SCIP Cardiac Measure

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Medicare Surgical Infection Prevention (SIP) Project Objective

To decrease the morbidity and mortality associated with postoperative infection in the Medicare patient population
Quality Indicators

National Surgical Infection Prevention Project

• Quality Indicator #1

  – Proportion of patients who receive antibiotics within 1 hour before surgical incision

Because of the longer required infusion times, vancomycin or fluoroquinolones, when indicated for beta-lactam allergy, may be started within 2 hours before the incision.
The SCIP Agenda

- The ultimate goal of the SCIP partnership is to reduce *nationally* the incidence of surgical complications by 25 percent by the year 2010.

- SCIP will promote universal use of evidence-based care processes known to reduce surgical complications.
SCIP Steering Committee

- American College of Surgeons
- American Hospital Association
- American Society of Anesthesiologists
- Association of peri-Operative Registered Nurses
- Agency for Healthcare Research and Quality

- Centers for Medicare & Medicaid Services
- Centers for Disease Control and Prevention
- Department of Veteran’s Affairs
- Institute for Healthcare Improvement
- Joint Commission on Accreditation of Healthcare Organizations
Surgical Care Improvement Project (SCIP)

• Preventable Complication Modules
  – Surgical infection prevention
  – Cardiovascular complication prevention
  – Venous thromboembolism prevention
  – Respiratory complication prevention
### Table 4. Relationship of Postoperative Complications to Unadjusted and Adjusted Total Hospital Costs and Length of Stay in the University of Michigan National Surgical Quality Improvement Program

<table>
<thead>
<tr>
<th>Complication</th>
<th>Hospital cost analysis, $ (95% CI)</th>
<th>Unadjusted</th>
<th>Adjusted for procedure complexity</th>
<th>Adjusted for complexity and patient characteristics</th>
<th>Adjusted for complexity, patient variables, and other complications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infectious</td>
<td>8,209 (5,566–10,853)</td>
<td>4,798 (4,110–5,486)</td>
<td>2,207 (1,301–3,113)</td>
<td>1,398 (377–2,418)</td>
<td></td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>13,256 (6,720–19,799)</td>
<td>13,330 (11,579–15,082)</td>
<td>7,519 (5,607–9,437)</td>
<td>7,789 (5,260–10,317)</td>
<td></td>
</tr>
<tr>
<td>Respiratory</td>
<td>54,430 (51,770–57,091)</td>
<td>44,554 (43,753–45,356)</td>
<td>51,409 (49,868–52,950)</td>
<td>52,466 (50,665–54,268)</td>
<td></td>
</tr>
<tr>
<td>Thromboembolic</td>
<td>28,355 (22,380–34,130)</td>
<td>15,727 (14,004–17,450)</td>
<td>18,341 (16,422–20,259)</td>
<td>18,310 (15,893–20,728)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Complication</th>
<th>Length of stay analysis, d (95% CI)</th>
<th>Unadjusted</th>
<th>Adjusted for procedure complexity</th>
<th>Adjusted for complexity and patient characteristics</th>
<th>Adjusted for complexity, patient variables, and other complications</th>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infectious</td>
<td>4.0 (1.6–7.2)</td>
<td>4.4 (1.8–8.2)</td>
<td>2.6 (0.7–5.2)</td>
<td>2.8 (0.8–5.4)</td>
<td></td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>2.8 (–1.5–12)</td>
<td>2.7 (–1.5–12)</td>
<td>–0.5 (–2.9–4.4)</td>
<td>–1.5 (–3.4–2.3)</td>
<td></td>
</tr>
<tr>
<td>Respiratory</td>
<td>20 (11–34)</td>
<td>18 (8.9–32)</td>
<td>5.8 (1.7–12)</td>
<td>5.5 (1.5–12)</td>
<td></td>
</tr>
<tr>
<td>Thromboembolic</td>
<td>15 (5.2–35)</td>
<td>12 (3.0–31)</td>
<td>4.7 (0–14)</td>
<td>2.8 (0.8–5.4)</td>
<td></td>
</tr>
</tbody>
</table>
# What Practices Will Most Improve Safety?

