SCAI Quality Improvement Toolkit

Working on QUALITY, One Cath Lab at a Time
The SCAI Cardiovascular Professional (CVP) Quality Improvement Toolkit was developed with support from Daiichi Sankyo and Lilly. The Society gratefully acknowledges this support, while taking sole responsibility for all content developed and disseminated through this effort.
“We have talked for a number of years about the need for interventionalists to “own” the QI process in the cath lab.

SCAI QIT offers a unique opportunity for SCAI members to demonstrate their commitment to improving quality of care and to reassure our patients that their expectations of receiving the highest quality of care in the cath lab are being met.

It’s time for you to get involved. It’s time for you to get to work.”

– Christopher J. White, MD, MSCAI
**Purpose**: To provide SCAI Cardiovascular Professionals (CVPs), who are SCAI QIT champions, the foundation to promote and implement quality improvement processes

**Audience**: Non-physicians involved in leading quality improvement in the area of cardiac and/or endovascular angiography and/or intervention
Module 1
Quality Improvement in the cath lab
Definition of Quality

Quality is a science that involves ensuring that appropriate structural and process elements are in place to achieve the best patient selection and the best patient outcomes.

Quality, at the patient level, ensures providing the right procedure to the right patient at the right time in the right way.
Evaluation of quality in the cath lab

- Quality can be evaluated in three broad areas or “domains”
Structural Domain

QA Committee
- Hospital QA Committee: Meets q2-3 months
- CCL QA Committee: Meets q2-3 months

Credentialing Committee
- Initial Credentialing
- Recurrent Credentialing

Generate and Review Monthly-Quarterly-Annual Reports

Procedural Logs, Outcomes, and CME Requirements

Defining Quality in the Cath Lab

www.SCAI.org/QIT
## Process Domain

### Direct Patient Care
- Quality of angiographic studies (peer review)
- Generation and completion of reports
- Handling of complications

### Systems Related
- Pre-procedure checklists
- Charting adequacy
- Response times in emergencies
- Ancillary services adequacy

### Guidelines Related
- Procedure indications
- Adjunctive medications
- Radiation and contrast safety
- Infection control

### Cost & Utilization
- Availability and quality of supplies
- Staffing and personnel
- LOS
- Impact on ancillary services

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**Defining Quality in the Cath Lab**

**Monitoring Patient Care Processes**

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**www.SCAI.org/QIT**
Example of quality in process domain

- Quality cath lab documentation and reporting to include:
  - Demographics, staff, procedure type
  - Indications, data to determine Appropriate Use Criteria (AUC) and PCI risk scores
  - History, physical findings, labs
  - Access site
  - Procedure section- equipment, time course, ACT, outcome of intervention, complications
  - Confirmation of hemodynamic data with physician before finalization
  - Drugs, doses, contrast, fluoro time, radiation dose (DAP, AK)
  - Disposition and condition of patient on transfer
Outcomes Domain

Monitor outcomes

- Risk-adjusted mortality
- Procedure-related LOS, fluoro time
- Complications (30-day)

Data sharing & Reporting

- Aggregated data and physician-specific data
- Cath lab statistics
- NCDR; state-mandated reporting

THE PURPOSE MUST BE QUALITY IMPROVEMENT
# QA vs. CQI

<table>
<thead>
<tr>
<th>Quality assurance (QA)</th>
<th>Continuous quality improvement (CQI)</th>
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<tbody>
<tr>
<td>Focus on the individual and inspection</td>
<td>Focus on “system” and “process”- how did the system fail and did not support the worker</td>
</tr>
<tr>
<td>Focus on short term reaction</td>
<td>Focus on long term planning- improve constantly and forever</td>
</tr>
<tr>
<td>Peer review ignored</td>
<td>Peer review valued</td>
</tr>
<tr>
<td>Perfection myth</td>
<td>Fallibility recognized</td>
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<tr>
<td>Errors punished</td>
<td>Errors seen as opportunities for improvement</td>
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**Defining Quality in the Cath Lab**

