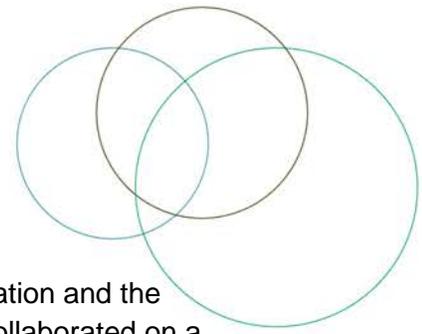


HOSPITAL HARM IMPROVEMENT RESOURCE

Wound Disruption



ACKNOWLEDGEMENTS

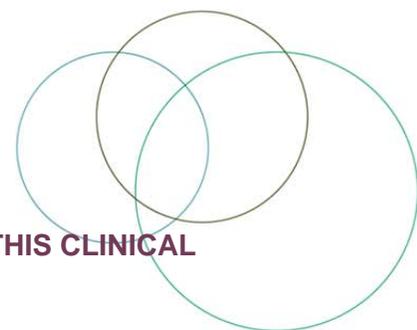


The Canadian Institute for Health Information and the Canadian Patient Safety Institute have collaborated on a body of work to address gaps in measuring harm and to support patient safety improvement efforts in Canadian hospitals.

The Hospital Harm Improvement Resource was developed by the Canadian Patient Safety Institute to complement the Hospital Harm measure prepared by the Canadian Institute for Health Information. It links measurement and improvement by providing evidence-informed resources that will support patient safety improvement efforts.

The Canadian Patient Safety Institute acknowledges and appreciates the key contributions of Heather L. Orsted, RN BN ET MSc Director, Education and Professional Development, Canadian Association of Wound Care for the review and approval of this Improvement Resource.





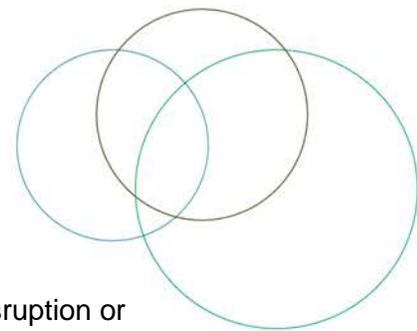
DISCHARGE ABSTRACT DATABASE (DAD) CODES INCLUDED IN THIS CLINICAL CATEGORY:

D23: Wound Disruption	
Concept	Disruption of surgical wound during the same hospital stay or an obstetric wound during the delivery episode of care.
Selection criteria	O90.002 O90.102 Identified as diagnosis type (M), (1), (2), (W), (X) or (Y)
	T81.3 T81.83* Identified as diagnosis type (2) AND Y60–Y84 in the same diagnosis cluster
Codes	Code descriptions
O90.002	Disruption of Caesarean section wound, delivered with mention of postpartum complication
O90.102	Disruption of perineal obstetric wound, delivered with mention of postpartum complication
T81.3	Disruption of operation wound, not elsewhere classified
T81.83*	Postoperative leak
Additional codes	
Inclusions	
Y60-Y84	Complications of medical and surgical care (refer to Appendix 6)

* Applicable to DAD abstracts from fiscal year 2015-2016 onward.

For the descriptions of external cause codes of complications of medical or surgical care (Y60–Y84), please refer to the technical notes: [Hospital Harm Indicator: Appendices to Indicator Library](#).





OVERVIEW

Wound healing is a critical outcome in surgery, and postoperative wound disruption or separation of the layers of a surgical wound with disruption of the fascia is a serious complication. Surgical incisions are acute wounds that activate the healing process. The healing process has four identified stages, namely: coagulation, inflammation, proliferative phase/granulation tissue formation and the remodelling phase, in reality it is a complex, continuous process (Demidova-Rice et al., 2012). Despite improvements in contemporary preoperative care and suture materials, the rate of surgical wound disruption has not decreased in recent years; estimated around six per cent after elective surgery and 16 per cent after emergency surgery (Sorensen et al., 2005). This may be attributable to the increasing incidence of risk factors within the patient population outweighing the benefits of technical achievements. Overall, surgical site infection (SSI) is the strongest predictor of wound disruption (Moghadamyeghaneh et al., 2015). Abdominal wound disruption typically occurs at 10 +/- 6.5 days (median eight days) after surgery (Kenig et al., 2014). A better understanding of which patients are at risk of such complications will help identify targets for preventative actions, patient satisfaction, and an equitable use of financial resources.