Evidence-Based Medicine Meets Patient Safety

<table>
<thead>
<tr>
<th>Patient Safety Target</th>
<th>Greatest Strength of Evidence</th>
<th>Patient Safety Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venous thromboembolism (VTE)</td>
<td>appropriate VTE prophylaxis</td>
<td>Use of perioperative β-blockers</td>
</tr>
<tr>
<td>Perioperative cardiac events in patients undergoing noncardiac surgery</td>
<td>Use of maximum sterile barriers during catheter insertion</td>
<td>appropriate use of antibiotic prophylaxis</td>
</tr>
<tr>
<td>Central venous catheter–related bloodstream infections</td>
<td>Asking that patients recall and restate what they have been told during informed consent</td>
<td>Continuous aspiration of subglottic secretions (CASS)</td>
</tr>
<tr>
<td>Surgical site infections</td>
<td>Use of pressure-relieving bedding materials</td>
<td>Use of real-time ultrasound guidance during central line insertion</td>
</tr>
<tr>
<td>Missed, incomplete, or not fully comprehended informed consent</td>
<td>Patient self-management using home monitoring devices</td>
<td>Various nutritional strategies</td>
</tr>
<tr>
<td>Ventilator-associated pneumonia</td>
<td></td>
<td>Antibiotic-impregnated catheters</td>
</tr>
<tr>
<td>Pressure ulcers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morbidity due to central venous catheter insertion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adverse events related to chronic anticoagulation with warfarin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morbidity and mortality in postsurgical and critically ill patients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central venous catheter–related bloodstream infections</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Leape et al. JAMA 2002
15. Evaluate each patient undergoing elective surgery for risk of an acute ischemic cardiac event during surgery, and provide prophylactic treatment of high-risk patients with beta blockers.

June 2003
SCIP Card-2

- **Performance Measure Name:** Surgery Patients on Beta-Blocker Therapy Prior to Admission Who Received a Beta-Blocker During the Perioperative Period.

- **Description:** Surgery patients on beta-blocker therapy prior to admission who received a beta-blocker during the perioperative period. The perioperative period for the SCIP Cardiac measures is defined as 24 hours prior to surgical incision through discharge from post-anesthesia care/recovery area.
Perioperative atenolol

2-year mortality

*%

Atenolol Placebo

Perioperative cardiac complications

%

Atenolol Placebo

Stroke CHF MI Death

Mangano et al. NEJM 1996
Wallace et al. Anesthesiology 1998
Patients scheduled for major vascular surgery
n=1351

Risk factors present (846)

DSE positive (173)

Randomized for beta-blockers (112)

Bisoprolol (59) Control (53)

No risk factors (505)

DSE negative (675)

Current beta-blockers (53)
Extensive ischemia/ rest WMA (8)

Poldermans et al. NEJM 1999;341:1789
Bisoprolol in high risk vascular patients

Poldermans et al. NEJM 1999;341:1789
Adjusted Odds Ratio for In-Hospital Death Associated with Perioperative Beta-Blocker Therapy among Patients Undergoing Major Noncardiac Surgery

Beta-Blocker Withdrawal

Hoeks et al. Eur J Vasc Endovasc Surg 2006
POISE

8351 randomized

4174 allocated metoprolol CR

4177 allocated matching placebo

8 lost to F/U

12 lost to F/U

99.8% complete 30 day follow-up and analyzed by ITT
<table>
<thead>
<tr>
<th>Outcome</th>
<th>Metoprolol (N=4174)</th>
<th>Placebo (N=4177)</th>
<th>HR (95% CI)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary outcome (CV death, nonfatal MI, nonfatal CA)</td>
<td>243 (5.8%)</td>
<td>290 (6.9%)</td>
<td>0.83 (0.70-0.99)</td>
<td>0.04</td>
</tr>
<tr>
<td>nonfatal MI</td>
<td>151 (3.6%)</td>
<td>215 (5.1%)</td>
<td>0.70 (0.56-0.86)</td>
<td>0.0007</td>
</tr>
<tr>
<td>CV death</td>
<td>75 (1.8%)</td>
<td>58 (1.4%)</td>
<td>1.30 (0.92-1.83)</td>
<td>0.14</td>
</tr>
<tr>
<td>nonfatal CA</td>
<td>21 (0.5%)</td>
<td>19 (0.5%)</td>
<td>1.11 (0.60-2.06)</td>
<td>0.74</td>
</tr>
</tbody>
</table>
## Secondary Outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Metoprolol (N=4174)</th>
<th>Placebo (N=4177)</th>
<th>HR (95% CI)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>total mortality</td>
<td>129 (3.1%)</td>
<td>97 (2.3%)</td>
<td>1.33 (1.02-1.74)</td>
<td>0.03</td>
</tr>
<tr>
<td>stroke</td>
<td>41 (1.0%)</td>
<td>19 (0.5%)</td>
<td>2.17 (1.26-3.73)</td>
<td>0.005</td>
</tr>
</tbody>
</table>
Bradycardia and beta-blockers

