Building The Foundation of a Great Cardiac Program Using Registries to Initiate and Sustain Improvement

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Ann Arbor, Michigan

April 30th, 2018
Disclosures:
Richard L. Prager, MD

I have nothing pertinent to disclose.
OVERVIEW

- **Data Source**
  - STS
  - MSTCVS: Quality Collaborative Meetings
  - Site specific data

- **Sociology**
  - Using ‘registries’
  - Peer Influence: An individual alters attitudes or behaviors in response to another.
  - Revelation

- **Messaging at “home”**
  - Feedback
  - Ownership

- **Performance Improvement**
It Is Time for a National Cardiothoracic Surgical Data Base

Richard E. Clark, MD
Surgery Branch, National Heart, Lung, and Blood Institute, Bethesda, Maryland

The Society of Thoracic Surgeons will soon sponsor an opportunity for its members to participate in a national clinical data base system for cardiac and thoracic operations and outcome. This effort by the STS to establish a national data base is more than 5 years old. An ad hoc committee initiated a pilot program that, unfortunately, did not evolve to national scope. The development of small portable computers that were fast and interactive and had large storage capabilities has made possible the formation of many local data bases for cardiac surgery. The time is now ripe for those with existing data bases and those who have none at present to participate in this national effort.

The reasons for the initiation of this program by the STS are many. The formation of a group to undertake the effort was prompted by the release by HCFA (Health Care Financing Administration), a component of the Department of Health and Human Services, of raw mortality data for Medicare patients undergoing coronary artery bypass grafting procedures without respect to any of the then-known risk factors associated with patients during coronary artery disease.

The Standards and Ethics Committee of the STS released its “Statement of Concern” with approval of Council late in 1986, which was well received by practitioners and hospitals. The Standards and Ethics Committee at the Toronto meeting of the STS in September of 1987 developed a proposal for the Council for the development of a national data base system sponsored by the STS.

The pressing need was clearly evident from a number of artery operations carried little or no risk was perpetuated. A third driving force was the action of the JCAHCO (Joint Commission on Accreditation of Health Care Organizations). Quality assurance programs for every segment of the health care system were required. Recredentialing on a yearly basis was to occur based on the previous year's clinical performance by the practitioner. Clearly, results of the surgeries were going to be readily evident in contrast to those of psychiatrists. Finally, Congress required of HCFA and a suborganization, the PPRC (Physicians Payment Review Commission), a complete study and review of physicians' billings and payments under the Medicare system with the requirement of reporting the results in late 1989 and early 1990. The purpose was to decrease the rate of increase in health care costs, which have been substantially exceeding the inflationary rate for more than a decade. The initial report by the investigator (Hsiao) to the HCFA recommended a rearrangement of payment schemes with greater weight given to so-called cognitive skills than to technical ones. Cardiothoracic surgeons were to receive a reduction in payments of 25% to 30%.

The need, therefore, to determine accurately the amount of services provided in toto by the cardiothoracic community had become acute.

Edmunds and Kaiser, in their preface to the report of the Committee for the state of the art symposium on coronary arterial surgery, made a pertinent strong plea.

Proper solution to the risk-benefit equation requires knowledge of the natural history of the disease and of the incremental risk factors that affect operative mortality and long-
The initial stimulus for developing The Society of Thoracic Surgeons (STS) National Database came in 1986 when the Health Care Financing Administration (HCFA) publicly reported hospital mortality using mini-

“The Society is committed to the principle of providing the public with accurate information regarding the conduct of coronary artery surgery. However, it believes that the data provided by HCFA do not provide this information and should not be used as the sole index of quality of care following coronary artery bypass surgery.” [1]

Shortly after that report, Richard E. Clark, MD (Fig 1), was appointed Chair of a newly formed Ad Hoc Committee to Develop a National Database for Thoracic Surgery [2].
STS National Database

- Adult Cardiac Surgery
- Congenital
- General Thoracic
- Intermacs
- Anesthesia Module
  - 64 Participants

Measurement to be used for improvement

STS-ACC-TVT Registry
Evolution of the STS Adult Cardiac Surgery Database
1989 - 2018
**THE SOCIETY OF THORACIC SURGEONS**

