



Data Driven Surgical Quality Improvement: Beyond M&M

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MTQIP

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What is Surgical QI?

§ Quality/Safety/Regulatory

– Sentinel Events

§ When a sentinel event occurs, the accredited organization is expected to conduct a timely, thorough and credible root cause analysis; develop an action plan designed to implement improvements to reduce risk; implement the improvements; and monitor the effectiveness of those improvements.

– RCA

§ Root Cause Analysis: A structured process for identifying the causal or contributing factors underlying adverse events, adverse outcomes, or other critical events

– Creating/Amending Policies & Procedure

§ Match current practice- Joint Commission and CMS hold hospital's accountable for their own policy/procedure

§ New policies/procedures are not always a cure for process improvement it may be as simple as a need for re-education

What is Surgical QI?

§ Departmental

– Surgical M&M

§ Educational sessions

§ More focused on personal rather than system improvement

– Grand Rounds

§ More education

§ May occasionally be dedicated to Quality Improvement and outcomes data

– NSQIP

What is Trauma QI?

- § Trauma Registry
 - Data, Data analysis?
- § Trauma Program Manager
 - Project Management, Planning
- § Multi-specialty Peer Review Committee
 - Error Analysis: Deaths, Audit Filters
- § Institutional Trauma Committee
 - Change Agent? Communication Mechanism?
- § NTDB
 - Benchmarks

Basic Elements of QI

- Data Collection
- Data Analysis
- Error Analysis
- Process Improvement

Basic Elements of QI

	Registries	Peer Review	Quality Improvement
Data Collection	+	-	+
Data Analysis	+/-	-	+
Error Analysis	-	+	+
Process Improvement	-	+/-	+

Basic Elements of QI

	Registries	Peer Review	Quality Improvement
Data Collection	+	-	+
Data Analysis	+/-	-	+
Error Analysis	-	+	+
Process Improvement	-	+/-	+

TQIP

PIPS

Basic Elements of QI


	Registries	Peer Review	Quality Improvement
Data Collection	+	Who	+
Data Analysis	+/-	-	+
Error Analysis	-	+	+
Process Improvement	-	+/-	+

Basic Elements of QI

	Registries	Peer Review	Quality Improvement
Data Collection	+	-	+
Data Analysis	+/-	What	+
Error Analysis	-	+	+
Process Improvement	-	+/-	+

Basic Elements of QI

	Registries	Peer Review	Quality Improvement
Data Collection	+	-	+
Data Analysis	+/-	-	+
Error Analysis	-	Why	+
Process Improvement	-	+/-	+



Basic Elements of QI

	Registries	Peer Review	Quality Improvement
Data Collection	+	-	+
Data Analysis	+/-	-	+
Error Analysis	-	+	+
Process Improvement	-	How	+



QI: Data Collection

- Who are the patients?
 - Registries
 - Chart Abstraction
 - Specific Elements
 - Self Reporting
 - M&M
 - Administrative Data
 - Delayed, Poor Quality

Identification of Surgical Complications and Deaths: An Assessment of the Traditional Surgical Morbidity and Mortality Conference Compared with the American College of Surgeons-National Surgical Quality Improvement Program

Matthew M Hutter, MD, MPH, Katherine S Rowell, MS, MHA, Lynn A Devaney, RN,
Suzanne M Sokal, MSPH, Andrew L Warshaw, MD, FACS, William M Abbott, MD, FACS,
Richard A Hodin, MD, FACS

Table 1. Postoperative Morbidity and Mortality Rates from the General Surgical Services at the Massachusetts General Hospital (July 1, 2002, to June 30, 2003)

	M&M conference		NSQIP		p Value
	n	%	n	%	
Total major cases	5,905		1,439	24	
Morbidity (% with morbidity)	380	6.4	416	28.9	< 0.0001
Mortality (% with mortality)	53	0.9	28	1.9	0.001

Rates are presented as determined either in traditional morbidity and mortality (M&M) conference, or by a National Surgical Quality Improvement Program (NSQIP) nurse-reviewer.

