the Chairman

Niv Ad, MD
Chairman, MCSQI

Dear Colleagues,

The Maryland Cardiac Surgery Quality Initiative is now in its eleventh year and remains steadfast to fulfill our mission to continuously improve the clinical quality of cardiac surgery in the state of Maryland through data analysis, research, and education.

A few highlights of 2023 that are further expanded in this report include:

- Clinical Performance Improvements – As a state, improvements between 2022 and 2023 include decreases in:
  - Risk-adjusted operative mortality
  - Risk-adjusted renal failure
  - Average length of stay: admit-discharge
  - New onset of atrial fibrillation
  - 30-day readmission
- Blood Glucose Management Guidelines – With an increase in deep sternal wound infection rates in the state and nation in the previous few years, the MCSQI 2017 Deep Sternal Wound Healing Guidelines were reassessed. As a result, Blood Glucose Management Guidelines were developed and distributed to programs for implementation.
- Education and Communication – Special presentations made by guest speakers included: “Minimally Invasive Mitral Valve Surgery: A Gimmick or Necessity” and “Public Reporting for CABG: Quest of the Optimal Scorecard.”

- Quality Research and Publications – As a result of focused efforts over the past couple of years, there were eight manuscripts published, four presentations made at prominent meetings, and four posters.
- Payer Discussions – MCSQI began formal discussions with CareFirst to explore ways to collaborate.
- HSCRC Data Linking – The outpatient data set was finalized allowing several research projects to progress.

I would like to personally thank the providers, administrators, and data managers who selflessly made the time to participate in MCSQI meetings and the advancement of key initiatives. Because of your dedication and contributions, patient care throughout the state continues to improve.

Please share this report with your team and I hope you benefit from the information provided.

Sincerely,

Niv Ad, MD

Chairman, MCSQI

MCSQI's MISSION is to continuously improve the clinical quality of cardiac surgery provided in the state of Maryland through data analysis, research, and education.

Since 2013, the Maryland Cardiac Surgery Quality Initiative has brought surgeons, data managers and hospital administrators together to compare data, share best practices, perform outcome analyses, and implement process improvements. MCSQI has become a trusted, credible leader promoting a culture of continuous quality improvement in the cardiac surgery community. Benefits include reduced costs, enhanced clinical effectiveness, increased accountability, fewer state variations, and stronger alliances between heart team members.

Our group endorses the spirit and intent of the Maryland Health Care Commission's (MHCC) legislative charge to maintain high performance standards in Maryland hospitals' cardiac programs.

MCSQI's Key Strategic Goals

***Improve Quality and Control Costs*:** MCSQI members collaborate to analyze hospital processes and provider practices, identify opportunities for improvement, and help implement relevant best practice protocols.

***Enhance Communications and Education*:** MCSQI serves as the interface to communicate process of care information between member sites, eliminating decision making in silos and connecting clinical teams. MCSQI's network of providers, data managers, and administrators fosters statewide collaboration through in-person meetings, conference calls and site visits. Through dynamic communication MCSQI informs, motivates, builds trust, and increases transparency, which helps affect meaningful organizational change.

***Inform MHCC Policy*:** MCSQI helps establish a voice within the state's healthcare legislation by providing MHCC committees and staff with ways to define and assess cardiac surgery performance. MCSQI works collaboratively with MHCC and submits consensus recommendation statements representing all 11 cardiac surgery programs to both MHCC and the Maryland Hospital Association. Informative and timely updates to MCSQI members about proposed MHCC projects, regulatory changes and comment periods are provided.

Organizational Focus

MCSQI is a non-profit consortium supported by all the hospitals that perform cardiac surgery in the state of Maryland. The organization is governed by cardiac surgeons and cardiovascular administrators from each of the member hospitals. The organization provides value to its stakeholders by improving the quality of care through data analysis and implementing best practice protocols led by the Board of Directors, Quality Committee and Research and Writing Committee.

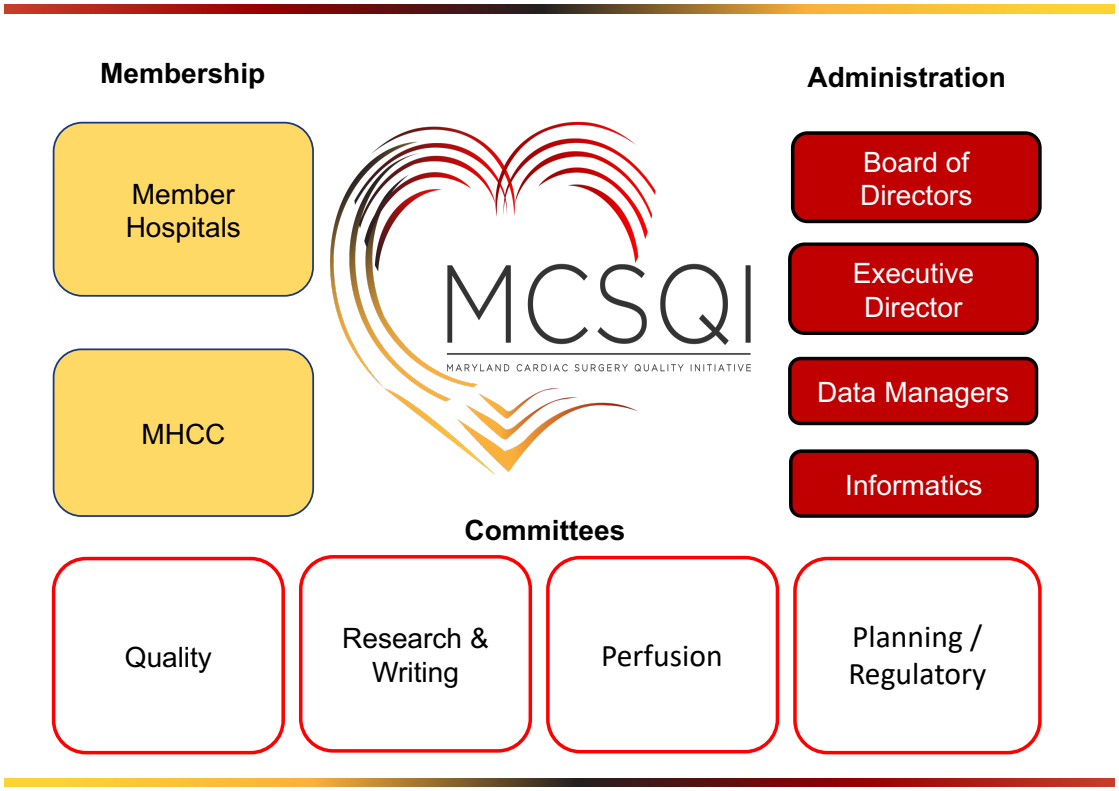
Benchmarking and Reporting: Benchmarking and reporting on key quality indicators are used in a confidential manner to assess trends and to stimulate conversation among providers about variations. Identification of statistically significant performance variations based on quarterly analysis of key clinical indicators have resulted in the development of MCSQI best practice guidelines.

***Multi-disciplinary Collaboration*:** MCSQI participants include cardiac surgeons, advance practice providers, data managers, hospital administrators, intensivists, cardiac anesthesiologists, perfusionists, cardiac rehabilitation specialists, and interventional cardiologists. A multi-disciplinary approach expands opportunity for quality improvement through enhanced coordination and delivery of value-based care.

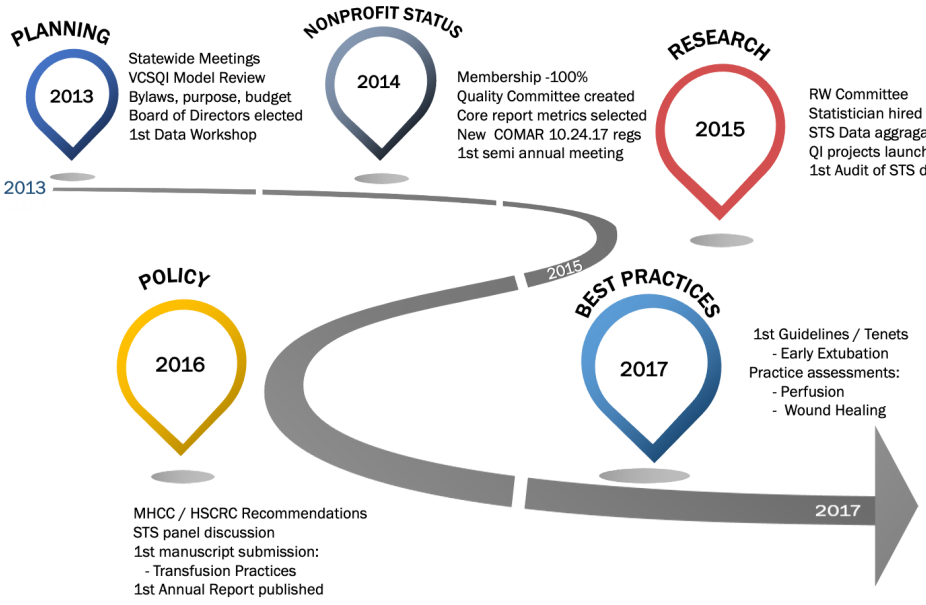
***Research and Writing Publications*:** Over 40 research posters, manuscripts, and presentations have been presented at national surgical society meetings. In addition to MCSQI's Director of Analytics, a biostatistician is contracted to assist MCSQI with committee-approved quality research projects and publications.