**NATIONAL CARDIAC SURGERY DATABASE**

**DATA COLLECTION FORM**

### Demographics

- **Patient Name (Last, First, M.):**
- **Member Number:** 
- **Address:**
  - **City:**
  - **State:**
  - **Zip:**
- **Telephone:**
  - **Social Security Number:**

### Hospital

- **Institution:**
- **Affiliation:**
- **State:**
- **City:**

### Insurance

- **Medicare**
- **Medicaid**
- **Private/Corporate**
- **CHAMPUS**
- **Uninsured**

### Patient History

- **Dates:**
  - **Admission:**
  - **Discharge:**
  - **Same Day Admit:**
  - **Surgery:**
  - **Same Day Elective Admission:**

- **Patient's Age:**
  - **Sex:**
  - **Race:**
    - **Caucasian**
    - **Black**
    - **Hispanic**
    - **Asian**
    - **Native American**
    - **Other**

- **Patient's Contact Information:**
  - **City:**
  - **Telephone:**

- **Physicians' Information:**
  - **Referring Physician:**
  - **Attending Physician:**
  - **Resident:**

### Previous CV Intervention

- **Vascular Access:**
  - **CABG:**
  - **VAD:**
  - **Aortic:**
  - **Other:**

- **Cardiac Anesthesia:**
  - **Cardiac TX:**
  - **Cardiac TX:**

- **Other Non-Cardiac:**
  - **Anesthetist:**
  - **Other:**

### Risk Factors

- **Smoking:**
- **Family History of CAD:**
- **Obesity:**
- **Hypertension:**
- **Diabetes:**
- **Dyslipidemia:**
- **Hypothyroidism:**
- **Pulmonary Hypertension:**
- **Cerebrovascular Accident:**
- **Recent (< 2 wks):**
- **Remote (> 2 wks):**
- **Hemorrhagic Stroke:**
- **Cardiomyopathy:**
- **DCOR:**
- **Immune/Immunosuppressive:**
- **Peripheral Vascular Disease:**
- **Cerebrovascular Disease:**
- **Cardiovascular Disease:**

### Responsible for Procedure

- **Surgeon:**
  - **Assistant Surgeon:**
  - **Resident:**

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Vista Cardiac Surgery Data Collection Form
### A. Administrative

| Participant ID:  
| --- |

### B. Demographics

| Patient Medical Record Number:  
| --- |
| Last Name:  
| First:  
| MI:  
| Date of Birth:  
| Gender: Male / Female  
| Race: Caucasian / Black / Hispanic / Asian / Native American / Other  
| Social Security (or National ID) Number:  
| ZIP or Postal Code:  
| Referring Cardiologist’s Name:  
| Referring Physician’s Name:  

### C. Hospitalization

| Hospital Name:  
| Primary Payor:  
| Same Day Elective Admission: No / Yes  
| Date of Admission:  
| Surgery:  
| Discharge:  

### D. Pre-Operative Risk Factors

| Weight (kg):  
| Height (cm):  
| Smoker: No / Yes  
| Current Smoker: No / Yes  
| Family History of CAD: No / Yes  
| Diabetes: No / Yes  
| Diabetes Control: None / Diet / Oral / Insulin  
| Hypertension: No / Yes  
| Renal Failure: No / Yes  
| Dialysis: No / Yes  
| Last Creatinine Level:  
| Hypertension: No / Yes  
| Congestive Heart Failure: No / Yes  
| Coronary Artery Disease: No / Yes  
| Invasive Endocarditis: No / Yes  
| Chronic Lung Disease: No / Yes  
| Immune Suppressive Treatment: No / Yes  
| Peripheral Vascular Disease: No / Yes  
| Cardiovascular Disease: No / Yes  

### E. Previous Interventions

| Previous CV Interventions: No / Yes  
| # of Prior Cardiac Operations:  
| Requiring Cardiopulmonary Bypass:  
| Without Cardiopulmonary Bypass:  
| Previous Surgery - Coronary Artery Bypass: No / Yes  
| Value: No / Yes  
| Prior PTCA/Coronary Angioplasty: No / Yes  
| Value: No / Yes  
| Prior PVA/Coronary Angioplasty: No / Yes  

1999 The Society of Thoracic Surgeons  
Cardiac Surgery Data Collection Form (data dictionary Version 2.35)
The Society of Thoracic Surgeons
Adult Cardiac Surgery Database
Data Collection Form
Version 2.41