<table>
<thead>
<tr>
<th>Study</th>
<th>β blockers n/N</th>
<th>Control n/N</th>
<th>Odds ratio (95% CI)</th>
<th>Odds ratio (95% CI)</th>
<th>Weight (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coleman*</td>
<td>1/27</td>
<td>0/15</td>
<td></td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td>Gibson*</td>
<td>1/21</td>
<td>0/19</td>
<td></td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td>Liu*</td>
<td>2/15</td>
<td>2/15</td>
<td>4.74 (0.08-283.15)</td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td>Magnusson*</td>
<td>1/15</td>
<td>0/15</td>
<td></td>
<td></td>
<td>0.3</td>
</tr>
<tr>
<td>Miller*</td>
<td>1/30</td>
<td>0/15</td>
<td>1.00 (0.13-7.92)</td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td>POBBLE*</td>
<td>47/55</td>
<td>28/48</td>
<td>7.39 (0.15-372.38)</td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td>Stone*</td>
<td>12/89</td>
<td>2/39</td>
<td>4.48 (0.07-286.49)</td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td>Subtotal</td>
<td>65/252</td>
<td>32/166</td>
<td>3.88 (1.63-9.23)</td>
<td></td>
<td>1.7</td>
</tr>
</tbody>
</table>

Heterogeneity: P=0.0%; df=6
Effect: Z=3.51, p<0.0001

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<tr>
<th>Study</th>
<th>β blockers n/N</th>
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<th>Weight (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BayliFF*</td>
<td>24/49</td>
<td>13/50</td>
<td>2.64 (1.18-5.94)</td>
<td></td>
<td>2.0</td>
</tr>
<tr>
<td>Cucchiaria*</td>
<td>5/37</td>
<td>5/37</td>
<td>1.00 (0.27-3.76)</td>
<td></td>
<td>0.7</td>
</tr>
<tr>
<td>Davies*</td>
<td>6/20</td>
<td>11/20</td>
<td>0.37 (0.11-1.27)</td>
<td></td>
<td>0.9</td>
</tr>
<tr>
<td>MaV5*</td>
<td>114/4166</td>
<td>84/250</td>
<td>1.70 (1.19-2.43)</td>
<td></td>
<td>10.2</td>
</tr>
<tr>
<td>Miller*</td>
<td>39/368</td>
<td>19/180</td>
<td>1.00 (0.56-1.79)</td>
<td></td>
<td>3.9</td>
</tr>
<tr>
<td>POISE*</td>
<td>626/4174</td>
<td>404/4177</td>
<td>1.64 (1.44-1.86)</td>
<td></td>
<td>77.1</td>
</tr>
<tr>
<td>Wallace*</td>
<td>13/99</td>
<td>13/101</td>
<td>1.02 (0.45-2.33)</td>
<td></td>
<td>1.9</td>
</tr>
<tr>
<td>Raby*</td>
<td>0/15</td>
<td>0/11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td>827/5008</td>
<td>549/4826</td>
<td>1.58 (1.41-1.78)</td>
<td></td>
<td>96.7</td>
</tr>
</tbody>
</table>

Heterogeneity: P=46.3%; df=6
Effect: Z=7.75, p<0.0001

Overall
<table>
<thead>
<tr>
<th>Study</th>
<th>β blockers n/N</th>
<th>Control n/N</th>
<th>Odds ratio (95% CI)</th>
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</tr>
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Heterogeneity: P=0.0%; df=6
Effect: Z=3.51, p<0.0001

Interaction p-value 0.041

Bangalore et al. Lancet 2008
Risk of stroke in chronic beta blockade

Van Lier et al. Am J Cardiol 2009
Bisoprolol and Fluvastatin for the Reduction of Perioperative Cardiac Mortality and Myocardial Infarction in Intermediate-Risk Patients Undergoing Noncardiovascular Surgery

A Randomized Controlled Trial (DECREASE-IV)

Martin Dünkelgrun, MD,* Eric Boersma, PhD,† Olaf Schouten, MD,* Ankie W. M. M. Koopman-van Gemert, MD,‡ Frans van Poorten, MD,§ Jeroen J. Bax, MD,‖ Ian R. Thomson, MD,|| and Don Poldermans, MD,** for The Dutch Echocardiographic Cardiac Risk Evaluation Applying Stress Echocardiography Study Group

Ann Surg June 2009
DECREASE-IV
Preoperative Anemia and Mortality

Beattie WS et al. Anesthesiology 2009
SCIP Surgical Care Improvement Project
A National Quality Partnership

Making Surgery Safer

Preliminary Project Overview as of September 14, 2004

A Partnership for Better Care
What Works to Improve Care?

• CME and didactic programs have little impact on changing behavior!

• Effective strategies include
  • reminder systems
  • standing orders
  • clinical pathways or protocols
  • opinion leaders and physician champions
  • self-monitoring and feedback

Payment-for-quality programs should include evaluation mechanisms that determine whether program goals are achieved or whether inadvertent adverse consequences result.

Monitoring of the program is needed to build an evidence base for payment-for-quality program outcomes.