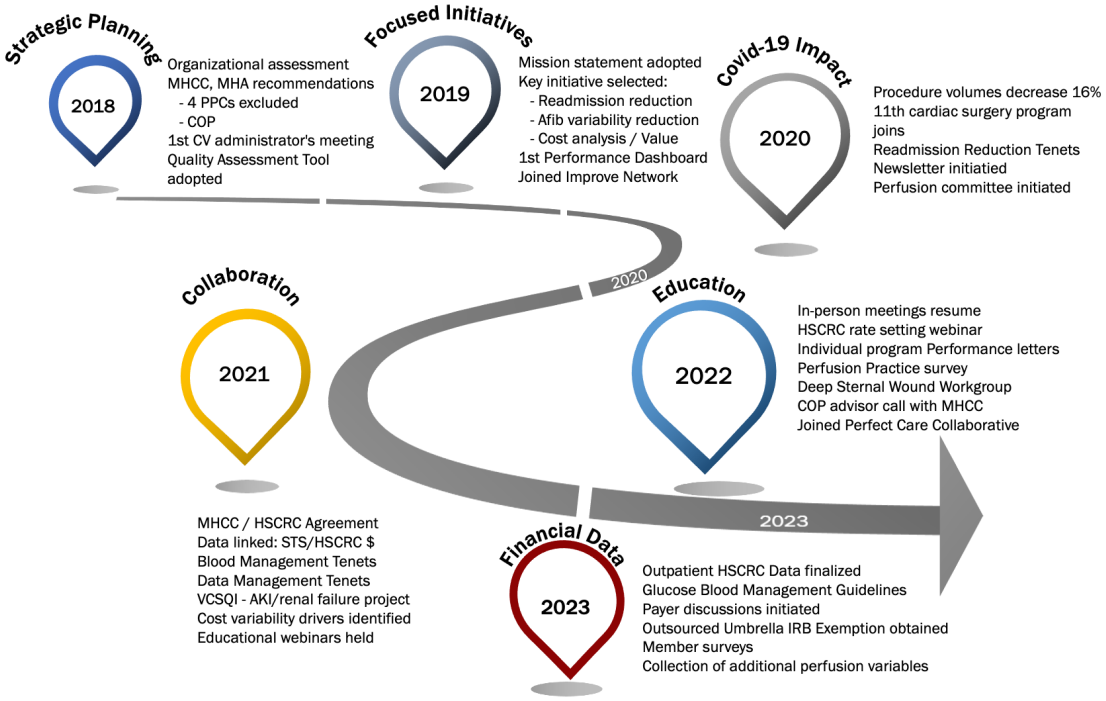
***Regional and National Collaboration*:** MCSQI has entered into formal agreements and projects with other cardiac quality consortiums such as the Virginia Cardiac Services Quality Initiative, the National Cardiac Surgery Quality IMPROVE Network that represents six regional collaboratives comprised of over 90 programs, and the Perfect Care Collaborative that includes programs from North Carolina and Virginia.

Organizational Structure



Key Milestones





Organizational Leadership

John Conte, MD
Chair, Board
2014-2015

Jamie Brown, MD
Chair, Board
2016

Kurt Wehberg, MD
Chair, Board
2017

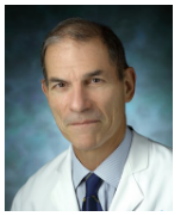
Paul Massimiano, MD
Chair, Board
2018

Rawn Salenger, MD
Chair, Board
2019-2020

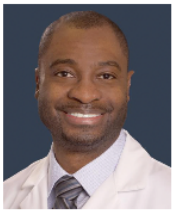
Thomas Matthew, MD
Chair, Board
2020-2021

Niv Ad, MD
Chair, Board
2022-2023
Chair, Research/Writing

Brad Taylor, MD, MPH
Treasurer



Glenn Whitman, MD
Chair, Quality



Ricardo Quarrie, MD
Co-Chair, Quality

Charlie Evans, MD
Chair, Perfusion

Elizabeth
Passano, MS
Chair, Data
Managers

Dawn
Roach, RN
Co-Chair,
Data
Managers

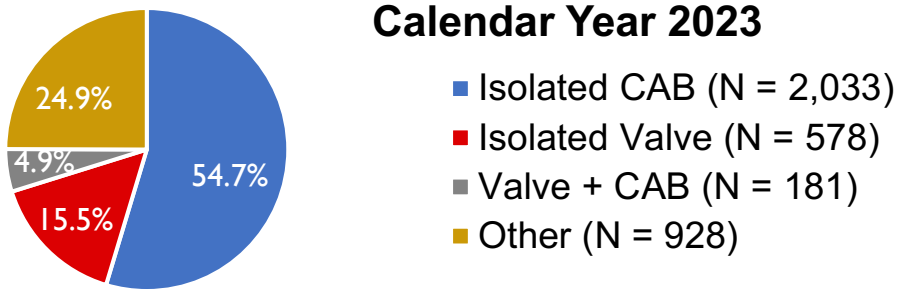
Diane Alejo
Co-Founder
Co-Chair,
Research/
Writing

Eddie
Fonner
Co-Founder
Director,
Analytics

Terri Haber,
MPH
Executive
Director

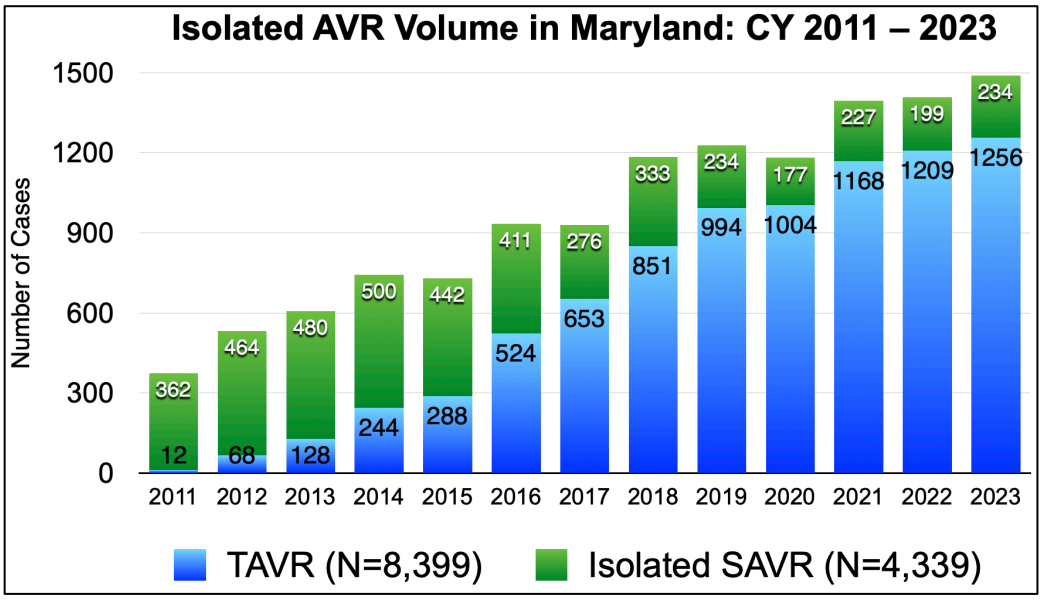
Volume Trends

Statewide Procedure Volume by STS Category: Calendar Year 2023



MCSQI Procedure Volume	2019	2020	2021	2022	2023
Isolated CABG	2,291 (58.4%)	1,872 (56.9%)	2,222 (58.9%)	2,201 (55.6%)	2,033 (54.7%)
Isolated AVR (SAVR)	235	177	227	198	234
AV Replacement + CABG	180	134	161	157	124
Isolated MVR	98	97	111	128	133
MV Replacement + CABG	29	29	27	35	31
Isolated MV Repair	222	250	206	204	211
MV Repair + CABG	46	44	56	42	26
Total: STS Major Procedures	**3,101 (79.1%)**	**2,603 (79.1%)**	**3,010 (79.8%)**	**2,965 (75.9%)**	**2,792 (75.1%)**
Other Procedures*	819 (20.9%)	688 (20.9%)	762 (20.2%)	991 (25.1%)	928 (24.9%)
Total: All Procedures	**3,920**	**3,291**	**3,772**	**3,956**	**3,720**

* Includes other cardiac surgery for ex: CABG or Valve + Other procedures, Transplants, VAD, Aortic Surgery. Excludes Transcatheter Procedures.



