Surgical Care Improvement Project

Past, present, and future

Dale W. Bratzler, DO, MPH
President and CEO
Oklahoma Foundation for Medical Quality

This material was prepared by Oklahoma Foundation for Medical Quality, the Medicare Quality Improvement Organization for Oklahoma, under contract with the Centers for Medicare & Medicaid Services (CMS), an agency of the U.S. Department of Health and Human Services. The contents presented do not necessarily reflect CMS policy.
Where we started.......the measurement
| SCIP Inf 1 | Antibiotic within 60 minutes before incision* |
| SCIP Inf 2 | Antibiotic consistent with guidelines* |
| SCIP Inf 3 | Antibiotic stopped within 24 hours of surgery end |
| SCIP Inf 4 | Glucose control for cardiac surgery |
| SCIP Inf 6 | Appropriate hair removal |
| SCIP Inf 9 | Urinary catheter removal within 2 days after surgery |
| SCIP Inf 10 | Normothermia or active warming in OR |
| SCIP Card 2 | Perioperative beta-blocker in patients on beta-blockers as a home medication |
| SCIP VTE 1 | Recommended VTE prophylaxis ordered |
| SCIP VTE 2 | Recommended VTE prophylaxis implemented within 24 hours before or after surgery |

*Also collected and reported for select outpatient operations.*
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

Committee that met between 2003 to 2009 to guide development and implementation of the national project.
Initial Quality Indicators
National Surgical Infection Prevention Project

– Proportion of patients with antibiotic initiated within 1 hour before surgical incision

– Proportion of patients who receive prophylactic antibiotics consistent with current recommendations

– Proportion of patients whose prophylactic antibiotics were discontinued within 24 hours of surgery end time

Measures implemented nationally in 2002 were based on literature review and consensus of national experts on surgical infection prevention, and authors of multiple guidelines on surgical antimicrobial prophylaxis.
Based on Principles of Surgical Antimicrobial Prophylaxis

• Delivery of an antibiotic just before incision results in the lowest rate of SSI
  – Infection rates go up if given too early or if given after incision

• Narrow spectrum antibiotic that targets the organisms likely to be encountered for the operation

• Maintain adequate antibiotic levels in the tissue the entire time the wound is open in the OR

• For most operations, the standard of care is to give an IV antibiotic just prior to incision
  – IM antibiotics are not reliably absorbed
  – Oral fluoroquinolones only for urologic surgery
Principles of Surgical Antimicrobial Prophylaxis

- Multiple studies have evaluated single dose or short-course antibiotic prophylaxis compared to multi-day courses in a wide variety of operations
  - No difference in rates of infection
  - When infection occurs, more likely to be with a resistant organism
  - Increases risk of *C. difficile* enterocolitis
The American College of Surgeons has been involved since the outset!
Acknowledgment:

The following organizations have endorsed this Advisory Statement: American Academy of Orthopaedic Surgeons; American Association of Critical Care Nurses; American Association of Nurse Anesthetists; American College of Surgeons; American College of Osteopathic Surgeons; American Geriatrics Society; American Society of Anesthesiologists; American Society of Colon and Rectal Surgeons; American Society of Health-System Pharmacists; American Society of PeriAnesthesia Nurses; Ascension Health; Association of periOperative Registered Nurses; Association for Professionals in Infection Control and Epidemiology; Infectious Diseases Society of America; The Medical Letter; Premier, Inc.; Society for Healthcare Epidemiology of America; Society of Thoracic Surgeons; and the Surgical Infection Society.

The following organizations have had the opportunity to review and provide comment on this Advisory Statement: American College of Obstetricians and Gynecologists; American Hospital Association; Centers for Disease Control and Prevention; Joint Commission on Accreditation of Healthcare; and VHA, Inc.
Key point – the national performance measures are not made up by CMS or The Joint Commission.... the measures are based on published guidelines with explicit input from surgical specialty societies and practicing physicians.

