

## Major Recommendations for the International Consolidated Wound Infection Guideline (ICWIG)

### Legend For International Consolidated Wound Infection Guideline (ICWIG) Recommendations Below

1. First entry is final recommendation based on evidence incorporating Validation Survey Respondent comments to assure multidisciplinary relevance.
2. Second entry is the letter indicating the standardized ICWIG Strength of Evidence described below. This was determined based on the literature searches and quality of the best up to 5 articles cited supporting the recommendation. If two studies had the same design, the one with larger sample size was selected.

Methods Used to Assess the Strength of the Evidence: Guideline developers determined what relative importance to give the evidence they obtained according to the rating scheme outlined below. Any recommendation with A level evidence and/or content validated clinical relevance (described below) qualified as a bona fide recommendation and was listed in normal font, not *italicized*.

A. Results of a meta- analysis or two or more clinical wound infection-related randomized controlled trials (RCT) on humans provide support. Alternatively for diagnostics , screening or risk assessment, A-level evidence included prospective cohort (CO) studies and/or controlled studies reporting recognized diagnostic validity measures, e.g. sensitivity or specificity; or screening validity measures, such as positive or negative predictive validity.

B. Results of one clinical wound infection-related RCT in humans plus two or more similar Historically Controlled Trials (HCT) or Convenience Controlled Trials (CCT) or one HCT and one CCT provide support or when appropriate, results of two or more RCT in animal model validated as clinically relevant to human wound infection provide indirect support. For diagnostics or risk assessment one clinical wound infection-related prospective cohort (CO) study and/or a controlled study reporting recognized diagnostic or predictive validity measures.

C. This rating requires one or more of the following:

- C1: Results of one controlled trial on clinical wound infection prevention or treatment, e.g. RCT, CCT or HCT (or for diagnostics or risk prediction one prospective CO study may be substituted for a controlled trial)
- C2: Results of at least two case series (CS) or descriptive studies or a cohort study in humans with or at risk of clinical wound infection
- C3: Expert opinion (EO)

3. Third entry in parentheses is last name of first author and publication year of up to 5 citations representing highest available strength of evidence found by searching PUBMED, CINAHL or EMBASE databases. Citations and evidence summaries are available in the ICWIG Evidence Table accessed at [aawconline.org](http://aawconline.org).

4. Underscored references support reduced costs of care or improved cost effectiveness.

5. First number after the evidence citations is Strength of Recommendation (SOR). This was based on independent standardized ratings of respondents to the online Validation Survey as they rated effects on patients of following each recommendation as:

- a. **0 = Risks, costs or harms clearly outweigh benefits or**
- b. **1 = Benefits clearly outweigh costs, risks and/or harms.**

In the final guideline, SOR ratings are listed as “High” if at least 75% of survey respondents rated effects on their patients of following the recommendation “1”, or “Moderate” if 50-74.99% of respondents rated it “1” or “Low” if less than 50% of respondents rated it “1”.

6. Second number after the evidence, the Content Validity Index (CVI), is percent of survey respondents rating the recommendation clinically relevant, i.e. 3 or 4 on a rating scale of:

- a. **1 = Not relevant;**
- b. **2 = Confusing/unable to assess relevance without more information;**
- c. **3 = Relevant but needs minor improvements:**

- d. 4 = Very Relevant and succinct.

The CVI = (Number of 3's + number of 4's) / (Total N Responding for that recommendation).

A CVI  $\geq$  0.75, establishes content validity for the recommendation as clinically relevant.

## International Consolidated Wound Infection Guidelines (ICWIG) Major Recommendations

**Guideline users:** Please inform decisions with ICWIG Recommendations only if they are appropriate and feasible for the patient(s) you are managing and they are consistent with your institution and setting protocols and procedures. Please document reasons for non-use and share this information with others on the patient's wound care team. All tests and measures should be performed by those adequately trained to perform the test reliably achieving accurate results.

### I. PREVENT DEVELOPMENT OF A WOUND INFECTION

**I.A. Use CDC recommended timelines and methods to assess, monitor, address and document risk factors for developing a wound infection, by informing clinical judgment with the information in I.A.1 to I.A.4.**

A (per evidence cited in A.1-4)

**I.A.1. Document medical history of diabetes mellitus (blood glucose > 126 mg/dL or 7 mmol/L or HbA1c > 6.5%) and address related issues that may increase likelihood of wound infection, e.g. ≥ 10 year duration and I.A.1.a to I.A.1.d below.**

A (Embil et al., 2006; Matsuda et al., 2009; Segers et al., 2007) High SOR = 0.95, CVI = 1.00