A. Administrative

Participant ID: [ ]
Cost Link Field: [ ] Optional
STS Total Link Number: [ ] Optional

B. Demographics

Patient Medical Record Number: [ ] Optional
Sex: Male/Female
Race: Caucasian/Black/Asian/Other
Social Security or National ID Number: [ ] Optional
ZIP or Postal Code: [ ] Optional
Referring Cardiologist's Name: [ ] Optional
Referring Physician's Name: [ ] Optional

C. Hospitalization

Hospital Name: [ ] Optional
Primary Physician: [ ] Optional
Date of Admission: [ ] Optional
Date of Surgery: [ ] Optional
Date of Discharge: [ ] Optional
Same Day Elective Admission: No/Yes
Initial ICU Hours: [ ] Optional
Readmit to ICU: Yes/No
Additional ICU Hours: [ ] Optional
Total Hours in ICU: [ ] Optional

D. Pre-Operative Risk Factors

Weight (kg): [ ]
Height (cm): [ ]
Smoker: Current/Former/No
Family History of CAD: No/Yes
Diabetes: No/Yes
Hypertension: No/Yes
Renal Failure: No/Yes
Hypothyroidism: No/Yes
Liver Disease: No/Yes
Chronic Lung Disease: No/Yes
Immunosuppressive Treatment: No/Yes
Peripheral Vascular Disease: No/Yes
Carotid Artery Disease: No/Yes

E. Previous Interventions

Previous CAVI Interventions: No/Yes
For Prior Cardiac Operations Without Cardiopulmonary Bypass:

Previous Surgery:

Coronary Artery Bypass: No/Yes
Valve: No/Yes
Previous Other Cardiac: No/Yes
Prior PTCA including Balloon and/or Atherectomy: No/Yes

Created November 2001
Page 1 of 4 © Society of Thoracic Surgeons 2001
## A. Administrative

- Participant ID: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Record ID: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Cost Link Field: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- STS Total Link Number: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Patient ID: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]

## B. Demographics

- Last Name: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- First Name: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Patient M.I.: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Name Fields Not Harvested: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Date of Birth: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Patient Age: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- System Calculation: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Gender: Male [ ] Female [ ]
- Social Security (or National Patient ID) Number: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
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- Medical Record Number: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Not Harvested: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Patient ZIP or Postal Code: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Race: Caucasian [ ] Black [ ] Hispanic [ ] Asian [ ] Native American [ ] Other [ ]
- Not Harvested: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Referring Cardiologist’s Name: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Not Harvested: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Referring Physician’s Name: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
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## C. Hospitalization

- Hospital Name: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Hospital ZIP Code: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Hospital State: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Patient: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
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- Date of Admission: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Date of Surgery: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Date of Discharge: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- ICU Visit: Yes [ ] No [ ]
- If Yes, Initial ICU Hours: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Reaction to ICU: Yes [ ] No [ ]
- If Yes, Additional ICU Hours: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Total Hours in ICU: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]

## D. Risk Factors

- Weight (kg): [ ]  [ ]  [ ]  [ ]  [ ]
- Height (cm): [ ]  [ ]  [ ]  [ ]  [ ]
- Smoker: Yes [ ] No [ ]
- Current Smoker: Yes [ ] No [ ]
- Family History of Coronary Artery Disease: Yes [ ] No [ ]
- Diabetes: Yes [ ] No [ ]
- If Yes, select one: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Diabetes Control: None [ ] Diet [ ] Oral [ ] Insulin [ ]
- Hypertension: Yes [ ] No [ ]
- Last Creatinine Level Prior: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Renal Failure: Yes [ ] No [ ]
- If Yes, Dialysis: Yes [ ] No [ ]
- Hypertension: Yes [ ] No [ ]
- Cerebrovascular Accident: Yes [ ] No [ ]
- If Yes, When: [ ]  [ ]  [ ]  [ ]
- Recent (1-2 weeks) Remote (>2 weeks): [ ]  [ ]  [ ]  [ ]
- Infectious Endocarditis: Yes [ ] No [ ]
- If Yes, Infectious Endocarditis Type: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
- Chronic Lung Disease: No [ ] Mild [ ] Moderate [ ] Severe [ ]
- Immunosuppressive Therapy: Yes [ ] No [ ]
- Peripheral Vascular Disease: Yes [ ] No [ ]
- Cardiomyopathy: Yes [ ] No [ ]
- Carinoembolic Disease: Yes [ ] No [ ]
- Prior Cardiac Surgery: Yes [ ] No [ ]