Identification of Surgical Complications and Deaths: An Assessment of the Traditional Surgical Morbidity and Mortality Conference Compared with the American College of Surgeons-National Surgical Quality Improvement Program

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Table 2. Postoperative Occurrence Rates Stratified by Different Groupings of Complications

Occurrences, complication group	M&M conference (n = 5,905)		NSQIP (n = 1,439)		p Value
	n	%	n	%	
Wound	71	1.2	104	7.2	< 0.0001
Respiratory	58	1.0	120	8.3	< 0.0001
Urinary	34	0.6	70	4.9	< 0.0001
Central nervous system	4	0.1	11	0.8	< 0.0001
Cardiac	32	0.5	24	1.7	< 0.0001
Other	181	3.1	87	6.0	< 0.0001
Total	380	6.4	416	28.9	< 0.0001

Rates are presented as determined either in traditional Morbidity and Mortality (M&M) conference, or by a National Surgical Quality Improvement Program (NSQIP) nurse-reviewer.

QI: Data Analysis

- What is the problem?
 - Standard Reports
 - Ad Hoc Reports
 - Data Tracking (Run Charts)
 - Risk Adjustment
 - Benchmarking

Health Care Reform at Trauma Centers—Mortality, Complications, and Length of Stay

Shahid Shafti, MD, MPH, Sunni Barnes, PhD, David Nicewander, PhD, David Ballard, MD, PhD, MSPH, Avery B. Nathens, MD, PhD, Angela M. Ingraham, MD, Mark Hemmila, MD, Sandra Goble, MS, Melanie Neal, MS, Michael Pasquale, MD, John J. Fildes, MD, and Larry M. Gentilello, MD

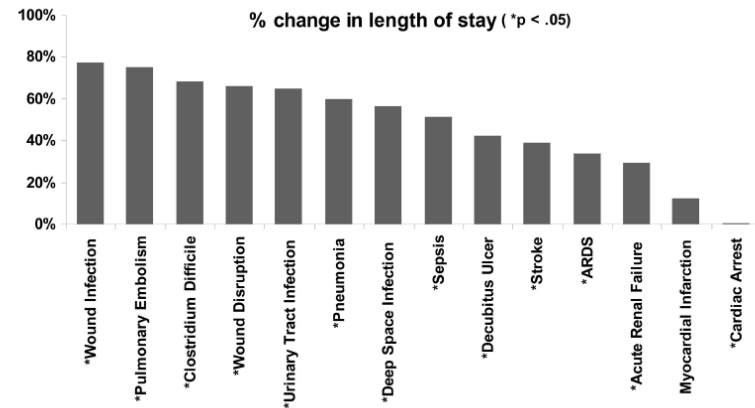
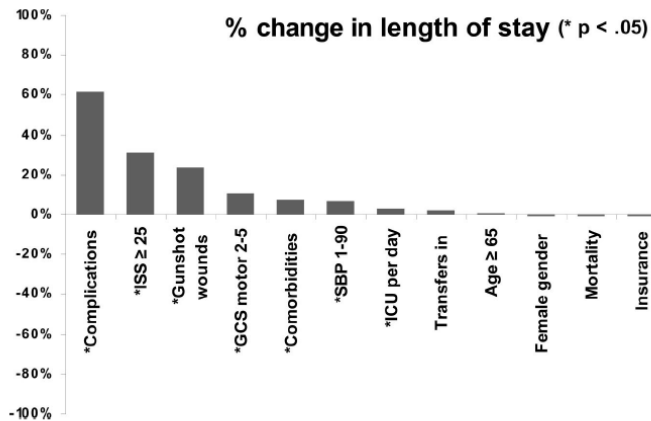


Figure 3. Predictors of length of stay. SBP, systolic blood pressure; ISS, Injury Severity Score; GCS, Glasgow Coma Scale
 Figure 4. Relative impact of specific complications on LOS. ARDS, acute respiratory distress syndrome, intensive care unit.

Detection of adverse events in surgical patients using the Trigger Tool approach

F A Griffin,¹ D C Classen²

Table 1 Triggers for Surgical Trigger Tool (initial testing)

T1	Unplanned return to surgery
T2	Unexpected change in procedure
T3	Unplanned intensive care unit admission
T4	Body mass index (BMI) >28
T5	Intubation or reintubation in PACU
T6	Unplanned x ray
T7	Transfusion of red blood cells or blood first intraoperative or first 24 h postoperatively
T8	Overnight stay of ambulatory patient
T9	Cardiac/pulmonary arrest
T10	Intraoperative or postoperative death
T11	Mechanical ventilation >24 h
T12	Intraoperative medications
T13	Positive blood culture
T14	Deep vein thrombosis/pulmonary embolism
T15	Increased troponin level
T16	Readmission within 30 days
T17	Change of anaesthesia
T18	Consult in PACU
T19	Complication (any)
T20	Pathology report normal or unrelated to diagnosis
T21	Insertion of central or a-line mid-procedure or in PACU
T22	Intraoperative time >6 h
T23	Unplanned organ removal, injury, repair
T24	Other (for adverse events uncovered that do not "fit" a trigger. Any adverse event can be placed under this "Other" trigger.)