[www.SCAI.org/QIT](http://www.SCAI.org/QIT)
Continuous Quality improvement (CQI)

- Focus of CQI - patient satisfaction, meeting/exceeding patient’s preferences/expectations and best patient outcomes

- Key components
  - Process indicators (emergency response times, protocols for patients on anticoagulation, contrast allergy, renal dysfunction, post PCI statin and DAPT prescription rate)
  - Structural indicators (credentialing, licensure, documentation of CME)
  - Outcome indicators (reduction in procedural complications)
  - Performance indicators (D2B times)
  - Peer review of complications
  - Random case review

- Link to SCAI paper on standards for quality assessment and improvement (cath lab CQI process)
QI techniques

FOCUS-PDSA

- **F**- find a problem or process to improve- what are we trying to accomplish?
- **O**- organize a team- how do we select/organize a team?
- **C**- clarify current knowledge of the process- how will we know that the change we make will bring about an improvement?
- **U**- understand sources or causes of process variation- what is the root cause of the problem?
- **S**- select the improvement or intervention- what change will we make that will result in an improvement?

- **P**- plan
- **D**- do
- **S**- study
- **A**- act

SCAI Core Curriculum for Adult and Pediatric Interventional Fellowship Training in Continuous Quality Assessment and Improvement

www.SCAI.org/QIT
PDSA

Plan
- Define the current situation/system and gather data to describe the current process
- Identify causes of variation or problems, and develop theories to address them
- Define specifically what you are trying to accomplish
- Obtain buy-in from key stakeholders
- Identify ways to counteract resistance to change
- Develop a communication plan

Do
- Implement the plan
- Record any unexpected events and other observations
- Begin analyzing the data

Study
- Monitor outcomes
- Determine if the interventions improved the process/problem
- Evaluate need for modifications to the approach
- Identify additional areas for improvement

Act
- Decide if it is appropriate to implement the plan broadly, modify or discard it
- Develop a monitoring schedule to measure the gains over time
- Determine if processes can be improved further
Root cause analysis (RCA)
- Retrospective (analysis performed after event has already taken place)
- Required by The Joint Commission for sentinel events
- Key components/concepts
  - Frequent use of Ishikawa or “fish-bone” diagrams to study cause and effect
  - Best way to deal with problems is to remove contributing causes
  - Systems need built in redundancy to prevent problems in the future

Example in the cath lab
- Medication/ verbal communication error, patient injury during transfer
- Identify cause(s) of deviation from standard practice
- Categorize causes in terms of “4Ps” (Place, Procedure, People, Policies), “4Ms” (Methods, Machines, Materials, Manpower), or the “4Ss” (Surroundings, Suppliers, Systems, Skills) or various combinations
- Construct a “fish-bone” diagram
- Eliminate causes and build redundancy in the system to prevent future events
Example of root cause analysis using fish-bone diagram

- **Equipment/Supplies**
  - Standards or compliance with standards
  - Document issues

- **Environmental**
  - Location, physical layout, visibility
  - Building safety
  - Lack of ability, supervision, scheduling
  - Communication
  - Lack of knowledge, information
  - Scheduling

- **Rules/Policies/Procedures**

- **Staff/People**
A resident fell and was injured during a transfer from her wheelchair to the toilet, while being assisted by an aide.
Failure mode and effects analysis (FMEA)
- Prospective (analysis performed before event has taken place)
- Identifies probability, possible mode(s), timing and impact of failure related to system design inadequacies
- Develops action plan to follow in case event occurs
- May be performed with use of a “fish-bone” or Ishikawa diagram