STS Major Procedure Volumes and Outcomes: MCSQI vs. STS Total

	2022 to 2023 (1-Year Change)	
Variable	**National**	**MCSQI**
Total Volume	+3% (156K → 160K)	–6% (2,965 → 2,792)
Elective	–3% (53% → 51%)	+12% (45.0% → 55.0%)
Non-Elective	+4% (47% → 49%)	–10% (55.0% → 49.5%)
CAB O/E Mortality	+0% (1.00 → 1.00)	+5% (0.83 → 0.87)
CAB Only Readmission Rate	+2% (9.1% → 9.3%)	–18% (9.7% → 8.0%)

MCSQI Patient Demographics: Isolated CABG Procedures

	2013	2023	% Change
Average Age	65.6	66.0	+1%
Male Gender	74.1%	77.6%	+5%
Female Gender	25.9%	22.4%	–14%
White Race	76.7%	68.6%	–11%
Black Race	15.5%	18.7%	+21%
Asian Race	4.4%	5.6%	+26%
Payor: Medicare	51.1%	52.6%	+3%
Payor: None / Self-Pay	5.0%	3.0%	–39%
Average BMI	31.4	29.8	–5%

Quality Committee

The Quality Committee is tasked with managing MCSQI's quality improvement agenda. The Chair is Glenn Whitman, MD and Co-chair is Ricardo Quarrie, MD. Membership is comprised of surgeons, data managers, intensivists, advanced practice providers, and administrators from the eleven MCSQI hospitals.

The Quality Committee examines hospitals' data from the statewide STS registry on a quarterly basis and correlates results with practice variation on key clinical indicators. Identification of statistically significant performance variances have resulted in the development of MCSQI best practice guidelines. Individual hospital outcomes have improved because of provider involvement in the analysis process and implementation of practice guidelines.

During the past 10 years MCSQI Tenets were developed for: Wound Healing, Blood Management, Early Extubation, Readmission Reduction, and STS Data Management are shown below. In 2023 recommended Blood Glucose Management Guidelines were adopted.

2013-2023 Comparisons:

	MCSQI Rates (Unadjusted)	2013 CAB Only	2023 CAB Only	Impact
Early Extubation / Prolonged Ventilation • **Tenets Adopted 2015**	Early Extubation	39.6%	72.5%	**83% Improvement**
	Prolonged Ventilation	9.5%	6.2%	**35% Reduction**
Sternal Wound Infection • **Guidelines 2017**	Deep Sternal Infection	0.43%	0.39%	**9% Reduction**
Blood Utilization • **Tenets Adopted 2021**	Intra-operative Blood Transfusion	39.5%	20.3%	**48% Reduction**
	Post-operative Blood Transfusion	34.2%	30.1%	**12% Reduction**
	Any Blood Transfusion	54.5%	37.7%	**31% Reduction**
Readmissions • **Tenets Adopted 2019**	30-day Readmission	7.1%	8.0%	**12% Increase**
Atrial Fibrillation	New Onset A-Fib	23.5%	25.6%	**9% Increase**
Blood Glucose • **Guidelines Adopted 2023**	Highest Intra-op. Glucose < 180	N/A	51.4%	**TBD**

MCSQI Recommended Guidelines / Tenets

Recommended guidelines and tenets developed by MCSQI over the years are listed below. The complete versions can be found on MCSQI's website: https://mcsqi.org/resources

- Glucose Management Guidelines
- Readmission Reduction Tenets
- Blood Conservation Tenets
- Data Management Tenets
- Sternal Wound Healing Guidelines
- Extubation Guidelines

MCSQI Glucose Management Guidelines:

In 2023, Glucose Management Guidelines were finalized and are meant to compliment the Sternal Wound Healing Guidelines that were established in 2017.

1. Develop and implement an institutional protocol for peri-operative blood sugar management with goal of 120-180 mg/dL.
2. Use an insulin infusion for blood sugar management in the intra-op phase and during the first 24 hours postop.
3. Check pre-op HA1C levels for all diabetic (at risk/suspected) patients.
4. For non-urgent cases in patients with HA1C > 10%, consider delaying surgery and obtaining better glucose control if possible.
5. Establish periodic surveillance of compliance of blood sugar target goals.
6. Inpatient consult for diabetic education for newly diagnosed patients and those with uncontrolled blood sugars pre-op.
7. Social work consult prior to discharge for assistance with obtaining affordable medications at discharge.
8. Schedule specialty (Endocrinology) or primary care follow-up at discharge for blood sugar management.

2023 Quality Committee Highlights

Cost / Value Initiative	• A formal agreement between MCSQI, MHCC and HSCRC was finalized in 2021 for MCSQI to obtain an expanded financial/administrative data set. The HSCRC inpatient and outpatient data set was successfully linked to MCSQI's STS data in 2022. In 2023 efforts focused on understanding and validating the outpatient data. • Research projects that are underway include: Observation and Readmissions, Comparison of APR-DRG and STS Risk Adjustments, Cost of Cardiac Surgery Under GBR, and New On-set AFib after Cardiac Surgery and Long-term Costs.
Perfusion	• Efforts to establish a meaningful Perfusion Performance Dashboard continued. • Two non-STS variables were collected for the last six months of 2023 to better understand variablity and derive meaningful data for the performance dashboard. • MCSQI began collaborating with Perfect Care Network's Goal Directed Perfusion Workgroup.
Deep Sternal Wound	• Due to recent increasing DSWI rates for the state, a workgroup was established in 2022 to develop recommendations for improvement. A survey was conducted to all programs. • In 2023 Blood Glucose Management Guidelines were established and distributed for implementation.
Educational Events **Guest Speakers**	• ***"Minimally Invasisve Mitral Valve Surgery: A Gimmick or Necessity?"*** *Anelechi Anyanwu, MD*, Professor and Vice Chair Dept. of Cardiovascular Surgery, Surgical Director of Heart Transplantation and Mechanical Circulatory Support, The Mount Sinai Hospital *Marc Gillinov, MD,* Professor and Chair Department of Thoracic and Cardiovascular Surgery Judith Dion Pyle Chair in Heart Valve Research, Cleveland Clinic • ***"Public Reporting for CABG: Quest for the Optimal Scorecard"*** - *Bradley S. Taylor, MD, MPH*, Chief of the Division of Cardiac Surgery at the University of Maryland School of Medicine and Director of Coronary Revascularization at University of Maryland Medical Center, Dr. Joseph S. and Irene P. McLaughlin Endowed Professor of Cardiothoracic Surgery.

Research and Writing Committee

The Research and Writing Committee, chaired by Niv Ad, MD and co-chair Diane Alejo, continues to have excellent engagement and collaboration from MCSQI membership. The committee reviews and approves proposals for research and oversees the research process. Statistical analysis is performed by MCSQI's Biostatistician, Sari Holmes, PhD, an expert in analyzing STS data and conducting cardiovascular research. Eddie Fonner, MCSQI's Director of Analytics, manages the MCSQI data warehouse and provides analytics to support the work of the Research and Writing Committee's efforts to impact quality improvement and research at state, regional and national levels.

2023 Highlights

In 2023, MCSQI published eight manuscripts, four posters and presented four presentations at the national level.