Post-partum perineal wound dehiscence remains a rare complication of vaginal delivery. Although infections rates in episiotomy wounds are surprisingly low, they are responsible for up to 80 per cent of wound dehiscence (Kamel & Khaled, 2014). The majority of perineal wound infections occur within the first three weeks postoperatively, after hospital discharge.

Risk Factors

Disruption of the vascular supply, thrombosis of blood vessels, and tissue hypoxia is common for all tissues subjected to surgery. When the blood supply is restored a number of factors may complicate healing with the most important being the proliferation of bacteria in the wound thus increasing the risk of infection (Sorensen et al., 2006).

Malnutrition is a common problem that adversely affects outcomes in surgical patients. Albumin is the most commonly used and reliable indicator of nutritional status, with preoperative hypoalbuminemia being an independent risk factor for the development of SSI (Hennessey et al., 2010).

Diabetic patients have a higher level of wound complications following general surgery and pregestational diabetes is associated with a 2.5 – fold increase in wound complications after Caesarean delivery (Takoudes et al., 2004). Obese patients have increased rates of diabetes mellitus as well as atherosclerosis vascular disease, both of which are associated with poor wound healing. In addition, thickness of subcutaneous fat is predictive of SSI. Finally, occult immune dysfunction is known to exist in the obese and one theory suggests that impairment of monocyte and macrophage function has the potential to be contributory (Winfield et al., 2016).

Smoking is also a risk factor for wound healing complications after different types of surgeries; plastic, abdominal, orthopedic, breast cancer and Caesarean delivery (Avila et al., 2012). Acute,



Wound Disruption

high-dose systemic corticosteroid use likely has no clinically effect on wound healing, whereas chronic systemic steroids may impair wound healing in susceptible individuals (Wang et al., 2013).

Psychological stress impairs the inflammatory response and matrix degradation processes in the wound immediately following surgery and these findings suggest that pre-operative interventions to reduce the patient's psychological stress level may improve wound repair and recovery (Broadbent et al., 2003). In children risk factors for wound disruption include patient age younger than one year, wound infection, median incision, and emergency surgery (van Ramshorst et al., 2009).

Operative vaginal delivery, third and fourth degree perineal laceration and meconium contamination, are the most significant factors leading to perineal wound infection (Williams, 2006).

IMPLICATIONS

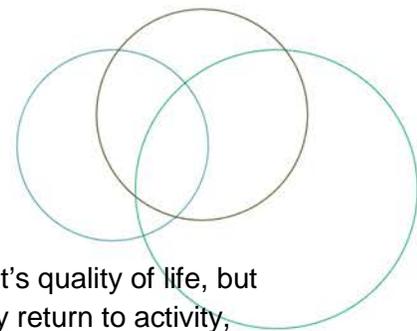
Wound disruption still remains a major cause of morbidity in surgical patients (Hahler, 2006). Wound disruption can be divided into two types; those requiring immediate surgical intervention due to bowel protrusion and those that can be managed using a more conservative approach. Hospital stay is significantly longer for patients with wound disruption, with a median of 36 days, compared to 16 days in a control group (van Ramshorst et al., 2010). Wound complications are a burden for patients, their families, and the health care system. Accurately estimating the cost associated with wound complications is difficult due to the use of different care products and their varying costs, frequency of interventions and costs associated with staff time and resources, but it is believed that wound care has a significant impact on healthcare expenditure (Butcher & White, 2014). A post discharge wound complication costs, on average, an additional \$3,000 (Marrs et al., 2014).

Perineal wound dehiscence, may lead to major physical, psychological and social problems if left untreated. It can be associated with persistent pain and discomfort at the perineal wound site, urinary retention, defecation problems, dyspareunia, psychosexual issues from embarrassment and altered body image (Williams & Chames, 2006).

GOAL

Reduce the incidence of wound disruption in surgical and obstetrical patients by assessing risk, implementing risk factor modifications prior to surgery and instituting good wound care management.





