SCIP Handbook

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SCIP Overview

The Surgical Care Improvement Project (SCIP) is a national partnership of organizations committed to improving the safety of surgical care through the reduction of post-operative complications. The ultimate goal of the partnership is to reduce nationally the incidence of surgical complications by 25 percent by the year 2010. Partners in SCIP believe that a meaningful reduction in complications requires that surgeons, anesthesiologists, perioperative nurses, pharmacists, infection control professionals and hospital executives work together to intensify their commitment to making surgical care improvement a priority.

In addition to continuing to reduce surgical site infections (SSIs), the SCIP Partnership has broadened the scope of the new national project by targeting additional adverse events to include venous thromboembolic and cardiac complications.

Quality Improvement Organizations across the country will be working on SCIP as part of the Patient Safety Theme in the 9th Statement of Work (SOW). This project will also include a small heart failure component.

The priorities of the West Virginia Medical Institute's (WVMI's) SCIP initiative are aligned with the Centers for Medicare & Medicaid Services' (CMS) Value Based Purchasing Plan, the Joint Commission's quality and safety goals and the Institute for Healthcare Improvement's (IHI) 5 Million Lives Campaign.

Project Description

The SCIP Community of Practice (CoP)

The SCIP Community of Practice (CoP) is a hospital initiative designed to educate providers and encourage institutional leaders to increase the use of evidence-based care processes in an effort to make surgery safer and reduce adverse patient outcomes. Each hospital participating in this CoP will have access to all WVMI resources including onsite visits, consultations, intervention strategies and support for data analysis.

Benefits of Participating in the SCIP CoP

- Collaborate with other West Virginia hospitals
- Shared learning, shared tools, shared successes, shared lessons learned
- Be recognized as a facility dedicated to providing evidenced-based surgical care
- Access to resources and successful interventions

The SCIP Quality Measures

SCIP is currently targeting three areas where the incidence and cost of surgical complications are high. They are surgical infection prevention, venous thromboembolism prophylaxis (VTE) and prevention of cardiac complications.

Surgical Infection Prevention
Surgical site infections (SSIs) account for 20 percent of hospital infections. Research shows that by reducing SSIs, hospitals, on average, could recognize a savings of $3,152 and a reduction in extended length of stay by seven days for each patient that develops an infection.

WVMI will work with your facility to assess and develop opportunities to improve your processes to reduce the incidence of post-operative wound infection. Listed below are processes of care that are scientifically based and are the focus of WVMI's SSI work.

SURGICAL CARE IMPROVEMENT PROJECT INFECTION PROCESS MEASURES
SCIP-Inf 1: Prophylactic antibiotic received within one hour prior to surgical incision
SCIP-Inf 2: Prophylactic antibiotic selection for surgical patients
SCIP-Inf 3: Prophylactic antibiotics discontinued within 24 hours after surgery end time (48 hours for cardiac surgery)
SCIP-Inf 4: Cardiac surgery patients with controlled 6 am postoperative serum glucose
SCIP-Inf 6: Surgery patients with appropriate hair removal

The rationale for each of these infection prevention measures are:

SCIP-Inf 1
A goal of prophylaxis with antibiotics is to establish bactericidal tissue and serum levels at the time of skin incision. Studies performed in the 1960s and 1970s demonstrated that a common reason for failure of prophylaxis was delay of antibiotic administration until after the operation. In a study of 2,847 surgery patients at LDS Hospital in Salt Lake City, it was found that the lowest incidence of post-operative infection was associated with antibiotic administration during the one hour prior to surgery. The risk of infection increased progressively with greater time intervals between administration and skin incision. This relationship was observed whether antibiotics preceded or followed skin incision (Classen 1993).

Opportunities to improve care have been demonstrated and timely administration has been recommended. For example, at LDS Hospital, administration of the first antibiotic dose "on call" to the operating room was frequently associated with timing errors. Altering the system there resulted in an increase in appropriate timing from 40 percent of cases in 1985 to 99 percent of cases in 1998.

SCIP-Inf 2
A goal of antibiotic prophylaxis is to use an agent that is safe, cost-effective, and has a spectrum of action that covers most of the probable intraoperative contaminants for the operation. First or second-generation cephalosporins satisfy these criteria for most operations, although anaerobic coverage is needed for colon surgery. Vancomycin is not recommended for routine use because of the potential for development of antibiotic resistance, but is acceptable if a patient is allergic to beta-lactams, as are fluoroquinolones and clindamycin in selected situations.

SCIP-Inf 3
A goal of antibiotic prophylaxis is to provide benefit to the patient with as little risk as possible. It is important to maintain therapeutic serum and tissue levels throughout the operation. Intraoperative re-dosing may be needed for long operations or in morbidly obese patients. However, administration of antibiotics for more than a few hours after the incision is closed offers no additional benefit to the surgical patient. Prolonged administration does increase the risk of *Clostridium difficile* infection and the development of antimicrobial resistant pathogens.