Manuscripts

Annals of Thoracic Surgery, 2023

- Institutional Variability in Red Blood Cell Transfusion with Coronary Bypass in a Statewide Database

Journal of Cardiothoracic Vascular Anesthesia, 2023

- Impact of Preoperative Hematocrit, Body Mass Index and Red Cell Mass on Allogeneic Blood Product Usage in Adult Cardiac Surgical Patients: Report from a Statewide Quality Initiative

Journal of Thoracic and Cardiovascular Surgery, 2023

- Unexpected Impact of Preoperative Anemia in Low-Risk Isolated CABG or Single Valve Surgical Patients: Do Not Overlook These Patients in Management!
- Statewide Data on Surgical Ablation for Atrial Fibrillation: The Data Provide a Path Forward
- Multiple Arterial Graft Use in Coronary Artery Bypass Surgery: Surgeon Perspective vs Practice
- Hospital Variability in Modifiable Factors Driving Coronary Artery Bypass Charges
- Interhospital Failure to Rescue after Coronary Artery Bypass Grafting

Journal of Thoracic and Cardiovascular Surgery Open, 2023

- Interhospital Variability in Failure to Rescue Rates Following Aortic Valve Surgery

Posters:

American Association of Thoracic Surgery (AATS) Annual Meeting, 2023

- Failure-to-Rescue in Valve Surgery: An Analysis of the Improve Network

American Heart Association Scientific Sessions Meeting, 2023

- Skeletonization Mitigates Risk of Deep Sternal Wound Infection in Patients with Diabetes Undergoing CABG with Bilateral Internal Mammary Arterial Grafting

Society of Thoracic Surgeons (STS) 58th Annual Meeting

- Maryland Capitated Payment Reform: Cost Savings or Cost Shifting?
- The Impact of Institutional Clinical Practice and Culture on Red Blood Cell Transfusion in Patients Undergoing CABG: A Statewide Analysis

Presentations:

American Association of Thoracic Surgery (AATS) 103rd Annual Meeting

- Statewide Data on Surgical Ablation for Atrial Fibrillation: The Data Provide a Path Forward
- Unexpected Impact of Preoperative Anemia in Low-Risk Isolated CABG or Single Valve Surgical Patients: Do Not Overlook These Patients in Anemia Management

Society of Cardiovascular Anesthesiologists (SCA) Annual Meeting

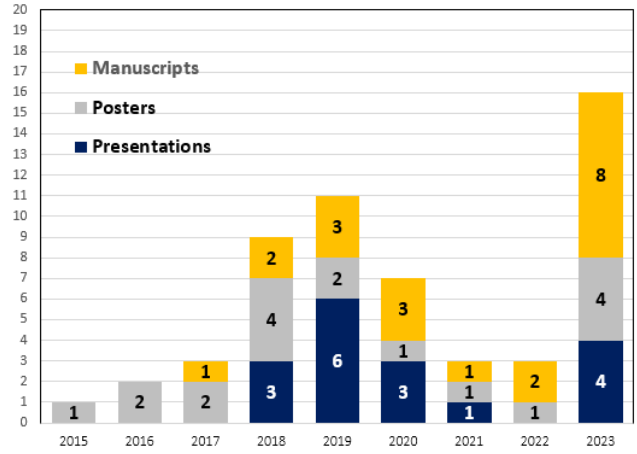
- Association of Lower Discharge Hemoglobin Levels on 30-Day Readmission in Cardiac Surgery: A Statewide Analysis

Society of Thoracic Surgeons (STS) 59th Annual Meeting

- Extubation in the Operating Room following Cardiac Surgery – Not so Fast

MCSQI Published Manuscripts, Posters and Presentations

TOTAL	
Manuscripts	20
Posters	18
Presentations	17



National Meetings

- American College of Surgeons Clinical Congress
- American Heart Association Scientific Sessions (AHA)
- American Heart Association Quality of Care & Clinical Outcomes Scientific Sessions
- American Association of Thoracic Surgery (AATS)
- American Society of Anesthesiologists
- Eastern Cardiothoracic Surgeons Society
- Heart Valve Society Scientific Meeting
- Society of Cardiovascular Anesthesiologists (SCA)
- Society of Thoracic Surgeons (STS)
- STS Advances in Quality & Outcomes (STS AQO)
- Southern Thoracic Society Association (STSA)

Journals

- Aorta
- Anesthesia & Analgesia
- Annals of Thoracic Surgery
- Cardiothoracic Vascular Anesthesia
- General Thoracic and Cardiovascular Surgery
- Innovations
- Journal of Cardiac Surgery
- Journal of Cardiothoracic and Vascular Anesthesia
- Journal of Hospital Administration
- The Journal of Thoracic and Cardiovascular Surgery
- The Journal of Thoracic and Cardiovascular Surgery Open

IMPROVE Network

In 2017, MCSQI joined the IMPROVE Network, a consortium of six regional collaboratives whose mission is to improve the value of cardiovascular surgical care by developing, sharing best practice knowledge, coordinating, undertaking, evaluating, and disseminating quality improvement projects across our member organizations. At the STS 56th Annual Meeting, "Evaluating the Role of Failure to Rescue on Mortality after Cardiac Surgery - A National Experience" won the Maxwell Chamberlain Memorial Paper Award!

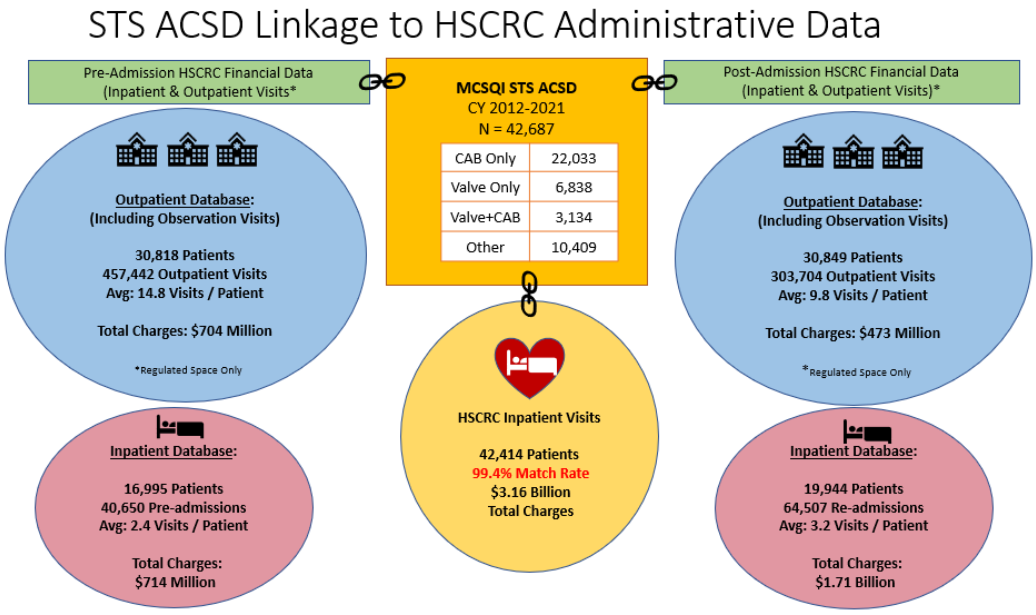
MCSQI has collaborated with IMPROVE on several research projects. Over 80,000 patients are included in the study populations, displaying the statistical power of the group's projects. This provides an opportunity for MCSQI to benchmark outcomes among other hospitals participating in quality improvement networks.