Example in the cath lab
- Prevention of radiation induced skin damage
- Recognize risk factors and probability for radiation induced injury (obesity, complex PCI, especially chronic total occlusion (CTO) PCI, prior radiation exposure/damage, faulty equipment)
- Awareness of implications of radiation damage (skin ulceration, malignancy)
- Action plan if high radiation exposure were to occur (establish limits for hard stop, change to 7.5 fps during case, staging PCI, close follow-up of patient and reporting)
Total quality management (TQM)
- Stresses importance of multidisciplinary or cross-organizational approach
- System wide emphasis on importance of quality, measurement, empowerment and continuous improvement

Examples in cath lab
- Development of multi-disciplinary team of nurses, physicians, NPs and pharmacists/pharmacy residents to ensure post PCI compliance with dual anti-platelet therapy (DAPT), statins and smoking cessation
- Coordination of care with patient’s primary care physician to ensure adequate follow-up post PCI and medication counselling

Lean production
- Focus on cost/value equation
- Aims for “Doing better with less (cost)”

Example in the cath lab
- Choosing lower cost equipment, of equivalent efficacy and safety, in cath lab inventory after consultation with physicians and staff in cath lab
Physicians and cath lab staff complain about the long turnaround between cases. Elective cases are being done late in the day due to slow turnaround, with a negative impact on staff and patient satisfaction.

There is no satisfactory explanation or solution. Cath lab, holding room staff and physicians are blaming each other, contributing to stress and low morale.

The above case demonstrates a cath lab situation in which application of QI technique(s) can help with resolution of the problem and improved outcomes.
Using root cause analysis to retrospectively understand problem of slow cath lab turnaround

**Main Problem**
Categories of causes as branches leading from the horizontal line leading to main problem

**Categories**
- Cath Scheduling
  - Cath lab scheduler has all patients arrive at 6am
  - Cath lab scheduler gets minimal information from MD to schedule patient
  - Cath lab scheduler doesn’t address MD scheduling conflicts, when
- Transportation
  - Transportation services slow to respond
  - Transportation services not notified regarding patient volume
- Post-cath Process
  - Unable to obtain hemostasis
  - Post-cath MD orders not written
- Nursing units and pre-cath area seldom have patient ready when transportation arrives because cath lab
  - Patient arrives without knowledge of procedure
  - Patients arrive without pre-op testing results, lab work has to be ordered stat and wait for results
  - No H&P dictated by physician
  - Patients arrive without physician orders
- MD slow to arrive because not given notice and/or expectation
  - Additional procedures performed on patient that weren’t scheduled
- Pre-procedure Processing
- Procedure Room
- Nursing Units
  - No telemetry beds available
  - No nursing staff available
  - No anticipation of cath lab patient needs, not given copy of cath lab schedule
  - Post-procedure discharge orders not pre-printed
- Procedure Room

**Defining Quality in the Cath Lab**
Cath lab patient throughput slow (mean turnaround time > 45 minutes)

Main Problem—write this on far right, with horizontal line leading out from it, going from right to left

All possible reasons for the cause, leading out from the cause category boxes
Using PDSA to develop the QI Plan

• Identify problem: long turnaround between cases

• **Plan**: focus group consisting of holding room and cath lab charge nurses, cath lab director, patient representative, bed manager and discharge coordinator

• **Do**: electronic charting, eliminate need to give report more than once, discharge patients from holding room in timely manner, physicians asked to place post-cath orders and speak with family immediately after case, use pre-procedure checklist to keep next patient ready

• **Study**: measure reduction in turn around time and obstacles to implementation of plan

• **Act**: Significant improvement was noted; plan was also implemented in EP lab
Developing a QI team and plan

Team
- Clinical leader - understands how changes will affect the clinical care process and leads efforts to practically implement CQI in the lab
- Technical expert - such as IT specialist, cath lab technical director or manager
- Project manager - ensures completion of data collection, analysis, and change implementation
- Project Sponsor – has executive authority (optional)