The measures are standardized nationally and publicly vetted through open public comment by the National Quality Forum. Reporting of the measures is the same for every hospital in the nation.
Issues Related to SCIP Infection 1

• How close to incision can the antibiotic be started? Does the infusion need to be completed?
  – Very little data upon which to base recommendation
  • Good pharmacokinetic studies show that peak tissue levels of drugs such as cefazolin are achieved within 20-40 minutes of infusion
    – Do you need peak levels at incision?
    – When is the greatest risk of surgical infection – at the start or end of the operation?
Issues Related to SCIP Infection 1

• We do know…
  – Multiple studies demonstrate that starting the antibiotic close to the time of incision reduces the infection rate – newer studies suggest within 30 minutes (vancomycin within 15-60 minutes)
  – Studies with tissue biopsy show antibiotic levels that exceed the MIC of common skin organisms at the time of incision when antibiotics given shortly before incision
  – The closer to incision the antibiotic is given, the greater the likelihood of persistent tissue levels at the end of the operation
# Antibiotic Recommendations

<table>
<thead>
<tr>
<th>Surgery Type</th>
<th>Antimicrobial recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hip or knee arthroplasty</td>
<td>Preferred: Cefazolin or cefuroxime</td>
</tr>
<tr>
<td></td>
<td>If patient high risk for MRSA: Vancomycin</td>
</tr>
<tr>
<td></td>
<td>Beta-lactam allergy:</td>
</tr>
<tr>
<td></td>
<td>• Vancomycin or clindamycin</td>
</tr>
<tr>
<td>Cardiac or vascular</td>
<td>Preferred: Cefazolin or cefuroxime</td>
</tr>
<tr>
<td></td>
<td>If patient high risk for MRSA: Vancomycin</td>
</tr>
<tr>
<td></td>
<td>Beta-lactam allergy:</td>
</tr>
<tr>
<td></td>
<td>• Vancomycin or clindamycin</td>
</tr>
</tbody>
</table>

* For the purposes of national performance measurement a case will pass the antibiotic selection performance measure if vancomycin is used for prophylaxis (in the absence of a documented beta-lactam allergy) if there is physician documentation of the rationale for vancomycin use.

## Antibiotic Recommendations (continued)

<table>
<thead>
<tr>
<th>Surgery Type</th>
<th>Antimicrobial recommendations</th>
</tr>
</thead>
</table>
| **Hysterectomy** | • Cefotetan, cefazolin, cefoxitin, cefuroxime, or ampicillin-sulbactam  
**Beta-lactam allergy:**  
• Clindamycin + gentamicin or fluoroquinolone* or aztreonam  
• Metronidazole + gentamicin or fluoroquinolone*  
• Clindamycin monotherapy  
• Metronidazole monotherapy |
| **Colorectal †** | • Cefotetan, cefoxitin, cefazolin + metronidazole, ampicillin-sulbactam, or ertapenem (single-dose)  
**Beta-lactam allergy:**  
• Clindamycin + gentamicin or fluoroquinolone* or aztreonam  
• Metronidazole + gentamicin or fluoroquinolone* |

* Ciprofloxacin, levofloxacin, gatifloxacin, or moxifloxacin.

Clindamycin and metronidazole monophylaxis are no longer recommended in new ACOG guidelines.

Should vancomycin be used routinely?

- Controversial
  - Some authors highlight that use of a couple of doses for prophylaxis may reduce the need for weeks of therapy for an infection
  - However, a lot of patients who would never get a SSI will be exposed to use of vancomycin
  - MICs to vancomycin are increasing in many centers

*CDC and others proposing additional studies*
Why can’t I use the antibiotics recommended for patients with beta-lactam allergy (in the absence of a documented allergy)

- Drugs such as fluoroquinolones should not be routinely used for surgical prophylaxis
  - Very high rates of gram negative resistance
  - Not great against common SSI organisms (such as \textit{S. aureus})
  - Associated with \textit{C. difficile} infection and in some centers tied to increasing MRSA rates
Preoperative Screening

• If preoperative MRSA colonization screening is done in advance of surgery there may be utility to
  – Nasal mupirocin twice daily for 5 days
  – CHG bathing at home
  – Vancomycin for surgical prophylaxis

You do not “treat” colonization. You may provide additional care before surgery (CHG baths, etc), and you may use or add vancomycin as a preoperative antibiotic. But, you do not continue vancomycin after surgery because you do not treat colonization.

What about the pre-surgical prep?