## E. Previous CV Interventions

- Incidence: First CV Surgery [ ]
- First Re-op CV Surgery [ ]
- Second Re-op CV Surgery [ ]
- Third Re-op CV Surgery [ ]
- Fourth or More Re-op Surgery [ ]
- Previous CV Interventions: Yes [ ] No [ ]
- If Yes, complete the rest of this section:
  - Previous Coronary Artery Bypass: Yes [ ] No [ ]
  - Previous Valve: Yes [ ] No [ ]
  - Previous Other Cardiac - Implantable or Great Vessel: Yes [ ] No [ ]
  - Previous Other Cardiac - Aortic: Yes [ ] No [ ]
  - Previous Other Cardiac - Pacemaker: Yes [ ] No [ ]
  - Previous Other Cardiac - Pacemaker Type: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
  - Previous Other Cardiac - PCI: Yes [ ] No [ ]
  - Previous Other Cardiac - PCI Type: [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]  [ ]
  - Prior Cardiac Surgery: Yes [ ] No [ ]

Created on 2009-09-20 Page 1/8 © Society of Thoracic Surgeons 2004
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**D. Risk Factors**

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**The Society of Thoracic Surgeons**

**Adult Cardiac Surgery Database**

**Data Collection Form Version 2.9**

February 13, 2017

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2017

v. 2.9

22 pages
Michigan Society of Thoracic and Cardiovascular Surgeons

- **History**
  - Founded 1965
- **Currently 91 Board Certified Thoracic Surgeons**
- **Foundation for Statewide quality initiative**
  - 2001 – First Regional STS Data Report containing data from Jan 1998 – Dec 2000 from 17 participating hospitals

Cameron Haight, MD
First President
The MSTCVS Quality Collaborative

- Surgeon Directed Quality Collaborative
  - All 33 Michigan Cardiac Surgery Programs participate voluntarily
  - Quarterly STS data collection and submission
  - Quarterly Statewide meetings

- Focused Quality Improvement Initiatives
  - Process and outcome measures for cardiac surgery
  - Audits of Cardiac Surgical Data including STS Data
A Regional Prospective Study of In-Hospital Mortality Associated With Coronary Artery Bypass Grafting (CABG)

Main Outcome Measures. —Crude and adjusted in-hospital mortality rates associated with CABG.

Main Results. —The overall crude in-hospital mortality rate for isolated CABG was 4.3%. The rate varied among centers (range, 3.1% to 6.3%) and among surgeons (range, 1.9% to 9.2%). Predictors of in-hospital mortality included increased age, female gender, small body surface area, greater comorbidity, reoperation, poorer cardiac function as indicated by a lower ejection fraction, increased left ventricular end-diastolic pressure, and emergent or urgent surgery. After adjusting for these effects, the overall mortality rate for the study was 3.8% (95% confidence interval, 3.4% to 4.2%).

Conclusions. —We conclude that the observed differences in in-hospital mortality rates among institutions and among surgeons in northern New England are not solely the result of differences in case mix as described by these variables and may reflect differences in current unknown aspects of patient care. Understanding this variation requires a detailed understanding of the processes of care.

From the Department of Medicine (O’Connor and Mc avocado), Surgery (Vick, Porter, Martin, and Hogan), and Community and Family Medicine (O’Connor and Harrison) and the Center for Investigative Clinical Sciences (O’Connor, Purve, and Harrison), Dartmouth-Hitchcock Medical Center, Lebanon, N.H.; the Cardiovascular Surgery Department, Brigham and Women’s Hospital, Boston, Mass.; the Cardiac Surgery Service, New York Presbyterian Hospital, New York, N.Y.; the Cardiovascular Surgery Department, Harvard Medical School, Boston, Mass.; the Cardiovascular Surgery Department, University of Utah School of Medicine, Salt Lake City, Utah; and the Cardiovascular Surgery Department, University of Washington School of Medicine, Seattle, Wash.