PACU, postanesthesia care unit.

QI: Error Analysis

- Why is there a problem?
 - Need Standardized Taxonomy and Tracking
 - Provides focus for where to start

ASSOCIATION FOR ACADEMIC SURGERY, 2008

A Report Card System Using Error Profile Analysis and Concurrent Morbidity and Mortality Review: Surgical Outcome Analysis, Part II

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TABLE 3
Delineation of Error, 2005

	2005		2005	
	Study grp	Deaths	Study grp	Deaths
Diagnosis				
Error Dx	53.8%	50.00%		
Delay in Dx	7.7%	37.50%		
Inappropriate test	0.0%	0.00%		
Failure to act on test	23.1%	0.00%		
Inadequate preop W/U	15.4%	12.50%		
Judgment				
Error judgment	50.0%	42.86%		
Inappropriate indication	7.1%	28.57%		
Failure prophylaxis	7.1%	0.00%		
Failure monitoring	7.1%	0.00%		
Failure follow/up	28.6%	28.57%		
Technique				
Error Rx/performance	63.0%	100.00%		
Incorrect procedure	7.4%	0.00%		
Inappropriate technique	11.1%	0.00%		
Avoidable delay	11.1%	0.00%		
Omission of care	7.4%	0.00%		
			Communication/supervision	
			Error communication	100.0%
			Error signout	0.0%
			Error consent	0.0%
			Lack supervision	0.0%
			Interpersonal conflict	0.0%
			Miscellaneous	
			Equipment failure	25.0%
			Inadequate supplies	75.0%
			Near miss	0.0%
			Medication error	0.0%
			Inadequate credentials	0.0%

Development of an Online Morbidity, Mortality, and Near-Miss Reporting System to Identify Patterns of Adverse Events in Surgical Patients

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Table 2. Error Grade and Class by Primary Category of Adverse Event

	No. (%)												
	Anesthesia	Biliary	Cardiac	Endocrine	GI	GU	Hematologic	Infectious	Miscellaneous	Neurologic	Pulmonary	Systems	Vascular
Error class													
Error in diagnosis	0	0	3 (3.9)	0	15 (6.9)	2 (6.3)	3 (1.7)	2 (1.3)	1 (3.1)	2 (5.6)	2 (2.3)	4 (17.4)	2 (2.1)
Error in judgment	2 (20.0)	0	9 (11.8)	0	14 (6.5)	6 (18.8)	8 (4.6)	9 (5.6)	4 (12.5)	3 (8.3)	11 (12.5)	2 (8.7)	3 (3.2)
Error in technique	4 (40.0)	8 (88.9)	1 (1.3)	2 (50.0)	90 (41.5)	7 (21.9)	96 (54.9)	48 (30.0)	16 (50.0)	12 (33.3)	23 (26.1)	1 (4.3)	52 (54.7)
Nature of disease	3 (30.0)	1 (11.1)	61 (80.3)	2 (50.0)	98 (45.2)	16 (50.0)	68 (38.9)	100 (62.5)	9 (28.1)	19 (52.8)	50 (56.8)	12 (52.2)	36 (37.9)
Systems error	1 (10.0)	0	2 (2.6)	0	0	1 (3.1)	0	1 (0.6)	2 (6.3)	0	2 (2.3)	4 (17.4)	2 (2.1)
Error grade													
I: Non-life-threatening noninvasive treatment	3 (30.0)	1 (11.1)	7 (9.2)	1 (25.0)	65 (30.0)	18 (56.3)	27 (15.4)	57 (35.6)	10 (31.3)	6 (16.7)	9 (10.2)	3 (13.0)	11 (11.6)
II: Potentially life-threatening noninvasive treatment	1 (10.0)	0	28 (36.8)	2 (50.0)	18 (8.3)	6 (18.8)	18 (10.3)	16 (10.0)	2 (6.3)	15 (41.7)	27 (30.7)	5 (21.7)	11 (11.6)
III: Any complication with invasive treatment	6 (60.0)	7 (77.8)	14 (18.4)	1 (25.0)	124 (57.1)	8 (25.0)	120 (68.6)	75 (46.9)	20 (62.5)	3 (8.3)	37 (42.0)	7 (30.4)	67 (70.5)
IV: Permanent disability	0	0	1 (1.3)	0	1 (0.5)	0	0	0	0	6 (16.7)	0	2 (8.7)	2 (2.1)
V: Death	0	1 (11.1)	26 (34.2)	0	9 (4.1)	0	10 (5.7)	12 (7.5)	0	6 (16.7)	15 (17.0)	6 (26.1)	4 (4.2)