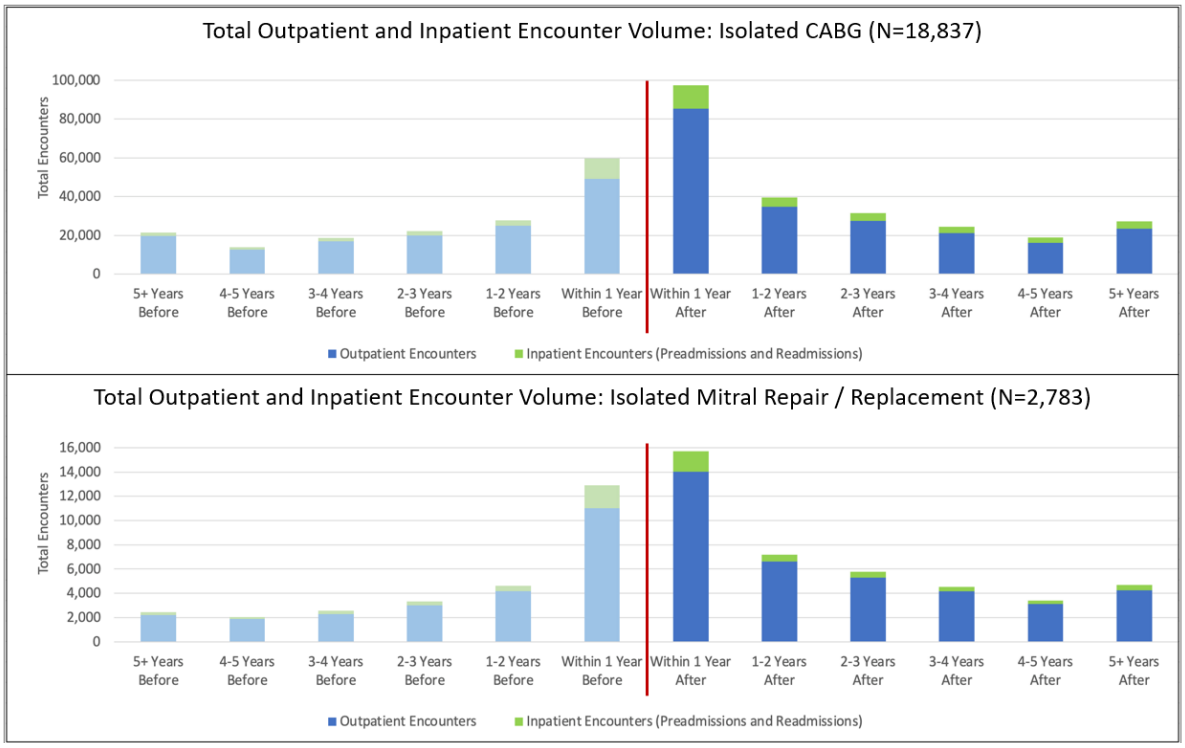
The IMPROVE Network Collaborative Projects:

- Increasing BMI on Morbidity and Mortality in CABG/Valve Repair or Replacement
- Interhospital Variability in Failure to Rescue Rates following Aortic Valve Surgery
- Inter-hospital failure to Rescue after Coronary Artery Bypass Grafting
- Comparison of Statistical Methods for Hospital Performance Assessment
- A Multicenter Study of Operating Room Extubation and Extubation Timing following Cardiac Surgery

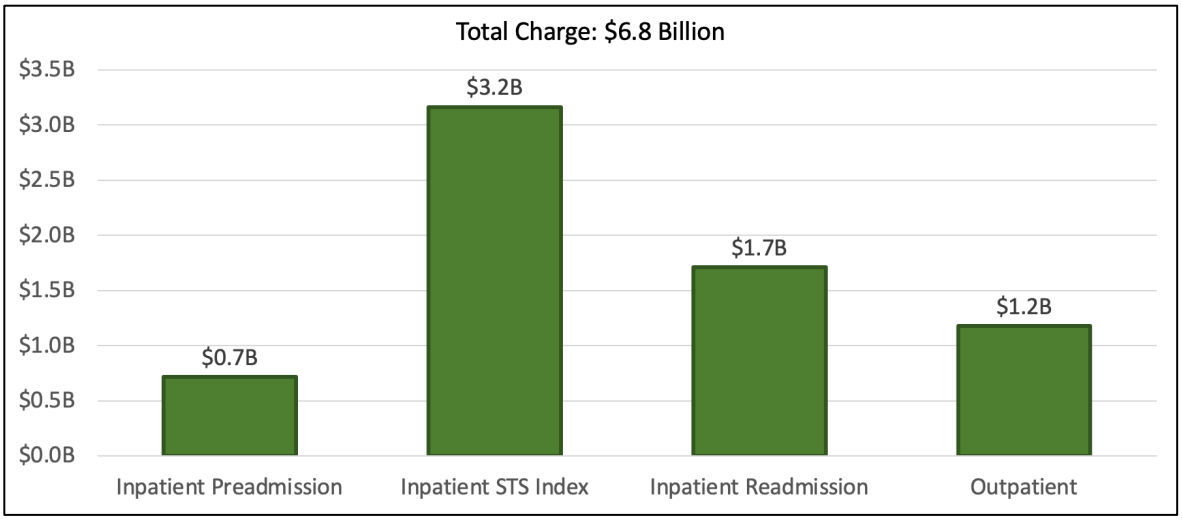
MCSQI Data Warehouse

The MCSQI data warehouse has expanded to include HSCRC Administrative & Financial Data that supports longitudinal analysis of resource utilization in regulated space. There were 42,687 surgeries captured in the STS ACSD with a HSCRC surgical inpatient admission record match rate of 99.4%! Longitudinal inpatient and outpatient visit match rates were 91% and 95% respectively.





Inpatient and Outpatient Visit Encounters Pre- and Post-Cardiac Surgery Operation, 2012-2021.



The financial impact of cardiac surgical patients among the MCSQI Hospitals in HSCRC regulated space, which includes all charges for visits directly related and indirectly related to the index STS operation.

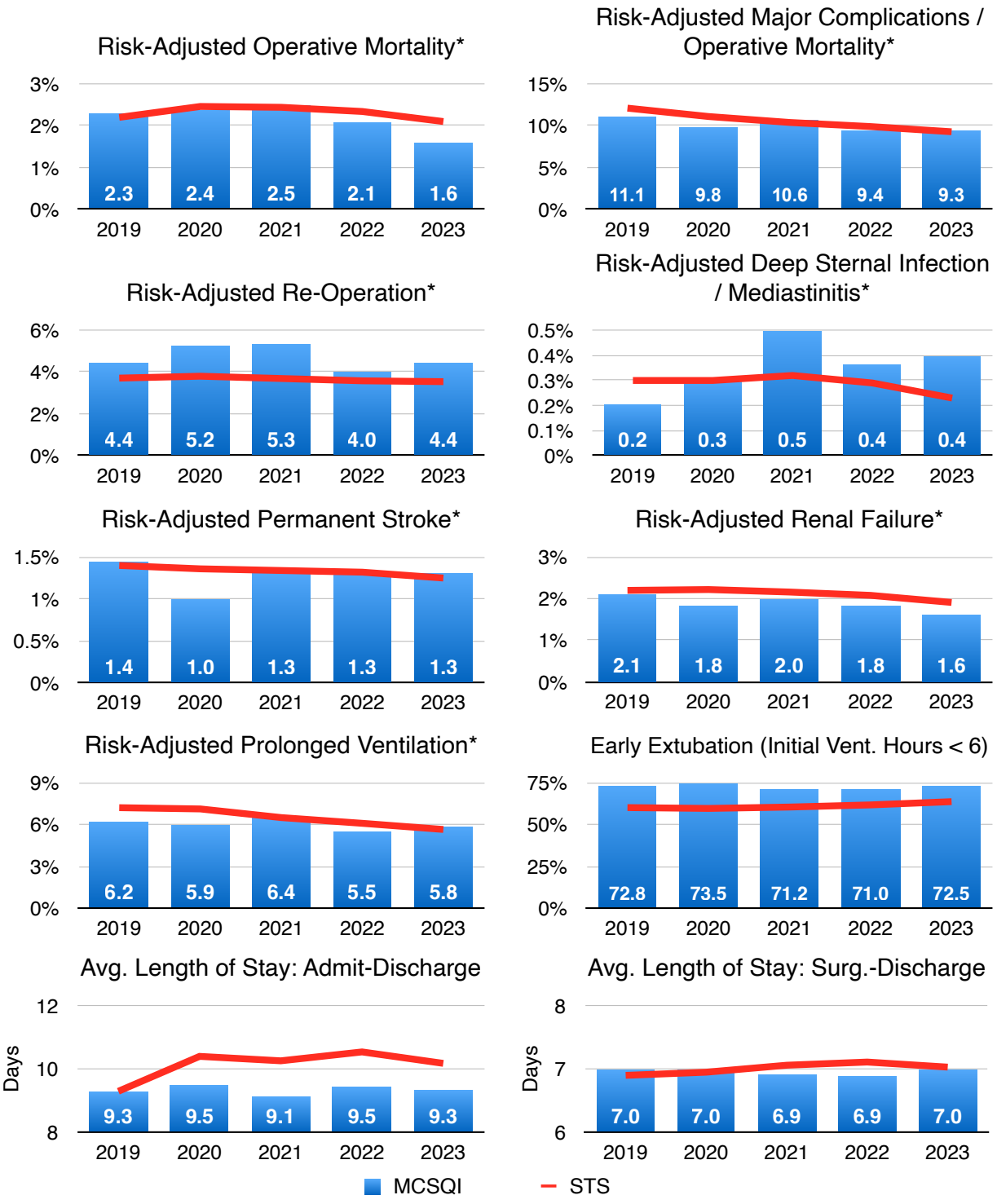
Data Manager Committee

MCSQI's STS Data Manager Committee, co-chaired by Elizabeth Passano, MS of Luminis Health Anne Arundel Medical Center, and Dawn Roach of University of Maryland St. Joseph Medical Center, serves as the backbone of the organization. The data managers share vital details related to data abstraction with their internal teams, which allows for more accurate and consistent data collection. Collaboration amongst the group is instrumental in ensuring that data is collected with the same understanding of STS definitions. MCSQI Data Managers also interface with counterparts nationally and serve alongside surgeons on various committees within the organization. MCSQI Data Managers presented eight posters at the STS Advances in Quality and Outcomes (AQO) Conference from 2015 to 2022 with a 100% abstract acceptance rate!