SCIP-Inf 4
Hyperglycemia has been associated with increased in-hospital morbidity and mortality for multiple medical and surgical conditions. In a study by Zerr et al. (1997), the risk of infection was significantly higher for patients undergoing coronary artery bypass graft (CABG) if blood glucose levels were elevated. Furthermore, Zerr et al. (2001) demonstrated that the incidence of deep wound infections in diabetic patients undergoing cardiac surgery was reduced by controlling mean blood glucose levels below 200mg/dL in the immediate postoperative period. Latham et al. (2001) found that hyperglycemia in the immediate postoperative phase increases the risk of infection in both diabetic and nondiabetic patients and the higher the level of hyperglycemia, the higher the potential for infection in both patient populations. A study conducted in Leuven, Belgium (Van den Berghe, 2001), demonstrated that intensive insulin therapy not only reduced overall in-hospital mortality but also decreased blood stream infections, acute renal failure, red cell transfusions, ventilator support, and intensive care. Hyperglycemia is a risk factor that, once identified, could minimize adverse outcomes for cardiac surgical patients.

SCIP-Inf 6
Studies show that shaving causes multiple skin abrasions that later may become infected**.** In a randomized study of 1,980 adult patients undergoing cardiopulmonary bypass surgeries, Ko et al. (1992), reported a significantly higher rate of infection among patients who were shaved with a razor than those who had hair removal by electric clippers before skin incision. In another randomized trial of 200 patients undergoing elective inguinal herniorraphy (Balthazar et al. [1982]), concluded that hair removal with electric clippers immediately prior to the procedures “did not increase the risk of postoperative wound infection” (p. 799). In a systematic literature review by Kjonniksen et al. (2002), there was no strong evidence to contraindicate preoperative hair removal; however, there was strong evidence against hair removal with a razor.

This review recommended depilatory or electric clippers immediately prior to surgery when hair removal was required. Alexander et al. (1983), reported that clippers, used on the morning of surgery, resulted in reduced surgical site infections and healthcare expenditures.

Appropriate antibiotics can be found in Appendix A. Cases to be selected for each of the infection process measures can be found in Appendix C. The referenced tables can be found on the accompanying CD.

Venous Thromboembolism (VTE)
Deep venous thromboembolism (DVT) occurs after approximately 25 percent of all major surgical procedures performed without prophylaxis, and pulmonary embolism (PE) occurs in seven percent of surgeries conducted without prophylaxis. More than 50 percent of major orthopedic procedures are complicated by DVT and up to 30 percent by PE, if prophylactic treatment is not instituted. Despite the well-established efficacy and safety of preventive measures, studies show that prophylaxis is often underused or used inappropriately.

Recent studies have shown that VTE is the most common preventable cause of hospital death. Recent estimates show that more than 900,000 Americans suffer VTE each year, with about 400,000 of these being DVT and 500,000 manifesting as PE. In about 300,000 cases, PE proves fatal; it is the third most common cause of hospital-related deaths in the United States. Survivors are at risk for recurrence and other serious long-term complications. Although VTE is often clinically silent, with as many as 25 percent of cases presenting as sudden death from PE, needless mortality and morbidity occur due to under-diagnosis and under-utilization of prophylaxis.

WVMI will work with your facility to assess and develop opportunities to improve your processes to reduce the incidence of postoperative venous thromboembolism. Listed below are processes of care that are scientifically based and are the focus of WVMI'S work.

SURGICAL CARE IMPROVEMENT PROJECT VTE PROCESS MEASURES
SCIP-VTE 1: Surgery patients with recommended venous thromboembolism prophylaxis ordered
SCIP-VTE 2: Surgery patients who received appropriate venous thromboembolism prophylaxis within 24 hours prior to surgery to 24 hours after surgery

Rationale: There are over 30 million surgeries performed in the United States each year. Despite the evidence that VTE is one of the most common postoperative complications and prophylaxis is the most effective strategy to reduce morbidity and mortality, it is often underused. The frequency of venous thromboembolism (VTE), that includes deep vein thrombosis and pulmonary embolism, is related to the type and duration of surgery, patient risk factors, duration and extent of postoperative immobilization, and use or nonuse of prophylaxis. According to Heit et al. (2000), surgery was associated with over a twenty-fold increase in the odds of being diagnosed with VTE. Studies have shown that appropriately used thromboprophylaxis has a positive risk/benefit ratio and is cost effective. Prophylaxis recommendations for this measure are based on selected surgical procedures from the 2008 American College of Chest Physicians guidelines.

Timing of prophylaxis is based on the type of procedure, prophylaxis selection, and clinical judgment regarding the impact of patient risk factors. The optimal start of pharmacologic prophylaxis in surgical patients varies and must be balanced with the efficacy-versus-bleeding potential. Due to the inherent variability related to the initiation

of prophylaxis for surgical procedures, 24 hours prior to surgery to 24 hours post surgery was recommended by consensus of the SCIP Technical Expert Panel in order to establish a timeframe that would encompass most procedures.

VTE Prophylaxis Selection for Surgery

Appropriate VTE prophylaxis will be evaluated for the following surgeries, and details can be found in Appendix B.