IMPORTANCE TO PATIENTS AND FAMILIES

Poor healing can result in wound disruption which not only affects the patient's quality of life, but may also delay adjuvant therapies, increase post-operative discomfort, delay return to activity, and increase costs as a result of re-intervention, longer hospitalization and readmission. Pain, particularly during dressing change remains a central and significant factor. Apart from the distress caused, pain can lead to feelings of anxiety, anger and depression (Woo, 2010). Accurate pain assessment and understanding of the type of pain, helps with decisions about when and how to give analgesia and what information needs to be shared with the multidisciplinary team (Taylor, 2010). A number of risk factors can be mitigated during the perioperative period, suggesting that the risk of developing wound disruption in vulnerable patients can be reduced. Additionally, taking into consideration a significant percentage of wound disruption events occur following hospital discharge, it seems logical to take all necessary steps to prevent this complication.

Patient Story

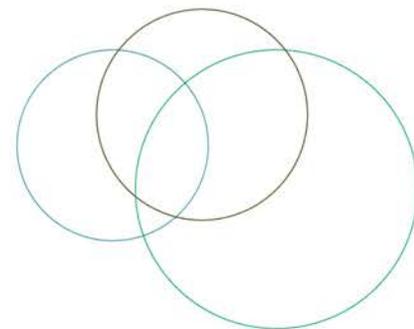
We are looking for a patient story related to wound disruption. If you have one, please share it with the Canadian Patient Safety Institute at info@cpsi-icsp.ca.

EVIDENCE-INFORMED PRACTICES

Assess For and Mitigate Risk Factors Preoperatively

1. Patients should abstain from smoking for at least three weeks pre and postoperatively (Herbert & McCormick, 2006).
2. Obese patients should be informed of surgical risk in regards to their weight and be encouraged to lose weight prior to surgery to decrease the risk of wound complications (Lobley, 2013).
3. Provide a balanced diet or nutritional support with sufficient protein to achieve positive nitrogen balance. Treat any suspected micronutrients deficiencies, especially Vitamin A, Vitamin C, and zinc (Scholl, 2001).
4. Preoperative corticosteroids treatment of at least 30 days, particularly at prednisone doses of 40 mg/day or greater, may increase wound complication rates up to two to five times (Wang, 2013). Evaluate corticosteroid treatment and if appropriate adjust prior to surgery according to medical evaluation.
5. Medication with an anticoagulant effect, such as aspirin or non-steroidal anti-inflammatory drugs should be evaluated and adjusted prior to surgery according to medical evaluation (Doughty, 2004).
6. Treat preoperative anemia. Lower preoperative hemoglobin has been described as operative risk factors for wound complications (Subramanian et al., 2014).





Prevention of Surgical Site Infections

Safer Healthcare Now! (2014)

Four Key Components of Reliable Perioperative Care:

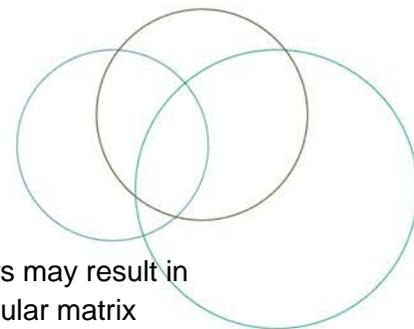
1. Antimicrobial Coverage Peri-operatively.
 - a. Appropriate use of prophylactic antibiotics; and
 - b. Antiseptic prophylaxis.
2. Appropriate Hair Removal.
3. Maintenance of Perioperative Glucose Control.
4. Perioperative Normothermia.

Detailed information relative to the four key components above is available in the [Safer Healthcare Now! Surgical Site Infection Getting Started Kit \(2014\)](#).