2023 Highlights

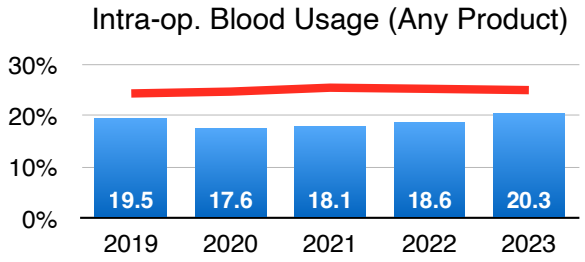
- Data Manager Workshop
- Quarterly STS Regional Call participation
- Networking Dinner
- Educational Preference Survey

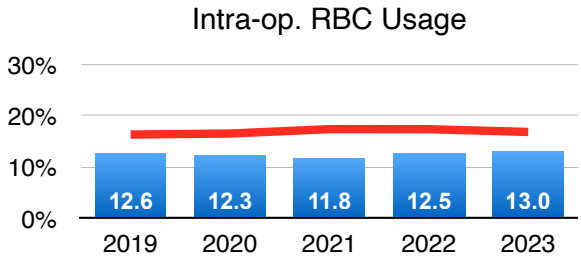
Clinical Quality Indicators – Isolated CABG

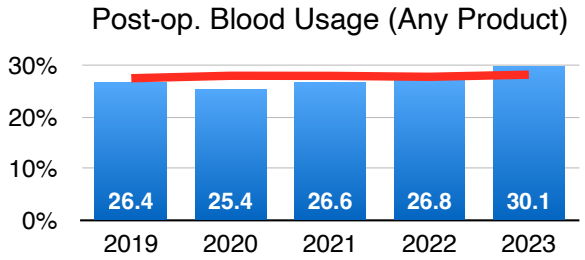


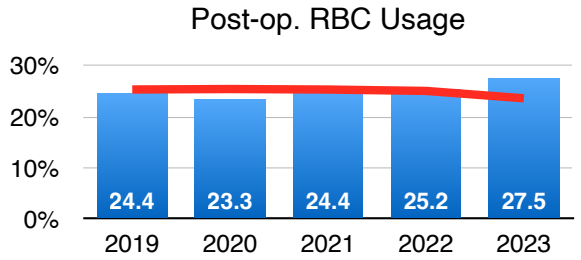
*__STS Risk-adjusted Rates__. These calculations involve two steps: 1) Calculation of the O/E ratio, which divides the percentage of an observed morbidity by the rate predicted by the STS risk calculator, and 2) Multiplication of the O/E ratio by the STS national rate of the observed morbidity. All O/E ratios apply STS Recalibration coefficients, which normalize the national benchmark value to exactly 1.0. All Risk-adjusted Rates apply Recalibration coefficients from the CY 2018 STS report.

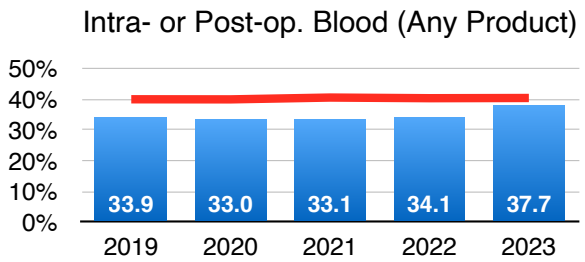
Clinical Quality Indicators – Isolated CABG

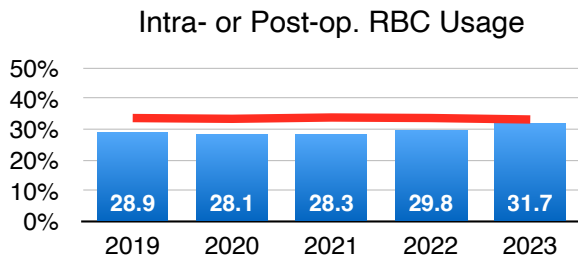


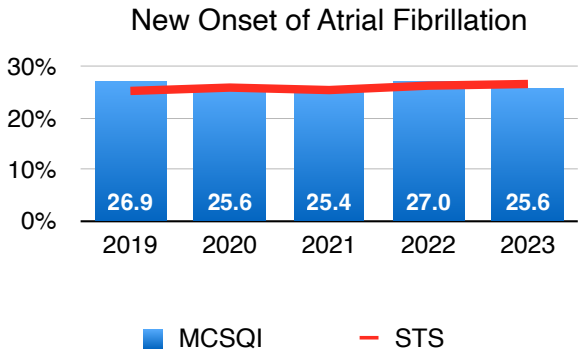












National Quality Forum Measures

Calendar Year 2023 Isolated CABG Procedures (unless otherwise indicated)		MCSQI 2023	STS 2022*
Procedure Volume	Isolated CABG	2,033 (54.7%)	155,923 (54.8%)
	Isolated Valve	578 (15.5%)	40,384 (14.2%)
	CABG + Valve	181 (4.9%)	19,378 (6.8%)
	Other	928 (24.9%)	68,827 (24.2%)
Pre-Operative	Timing of Antibiotic Administration	99.4%	97.4%
	Selection of Antibiotic Administration	99.9%	98.1%
	Antibiotics Discontinued	99.0%	97.3%
	Pre-operative Beta Blockers	98.2%	96.6%
Operative	Use of Internal Mammary Artery	99.7%	99.6%
Complications**	Risk-Adjusted Prolonged Ventilation	5.8%	6.1%
	Risk-Adjusted Deep Sternal Infection	0.4%	0.3%
	Risk-Adjusted Permanent Stroke	1.3%	1.3%
	Risk-Adjusted Renal Failure	1.6%	2.1%
	Risk-Adjusted Cardiac-Related Re-Operation	3.1%	2.5%
Discharge	Anti-Platelets	99.6%	97.8%
	Beta Blockers	99.6%	99.2%
	Anti-Lipids	99.1%	99.2%
Mortality**	Risk-Adjusted Inpatient Mortality: Isolated CABG	1.5%	1.8%
	Risk-Adjusted Operative Mortality: Isolated CABG	1.6%	2.3%
	Risk-Adjusted Operative Mortality: AV Replacement	2.1%	2.2%
	Risk-Adjusted Operative Mortality: AV Replacement + CABG	7.6%	4.2%
	Risk-Adjusted Operative Mortality: MV Replacement	4.7%	5.3%
	Risk-Adjusted Operative Mortality: MV Replacement + CABG	7.0%	11.3%
	Risk-Adjusted Operative Mortality: MV Repair	0.6%	1.1%
	Risk-Adjusted Operative Mortality: MV Repair + CABG	4.2%	6.5%
Readmissions	30-Day Readmission Rate: Isolated CABG	8.0%	9.1%

* STS Calendar Year 2023 data was not available when this MCSQI Annual Report was published.