- Intracranial neurosurgery
- General surgery
- Gynecologic surgery
- Urologic surgery
- Elective hip and knee replacements
- Hip fracture surgery

Beginning with October 1, 2008 discharges, cases excluded from the VTE measures are:

- Patients less than 18 years of age
- Patients who have a length of stay >120 days
- Burn patients (as defined in Appendix A, Table 5.14 for ICD-9-CM codes)
- Patients with procedures performed entirely by laparoscope
- Patients enrolled in clinical trials
- Patients who are on warfarin prior to admission
- Patients whose ICD-9-CM principal procedure occurred prior to the date of admission
- Patients whose total surgery time is less than or equal to 60 minutes
- Patients who stayed less than or equal to three calendar days postoperatively
- Patients with contraindications to both mechanical and pharmacological prophylaxis

Adverse Cardiac Events
Postoperative cardiac complications occur in two to five percent of patients undergoing non-cardiac surgery and as many as 34 percent of patients undergoing vascular surgery. Certain perioperative cardiac events, such as myocardial infarction, are associated with a mortality rate of 40 to 70 per event, prolonged hospitalization and higher costs. Current studies show that nearly half of the fatal cardiac events could be preventable with beta-blocker therapy.

WVMI will work with your facility to assess and develop opportunities to improve your processes to reduce the incidence of post-op cardiac events. Listed below is the process of care that is scientifically based and is the focus of WVMI's work.

SURGICAL CARE IMPROVEMENT PROJECT CARDIAC PROCESS MEASURE
SCIP-Card 2: Surgery patients on a beta blocker prior to arrival that received a beta blocker during the perioperative period

Rationale: Concerns regarding the discontinuation of beta-blocker therapy in the perioperative period have existed for several decades. Shammash and colleagues studied a total of 140 patients who received beta-blockers preoperatively. Mortality in the eight patients who had beta-blockers discontinued postoperatively (50 percent) was significantly greater than in the 132 patients in whom beta-blockers were continued. Hoeks and colleagues studied 711 consecutive peripheral vascular surgery patients. After adjustment for potential confounders and the propensity of its use, continuous beta-blocker use remained significantly associated with a lower one-year mortality than among nonusers. In contrast, beta-blocker withdrawal was associated with an increased risk of one-year mortality compared with nonusers. The American College of Cardiology/American Heart Association site continuation of beta-blocker therapy in the perioperative period as a class I indication, and accumulating evidence suggests that titration to maintain tight heart rate control should be the goal

Surgical Procedures Selection Criteria
To be included in the population for the SCIP process measures, a patient must be admitted to the hospital for acute inpatient care, be over 18 and have a surgical procedure of interest performed during the hospital stay. The following information guides SCIP CoP participants to use the appropriate ICD-9-CM tables to identify the surgical procedure of interest and determine which cases to include when calculating their SCIP process measures. A summary table is available in Appendix C.

Eligibility for SCIP Measures

- Table 5.10 lists major surgical procedure codes eligible for all SCIP measures

Eligibility for Infection Measures

- Tables 5.01-5.08 list the procedure of interest codes for SCIP-Inf-1, 2, 3
- Table 5.09 lists the diagnosis codes that are excluded from SCIP-Inf-1, 2, 3, 4
- Table 5.11 lists cardiac surgical procedure codes for SCIP-Inf-4
- Table 5.14 lists the burn diagnosis codes that are excluded from SCIP-Inf-4 and VTE-1, VTE-2
- Table 5.15 lists the transplant diagnosis codes that are excluded from SCIP-Inf-4

Eligibility for Venous Thromboembolism (VTE) Measures

- Tables 5.17 and 5.19- 5.24 list the procedure codes for the VTE measures only

Heart Failure

As an additional patient safety measure, this project also includes the appropriate treatment of heart failure patients with poor left ventricular systolic dysfunction. Specifically, success for this measure will be seen when all heart failure patients with left ventricular systolic dysfunction (LVSD), and without both angiotensin converting enzyme inhibitor (ACEI) and angiotensin receptor blocker (ARB) contraindications, are prescribed an ACEI or ARB at hospital discharge. For purposes of this measure, LVSD is defined as chart documentation of a left ventricular ejection fraction (LVEF) less than 40 percent or a narrative description of left ventricular systolic (LVS) function consistent with moderate or severe systolic dysfunction.

PATIENT SAFETY INITIATIVE: HEART FAILURE PROCESS MEASURE
HF-3: Appropriate use of ACE/ARB for LVSD in patients with heart failure

The rationale for this measure is that ACEI therapy reduces mortality and morbidity in patients with heart failure and left ventricular systolic dysfunction (The SOLVD Investigators, 1991 and CONSENSUS Trial Study Group, 1987) and is effective in a wide range of patients (Masoudi, 2004). Recent clinical trials have also established ARB therapy as an acceptable alternative to ACEI, especially in patients who are ACEI intolerant (Granger, 2003 and Pfeffer, 2003). National guidelines strongly recommend ACEIs for patients hospitalized with heart failure (Hunt, 2005 and HFSA, 2006). Guideline committees have also supported the inclusion of ARBs in performance measures for heart failure (Executive Council of the Heart Failure Society of America, 2004). Despite these recommendations, ACEIs and ARBs remain underutilized in eligible older patients hospitalized with heart failure (Jencks, 2000 and Masoudi, 2004).

Hospital Leadership and Quality Assessment Tool (HLQAT) Agency for Healthcare Research and Quality (AHRQ) Hospital Survey on Patient Safety Culture

Recognizing that high performing hospitals exhibit a quality and safety culture throughout their organization, the CoP members are expected to complete the Hospital Leadership and Quality Assessment Tool (HLQAT) and the Agency for Healthcare Research and Quality (AHRQ) Hospital Survey on Patient Safety Culture during the first few months to obtain a baseline score and then again at the conclusion of the project for remeasurement.