Abbreviations: GI, Gastrointestinal; GU, genitourinary.

Table 3. Error Class According to Error Grade

	No. (%)				
	I: Non-Life-Threatening Noninvasive Treatment	II: Potentially Life-Threatening Noninvasive Treatment	III: Any Complication With Invasive Treatment	IV: Permanent Disability	V: Death
Error in diagnosis	3 (1.4)	4 (2.7)	25 (5.1)	1 (8.3)	3 (3.4)
Error in judgment	13 (6.0)	19 (12.8)	31 (6.3)	1 (8.3)	7 (7.9)
Error in technique	60 (27.5)	39 (26.2)	252 (51.5)	1 (8.3)	8 (9.0)
Nature of disease	138 (63.3)	86 (57.7)	175 (35.8)	8 (66.7)	68 (76.4)
Systems error	4 (1.8)	1 (0.7)	6 (1.2)	1 (8.3)	3 (3.4)

Transforming the Morbidity and Mortality Conference into an Instrument for Systemwide Improvement

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Table 3. Factors contributing to adverse outcome

Factor	% Cases
Communication: e.g., inadequate handoffs; incomplete clinical information	64
Coordination of care: e.g., involving multiple services and/or care sites	36
Volume of activity/workload: e.g., increased clinical volume and/or perception of workload	18
Escalation of care: e.g., delay or failure to involve more senior physician or nurse	14
Recognition of change in clinical status: e.g., delay or failure to recognize changing clinical signs and/or symptoms	14

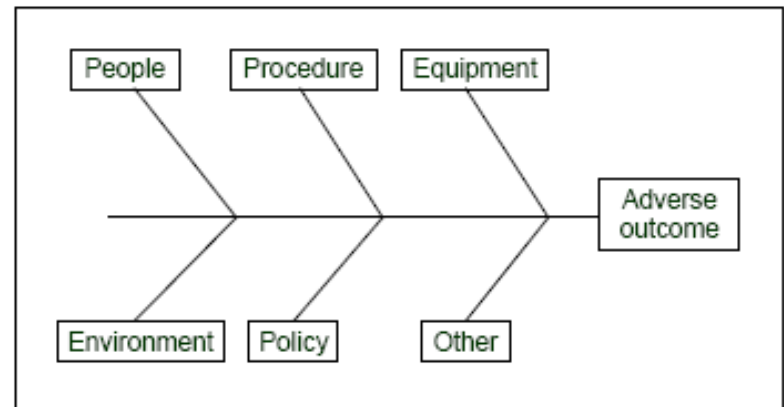


Figure 1. Ichikawa ("fishbone") cause-and-effect diagram.

Patient Safety in Trauma: Maximal Impact Management Errors at a Level I Trauma Center

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Table 2 Patient Safety Net Event Taxonomy in Trauma With Maximal Impact (Mortality): Type

Communication	Patient Management	Clinical Performance
Questionable 3	Resuscitation Questionable: 35 (airway 11, breathing 1, circulation 23) Questionable OR/ ICU care: 32 Missed injuries: 9	Questionable: Diagnosis: 11 Treatment: 31 Both: 34

Table 3 Patient Safety Net Event Taxonomy in Trauma With Maximal Impact (Mortality): Domain

Setting	Phase	Staff
Outside hospital: 1 Prehospital: 6	Prehospital: 7 Initial assessment and resuscitation: 30	EMS: 6
Emergency department: 23 Operating room: 11 PACU: 2 Intensive care unit: 24 Nursing floor: 5 Others 4	Secondary survey and tests:10 ICU care: 24 Post ICU phase: 5	Physicians: 76 Nursing: 2

Table 4 Patient Safety Net Event Taxonomy in Trauma With Maximal Impact (Mortality): Cause