** MCSQI Risk-Adjusted Rates are not statistically significantly different from STS National Rates.

STS Metric Specifications

Operative Mortality O/E*: Any death during patient hospitalization or within 30 days of surgery	**Inpatient Mortality O/E***: Any death during patient hospitalization
Prolonged Ventilation O/E*: Post-operative pulmonary ventilation greater than 24 hours	**Permanent Stroke O/E***: Post-operative stroke that did not resolve within 24 hours
Renal Failure O/E*: Increase in post-operative serum creatinine greater than 3 times baseline, serum creatinine greater or equal to 4 mg/dL, or new requirement for dialysis post-operatively	**Mediastinitis O/E***: Any post-operative deep sternal wound infection or mediastinitis during patient hospitalization or within 30 days of surgery
Re-Operation O/E*: Return to the operating room for bleeding, valve dysfunction, graft occlusion, aortic intervention, or other cardiac reasons (the NQF definition does not include 'other non-cardiac reasons')	**Morbidity/Mortality O/E***: Any patient incurring operative mortality or any of the five major STS morbidities
Readmissions within 30 Days: Any patient who was readmitted for inpatient stay at an acute care facility within 30 days of discharge	**Re-Operation for Bleeding**: Re-exploration for mediastinal bleeding either in the ICU or return to operating room
Length of Stay (LOS) Admit-Discharge: Total number of days from patient admission to discharge	**Length of Stay (LOS) Surgery-Discharge**: Total number of days from surgery to discharge
Post-Operative Ventilation Time: Total amount of time from operating room exit to initial extubation, plus any additional time spent on pulmonary ventilation	**Early Extubation**: Initial Ventilation Hours less than 6, including patients who were extubated in the operating room
Intra-Operative Blood Products: Any patient who was transfused any time intra-operatively during the initial surgery.	**Post-Operative Blood Products**: Any patient who was transfused any time post-operatively
New Onset of Atrial Fibrillation: Any patient with post-operative Atrial Fibrillation; excludes patients with pre-operative history of atrial fibrillation or arrhythmia.	***The Observed-to-Expected Ratio (O/E)**: These calculations divide the percentage of an observed morbidity by the rate predicted by the STS risk calculator. All O/E ratios apply STS Recalibration coefficients, which normalize the national benchmark value to exactly 1.0.

Posters, Manuscripts and Presentations

Posters

Skeletonization Mitigates Risk of Deep Sternal Wound Infection in Patients with Diabetes Undergoing CABG with Bilateral Internal Mammary Arterial Grafting
American Heart Association Scientific Sessions Meeting, 2023

Failure-to-Rescue in Valve Surgery: An Analysis of the Improve Network
American Association of Thoracic Surgery (AATS) Annual Meeting, 2023

Maryland Capitated Payment Reform: Cost Savings or Cost Shifting?
Society of Thoracic Surgeons (STS) 58th Annual Meeting, 2023

The Impact of Institutional Clinical Practice and Culture on Red Blood Cell Transfusion in Patients Undergoing CABG: A Statewide Analysis
Society of Thoracic Surgeons (STS) 58th Annual Meeting, 2023

Comparison of Surgeon Survey Responses with Actual Multiple Arterial Graft Use in Patients Undergoing Coronary Artery Bypass Grafting in a Statewide Quality Database Collaborative. *Society of Thoracic Surgeons Annual Meeting, 2022*

Strategies for optimizing STS Data Quality and Efficiency – A Statewide Assessment
Society of Thoracic Surgeons Advances in Quality and Outcomes, 2021

Multiple Arterial Grafts in Coronary Artery Bypass Surgery: Variation in Practice & Outcomes. *Society of Thoracic Surgeons Advances in Quality and Outcomes, 2020*

The Value and Impact of A Statewide Quality Collaborative
Society of Thoracic Surgeons Advances in Quality and Outcomes, 2019

Complementing Society of Thoracic Surgeons (STS) Adult Registry Data with Financial Data – A First Pass
Society of Thoracic Surgeons Advances in Quality and Outcomes, 2019

Predictors of Operative Mortality in Cardiac Surgery Patients with Prolonged Ventilation. *American College of Surgeons Clinical Congress, 2018*

Government Based Insurance is Associated with Fewer Arterial Conduits in CABG
American College of Surgeons Clinical Congress, 2018

Contemporary Outcomes Comparing Mitral Valve Repair and Replacement in the Elderly in a Statewide Registry. *Heart Valve Society Scientific Meeting, 2018*

Off-pump Coronary Artery Bypass in Octogenarians: Results of a Statewide, Matched Comparison. *Society of Thoracic Surgeons Annual Meeting, 2018*

Variations in Perfusion Practice during Adult Cardiac Surgery: A Statewide Survey
Eastern Cardiothoracic Surgical Society (ECTSS) Annual Meeting, 2017

Sternal Wound Care Practices in Maryland Cardiac Surgery Programs
Society of Thoracic Surgeons Advances in Quality and Outcomes Meeting, 2017

STS Data Managers & Surgeons Enhancing Quality Measurement – Statewide Review of Reasons for Prolonged Ventilation
Society of Thoracic Surgeons Advances in Quality and Outcomes Meeting, 2016

Posters, Manuscripts and Presentations

Are Surgeons Discussing STS Predicted Risk Scores? A Look across Maryland Hospitals. *Society of Thoracic Surgeons Advances in Quality and Outcomes Meeting, 2016*

The Maryland Cardiac Surgery Quality Initiative: Collaborating to Improve Outcomes Statewide
Society of Thoracic Surgeons Advances in Quality and Outcomes Meeting, 2015

Manuscripts

Interhospital Variability in Failure to Rescue Rates Following Aortic Valve Surgery
Journal of Thoracic and Cardiovascular Surgery Open, 2023

Unexpected Impact of Preoperative Anemia in Low-Risk Isolated CABG or Single Valve Surgical Patients: Do Not Overlook These Patients in Management!
Journal of Thoracic and Cardiovascular Surgery, 2023

Institutional Variability in Red Blood Cell Transfusion with Coronary Bypass in a Statewide Database. *Annals of Thoracic Surgery, 2023*

Statewide Data on Surgical Ablation for Atrial Fibrillation: The Data Provide a Path Forward. *Journal of Thoracic and Cardiovascular Surgery, 2023*

Multiple Arterial Graft Use in Coronary Artery Bypass Surgery: Surgeon Perspective vs Practice. *Journal of Thoracic and Cardiovascular Surgery, 2023*

Hospital variability in modifiable factors driving coronary artery bypass charges
Journal of Thoracic and Cardiovascular Surgery, 2023

Impact of Preoperative Hematocrit, Body Mass Index and Red Cell Mass on Allogeneic Blood Product Usage in Adult Cardiac Surgical Patients: Report from a Statewide Quality Initiative. *Journal of Cardiothoracic Vascular Anesthesia, 2023*

Interhospital Failure to Rescue after Coronary Artery Bypass Grafting
Journal of Thoracic and Cardiovascular Surgery, 2023

Center Variation in Use of Preoperative Dual Antiplatelet Therapy and Platelet Function Testing at the Time of Coronary Artery Bypass Grafting in Maryland.
Anesthesia Analgesia, 2022

Number and Type of Blood Products are Negatively Associated with Outcomes Following Cardiac Surgery. *Annals of Thoracic Surgery, 2022*

A Comparison of Statistical Methods for Hospital Performance Assessment.
Journal of Hospital Administration, 2021

Interhospital Failure to Rescue after Coronary Artery Bypass Grafting
Journal of Thoracic and Cardiovascular Surgery, 2021

Clinical Practice Variation and Outcomes for Stanford Type A Aortic Dissection Repair Surgery in Maryland: Report from a Statewide Quality Initiative
Aorta (Stamford), 2020

Racial Disparity in Cardiac Surgery Risk and Outcome: Report From a Statewide Quality Initiative. *Annals of Thoracic Surgery, 2020*

Mitigating the Risk: Transfusion or Reoperation for Bleeding After Cardiac Surgery
Annals of Thoracic Surgery, 2020

Posters, Manuscripts and Presentations

Predictors of Operative Mortality Among Cardiac Surgery Patients with Prolonged Ventilation. *Journal of Cardiac Surgery, 2019*

Variation in Platelet Transfusion Practices in Cardiac Surgery. *Innovations, 2019*

Off-Pump Coronary Artery Bypass in Octogenarians: Results of a Statewide, Matched Comparison. *General Thoracic and Cardiovascular Surgery, 2019*

Bilateral Internal Mammary Artery Use in Diabetic Patients: Friend or Foe?
Annals of Thoracic Surgery, 2018

Less is More: Results of a Statewide Analysis of the Impact of Blood Transfusion on CABG Outcomes. *Annals of Thoracic Surgery, 2018*

Variation in Red Blood Cell Transfusion Practices During Cardiac Surgery Among Centers in Maryland: Results from A State Quality Improvement Collaborative
Annals of Thoracic Surgery, 2017

Podium Presentations

Safety and Efficacy of Internal Thoracic Artery Use in CABG Patients with Prior Mediastinal Irradiation: A Propensity-matched Analysis of a Statewide Database
American Association of Thoracic Surgery (AATS) 104th Annual Meeting 2024

Statewide Matching of the Society of Thoracic Surgeons Adult Cardiac Surgery Database (ACSD) and Unique Administrative Data Provide Detailed Information on Cardiac Surgery Outcomes and Utilization
Society of Thoracic Surgeons (STS) 60th Annual Meeting, 2024