The HLQAT is a survey tool designed to assess the perceptions that hospital board members and leaders have about important areas of clinical quality improvement in their hospitals. A hospital can use the HLQAT to identify leadership strengths as well as any gaps, which may serve to inhibit desired change or success. The HLQAT identifies 12 categories of leadership capacity and commitment that are correlated with high performance. These measures of leadership include:

Knowledge Seeking	***Rewards/Compensation***
Goals and Priorities	Resource Support for Quality Improvement
Communication	Education and Training
Collaboration	Nonpunitive Culture
Roles and Responsibilities	Public Reporting/Transparency
Monitoring and Evaluation	Clinical Management Tools

The AHRQ Hospital Survey on Patient Safety Culture was developed by AHRQ as a way to allow hospitals to compare their patient safety culture results against other hospitals, to provide data to facilitate internal assessment and learning in the patient safety improvement process, and to provide supplemental information to help identify strengths and areas with potential for improvement in patient safety culture. The survey is designed to assess the hospital staff opinions about patient safety issues, medical error, and event reporting; it includes 42 items that measure 12 areas or composites of patient safety culture:

1. Communication openness
2. Feedback and communication about error
3. Frequency of events reported
4. Handoffs and transitions
5. Management support for patient safety
6. Nonpunitive response to error
7. Organizational learning/continuous improvement
8. Overall perceptions of patient safety
9. Staffing
10. Supervisor/manager expectations and actions promoting safety
11. Teamwork across units
12. Teamwork within units

CoP Expectations and Team Composition

Community of Practice (CoP) Expectations

A major component of the current Scope of Work (SOW) is transformational change, a philosophy for improvement and the delivery of care that is adopted by hospital leadership and embodies the following elements:

- Alters the culture of the institution by changing underlying institutional assumptions, behaviors, processes, and products
- Is deep and pervasive and affects the whole institution
- Is intentional
- Is continuous
- Occurs over time
- Requires that you set a clear performance agenda
- Requires that quality and safety be part of the core business processes of the organization
- Ensures quality and safety initiatives are driven by the strategic plan
- Requires that departments have a clear map of how to implement the agenda

The approach WVMI will use is focused on working with a smaller group of hospitals to effect change related to the SCIP safety measures. The CoP consists of a group of rural and urban prospective payment system (PPS) hospitals working individually and in collaboration to improve their SCIP and HF processes.

It is expected that the hospital will:

- ❑ Obtain executive agreement to participate in the SCIP Patient Safety Initiative
- ❑ Form a multidisciplinary SCIP team (i.e., surgeons, anesthesia, perioperative staff, quality improvement experts, infection control practitioners, pharmacists, etc.) and conduct team meetings on a regular basis
- ❑ Complete the HLQAT and AHRQ Patient Safety Surveys at baseline and remeasurement
- ❑ Abstract medical records, either by sampling or 100 percent review, using their chosen vendor software
- ❑ Agree to submit abstracted SCIP and HF data to the QIO Clinical Warehouse
- ❑ Allow WVMI staff monthly access to recently discharged surgical records, either on-site record review or copying the requested number of records and sending them to WVMI
- ❑ Direct abstractors to submit monthly HF statistics to WVMI. The data should include the number of HF records abstracted, the number of HF records with LVSD, the number of the LVSD records prescribed and ACE or ARB and the number of LVSD records without an ACE or ARB that contain appropriate documentation of the reason for not prescribing
- ❑ Use a variety of improvement methods, to develop strategies aimed at improving the SCIP measures
- ❑ Identify physician and other clinical champions
- ❑ Implement order sets to address evidence-based practices for the prevention of SSI, VTE and cardiac complications

- Collaborate with other hospitals in the CoP to share successful approaches to improving the SCIP measures, as well as barriers and lessons learned
- Maintain monthly contact with your assigned WVMI project coordinator
- Attend face-to-face regional meetings and participate in WebEx sessions and conference calls
- Sign up for inclusion in the SCIP listserv as a means of communication among other SCIP CoP hospitals and WVMI
- Strive to improve performance and meet or exceed ABC achievable benchmarks of care

WVMI staff will:

- Provide information, innovative tools and interventions with proven success for the SCIP topics and appropriate use of ACE/ARB for LVSD in patients with heart failure
- Abstract recent surgical records to provide timely data collection and analysis
- Provide monthly and quarterly reports showing improvement trends and areas needing further attention
- Analyze the HLQAT and AHRQ survey results
- Distribute the HLQAT and AHRQ survey analysis to the hospital
- Plan and implement learning sessions and other educational offerings
- Provide coaching to teams, training, consultation and onsite visits, as necessary
- Customize quality improvement initiatives adapted to your hospital's needs
- Assist with strategic planning and individualized data analysis to identify the performance measures with the most opportunity for improvement
- Provide communication venues for shared learning
- Maintain and safeguard the confidentiality of privileged data or information

Team Composition
Each hospital will form a team to test and implement system changes related to improvement of the SCIP measures. Teams should include persons from departments and work areas that will be affected by the changes to ensure that the team understands the system it is trying to redesign and to promote buy-in for the changes. Getting the right people on the team is critical to a successful improvement effort. Teams vary in size and composition, with each organization building teams to suit its own needs. The most important success factor for a team is commitment to working together toward a shared goal.