Chlorhexidine–Alcohol versus Povidone–Iodine for Surgical-Site Antisepsis

Rabih O. Darouiche, M.D., Matthew J. Wall, Jr., M.D., Kamal M.F. Itani, M.D., Mary F. Otterson, M.D., Alexandra L. Webb, M.D., Matthew M. Carrick, M.D., Harold J. Miller, M.D., Sarnir S. Awad, M.D., Cynthia T. Crosby, B.S., Michael C. Mosier, Ph.D., Atef AlSharif, M.D., and David H. Berger, M.D.

CONCLUSIONS: Skin preparation solution is an important factor in the prevention of surgical-site infections. Iodophor-based compounds may be superior to chlorhexidine for this purpose in general surgery patients.

CHG-alcohol vs iodine-alone

My key point from these studies – use an alcohol-based prep!

CONCLUSIONS: Skin preparation solution is an important factor in the prevention of surgical-site infections. Iodophor-based compounds may be superior to chlorhexidine for this purpose in general surgery patients.
Studies Comparing Single versus Multiple Antibiotic Doses in Colorectal Surgery

Surgical infection rates were no different in those patients that got one versus multiple doses of antibiotics!

Fig. 5 Effect of single versus multiple doses of antibiotic in preventing surgical wound infection in colorectal surgery. Values in parentheses are number of doses. c.i., Confidence interval.
SCIP Infection 4

- Proportion of cardiac surgery patients whose post-operative day 1 and 2 AM blood sugar is 200 mg/dL or less.
Glucose Control

• May be important for all operations
  – However, incidence of hyperglycemia may be less for non-cardiac surgery patients
  – Cardiac surgery patients have high rates of hyperglycemia (~30% diabetic coming in the door), use of inotropes that may elevate blood sugar, and unrecognized diabetes
AACE/ADA Consensus Statement

AMERICAN ASSOCIATION OF CLINICAL ENDOCRINOLOGISTS
AND AMERICAN DIABETES ASSOCIATION
CONSENSUS STATEMENT ON INPATIENT GLYCEMIC CONTROL

Etie S. Moghissi, MD, FACP, FACE; Mary T. Korytkowski, MD;
Monica DiNardo, MSN, CRNP, CDE; Daniel Einhorn, MD, FACP, FACE;
Richard Hellman, MD, FACP, FACE; Irl B. Hirsch, MD; Silvio E. Inzucchi, MD;
Faramarz Ismail-Beigi, MD, PhD; M. Sue Kirkman, MD;
Guillermo E. Umpierrez, MD, FACP, FACE

SUMMARY OF RECOMMENDATIONS

I. Critically Ill Patients
- Insulin therapy should be initiated for treatment of persistent hyperglycemia, starting at a threshold of no greater than 180 mg/dL (10.0 mmol/L).
- Once insulin therapy has been started, a glucose range of 140 to 180 mg/dL (7.8 to 10.0 mmol/L) is recommended for the majority of critically ill patients.
- Intravenous insulin infusions are the preferred method for achieving and maintaining glycemic control in critically ill patients.
- Validated insulin infusion protocols with demonstrated safety and efficacy, and with low rates of occurrence

- Clinical judgment and ongoing assessment of clinical status must be incorporated into day-to-day decisions regarding treatment of hyperglycemia.

III. Safety Issues
- Over-treatment and undertreatment of hyperglycemia represent major safety concerns.
- Education of hospital personnel is essential in engaging the support of those involved in the care of inpatients with hyperglycemia.
- Caution is required in interpreting results of POC glucose meters in patients with anemia, polycythemia, etc.
SCIP Cardiac 2

- The proportion of patients undergoing surgery who take a beta-blocker as a home medication who have it continued peri-operatively
  - To pass measure, patient may take the medication at home (within 24 hours before incision), take it with a sip of water before surgery, or be given a beta-blocker intra-operatively or in the immediate postop period
    - Or, an explicit reason to not continue the beta-blocker must be documented by the physician in the chart
  - MUST be documented in the chart.
Guidelines for pre-operative cardiac risk assessment and perioperative cardiac management in non-cardiac surgery

The Task Force for Preoperative Cardiac Risk Assessment and Perioperative Cardiac Management in Non-cardiac Surgery of the European Society of Cardiology (ESC) and endorsed by the European Society of Anaesthesiology (ESA)

Authors/Task Force Members: Don Poldermans; (Chairperson) (The Netherlands)*; Jeroen J. Bax (The Netherlands); Eric Boersma (The Netherlands); Stefan De Hert

Available at: http://www.escardio.org/guidelines.
# Recommendations on β-blockers