Mitigate Risk Factors: Perioperative

1. Excessive intraoperative blood loss and long surgical duration have been described as operative risk factors for wound complications (Subramanian et al., 2014).
2. Subcutaneous closure if the depth is greater than 2 cm is effective to avoid wound complications (Tipton et al., 2011).
3. An optimal technique for closure of abdominal surgical wounds includes:
 - Use of a simple running technique.
 - Use of #1 or #2 delayed absorbable suture.
 - Use of mass closure to incorporate all layers of the abdominal wall (except skin).
 - Taking wide tissue bites (about 1 cm).
 - Use of a short stitch interval (about 1 cm) (Mizell, 2016).
4. Use of staples for Caesarean delivery closure is associated with an increased risk of wound complications (Basha et al., 2010).
5. Laparoscopic approach is associated with a decreased risk of wound disruption (Moghadamyeghaneh et al., 2014).
6. Various forms of peritoneal lavage are routinely used in the management of patients with peritonitis. With increased use of prophylactic antibiotics, the trend in general surgery has been away from the use of antibiotics in intra-abdominal irrigation however, imipenem 1 mg/ml irrigation (Parcells et al., 2009) and gentamicin-clindamycin irrigation (Ruiz-Tovar et al., 2012) have been found to be associated with a lower incidence of intra-abdominal abscesses and wound infections. Irrigation at the time of Caesarean delivery increases intraoperative nausea without any beneficial effects on postoperative maternal infectious morbidity (Viney et al., 2012).





Postoperative

1. Assess and manage pain. The exaggerated release of pain mediators may result in nociceptor hypersensitization, hyperinflammatory cellular and extracellular matrix changes, and in some cases the potential for a fibrotic healing pattern (Widgerow & Kalaria, 2012).
2. Educate patients to avoid heavy lifting following abdominal surgery to minimize stress on the healing fascia (Mizell, 2016).

Manage Open Surgical Wounds

(Orsted et al., 2010)

Cause:

1. Complete a holistic assessment to identify factors that may affect surgical wound healing in the pre-operative, intra-operative and post-operative phases.
2. Create a treatment plan to eliminate or reduce factors that may affect surgical wound healing in the pre-operative, intra-operative and post-operative phases of care.

Patient-centered concerns:

3. Include the patient, family and/or caregiver as members of the team when developing care plans.
4. Educate the patient, family and/or caregiver to optimize surgical wound healing.
5. Assess the surgical wound and document findings using a standardized approach.
6. Debride the surgical wound of necrotic tissue.
7. Rule out or treat a surgical site infection.
8. Provide optimal local wound moisture balance to promote healing by choosing an appropriate dressing for the acute and chronic phases of surgical wound healing.

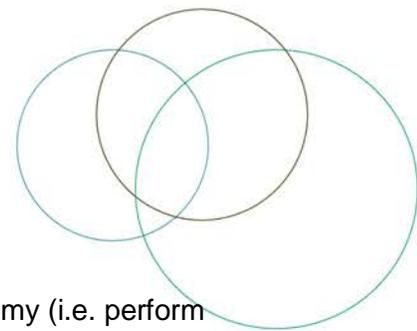
Re-evaluation:

9. Determine the effectiveness of interventions and reassess if healing is not occurring at the expected rate. Assess the wound edge and rate of healing to determine if the treatment approach is optimal.
10. Consider the use of adjunctive therapies and biologically active dressings.

Organizational concerns:

11. Recognize that surgical wound healing requires a team approach.
12. Implement a surgical site surveillance program that crosses clinical setting boundaries.





Care of Perineal Obstetric Wound

(Harvey et al., 2015)

1. Obstetrical care providers should follow a policy of restricted episiotomy (i.e. perform an episiotomy only if indicated).
2. If an episiotomy is indicated, a mediolateral over midline should be considered. The optimal cutting angle appears to be no less than 45 degrees and ideally around 60 degrees.
3. Obstetric anal sphincter injuries should be repaired by appropriately trained clinicians. Repairs can be delayed eight to 12 hours, with no detrimental effect, to ensure access to an experienced obstetrical surgeon.
4. Prophylactic single dose intravenous antibiotics should be administered for the reduction of perineal wound complications following the repair of obstetrical anal sphincter injury.
5. Laxative should be prescribed following an obstetrical anal sphincter injury repair to ensure an earlier and less painful first bowel movement.

MEASURES

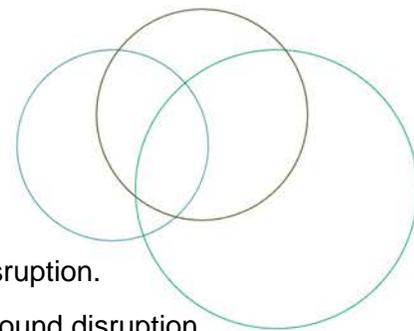
Vital to quality improvement is measurement, and this applies specifically to implementation of interventions. The chosen measures will help to determine whether an impact is being made (primary outcome), whether the intervention is actually being carried out (process measures), and whether any unintended consequences ensue (balancing measures).