System	Human
2	Skill based 6 Rule based 65 Both 3

QI: Process Improvement

- How are we going to fix the problem?
 - Loop Closure
 - Counseling
 - Policies
 - Guidelines
 - Forms

QI: Process Improvement

- How are we going to fix the problem?
 - Loop Closure
 - Counseling
 - Policies
 - Guidelines
 - Forms



•Not PI

Patterns of Errors Contributing to Trauma Mortality

Lessons Learned From 2594 Deaths

Russell L. Gruen, MD, PhD, Gregory J. Jurkovich, MD, Lisa K. McIntyre, MD, Hugh M. Foy, MD, and Ronald V. Maier, MD

TABLE 2. Major Patterns of Errors Contributing to Trauma Mortality

Error Patterns	Cases (n)	%
Hemorrhage control		
Delayed control of abdominal/pelvic hemorrhage	10	15.6
Delayed control of intrathoracic hemorrhage	6	9.4
Failure to rewarm and/or correct coagulopathy	2	3.1
Airway management		
Unsuccessful intubation and delayed surgical airway	5	7.8
Failure to secure or protect airway	5	7.8
Management of unstable patients		
Unduly long initial operative procedure in unstable patient	5	7.8
Inappropriate interhospital transfer of unstable patient	2	3.1
Unstable patient sent to CT scanner	2	3.1
Procedures		
Complication of intravascular lines	4	6.3
Complication of feeding tubes	3	4.7
Retained intraoperative foreign body	1	1.6
Prophylaxis		
Inadequate DVT/PE prophylaxis	4	6.3
Inadequate GI ulcer prophylaxis	2	3.1
Inadequate physical restraint	1	1.6
Missed or delayed diagnoses		
Intracranial hemorrhage	2	3.1
Intraabdominal injury	2	3.1
Pericardial tamponade	1	1.6
Septicemia	1	1.6
Hyperkalemia	1	1.6
Other		
Overresuscitation with fluids	3	4.7
Other poor management decisions	2	3.1

A

Error group	1996	1997	1998	1999	2000	2001	2002	2003	2004
Uncontrolled thoracic hemorrhage	•	•••	•			•			
Interhospital transfer of unstable pt	••								
Complications of feeding tubes		•	•						•
Retained foreign body in OR				•					

B

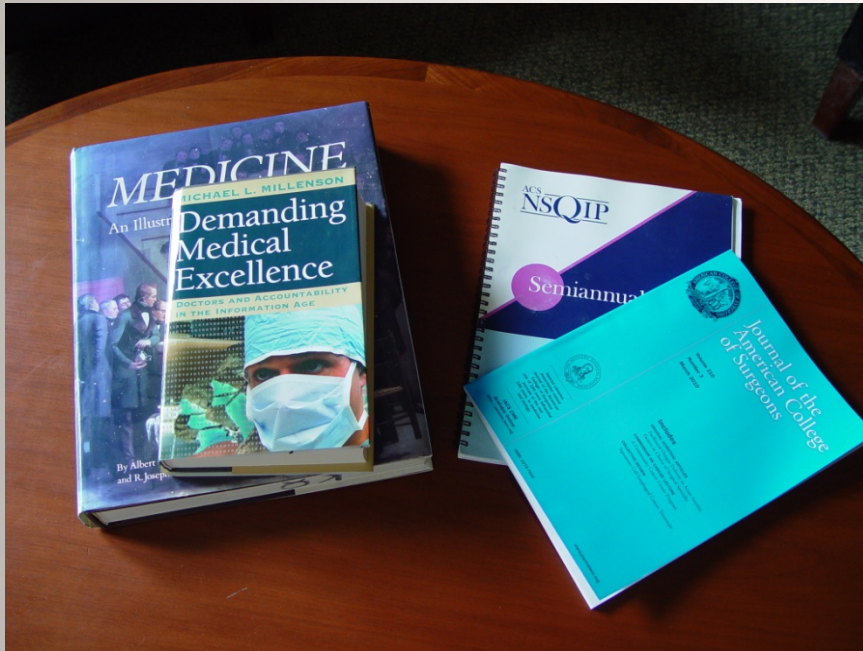
Error group	1996	1997	1998	1999	2000	2001	2002	2003	2004
Delayed OR/angio control of hemorrhage		••	•	•	•••			•	
Failure to rewarm +/- correct coagulopathy		••			•	•			
Airway loss during orotracheal intubation	•		•	•				•	•
Unprotected airway in vulnerable patient	••		•			••			
Lengthy operation in unstable patient		•					•	•	••
Unstable patient to CT scanner					•				•
Complications of procedures			•			•		••	
Inadequate VTE prophylaxis	•	•			•			•	
Inadequate GI prophylaxis						•			•
Over-resuscitation with fluid							••		•