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Class</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>β-Blockers are recommended in patients who have known IHD or myocardial ischaemia according to pre-operative stress testing&lt;sup&gt;a&lt;/sup&gt;</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>β-Blockers are recommended in patients scheduled for high-risk surgery&lt;sup&gt;a&lt;/sup&gt;</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Continuation of β-blockers is recommended in patients previously treated with β-blockers because of IHD, arrhythmias, or hypertension</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>β-Blockers should be considered for patients scheduled for intermediate-risk surgery&lt;sup&gt;a&lt;/sup&gt;</td>
<td>IIa</td>
<td>B</td>
</tr>
<tr>
<td>Continuation in patients previously treated with β-blockers because of chronic heart failure with systolic dysfunction should be considered</td>
<td>IIa</td>
<td>C</td>
</tr>
<tr>
<td>β-Blockers may be considered in patients scheduled for low-risk surgery with risk factor(s)</td>
<td>IIb</td>
<td>B</td>
</tr>
<tr>
<td>Perioperative high-dose β-blockers without titration are not recommended</td>
<td>III</td>
<td>A</td>
</tr>
<tr>
<td>β-Blockers are not recommended in patients scheduled for low-risk surgery without risk factors</td>
<td>III</td>
<td>B</td>
</tr>
</tbody>
</table>

<sup>a</sup>Treatment should be initiated optimally between 30 days and at least 1 week before surgery. Target: heart rate 60–70 beats/min, systolic blood pressure >100 mmHg.

<sup>b</sup>Class of recommendation.

<sup>c</sup>Level of evidence.

IHD = ischaemic heart disease.
PRACTICE GUIDELINE: FOCUSED UPDATE

2009 ACCF/AHA Focused Update on Perioperative Beta Blockade

A Report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines

Developed in Collaboration With the American Society of Echocardiography, American Society of Nuclear Cardiology, Heart Rhythm Society, Society of Cardiovascular Anesthesiologists, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine, and Society for Vascular Surgery

2009 Writing Group to Review New Evidence and Update the 2007 Guidelines on Perioperative Cardiovascular Evaluation and Care for Noncardiac Surgery

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Hugh Calkins, MD, FACC, FAHA‡
Lee A. Fleisher, MD, FACC, FAHA§
William K. Freeman, MD, FACC∥
James B. Froehlich, MD, MPH, FACC†
Edward K. Kasper, MD, FACC, FAHA†
Judy R. Kersten, MD, FACC¶
John F. Robb, MD, FACC, FAHA#
R. James Valentine, MD**

*SVM Representative; †ACCF/AHA Task Force on Practice Guidelines Liaison; ‡HRS Representative; §ACCF/AHA Representative; ||ASE Representative; ¶SCAI Representative; $#CAI Representative; **SVS Representative
<table>
<thead>
<tr>
<th>Class</th>
<th>2007 Perioperative Guideline Recommendations</th>
<th>2009 Perioperative Focused Update Recommendations</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I</td>
<td>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. <em>(Level of Evidence: C)</em></td>
<td>1. Beta blockers should be continued in patients undergoing surgery who are receiving beta blockers for treatment of conditions with ACCF/AHA Class I guideline indications for the drugs. <em>(Level of Evidence: C)</em></td>
<td>2007 recommendation remains current in 2009 update with revised wording.</td>
</tr>
<tr>
<td></td>
<td>2. Beta blockers should be given to patients undergoing vascular surgery who are at high cardiac risk owing to the finding of ischemia on preoperative testing. <em>(Level of Evidence: B)</em></td>
<td></td>
<td>Deleted/combined recommendation (class of recommendation changed from I to Ila for patients with cardiac ischemia on preoperative testing).</td>
</tr>
<tr>
<td>Class Ila</td>
<td>1. Beta blockers are probably recommended for patients undergoing vascular surgery in whom preoperative assessment identifies coronary heart disease. <em>(Level of Evidence: B)</em></td>
<td>1. Beta blockers titrated to heart rate and blood pressure are probably recommended for patients undergoing vascular surgery who are at high cardiac risk owing to coronary artery disease or the finding of cardiac ischemia on preoperative testing <em>(4,5).</em> <em>(Level of Evidence: B)</em></td>
<td>Modified/combined recommendation (wording revised and class of recommendation changed from I to Ila for patients with cardiac ischemia on preoperative testing).</td>
</tr>
</tbody>
</table>
SCIP VTE Measures