Effective teams have representation from at least four different areas of expertise within the organization:

- **System Leadership**: someone, such as the CEO, COO, VP, or clinical director, who has the authority in the organization to institute a change when one is suggested, and to overcome barriers when they arise.

- **Clinical Champion**: an individual, such as a surgeon or anesthesiologist, who understands the scientific and clinical foundations of the processes of care that are being improved.

- **Day-to-Day Project Leadership**: someone who understands the process being improved, the effects of any planned changes, and who will drive the project on a daily basis. This may be a physician, a nurse, or the quality improvement professional in the hospital.

- **Caregivers**: staff providing direct patient care, such as perioperative nurses, who are involved in everyday tasks that are directly related to surgical care. Their ideas, commitment, and support are crucial to the success of any improvement effort.

- **Other Team Members**: pharmacist, anesthesia personnel, infection control practitioner, operating room nurse manager, nurse educators

Checklist for Selecting Team Members
An effective team has members who work well together and who have a combination of skills, styles, and competencies. An effective team has members who:

- Are leaders
- Are team players
- Have specific skills and technical proficiencies relevant to the surgical arena
- Possess excellent listening skills
- Communicate well verbally
- Are problem-solvers
- Are motivated to improve current systems and processes
- Are creative, innovative and enthusiastic

Change Package

This change package includes intervention strategies proven to be effective in other settings. They encompass both global change strategies and those specific to SCIP. Implementing such changes through current or new processes may result in improving the SCIP performance measures and lead to transformational change.

The following tables contain established change strategies.

SCIP Change Strategies

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Infection Prevention

Process Measures	Change Strategies*
SCIP-INF 1: Prophylactic antibiotic received within one hour prior to surgical incision	• Designate the responsibility and/or accountability to administer preoperative prophylactic antibiotic to a key position (e.g., anesthesiologist, preoperative or circulating nurse, etc.). • Standardize the antibiotic administration process to occur with commonly performed activity, within one hour (within two hours for vancomycin or fluoroquinalones) prior to surgical incision. • Administer prophylactic antibiotics according to published guidelines. • Employ antibiotic standing orders specific to the type of surgical procedure performed, or develop printed order sets with recommended antibiotic by procedure. • Use visible reminders or a checklist to give antibiotics on each case (e.g., brightly colored stickers, reminder posters located above operating room entrance). • Standardize the documentation process of antibiotic administration on every patient chart (paper or electronic) to include required fields for time of prophylactic antibiotic administration, discontinuation and incision closure time. • Adopt a system whereby surgical staff inquires about prophylactic antibiotics during surgical pause or incorporate antibiotic delivery verification into preoperative “time out.” • Adopt a system whereby antibiotics are administered preoperatively (hung at head of patient’s bed ready for administration when patient enters the preoperative holding area). • Educate operating room staff periodically regarding the importance and reasoning of antibiotic timing. • Provide regular and ongoing feedback to physicians/surgeons and anesthesia personnel on prophylaxis timing compliance and infection rate data monthly. • Stock operating room and/or anesthesia holding area with only approved prophylactic antimicrobials; standardize delivery process to ensure timely delivery. • Implement drug matrix cards for physicians, surgeons, and nursing staff.

Process Measures	Change Strategies*
	• Use wall clock to document all times; have maintenance synchronize all clocks. • Implement a universal protocol checklist. • Address antibiotic timing with surgeons and anesthesiologists via physician champions. • Initiate appropriate antibiotic regimen form during pre-op clinic visit and send to physician for completion. • Develop and implement policy for delivery of prophylactic antibiotics. • Modify documentation forms to include timing of first antibiotic dose. • Include "All antibiotics administered IV, unless otherwise noted" on anesthesia forms. • Incorporate antibiotic delivery into operating room personnel orientation (modification of job description).
SCIP-INF 2: Prophylactic antibiotic selection for surgical patients	• Ensure availability of formulary antibiotics or make agreed-upon prophylactic antibiotics available in or near the operating room. • Establish a pharmacy and therapeutics committee (or equivalent) to conduct an annual and as needed review and development of a standard formulary for antimicrobial prophylaxis. • Involve pharmacy in correct selection and delivery of antibiotics. • Develop standard pre-printed orders and/or protocols for prophylactic antibiotic selection specific to surgical site according to guidelines. • Provide regular and ongoing feedback to physicians/surgeons on prophylaxis selection compliance and infection rate data.
SCIP-INF 3: Prophylactic antibiotics discontinued within 24 hours after surgery end time (48 hours for cardiac patients)	• Develop a policy or assign responsibility for automatic prophylactic antibiotic discontinuation by the pharmacy. • Have PACU fax post-op orders to the pharmacy, indicating surgery end time and/or time of pre-op dose, to assure timeliness of next dose. • Limit post-op antibiotics to one or two doses.