Evaluation is also necessary to ensure that payment-for-quality programs do not increase disparities (e.g., racial/ethnic, socioeconomic, regional) in health care and do not have unintended consequences either at the patient (e.g., impact on populations such as older persons with multiple comorbidities) or provider (e.g., administrative burden placed on physicians and hospitals) level.

Bufalino et al. Circulation 2006
ACC/AHA PRACTICE GUIDELINES

ACC/AHA 2006 Guideline Update on Perioperative Cardiovascular Evaluation for Noncardiac Surgery: Focused Update on Perioperative Beta-Blocker Therapy

A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines
(Writing Committee to Update the 2002 Guidelines on Perioperative Cardiovascular Evaluation for Noncardiac Surgery)

Developed in Collaboration With (organizations to be added post approval)

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2. PERIOPERATIVE MEDICAL THERAPY

2.1. Perioperative Beta-Blocker Therapy

Recommendations for Beta-Blocker Medical Therapy (Table 1):

Class I

1. Beta blockers should be continued in patients undergoing surgery who are receiving beta-blockers to treat angina, symptomatic arrhythmias, hypertension, or other ACC/AHA Class I guideline indications. *(Level of Evidence: C)*

2. Beta blockers should be given to patients undergoing vascular surgery at high cardiac risk owing to the finding of ischemia on preoperative testing. *(Level of Evidence: B)*
Table 11. Recommendations for Perioperative Beta-Blocker Therapy Based on Published Randomized Clinical Trials

<table>
<thead>
<tr>
<th>Surgery</th>
<th>No Clinical Risk Factors</th>
<th>1 or More Clinical Risk Factors</th>
<th>CHD or High Cardiac Risk</th>
<th>Patients Currently Taking Beta Blockers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vascular</td>
<td>Class IIb, Level of Evidence: B</td>
<td>Class IIa, Level of Evidence: B</td>
<td>Patients found to have myocardial ischemia on preoperative testing: Class I, Level of Evidence: B*</td>
<td>Class I, Level of Evidence: B</td>
</tr>
<tr>
<td>Intermediate risk</td>
<td>...</td>
<td>Class IIb, Level of Evidence: C</td>
<td>Class IIa, Level of Evidence: B</td>
<td>Class I, Level of Evidence: C</td>
</tr>
<tr>
<td>Low risk</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>Class I, Level of Evidence: C</td>
</tr>
</tbody>
</table>

See Table 4 for definition of procedures. Ellipses (…) indicate that data were insufficient to determine a class of recommendation or level of evidence. See text for further discussion. CHD indicates coronary heart disease.

*Applies to patients found to have coronary ischemia on preoperative testing.
†Applies to patients found to have coronary heart disease.
SCIP Card-2

• Performance Measure Name: Surgery Patients on Beta-Blocker Therapy Prior to Admission Who Received a Beta-Blocker During the Perioperative Period.

• Description: Surgery patients on beta-blocker therapy prior to admission who received a beta-blocker during the perioperative period. The perioperative period for the SCIP Cardiac measures is defined as 24 hours prior to surgical incision through discharge from post-anesthesia care/recovery area.
SCIP Card-2

- Type of Measure: **Process**
- Improvement Noted As: **An increase in the rate.**
- Numerator Statement: **Surgery patients on beta-blocker therapy prior to admission who receive a beta-blocker during the perioperative period.**
  - Included Populations: **Not applicable**
- Excluded Populations: **None**
- Data Elements:
  - **Beta-Blocker Perioperative**

- Denominator Statement: **All surgery patients on beta-blocker therapy prior to admission**
SCIP Card-2

- Included Populations:
- *ICD-9-CM Principal Procedure Code* of selected surgeries (refer to Appendix A, Table 5.10 for ICD-9-CM codes).

- Excluded Populations:
  - Patients who are less than 18 years of age.
  - Patients who did not receive beta-blockers due to contraindications as documented in the medical record. (HR<50bpm)
  - Patients whose ICD-9-CM principal procedure occurred prior to the date of admission.
  - Patients whose ICD-9-CM principal procedure was performed entirely by laparoscope.
  - Patients who expired during the perioperative period.
  - Pregnant patients taking a beta-blocker prior to admission.
  - Patients involved in clinical trials.
Qnet Quest

• The abstractor must find documentation that the beta blocker was given during the specific timeframe of 24 hours prior to surgical incision through discharge from the post anesthesia care/recovery area. A date and time of administration would be required to answer that the patient received the beta blocker in this timeframe.
Improvement in Composite Process Measures among Hospitals Engaged in Both Pay for Performance and Public Reporting and Those Engaged Only in Public Reporting

Summary

• In patients already taking beta-blockers, continuation of beta-blockers is associated with improved outcome.
• Current SCIP measure ensures beta-blockers day of surgery, but does not measure continuation.
• TEP will be re-evaluating measure.