- VTE-1 Proportion of surgical patients who have recommended forms of VTE prophylaxis ordered

- VTE-2 Proportion of surgical patients who receive recommended forms of VTE within 24 hours before or after surgery
Pitfalls for VTE prophylaxis

• Ambulation alone is not sufficient – early ambulation is the norm but VTE has not gone away
  – Prophylaxis should continue until discharge for most patients

• Mechanical devices don’t work when they are on the floor or next to the bed
  – Well documented high rates of non-compliance in multiple studies
Risk Factors for DVT or PE
Nested Case-Control Study (n=625 case-control pairs)

- Surgery
- Trauma
- Inpatient
- Malignancy with chemotherapy
- Malignancy without chemotherapy
- Central venous catheter or pacemaker
- Neurologic disease
- Superficial vein thrombosis
- Varicose veins/age 45 yr
- Varicose veins/age 60 yr
- Varicose veins/age 70 yr
- CHF, VTE incidental on autopsy
- CHF, antemortem VTE/causal for death
- Liver disease
Cumulative Incidence of VTE After Primary Hip or Knee Replacement

![Graph showing the cumulative incidence of VTE after primary hip or knee replacement. The graph compares the incidence of VTE between primary hip and primary knee replacement over a period of 91 days.](image)

Practice Parameters for the Prevention of Venous Thrombosis

Thomas J. Stahl, M.D., Sharon G. Gregorcyk, M.D., Neil H. Hyman, M.D., W. Donald Buie, M.D., and the Standards Practice Task Force of The American Society of Colon and Rectal Surgeons

The American Society of Colon and Rectal Surgeons is dedicated to ensuring high quality patient care by advancing the science, prevention, and management of disorders and diseases of the colon, rectum, and anus. The Standards Committee is composed of Society members who are chosen specific procedure must be made by the physician in light of all of the circumstances presented by the individual patient. The evidence-based guidelines are used to categorize each recommendation by Level of Evidence and Grade of Recommendation.
New Measures for SCIP
Catheter-associated Urinary Tract Infections

• Most common HAI (40%)
• More common in older adults
  – 44% of HAIs vs. 28% in younger adults
• 500,000+ cases annually
• 5% complicated by bacteremia
• $676/case, $424-$452 million/year
The indwelling urinary (Foley) catheter

Associated with **84%** of nosocomial UTIs

**DURATION** = biggest UTI risk factor
Urinary catheter use in hospitals

• Widespread
  – 40% of Medicare inpatients (MPSMS)
  – 86% of Medicare patients w/selected major surgeries (SIP)
  – 25% of Emergency Department patients
    • 75% are in patients > 65 years
Urinary catheter use in hospitals

- Often inappropriate
  - 30-50% of catheter-days on medical services
  - 50% of ED use

- Often overlooked or forgotten
  - Physicians don’t know who has a catheter

- Often unmonitored
  - 23% of hospitals monitor who has catheters
  - 14% monitor catheter duration or discontinuation
Based on Medicare inpatients (N=35904) undergoing major surgery in 2001:

- Eighty-six percent of patients undergoing major operations had perioperative indwelling urinary catheters. Of these, 50% had catheters for longer than 2 days postoperatively. These patients were twice as likely to develop urinary tract infections than patients with catheterization of 2 days or less.
SCIP Infection 9

- Urinary catheter removed on postoperative day 1 (POD 1) or postoperative day 2 (POD 2) with day of surgery being day zero.
  - Excluded: Patients who had a urological, gynecological or perineal operation performed, (also ICU patients on diuretics)
  - Excluded: Explicit physician documentation of a reason to not remove

*Final IPPS rule required hospitals to start publicly reporting this measure for January 2010 discharges to receive full Medicare Annual Payment Update*
Consequences of Hypothermia

Perioperative Patients

- Adverse myocardial outcomes
  - 1.5°C core temperature decrease triples the risk of morbid myocardial events
- Coagulopathy
  - impairs platelet function and coagulation cascade
- Reduces drug metabolism
- Thermal discomfort (patient satisfaction)
- Surgical wound infection
  - thermoregulatory vasoconstriction