Process Measures	Change Strategies*
	• Require surgeons to document reason for continuing antibiotic beyond 24 hours (48 hours for cardiac surgery), e.g. treatment for an ongoing infection. • Provide regular and ongoing feedback to physicians/surgeons on prophylaxis duration compliance and infection rate data monthly. • Provide education to nursing and pharmacy on duration of postoperative prophylactic antibiotic doses. • Update postoperative forms or pathways to routinely discontinue prophylactic antibiotics within 24 hours or 48 hours for cardiac procedures.
SCIP-INF 4: Cardiac surgery patients with controlled 6 a.m. postoperative serum glucose (≤ 200mg/dL)	• Adopt a multidisciplinary team approach to address intra-operative and postoperative glucose control. • Establish perioperative glucose control accountability. • Standardize protocol for preoperative, intra-operative and postoperative glucose monitoring in patients undergoing cardiac surgery or having a diagnosis of diabetes. • Gain anesthesia's acceptance of their responsibility for intra-operative glucose control. • Identify patients with hyperglycemia prior to surgery; include glucose testing and HbA1c in pre-op evaluation. • Educate physicians and clinical staff on correlation between elevated blood glucose level and the infection rate. • Institute a glucose management protocol, which includes the transition from intravenous insulin to insulin injections to oral hypoglycemic agents as required. • Standardize treatment protocol to maintain serum glucose less than 200 mg/dL in patients undergoing cardiac surgery or having a diagnosis of diabetes.
SCIP-INF 6: Surgery patients with appropriate hair removal	• Remove all razors from operating suites and surrounding patient support areas, or eliminate razors from surgical prep kits. • Institute a policy to avoid shaving surgical sites, or if hair removal is necessary, perform hair removal only with clippers right before surgery. • Gain support from chief of surgery. • Send letters to surgeons and staff regarding the change from razors to clippers, including a timeline.

Process Measures	Change Strategies*
	• Institute the placement of electric clippers throughout the holding and operating rooms where hair removal is likely to occur. • Educate surgeons and clinical staff on appropriate hair removal techniques, and purchasing personnel on appropriate supplies. • Implement “No Shave Zone” posters throughout the hospital. • Standardize documentation of hair removal technique in preoperative/operative record to include “no hair removal, clipper, depilatory,” eliminating razor/shaving option. • Educate patients to not shave surgical site before surgery or develop patient education materials on proper hair removal.

Venous Thromboembolism (VTE) Prevention

Process Measures	Change Strategies*
SCIP-VTE 1: Surgery patients with recommended VTE prophylaxis ordered AND SCIP-VTE 2: Surgery patients who received appropriate VTE prophylaxis within 24 hrs. prior to surgery to 24 hrs. after surgery	• Implement or revise clinical guidelines for pre- and postoperative venous thromboembolism risk assessment and prophylaxis. • Include venous thromboembolism risk assessment with physician pre-op order set to be completed during pre-op evaluation. • Complete venous thromboembolism risk assessment during preoperative anesthesia evaluation visit. • Incorporate current recommendations for venous thromboembolism prophylaxis into guidelines for surgical services. • Include the pharmacy in venous thromboembolism prophylaxis planning. • Employ a standard protocol or standing order set to administer correct prophylactic treatments based on identified patient risk factors; allow sign off for physician if contraindicated or not warranted. • Include venous thromboembolism risk assessment in ICU/SICU documentation for postoperative evaluation. • Implement a DVT awareness campaign and training. • Provide regular and ongoing feedback to physicians/surgeons on VTE prophylaxis usage monthly.

Adverse Cardiac Event Prevention

Process Measures	Change Strategies*
SCIP-Card 2: Surgery patients on a beta-blocker prior to arrival that received a beta-blocker during the perioperative period	• Provide staff education on adverse cardiovascular complications for surgical patients. • Develop a policy for universal cardiac risk assessment of all patients admitted to the hospital or flag chart when patient is eligible for beta-blocker administration. • Engage physician/surgeon champion to address beta-blocker usage with peers. • Develop standardized orders to incorporate beta-blocker administration/continuation for eligible patients. • Develop policy and protocol or algorithm to address beta-blocker eligibility (i.e., documentation of risk factors, allergies, etc.). • Provide regular and ongoing feedback to physicians/surgeons on beta-blocker usage monthly. • Adopt a system whereby admitting staff or pharmacy is assigned responsibility for reviewing home medications or include checkbox on nursing assessment to identify patients on beta-blockers, including date and time of last dose administered.

Heart Failure

Process Measures	Change Strategies*
HF-3: Heart failure patients with LVSD and without ACE and ARB contraindications who are prescribed an ACE or ARB at hospital discharge	• Use evidence-based medicine to develop policies and procedures. • Develop HF order sets that include orders for LVF assessment or obtaining results of prior LVF assessment. • Develop standardized orders to incorporate use of ACE/ARB for HF patients and include list of possible contraindications that can be checked off. • Make ACE/ARB usage a priority in staff education related to HF. Consider having nephrologists address ACE/ARB appropriateness in the renal insufficiency population. • Engage a physician champion to address ACE/ARB use with peers. • Provide regular and ongoing feedback to physicians regarding ACE/ARB use. • Use chart stickers and posters to prompt for LVF assessment and ACE/ARB use. • Involve pharmacy in care planning for the care of the HF patient and to encourage prescribing an ACE or ARB for LVSD.