Association of Lower Discharge Hemoglobin Levels on 30-Day Readmission in Cardiac Surgery: A Statewide Analysis
Society of Cardiovascular Anesthesiologists Annual Meeting, 2023

Statewide Data on Surgical Ablation for Atrial Fibrillation: The Data Provide a Path Forward. *American Association of Thoracic Surgery (AATS) 103rd Annual Meeting, 2023*

Unexpected Impact of Preoperative Anemia in Low-Risk Isolated CABG or Single Valve Surgical Patients: Do Not Overlook These Patients in Anemia Management
American Association of Thoracic Surgery (AATS) 103rd Annual Meeting 2023

Extubation in the Operating Room following Cardiac Surgery – Not so Fast
Society of Thoracic Surgeons (STS) 59th Annual Meeting, 2023

Association between Cerebral Oximetry Use and Perioperative Stroke in Patients Having Cardiac Surgery with CPB
American Society of Anesthesiologists Annual Meeting, 2021

Dual Antiplatelet Therapy at Discharge is Safe after Acute Myocardial Infarction Treated with Coronary Artery Bypass Grafting Yet Practice Variation Exists Within a Statewide Quality Collaborative
Society of Thoracic Surgeons (STS) 55th Annual Meeting, 2020

Posters, Manuscripts and Presentations

Evaluating the Role of Failure to Rescue on Mortality after Cardiac Surgery - A National Experience (Maxwell Chamberlain Memorial Paper Award: IMPROVE Network). *Society of Thoracic Surgeons (STS) 55th Annual Meeting, 2020*

A Maryland Cardiac Surgery Statewide Analysis of the Impact of Extubation in the Operating Room Following Routine Cardiac Surgery
Society of Thoracic Surgeons (STS) 55th Annual Meeting, 2020

Modifiable Inter-Hospital Cost Variability in Coronary Artery Bypass Surgery.
Eastern Cardiothoracic Surgical Society (ECTSS) 57th Annual Meeting, 2019

Does the Number and Type of Blood Products Transfused Negatively Impact Patient Outcomes Following Open Heart Surgery?
American Association of Thoracic Surgery (AATS) Annual Meeting, 2019

Racial Disparity in Cardiac Surgery Risk and Outcome: Report From a Statewide Quality Initiative
American Association of Thoracic Surgery (AATS) Annual Meeting, 2019

Center-specific Variation in Use of Dual Antiplatelet Therapy Prior to Coronary Surgery: An Outcome Analysis from the Maryland Cardiac Surgery Quality Initiative. *American Heart Association (AHA) Quality of Care and Outcomes Research Scientific Sessions, 2019*

Mitigating the Risk: Transfusion or Reoperation for Bleeding After Cardiac Surgery
Society of Thoracic Surgeons (STS) 55th Annual Meeting, 2019

Blood Utilization: Tale of Two Metrics – Improvement and Variability
Society of Thoracic Surgeons (STS) 55th Annual Meeting, 2019

Recent Antiplatelet Therapy Does Not Affect Short Term Outcomes Following Non-CABG Cardiac Surgery
Southern Thoracic Surgical Association (STSA) 65th Annual Meeting, 2018

Bilateral Internal Mammary Artery Utilization in Diabetics: Friend or Foe?
Society of Thoracic Surgeon (STS) 54th Annual Meeting, 2018

Variation in Platelet Transfusion Practices During Cardiac Operations Among Centers in Maryland: Results from a State Quality-Improvement Collaborative
Society of Thoracic Surgeon (STS) 54th Annual Meeting, 2018

MCSQI Committee Leadership

Hospitals

Adventist HealthCare White Oak Medical Center
Johns Hopkins Hospital
Luminis Health Anne Arundel Medical Center
MedStar Union Memorial Hospital
Sinai Hospital
Suburban Hospital
TidalHealth Peninsula Regional
University of Maryland Capital Region Health
University of Maryland St. Joseph Medical Center
University of Maryland Medical Center
University of Pittsburgh Medical Center Western Maryland

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Christa Kampert, CCP	UM St. Joseph Medical Center
Terri Haber, MPH	MCSQI

MCSQI Leadership and guest speakers at the MCSQI Spring 2023 Bi-Annual Meeting

Dr. Brad Taylor presents at the MCSQI Fall 2023 Bi-Annual Meeting

Resources and Affiliates

RESOURCES:	
MCSQI Website	https://mcsqi.org
Maryland Health Care Commission (MHCC)	https://mhcc.maryland.gov
MHCC Quality Reports	https://healthcarequality.mhcc.maryland.gov
Maryland Health Services Cost Review Commission (HSCRC)	http://www.hscrc.state.md.us
Society of Thoracic Surgeons (STS)	https://www.sts.org
STS Public Reporting	https://publicreporting.sts.org/acsd
National Quality Forum (NQF)	http://www.qualityforum.org

AFFILIATES:	
ARMUS by HealthCatalyst ARMUS LLC by Health Catalyst	https://www.armus.com
IMPROVE Network	http://www.improvenetwork.org
VCSQI Virginal Cardiac Services Quality Initiative	http://vcsqi.org
PERFECTCARE	http://perfectcare.org

MCSQI Member Hospitals

Adventist HealthCare White Oak Medical Center

SINAI HOSPITAL A LifeBridge Health Center

JOHNS HOPKINS MEDICINE THE JOHNS HOPKINS HOSPITAL

Luminis Health

MedStar Union Memorial Hospital

TidalHealth Peninsula Regional

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UPMC | WESTERN MARYLAND

UNIVERSITY of MARYLAND MEDICAL CENTER

UNIVERSITY of MARYLAND CAPITAL REGION HEALTH

UNIVERSITY of MARYLAND ST. JOSEPH MEDICAL CENTER

Testimonials

"The MCSQI has demonstrated that by working together on important clinical questions we can improve important quality metrics in the care of Maryland Cardiac Surgery patients and by rotating the leadership positions we can make sure that all of our state cardiac surgery programs are well represented and empowered to participate."

~ John V. Conte, MD, Co-founder MCSQI

"The MCSQI state collaborative has been a successful collaboration of all the cardiac surgery centers in Maryland and is taking quality of care for cardiac surgery patients to an even higher level. The multidisciplinary interaction provides resources, networking, and sharing of best practices and ideas that has already demonstrated positive outcomes and has set the basis for future quality initiatives in cardiac surgery."

~ Chrissy Ruhl, UPMC Western Maryland

"It is gratifying to see Maryland's cardiac surgery programs working together to improve services for cardiac surgery patients. MCSQI's collaborative efforts bode well for future patients."

~ Eileen Fleck, Maryland Health Care Commission

"In this day and age with so much confrontation and dissension, it is comforting to note that the Maryland Cardiac Surgery Quality Initiative stands for just the opposite. Through the sharing of experience and data, collegiality and cooperation, MCSQI has a vision to improve the care that this state gives its cardiac patients. There are not many collaboratives throughout the country like this, and Maryland can count itself among those few that recognize the importance of this kind of united effort, where the only thing that matters is one common goal, better treatment for our patients."

~ Dr. Glenn Whitman, Johns Hopkins Hospital

"Following the pioneering efforts of Dr. Alfred Blalock at Johns Hopkins Hospital in the 1940's and Dr. Joseph McLaughlin at University of Maryland in the 1970's, the development of the Maryland Cardiac Surgery Quality Initiative (MCSQI) is probably the single most important advancement in the history of organization of cardiovascular medicine in the state of Maryland. The future of cardiac surgery in Maryland is dependent on statewide hospital and physician collaboration and sharing of "best practices."

~ Dr. Kurt Wehberg, Peninsula Medical Regional Center

"MCSQI provides the framework for an ongoing unprecedented level of collaboration between cardiac surgery programs in Maryland. By learning from experiences at other high-quality programs, UM Saint Joseph Medical Center has been able to augment our own quality initiatives, and ultimately improve care for our patients."

~ Dr. Rawn Salenger, University of Maryland St. Joseph Medical Center

"The MCSQI state collaborative has been a great source of clinical collaboration for our newly launched Cardiac Surgery Program at Luminis Health, helping ensure the absolute highest quality of cardiac care to our community! The sharing of best practices, innovative ideas and networking is so supportive and so beneficial to the future of the quality of cardiac surgery care in Maryland, we are grateful to be a part of this amazing group!"

~ Wendy Penny MBA, BSN, RN, NE-BC, Associate Chief Nursing Officer, Luminis Health Anne Arundel Medical Center