Temperature and Tissue $O_2$ tension

- Subcut temp increase 4°C
- Subcut $O_2$ tension increase 40 torr
- Linear correlation between temperature and $O_2$ tension
- Threefold increase in local perfusion

Rabkin. *Arch Surg* 1987;122:221
Redistribution Hypothermia

Vasoconstricted → Anesthesia → Vasodilated
Intraoperative Heat Transfer

Convection

Radiation

Evaporation

Conduction
Myocardial Outcomes: n=300

<table>
<thead>
<tr>
<th></th>
<th>Normothermic</th>
<th>Hypothermic</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (°C)</td>
<td>36.7 ± 0.1</td>
<td>35.3 ± 0.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Morbid Cardiac Events (%)</td>
<td>2</td>
<td>7</td>
<td>=0.04</td>
</tr>
<tr>
<td>Ventricular Tachycardia (%)</td>
<td>3</td>
<td>8</td>
<td>=0.03</td>
</tr>
</tbody>
</table>

Three-fold increase in norepinephrine during hypothermia
No correlation between ischemia and shivering

Frank. *JAMA* 1997; 277:1127
Temperature and SSI Following Colectomy

<table>
<thead>
<tr>
<th></th>
<th>Normo (104)</th>
<th>Hypo (96)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfused pts</td>
<td>23</td>
<td>34</td>
<td>.054</td>
</tr>
<tr>
<td>Units transfused</td>
<td>0.4 ± 1</td>
<td>0.8 ± 1.2</td>
<td>.01</td>
</tr>
<tr>
<td>Vasoconstr-O.R.</td>
<td>6</td>
<td>77</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Vasoconst-PACU</td>
<td>21</td>
<td>81</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Kurz. NEJM 1996;334:1209
Temperature and SSI Following Colectomy

<table>
<thead>
<tr>
<th></th>
<th>Normo (104)</th>
<th>Hypo (96)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSI</td>
<td>6</td>
<td>18</td>
<td>.009</td>
</tr>
<tr>
<td>Collagen dep</td>
<td>328</td>
<td>254</td>
<td>.04</td>
</tr>
<tr>
<td>Time to eat</td>
<td>5.6d</td>
<td>6.5d</td>
<td>&lt;.006</td>
</tr>
</tbody>
</table>

SCIP Infection 10
Surgical Normothermia

• Proportion of patients undergoing any operation (any age) who have anesthesia for more than one hour, who have active warming devices* used or achieve normothermia within 30 minutes before or 15 minutes after the end of anesthesia
  – Measure aligned with physician (PQRI) measure
  – Excludes patients with intentional hypothermia and all patients on cardiopulmonary bypass
  – NQF endorsed as of July 2008

*Active warming defined as: forced warm air, warm water garments, or conductive over-patient resistive heating blankets.
# Pharmacologic Therapy for Heart Failure

<table>
<thead>
<tr>
<th>Drug Category</th>
<th>Improved symptoms</th>
<th>Decreased mortality</th>
<th>Prevention of CHF</th>
<th>Neurohumoral Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diuretics</td>
<td>yes</td>
<td>?</td>
<td>?</td>
<td>NO</td>
</tr>
<tr>
<td>DIGOXIN</td>
<td>yes</td>
<td>=</td>
<td>minimal</td>
<td>yes</td>
</tr>
<tr>
<td>INOTROPES</td>
<td>yes</td>
<td>mort.</td>
<td>?</td>
<td>no</td>
</tr>
<tr>
<td>Vasodil.(Nitrates)</td>
<td>yes</td>
<td>yes</td>
<td>?</td>
<td>no</td>
</tr>
<tr>
<td>ACEI</td>
<td>yes</td>
<td>YES</td>
<td>yes</td>
<td>YES</td>
</tr>
<tr>
<td>Other neurohormonal control drugs</td>
<td>yes</td>
<td>+ / -</td>
<td>?</td>
<td>YES</td>
</tr>
</tbody>
</table>
What are we at now?
Changes in National Performance
Baseline to Q4, 2009