QI Needs Assessment

§ What we need:

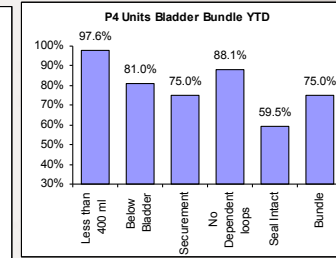
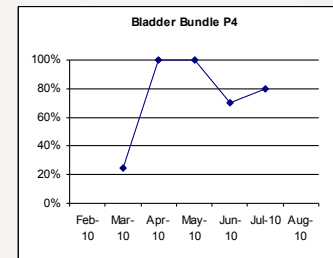
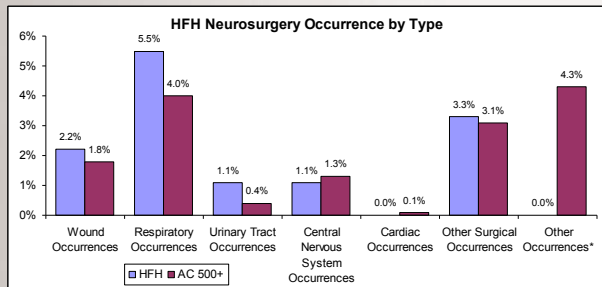
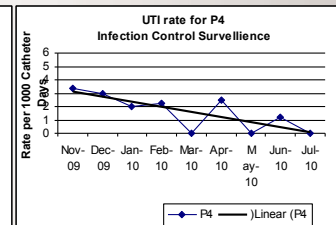
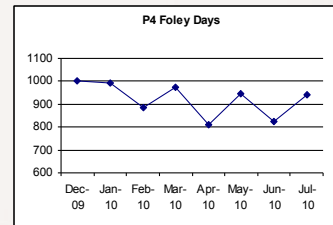
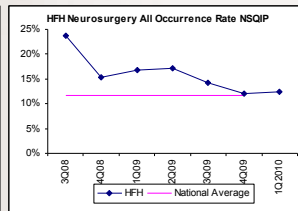
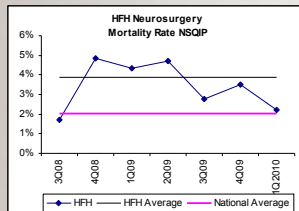
- Reliable data, Data Analysis (TQIP)
- Error Analysis, Tracking
- Data Sharing
- Strategic Improvement Plan (Change)
- Multidisciplinary Project Management
- Communication

Is this your Data?



Organizing Your Data Mess

- First Rule of Data to Monitor Processes
 - Track data over time!
 - If it is not a run chart then ask to see it as a run chart!



Systematic Review of Information

- Outside agency required measures
- Dashboards (regularly updated measures related to key projects and day to day operation)
- Deep dives into topics. Where results are not what are desired take the time to understand process and drivers of the outcomes.
- Listen to Gripes

Three Nolan Questions

- What are you trying to accomplish?
- What ideas do you have that might lead to an improvement?
- How will you know the change is an improvement?

Process

- Deep dive into the data
 - Identify opportunities
- Share the data
 - Explain what it means, where it comes from, why its important
 - Surgical Grand Rounds
 - Quarterly session devoted to Quality Improvement
 - Surgical Services/Anesthesia/ED
 - Promote “team”
 - Hospital Administration
- Identified interested stakeholders/champions
 - Bring everyone to the table
 - Collaborative Process Improvement

Goals of Surgical QI

- Define objectives for a quality plan
- Define stakeholders in surgical quality and their roles
- Apply strategies for engagement, for improvement and for sustaining quality efforts
- Identify best practices

Team goals

- Establish transparency
 - Data dissemination
 - Successes and “opportunities”
- Develop process improvement plan for opportunities
- Increase communication
 - Safety Checklists
 - Meetings, Newsletters

Project Leadership

- Process Design

- Suggest methods for PI (PDSA, Six Sigma, Lean, Homemade)
- Identify which method will be used
- Determine measurable goals
 - Let the team come up with the improvement effort based on your data (even though you know what it should be coach toward your pre-determined goal) this will help to create “buy-in”
- Identify resources to be utilized
 - External: ACS, IHI, IOM, AHA, NPSF, AORN, ANA etc.
 - Internal resources: quality dept, risk management, nursing councils, education depts, pharmacy, anesthesia quality, data analysts etc.