** Not listed in priority or sequential order*

Global Change Strategies

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Strategy	Recommended Actions*
Transform Organizational Culture: Establish a Culture Based on Quality (The culture of an organization defines its values and beliefs related to the patient care. A culture leased on quality aims for safe, effective, patient-centered, timely, efficient and equitable care)	Ensure "quality" is incorporated into the hospital's mission and vision statements and strategic plan. Use board leadership to transform organizational culture. • Educate the board about quality, culture and technology. • Link compensation to quality. • Change board agenda to focus on quality. Use executive leadership to transform organizational culture. • Adopt a unit. • Implement walk-arounds. • Develop leadership. • Develop an organizational plan for change. Obtain physician support. • Involve physicians at the beginning of each quality initiative and disseminate supporting literature with references. • Speak with physicians one-on-one about concerns, and ask for their input on ideas for tests of change. • Communicate and reinforce new processes in multiple ways. Foster a blame-free environment for reporting errors. Educate staff on quality improvement methodologies. • Educate staff on human factors research. • Educate staff on the model for improvement. • Use simulation exercises to teach improvement model concepts. Educate staff on "core measures" public reporting and other QI initiatives.

Strategy	Recommended Actions*
	Educate staff about evidence-based recommendations. Involve patients in quality improvement and other initiatives. Use storytelling to transform and define culture, humanize problems and drive change. Change the work environment. • Focus on core processes and purpose. • Give people access to information. • Take care of basics. • Conduct training. • Develop alliances/cooperative relationships. • Share risks. • Break down hierarchical communication barriers.
Redesign Processes	Design systems to avoid mistakes. • Use reminders. • Attempt to break patterns through the use of color coding, sizing, different symbols or separating similar things. • Build a constraint into a procedure so that an unwanted action, which may result in a mistake, can be prevented. • Use aids that provide a visual prompting for the actions that should be performed (diagrams, arrows). • Use electronic prompts as evidence-based care reminders. • Investigate instances when the system did not, or almost did not, function. Improve workflow. • Minimize handoff. • Find and remove bottlenecks. • Do tasks in parallel. • Move steps in the process close together. Adopt Lean Methodology for redesigning systems. • Use process mapping to reduce inefficiencies. • Use the five “S”s to eliminate waste (sorting, simplifying, systematic cleaning, standardizing, sustaining). Redesign workflow to improve quality, safety and efficiency. • Use human factor principles to increase the reliability of processes. • Reduce the number of steps in a process. • Standardize work processes. Use small-scale rapid tests of change.

Strategy	Recommended Actions*
	Use storyboards to promote and share improvements and changes. • Post results of improvement efforts on storyboards to create interest. • Use storyboards at workshops to demonstrate improvements. Coordinate across settings to make care safer and more effective. • Strengthen hand-offs between settings and caregivers. • Reconcile medications to improve safety, quality and efficiency. Spread improvements throughout the organization to maximize impact. Improve teamwork and training to facilitate process improvements. • Identify physician and other clinical champions. • Empower and train teams.
Measure and Report Performance	Implement a performance measurement reporting system. • Identify goals and clarify the importance of measurement and reporting. • Measure workflow to improve patient care. • Measure progress toward meeting goals. • Use standardized measures. • Publicly report results of quality improvement initiatives. • Use available resources. Use overarching quality models to guide and measure progress and gain a comprehensive picture of how the organization is doing (i.e., Baldridge, ISO, Six Sigma, etc.). Use data to drive improvement. • Use public reporting to benchmark performance. • Use internal displays or dashboards to track and report improvement. • Participate in projects and share data between organizations. Manage variation. • Create and standardize processes. • Develop operational definitions. • Assign responsibility for process. • Develop contingency plans. Demonstrate the rationale for quality care by making the business case for quality.

Strategy	Recommended Actions*
	Reward staff for quality. • Base pay-for-performance on quality improvement results. • Offer CE credits for quality improvement work. • Promote quality awards for staff and providers that achieve high quality care. • Provide incentive for work on quality improvement projects.
Adopt Health Information Technology	Use information technology to create connections between clinicians. • Use software designed to improve information exchange. • Develop systems to increase the ease and spread of information sharing. Use information technology to provide person-centered care and aid in the care delivery process. • Support the use of electronic health records. • Invest in CPOE and bedside bar-coding. • Invest in telehealth solutions to improve accessibility to care. • Implement an electronic registry to track patients with chronic conditions. • Implement a pharmacy system that utilizes alerts to avoid medication errors. • Use hand-held computers to support decision-making. • Use e-prompts as evidence-based care reminders.

** Not listed in priority or sequential order*

Communications

Inpatient Listserv

A listserv is available for participants in all inpatient CoPs. The listserv will serve as a means of communication among the CoP groups and WVMI staff. Electronic mail posted to the listserv will be used to disseminate information to participants; ask questions of, and receive replies from the leadership team and participants; and conduct ongoing discussions of content.

The number of individuals from each facility that subscribe to this listserv is not limited, so if you want to be "in the loop," please sign up. To join the Inpatient listserv, go to www.qigroup.org, and click on *WVMI*. Click on *INPT-WV* and then *subscribe*.