Reprint requests to Clinical Research Section, Department of Medicine, Dartmouth-Hitchcock Medical Center, 2 Maynard St, Hanover, NH 03755 (O’Connor).
Partnering with payers to improve surgical quality: The Michigan plan

Nancy J. O. Birkmeyer, PhD,* David Share, MD, MPH,† Darrell A. Campbell Jr, MD,* Richard L. Prager, MD,* Mauro Moscucci, MD,* † and John D. Birkmeyer, MD,* Ann Arbor and Detroit, Mich

From the Michigan Surgical Collaborative for Outcomes Research and Evaluation, Departments of Surgery* and Medicine,† University of Michigan, Ann Arbor, and Blue Cross/Blue Shield of Michigan,† Detroit
MSTCVS Quality
Collaborative Philosophy

Steer patients to the best hospitals or surgeons

“Centers of excellence”

Provide financial incentives for good performance

“Pay for performance”

Improve care at all hospitals

Underwrite costs of data collection and surgeon participation in QI activities

“Pay for participation”
The MSTCVS Plan

Raising the Bar
### Michigan STS Regional Report - 2001

#### Michigan Regional Report 1998 to 2000 Isolated CABG Procedures

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**Operative Information**

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- **Procedure:**
  - 17 sites

**Report Data**

- **Report Date:** June 2001
- **Harvest Dates:** January 1, 1998 - December 31, 2000

---

17 sites
Dear Physician Champion,

As you know, the MTRCQI Project has been assisting __________ Hospital in monitoring IMAC use in the patients undergoing isolated coronary artery bypass grafting. The data managers at your site are submitting MTRCQI EXCLUSION CRITERIA FORMS that the cardiac surgeons are completing. The results are provided on the enclosed excel data sheet. Below is a summary of the data sheet tracking 13 patients that the IMAC was not used, (excluding re-operations) from June 2006 -- December 06.

Indication for Exclusion:
- Subclavian stenosis: 1 patient
- Previous thoracic surgery: 2 patients (IMA not patent injured from 2 prior sternotomy, left pneumonectomy)
- Current Immunosuppressive Therapy: 2 patients
- Emergent Procedures: 3 patients
- Morbid Obesity: 2 patients (One pt. also with uncontrolled diabetes)
- Other reasons: 3 patients
  1. Multiple myeloma, cr. 2.5, type B aortic dissection
  2. IMA conduit not appropriate for use
  3. Lg. radial/small LIMA, pt. also with AV fistula for dialysis

A bar graph is also included tracking historical and current IMA Use years 2005 and 2006. The trend line reveals the use of IMA remains below the MTRCQI benchmark of 90%. Since tracking the data monthly, the cumulative percentage is 85.1%.

After review of the above data at the MTRCQI Quality Collaborative meeting, an analysis of your data is included............

We would like to take this opportunity to personally thank you and the __________ Hospital for your diligent participation in the MTRCQI QI Collaborative. Please let us know if there is anything we can do to assist you as you continue to work on the IMAC initiative at your site.

Sincerely,

Patty Theurer, RN
Quality Initiative Coordinator

Gail Bell, RN
Data Management Supervisor
Interventions:
1) Quarterly data review
2) Educational lectures including literature reviews
3) IMA Exclusion Rationale forms
4) Quarterly reports with IMA use and exclusions

Fig 5. Internal mammary artery (IMA) use from 2005 to 2008 for Michigan (Mich) and the Society of Thoracic Surgeons database (STS) with 95% confidence intervals.
We identified Low IMA Users

Fig 3. 2005 internal mammary artery (IMA) use for each of the 31 Michigan cardiac surgery programs.

University of Michigan

Low IMA Users
*Exclusions: Prior cardiac or thoracic surgery, emergent/salvage, hx. mediastinal radiation, no bypassable LAD disease, subclavian stenosis

* STS Database incorporated IMA exclusions into the national database
Isolated CAB
Any Blood Product Use

Michigan  STS  University Of Michigan

Alan Speir, MD
Feb 2009
What did we do?

Blood Conservation Team

• Surgeons
• Anesthesiologists
• Perfusionists
• Nursing

Review of Data

Discussed options
Cardiac operations put patients at risk for requiring blood transfusions which can cause adverse outcomes. The cost of blood transfusions is also a concern. Comparing ourselves with the Society of Thoracic Surgeons National Database revealed that we used more blood products than our colleagues for isolated Coronary Artery Bypass (CAB) operations.