Project Leadership

- Process Design (Con' t)
 - Assign tasks to all team members (homework)
 - Meet often in the beginning of the process to ensure project is progressing
 - Track progress
 - Summarize and provide feedback to the team

Methods to Improve 1

- Understand Your Current Process
 - Apply tools to understand your current process and identify opportunities
 - Flow diagrams, value stream map, define
 - Gemba walk, observation
 - Process measures
 - Develop possible changes and test.
 - Trial on a small scale if possible

Methods to Get Started

- Fix the Issues

- Start small one project at a time “low hanging fruit” - pilot a project
- Copy best practice
 - Don’ t waste time reinventing the wheel
 - Almost always has to be customized for local issues
- Find out what works - utilize resources

- Give The Team Faith

- Emphasize success
- Communicate results

How to Implement Surgical QI

Pre-work (preparation phase)

- Organize your data in a clear concise fashion
 - Display charts/graphs that are understandable to the audience
 - Present “good” and “not so good data”
- Identify the improvement effort ahead of time

How to Implement Surgical QI

Pre-work (preparation phase)

- Perform a total assessment of your hospital's or health systems resources
 - Clinical performance specialists roles
 - Quality improvement specialists
 - Pharmacy
 - Infection Control
 - Nursing
 - Committees that have approval authority
 - Identify what processes have to go where and who has to sign off on them

How to Implement Surgical QI

Pre-work (preparation phase)

- Identify Stakeholders
 - Who needs to be at the table (leadership, MDs, Admin, Nursing etc)
 - Who is accountable
 - Determine the champion of the project
 - May need more than one

How to Implement Surgical QI

Work Phase

- You need a facilitator
 - Invite the stakeholders to a meeting
 - It is important to have the support of administration
 - Run the meeting with the assistance of the champion of the project
 - Set the agenda have a mission and goal for the initial meeting

How to Implement Surgical QI

Work Phase

- Identify a liaison to multiple departments
 - Dept of Surgery and Sub-specialties, Anesthesia, Nursing, Pharmacy, Quality etc.
 - Break down the silos

Team Building

- Right People
- Right Time
- Responsibility with Authority

Communicate, Communicate and Communicate Some More

- Identify what are we trying to communicate
 - Message- factual, short, concrete and simple for all audiences to achieve a basic understanding of PI
 - Use a variety of methods to communicate
 - Keep everyone on the same page
 - Do not send mixed messages
 - Know your project

Staying Focused in a World of Organized Chaos

- Create a vision
 - Review organizational mission, vision and values to ensure consistency
 - Engage others to validate or modify
 - Publish the vision, post the vision, review the vision regularly
 - Ensure leadership team is on board
 - Share with physician leaders

Staying Focused Continued

- Use the strategic plan to guide your daily work
 - Review regularly to monitor progress
 - Revise - situations change and the strategic plan needs to evolve as the department does
 - Publish and engage frontline staff in accomplishing the goals
 - Document your progress and share the information!
 - Celebrate the accomplishments!

Strategic Improvement: Change

- The Institute for Healthcare Improvement (IHI) uses a simple mantra to describe the essential elements for strategic improvement: *Will, Ideas, and Execution*.
- You have to have the *will* to improve, you have to have *ideas* about alternatives to the status quo, and then you have to make it real — *execution*.

10 Reasons Execution Fails

- Poor communication
- Impact of change underestimated
- Lack of leadership
- Lack of executive sponsor
- Project management lacking
- Insufficient planning
- Inadequate resources allocated
- Technical knowledge insufficient
- Lack of rationale for need to change
- Consultants not managed closely

Strategies to Success

- Build the case for change
- Secure executive buy-in and support
- Develop a road map
- Communicate the plan (map)
- Empower others to act
- Start small, deliver early and frequently
- Spread and add value
- Monitor / evaluate progress
- Share the story

“...better is not a number, soon
is not a time; trying is having
granted yourself permission to
fail...”