Changes in National Performance

Baseline to Q4, 2009

Changes in National Performance

Baseline to Q4, 2009

Beta-blocker

Percent
Changes in National Performance

Baseline to Q4, 2009


(Brattzler, unpublished data)
## State Performance and National Benchmarks

<table>
<thead>
<tr>
<th>Measure</th>
<th>Kansas</th>
<th>National Benchmark</th>
</tr>
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<tbody>
<tr>
<td>SCIP Inf 1 – Abx in 60 minutes</td>
<td>95.4</td>
<td>99.8</td>
</tr>
<tr>
<td>SCIP Inf 2 – Abx consistent with guideline</td>
<td>96.4</td>
<td>99.8</td>
</tr>
<tr>
<td>SCIP Inf 3 – Abx discontinued 24 hours</td>
<td>93.3</td>
<td>99.5</td>
</tr>
<tr>
<td>SCIP Inf 4 – Glucose control cardiac surgery</td>
<td>92.4</td>
<td>99.6</td>
</tr>
<tr>
<td>SCIP Inf 6 – Hair removal</td>
<td>99.5</td>
<td>100</td>
</tr>
<tr>
<td>SCIP Card 2 – Perioperative beta-blocker</td>
<td>90.0</td>
<td>99.8</td>
</tr>
<tr>
<td>SCIP VTE 1 – Recommended VTE prophylaxis</td>
<td>91.2</td>
<td>99.8</td>
</tr>
<tr>
<td>SCIP VTE 2 – Timely VTE prophylaxis</td>
<td>90.1</td>
<td>99.7</td>
</tr>
<tr>
<td>SCIP Inf 9 – Urinary catheter removal</td>
<td>87.9</td>
<td>99.2</td>
</tr>
<tr>
<td>SCIP Inf 10 – Perioperative normothermia</td>
<td>97.8</td>
<td>99.9</td>
</tr>
<tr>
<td>HF-3 – ACEI/ARB for LV systolic dysfunction</td>
<td>90.5</td>
<td>99.8</td>
</tr>
</tbody>
</table>
Limited to all Medicare patients undergoing those operations included in SCIP.
National Trends Surgical Mortality

Cardiac surgery

Limited to all Medicare patients undergoing those operations included in SCIP.
“Progress Toward Eliminating Healthcare-Associated Infections”
Expert Meeting and Workshop:
September 23-24, 2010
Key Bridge Marriott – Arlington, VA
Surgical Site Infections (SSI)

- Measurement System: CDC National Healthcare Safety Network (NHSN)
- **2013 Target: 25% reduction in admission and readmission SSI**
- Baseline Period: 2006-2008
- **Current (CY 2009): SIR = 0.95 = 3,930 / 4,144 SSIs**
  - 5% reduction from baseline
  - 946 facilities reporting; 416,341 procedures reported

<table>
<thead>
<tr>
<th>SCIP Procedure</th>
<th>No. of SSIs</th>
<th>Validated Parameters for Risk Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal aortic aneurysm repair</td>
<td>30</td>
<td>duration of procedure, wound class</td>
</tr>
<tr>
<td>Coronary artery bypass graft</td>
<td>1,644</td>
<td>age, ASA, duration of procedure, gender, med school affiliation, age gender (interaction)</td>
</tr>
<tr>
<td>Cardiac surgery</td>
<td>229</td>
<td>age, duration of procedure, emergency (y/n)</td>
</tr>
<tr>
<td>Colon surgery</td>
<td>1,825</td>
<td>age, ASA, duration, endoscope, med school affiliation, hospital bed size, wound class</td>
</tr>
<tr>
<td>Hip prosthesis</td>
<td>1,183</td>
<td>total/partial/revision, age, anesthesia, ASA, duration of procedure, med school affiliation, hospital bed size, trauma (y/n)</td>
</tr>
<tr>
<td>Abdominal hysterectomy</td>
<td>389</td>
<td>age, ASA, duration of procedure, hospital bed size</td>
</tr>
<tr>
<td>Knee prosthesis</td>
<td>1,108</td>
<td>age, ASA, duration of procedure, gender, med school affiliation, hospital bed size, trauma (y/n)</td>
</tr>
<tr>
<td>Peripheral vascular bypass surgery</td>
<td>176</td>
<td>age, ASA, duration of procedure, med school affiliation</td>
</tr>
<tr>
<td>Rectal surgery</td>
<td>38</td>
<td>duration of procedure, gender, hospital bed size</td>
</tr>
<tr>
<td>Vaginal hysterectomy</td>
<td>122</td>
<td>age, duration of procedure</td>
</tr>
</tbody>
</table>

Data as of September 2010
Surgical Care Improvement Project (SCIP) Process Measures