Reporting Mechanisms

- A minimum of monthly communication will be maintained between the hospital and its WVMI project coordinator via onsite visits, e-mail and/or telephone.
- The hospital should be prepared to report on project activity for the preceding month noting any progress, barriers encountered and lessons learned.
- When data is available, WVMI will provide facility-specific results.
- Your project coordinator will provide more information individually

Antibiotic Recommendations

Appendix A

Surgical Procedure	Approved Antibiotics
CABG, Other Cardiac Or Vascular	Cefazolin, Cefuroxime or Vancomycin** If β-lactam allergy: Vancomycin* or Clindamycin*
Hip/Knee Arthroplasty	Cefazolin or Cefuroxime or Vancomycin** If β-lactam allergy: Vancomycin* or Clindamycin*
Colon	Cefotetan, Cefoxitin, Ampicillin/Sulbactam, or Ertapenem*** **OR** Cefazolin or Cefuroxime + Metronidazole If β-lactam allergy: Clindamycin + Aminoglycoside Clindamycin + Quinolone Clindamycin + Aztreonam **OR** Metronidazole with Aminoglycoside Metronidazole + Quinolone
Hysterectomy	Cefotetan, Cefazolin, Cefoxitin, Cefuroxime, or Ampicillin/Sulbactam If β-lactam allergy: Clindamycin or Metronidazole
Special Considerations	*For cardiac, orthopedic, and vascular surgery, if the patient is allergic to β-lactam antibiotics, Vancomycin or Clindamycin are acceptable substitutes. **Vancomycin is acceptable with a physician/APN/PA documented justification for its use (see data element *Vancomycin*) ***A single dose of ertapenem is recommended for colon procedures.

Venous Thromboembolism Prophylaxis
Appendix B

Surgery Type	Recommended Prophylaxis Options*
Intracranial Neurosurgery	Any of the following: • Intermittent pneumatic compression devices (IPC) with or without graduated compression stockings (GCS) • Low-dose unfractionated heparin (LDUH) • Low molecular weight heparin (LMWH)** • LDUH or LMWH** combined with IPC or GCS **Current guidelines recommend *postoperative* low molecular weight heparin for Intracranial Neurosurgery.
General Surgery	Any of the following: • Low-dose unfractionated heparin (LDUH) • Low molecular weight heparin (LMWH) • Factor Xa Inhibitor (Fondaparinux) • LDUH or LMWH or Factor Xa Inhibitor combined with IPC or GCS
General Surgery with contraindications to pharmacological prophylaxis	Any of the following: • Graduated Compression Stockings (GCS) • Intermittent pneumatic compression devices (IPC)
Gynecologic Surgery	Any of the following: • Low-dose unfractionated heparin (LDUH) • Low molecular weight heparin (LMWH) • Factor Xa Inhibitor (Fondaparinux) • Intermittent pneumatic compression devices (IPC) • LDUH or LMWH or Factor Xa Inhibitor combined with IPC or GCS
Urological Surgery	Any of the following: • Low-dose unfractionated heparin (LDUH) • Low molecular weight heparin (LMWH) • Factor Xa Inhibitor (Fondaparinux) • Intermittent pneumatic compression devices (IPC) • Graduated compression stockings (GCS) • LDUH or LMWH or Factor Xa Inhibitor combined with IPC or GCS
Elective Total Hip Replacement	Any of the following started within 24 hours of surgery: • Low molecular weight heparin (LMWH) • Factor Xa Inhibitor (Fondaparinux) • Warfarin
Elective Total Knee Replacement	Any of the following: • Low molecular weight heparin (LMWH). • Factor Xa Inhibitor (Fondaparinux). • Warfarin. • Intermittent pneumatic compression devices (IPC). • Venous foot pump (VFP).
Hip Fracture Surgery	Any of the following: • Low-dose unfractionated heparin (LDUH) • Low molecular weight heparin (LMWH) • Factor Xa Inhibitor (Fondaparinux) • Warfarin
Elective Total Hip Replacement with contraindications to pharmacological prophylaxis	Any of the following: • Intermittent pneumatic compression devices (IPC) • Venous foot pump (VFP)
Elective Hip Fracture Surgery with contraindications to pharmacological prophylaxis	Any of the following: • Graduated Compression Stockings (GCS) • Intermittent pneumatic compression devices (IPC) • Venous foot pump (VFP)

**Patients who receive neuraxial anesthesia or have a documented contraindication to pharmacological prophylaxis may pass the performance measure if either appropriate pharmacological or mechanical prophylaxis is ordered*

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Appendix C
ICD-9-CM Code Table

Table		Applicable Measures
5.01	Coronary Artery Bypass Graft (CABG)	SCIP-Inf-1, 2, 3
5.02	Other Cardiac Surgery	SCIP-Inf-1, 2, 3
5.03	Colon Surgery	SCIP-Inf-1, 2, 3
5.04	Hip Arthroplasty	SCIP-Inf-1, 2, 3
5.05	Knee Arthroplasty	SCIP-Inf-1, 2, 3
5.06	Abdominal Hysterectomy	SCIP-Inf-1, 2, 3
5.07	Vaginal Hysterectomy	SCIP-Inf-1, 2, 3
5.08	Vascular Surgery	SCIP-Inf-1, 2, 3
5.09	Infection	SCIP-Inf-1, 2, 3, 4
5.10	Major Surgery	All SCIP Measures
5.11	Cardiac Surgery	SCIP-Inf-4
5.14	Burns	SCIP-Inf-4, VTE-1, 2
5.15	Transplants	SCIP-Inf-4
5.17	Intracranial Neurosurgery	SCIP-VTE-1, 2
5.19	General Surgery	SCIP-VTE-1, 2
5.20	Gynecological Surgery	SCIP-VTE-1, 2
5.21	Urological Surgery	SCIP-VTE-1, 2
5.22	Elective Total Hip Replacement	SCIP-VTE-1, 2
5.23	Elective Total Knee Replacement	SCIP-VTE-1, 2
5.24	Hip Fracture Surgery	SCIP-VTE-1, 2

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