Characteristics of a good QI plan
- Describe of the program structure (see structural domain slide)
- Identify Interdisciplinary QI committee membership
- List the improvement goals that are specific, measurable, achievable, relevant, and time bound
- Generate of monthly/ quarterly performance reports on key quality metrics
- Use QI dashboards (1-3 page summary reports that provide a graphic summary of progress toward key process and outcome metrics; includes copies of ongoing PDSA cycles)
Components of CCL QI program

- Appropriate quality registries
- QA/case review - at least quarterly
- M&M conference - at least quarterly
- Quality Committee
  - Includes CCL director, manager, other stakeholders
  - Responsible for reviewing complications not discussed in M&M conferences
  - Responsible for reviewing other metrics of CCL quality, such as completion of time-outs, QA equipment checks, D2B times, and others as required by the hospital, state department of health, and TJC
SCAI recommended key conferences

- **Invasive Cardiology Morbidity and Mortality (Cath Lab M&M)**
  - Separate from clinical cardiology M&M
  - *Open review and assessment* of cath lab complications and in-hospital events following invasive cardiovascular procedures
  - Serious complications (death) take precedence over non-serious events
  - Should occur as soon as feasible after adverse event
  - Formal phase of care (pre-procedure, intra-procedure, post-procedure) analysis to achieve consensus regarding preventability of event

- **Invasive Case Review Conference (Case Review)**
  - *Open review* of random sample of cases
  - Diagnostic and interventional cases
  - Ideally peer review should be blinded and external when possible

- **Catheterization Laboratory Educational Conference**
  - Regular, frequent, *formal educational events*
  - Focus on cath lab practice and issues
  - Opportunity to discuss management of complex patients
Opportunity to review adverse events with peers; required by The Joint Commission

- Non-punitive: *aim is process improvement*

- Cases for review can be brought up by MD, Quality Officer, nurses or technicians
  - All deaths within 30 days of the procedure are reviewed at the next conference
  - All major complications, defined by ACCF/SCAI and/or state reporting requirements, are reviewed (See page 71-73 of NCDR coder's data dictionary for definition of vascular complications and bleeding)
  - Other complications aligned with process/quality improvement projects

- Should occur at least quarterly, more often if possible

- Ideally physicians, physician trainees, nursing and technical staff from CCL and representative from the hospital quality team should attend

- Case presentations by CVPs should be encouraged; case MD must be present

- A statement of confidentiality should appear on materials distributed in print or electronically
Must review
- In-lab death
- In-lab cardiac arrest
- Emergency CABG
- Stroke
- Unanticipated PCI (such as due to iatrogenic vessel dissection, embolic occlusion)

Should review
- Vascular complications
- Major access site bleeding
- Contrast induced nephropathy, in-hospital dialysis
- Anaphylactoid reaction to contrast
- Respiratory depression requiring reversal/intubation
- Medication error, verbal miscommunication
- Cases with excessive radiation, specially those resulting in skin damage
Case review

- Random review
  - Case for review should be identified by randomizing tool
  - Regular review by and review of at least one case per physician
  - Reviewer should be assigned randomly
  - Both diagnostic and interventional cases included
  - Peer review process should include
    - Evaluation of the documented indications
    - Angiographic quality and findings
    - Description of intervention
    - Post procedure plan
    - Requires operator’s attendance during case review
The following steps may be useful when trying to discuss a quality issue with the physician:

- Do your homework before presenting data
- Stick to the facts documented in the medical record
- Select appropriate setting to present data
- Enlist allies such as physician director
- Collaborate with physician to bring about the change
- Emphasize the “what’s in it for the physician and patient” message
- Reference best practices from ACC, SCAI, ACE or NCDR

Incorporation of “blameless culture” and “level playing field/ abolish authority gradient” philosophy at institutional level.
Resources & Support

- SCAI QI Committee Assistance: Info@scai.org
- SCAI QIT Updates: http://www.scai.org/QIT/default.aspx
- SCAI QIT Tip of the Month: http://www.scai.org/QITTip/default.aspx
Acknowledgments

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