- 2013 Target: **95%** adherence to process measures to prevent SSI
- Baseline Period: CY 2006-2008
- Current Data: FY 2009
- Date Source: CMS Hospital Compare [http://www.cms.gov/HospitalQualityInitiatives/11_HospitalCompare.asp](http://www.cms.gov/HospitalQualityInitiatives/11_HospitalCompare.asp)
- Based on 3,600-3,700 hospitals reporting each quarter since mid-2006
## SCIP Performance and Relative Improvement Rates (RIR)

<table>
<thead>
<tr>
<th></th>
<th>Baseline CY06 Rate (%)</th>
<th>Baseline CY07 Rate (%)</th>
<th>Baseline CY08 Rate (%)</th>
<th>Current FY09 Rate (%)</th>
<th>RIR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCIP Inf 1: Antibiotic 1 hr prior to incision</td>
<td>84</td>
<td>88</td>
<td>92</td>
<td>96</td>
<td>9</td>
</tr>
<tr>
<td>SCIP Inf 2: Appropriate antibiotic</td>
<td>92</td>
<td>93</td>
<td>96</td>
<td>98</td>
<td>4</td>
</tr>
<tr>
<td>SCIP Inf 3: Antibiotic discontinued</td>
<td>75</td>
<td>82</td>
<td>88</td>
<td>92</td>
<td>12</td>
</tr>
<tr>
<td>SCIP Inf 4: Glucose control for cardiac surgery</td>
<td>n/a</td>
<td>n/a</td>
<td>89</td>
<td>92</td>
<td>3</td>
</tr>
<tr>
<td>SCIP Inf 6: Appropriate hair removal</td>
<td>n/a</td>
<td>n/a</td>
<td>97</td>
<td>99</td>
<td>2</td>
</tr>
</tbody>
</table>

**RIR** = (current - baseline) / baseline

Baseline = sum numerators 2006 to 2008 / sum denominators 2006 to 2008

Data as of September 2010
Where are we going?
What’s coming for SCIP

• Greater focus on healthcare-associated infections
  – Required public reporting of CLABSI (Jan 1, 2011), and SSI rates (Jan 1, 2012)
  – National Action Plan on HAIs
• Surgical outcomes (e.g., risk-standardized infection rates, reoperation, mortality, rehospitalization)
• New measures?
How do you sustain improvement?

Principles include:
• Provide direct and visible leadership
• Deploy teams to make changes
• Test changes with the PDSA process
• Use the service delivery as a framework for change
• Coach for change
• Make the new way unavoidable
• Allocate actual resources
• Monitor what you want to sustain
• Create a culture of improvement
Make the New Way Unavoidable

Imbedded/institutionalized the process and the new way:
- Consumer delivery processes and forms
- Policies and procedures
- Staff education, training, orientation, and professional development
- Job description and performance evaluations
- New services/programs/departments and other infrastructures
- Provider incentives
- Existing and new committees and departments
- Orientations and staff development
- Strategic plans, including vision, mission, and strategic direction
- Measurements and reports

Do you make it hard to do the wrong thing?
Culture of Improvement

• Everyone in the organization is clear on major performance improvement activity and can explain their role in it.
• Staff view quality improvement work as part of their job.
• Managers write job descriptions to reflect improvement responsibilities.
• Managers create opportunities for all stakeholders in improvement to share ideas and express concerns.

Is there a gap in perception about the importance of quality between leadership and front-line healthcare workers?
The Sequence for Improvement and Spread

Developing a change

Testing a change

Implementing a change

Make part of routine operations

Spreading a change to other locations

Theory and Prediction

Act
Study
Plan
Do
"It is usually the system.... not the people"

“Sam” came into the hospital outpatient department for a relatively minor laparoscopic operation...

..he had seen his primary care physician, surgeon, and anesthesiologist several days before surgery and everything was done correctly
We assume the system will protect us...

- Medication Reconciliation
- Surgical Checklist
- Redundant Checks
- TeamSTEPPs
- Senior Leadership Support
- New training policy
- Updated Job Descriptions
- Pre-printed orders
Unfortunately for Sam, all of the holes lined up

- No preoperative check list
- Lab not available in surgical chart
- Physician not notified of lab result
- Some holes due to active failures
- Other holes due to latent conditions

Unfortunately for Sam, all of the holes lined up