Below are some recommended measures to use, as appropriate, to track your progress. In selecting your measures, consider the following:

- Whenever possible, use measures you are already collecting for other programs.
- Evaluate your choice of measures in terms of the usefulness of the final results and the resources required to obtain them; try to maximize the former while minimizing the latter.
- Try to include both process and outcome measures in your measurement scheme.
- You may use different measures or modify the measures described below to make them more appropriate and/or useful to your particular setting. However, be aware that modifying measures may limit the comparability of your results to others.
- Posting your measure results within your hospital is a great way to keep your teams motivated and aware of progress. Try to include measures that your team will find meaningful and exciting (IHI, 2011).

For more information on measuring for improvement contact the Canadian Patient Safety Institute Central Measurement Team at measurement@cpsi-icsp.ca





Outcome Measures

1. Percent of patients with Caesarian section who developed wound disruption.
2. Percent of patients with perineal obstetrical wound who developed wound disruption.
3. Percent of patients with a surgical incision who developed wound disruption

Process Improvement Measures

Process Improvement Measures for Surgical Site Infections

(*Safer Healthcare Now!* 2014)

1. Percentage of clean and clean-contaminated patients with timely prophylactic antibiotic administration.
2. Percentage of clean and clean-contaminated patients with appropriate prophylactic antibiotic discontinuation.
3. Percentage of surgical patients with appropriate hair removal.
4. Percentage of all diabetic or surgical patients at risk of high blood glucose with controlled post-operative serum glucose post op day 0, 1, and 2.
5. Percentage of all clean or clean-contaminated surgical patients with normothermia within 15 minutes prior to skin closure or on arrival in post anaesthetic care unit.
6. Percentage of clean and clean-contaminated patients with pre-op wash with soap or antiseptic agent.
7. Percentage of clean and clean-contaminated surgical patients with appropriate intra-op skin cleansing on intact skin.
8. Percentage of clean and clean-contaminated patients receiving 2 grams of cefazolin as prophylactic antibiotic.
9. Percentage of clean and clean-contaminated surgical patients receiving appropriate prophylactic antibiotic re-dosing.
10. Percentage of clean and clean contaminated surgical patients with evidence of surgical site infection at or prior to discharge.
11. Percentage of clean and clean contaminated surgical with appropriate selection of prophylactic antibiotics (optional).

Process Improvement Measures for Wound Care

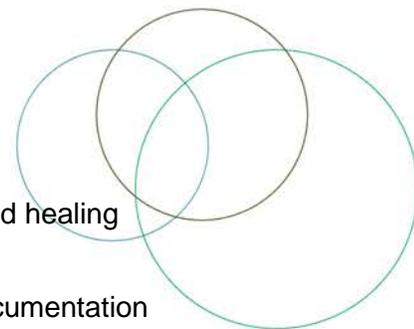
(Orsted et al., 2010)

1. Percentage of patients undergoing a surgical wound healing risk assessment.
2. Percentage of patients who had an individualized treatment plan to eliminate and reduce risk factors.



Wound Disruption

3. Percentage of patients/family/caregivers who received surgical wound healing education.
4. Percentage of patients who had surgical wound assessment and documentation starting 48 hours post-op.
5. Percentage of patients with appropriate dressing for the acute phase of surgical wound healing.



Process Improvement Measures for Care of Perineal Obstetric Wounds

1. Percent of patients with an episiotomy.
2. Percent of prophylactic single dose intravenous antibiotics administered following the repair of obstetrical anal sphincter injury.
3. Percent of patients prescribed a laxative following the repair of obstetrical anal sphincter injury.

Additional Process Improvement Measures for Prevention of Wound Disruption

1. Percent of patients with preoperative risk assessment and individualized plan of care to mitigate risk of wound disruption.
2. Percentage of patients with a pain assessment/monitoring completed every four hours or more.
3. Percentage of patients with significant pain (pain is counted as significant if above target level according to pain scale used i.e. NRS ≥ 4 or BPS ≥ 6)
4. Percentage of patients with an individualized plan of care to mitigate perioperative risk of wound disruption.