The goals for this project were to:
1. Convene multidisciplinary group to meet monthly
2. Decrease the percent of CAB patients receiving intra-operative blood to 50% by 2010
3. Establish Blood Utilization guidelines for all adult cardiac operations by Mid 2010
4. Decrease blood use for most adult cardiac surgery cases

**PLAN: the case for improvement**

Cardiac Surgery Blood Utilization QI

**DO: what changes were implemented**

**CHECK: outcomes achieved**

**ACT: plans to sustain results or to spread change**

- Perfusion process accepted practice now
- Monthly Blood Utilization Meeting to review blood usage.
- Discussion of blood report with surgeons, anesthesia, and perfusion at staff meetings
- Plan to create more condensed blood report using CIDSS data and cardiac surgery data
- Plan for posting data monthly in office suite.
- Monthly feedback to cardiac surgeons and team on blood use

**ACT: Keys to success & other insights about the work**

- Monthly meetings with team members from all disciplines is key
- Feedback and monthly reports are needed to see improvement trends
- Must have surgeon, Perfusionist, and anesthesiologists buy-in

**Team**

Richard Prager, MD, Timur Dubovyk, MD, Russell Butler, CCP, Jonathon Halt, MD, James Blum, MD, Eric Smith, PA-C, Theron Paugh, CCP Amy Geltz, RN

Contact: rbutler@umich.edu
Cardiac operations have become more complex and most are still performed using cardiopulmonary bypass. Perioperative bleeding is common during these operations, and those operations using cardiopulmonary bypass increase the need for blood transfusions as clotting factors may be affected. Cardiac operations account for 15% of the nation’s blood supply consumption (STS, 2011). Recent literature has also reported a link between blood transfusions and poor outcomes (STS, 2011).

Participation in the Society for Thoracic Surgeons (STS) National Database provided cardiac surgery the benchmark data that revealed a higher blood utilization rate as compared to the nation. This was also true when compared to the Michigan Society of Thoracic and Cardiovascular Surgeons (MSTCVS) data.

A multidisciplinary group which included surgeons, anesthesiologists, perfusionists, and OR physician assistants was organized. The goals of the group were to decrease the percent of patients receiving intraoperative blood products for isolated CAB to 50%, establish blood utilization guidelines for all cardiac surgery patients, and to decrease the percent of patients receiving blood products for most adult cardiac surgery patients (VAD and transplant patients were excluded in this initial goal).

Key events in the project were change in cardioplegia method, change in perfusion circuit, and the introduction of RAP (retrograde autologous prime). Without these perfusion techniques, blood conservation was difficult. Autologous blood donation in the operating room was also introduced. This technique removes whole blood from the patient before the onset of bypass and is then given back post bypass. Use of this fresh whole blood can prevent the patient from receiving blood bank blood. Active discussion of the blood plan before, during, and after the case involves the Perfusionist, anesthesiologist, and surgeon. This information is discussed during a brief and debrief and also documented on the OR to ICU handoff tool. The trigger to discuss transfusion was lowered from a hematocrit of 25% to 22%. Finally, cardiac surgery blood utilization guidelines which included intra-operative and post-operative blood management were approved by all faculty.

Our group monitored the use of blood products monthly using data from the adult cardiac surgery database and also from the CIDSS Blood dashboard. The data displayed on the poster is through calendar year 2010 and shows a decrease in the percent of patients receiving blood products as compared to the STS and internal data trends. We also compared the total number of products used in 2009 compared to 2010. This data showed a decrease in product use while the case volume increased by 7.5%. This demonstrated a cost saving of over $260,000 in one year. We also met our goal in our isolated CAB population of 50% of patients received blood products during their hospitalization. (which was now below the STS benchmark).
To sustain these results, perfusion is now utilizing RAP techniques on all appropriate patients and we have worked to standardize the way autologous blood is removed. Monthly reporting of the data continues to be a work in progress, as we format easy to read blood reports to share with all disciplines. Feedback to surgeons in the form of emails will begin in July 2011 that will include alerts on patients that received only 1 unit of blood bank product. Feedback and displaying of data has shown to be a successful way of sustaining awareness for blood conservation.
All 33 hospitals are transfusing less red blood cells during and/or after isolated coronary artery bypass procedures.

Blue is April 2016 – March 2017

Gray is 2006

Site QI Project 2017:
Allegiance
McLaren Flint
Port Huron
Spectrum
The Team, The Team, The Team
Thank you