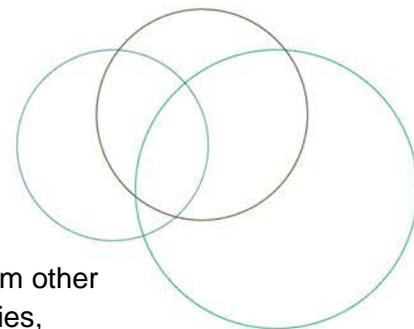
STANDARDS AND REQUIRED ORGANIZATIONAL PRACTICES

Accreditation Canada Standards

Perioperative Services and Invasive Procedure Standards include several requirements to prevent and minimize infection, including: providing information to clients about how to protect themselves from infections; conducting risk assessments; using procedure-specific care maps or guidelines; following routine practices; administering prophylactic antibiotics; using airborne, droplet and contact precautions; reprocessing; etc. There are also requirements around preoperative assessments to identify risk factors, and discussing postoperative pain management options and preferences with clients.

Obstetrics Services Standards include pain management requirements and criteria to prevent and minimize infection by providing information to clients on how to prepare for C-sections.





GLOBAL PATIENT SAFETY ALERTS

[Global Patient Safety Alerts](#) provides access and the opportunity to learn from other organizations about specific patient safety incidents including alerts, advisories, recommendations and solutions for improving care and preventing incidents. Learning from the experience of other organizations can accelerate improvement.

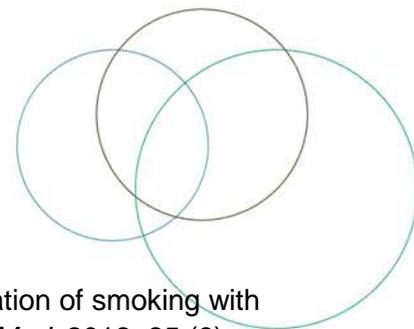
Recommended search terms:

- Wound Disruption
- Surgical Site Infection
- Preoperative/Postoperative

SUCCESS STORIES

We are looking for an improvement success story related to wound disruption. If you have one, please share it with the Canadian Patient Safety Institute at info@cpsi-icsp.ca.

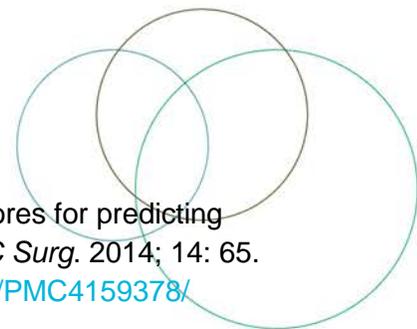




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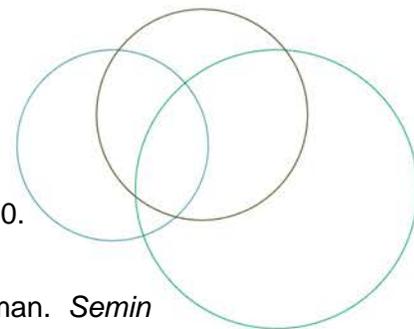
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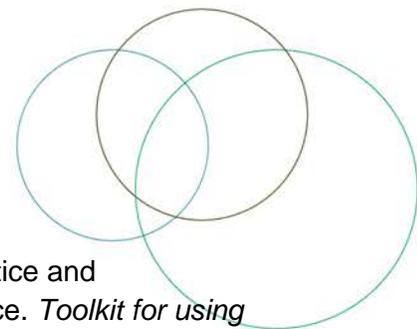
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WOUND DISRUPTION RESOURCES

Professional Associations and Helpful Websites

- Canadian Association of Wound Care
<http://cawc.net/index.php/resources/resources/clinical-practice/>
- Canadian Patient Safety Institute, Surgical Site Infection
[http://www.patientsafetyinstitute.ca/en/Topic/Pages/Surgical-Site-Infection-\(SSI\).aspx](http://www.patientsafetyinstitute.ca/en/Topic/Pages/Surgical-Site-Infection-(SSI).aspx)
- Centers for Disease Control and Prevention, Surgical Site Infection
<http://www.cdc.gov/HAI/ssi/ssi.html>
- Institute for Healthcare Improvement, Surgical Site Infection
<http://www.ihi.org/topics/ssi/pages/default.aspx>





Wound Disruption Clinical Practice Guidelines

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