**I.A.1.a. Perform a valid test for peripheral neuropathy (e.g. using Semmes-Weinstein monofilament or a tuning fork) and document at least 6 areas of loss of protective sensation (LOPS) that may lead to unfelt skin injury, which opens the skin to microbial invasion,**

A (Lipsky et al., 2012; Singh et al., 2005) High SOR = 0.88, CVI = 0.95

**I.A.1.b. Document altered or abnormal anatomy of foot (e.g. hallux rigidus) or other body sites that may cause skin injury allowing microbial invasion.**

B (Lipsky et al., 2012; Weiner et al., 2011) High SOR = 0.88, CVI = 0.88

**I.A.1.c. Document sites of dry, cracked or damaged skin of sufficient depth and severity to allow microorganisms to invade healthy tissue. Moisturize dry skin or protect cracked or damaged skin with a microbial barrier.**

C2 (Farage et al. 2007, Lipsky et al., 2012; Wilson et al., 2005) High SOR = 0.93, CVI = 0.88

**I.A.2. Use valid, patient- and setting- appropriate measures or referrals before surgery to document and address comorbidities such as circulatory, immunologic, renal or respiratory insufficiency that may increase risk of infection. Example risk factors for SSI are listed in I.A.2.a-2.d below**

A (Aragón-Sánchez et al., 2013; Mohammed et al., 2013; Prompers et al., 2008) High SOR = 0.91, CVI = 0.87

**I.A.2.a. Chronic obstructive pulmonary disease,**

A (Segers et al., 2007; Mohammed et al., 2013) High SOR=0.78, CVI=0.75

**I.A.2.b. Ischemia, e.g. for a lower extremity wound, A Doppler ratio of systolic ankle: brachial blood pressure index (ABI) ratio < 0.9 reflects some ischemia; < 0.8 suggests referral to a specialist to assess for arterial disease. ABI > 1.2 may reflect arterial calcification so that the ankle artery is not compressible. In this case, toe / brachial systolic blood pressure (TBI) > 0.6 or trans-cutaneous oxygen partial pressure > 30mmHg near the ulcer may suggest adequate arterial flow.**

A (Henke et al., 2005; Prompers et al., 2008; Segers et al., 2007;) High SOR=0.93, CVI=0.93

**I.A.2.c. Increased risk on a standardized SSI risk score validated for the patient age, condition and intended surgical procedure can help inform clinical decisions. [Note: Survey respondents gave this recommendation a low CVI and SOR without the following qualifying statement: These decisions are ultimately made by the multidisciplinary team considering individual patient health, benefits and risks.]**

A (Berger et al., 2013; Biscione et al., 2012; Segers et al., 2007) Low SOR = 0.59, CVI = 0.60

**I.A.2.d. Patient immunologic dysfunction or use of agents that may suppress immunity, including nicotine use, radiation treatment or prolonged (> 7 day) use of corticosteroids.**

A (Lipsky et al., 2012; Ridderstolpe et al., 2001; Sato et al., 2011; Sorensen et al., 2012; Wu et al., 2010) High SOR=0.93, CVI=0.98

**I.A.3. Document patient behaviors that may expose wounds to infecting organisms and as feasible implement strategies to minimize those behaviors.**

C2 (Lipsky et al., 2013) High SOR = 0.88, CVI = 0.85

**I.A.3.a. As feasible and appropriate to patient and setting, assess patient, family and caregiver learning style, level of understanding of, instructions and capacity to participate in care and engage in activities that prevent infection,**

C2 (Lipsky et al., 2013) High SOR = 0.93, CVI = 0.90

**I.A.3.b. Document nicotine use. Educate patient on importance of minimizing nicotine use and avoiding use at least 4 weeks before surgery. Document patient's understanding, goals and progress toward reducing nicotine use.**

A (Lee et al. 2013; Mills et al. 2011; Ridderstolpe et al., 2001; Sorenson, 2012; Wong et al. 2012)  
High SOR = 0.98, CVI = 0.93

**I.A.4. Document patient nutritional status and intake limitations using validated screening tools or parameters (e.g. serum pre-albumin < 25 g/dl; hemoglobin <12) or use a nutritional consult to do so. Correct nutritional deficiencies.**

A (Font-Vizcarra 2011; Giri et al., 2013; Kinross et al. 2012; Klek et al., 2008; Markel et al., 2008) High SOR = 0.93, CVI = 0.95

**I.B. Prevent surgical wound infection or prevent infection transmission**

**I.B.1. For surgical wounds, preoperatively document and address wound contamination classification (clean, clean contaminated, contaminated or dirty) using CDC standardized criteria. It is not yet clear whether these criteria reflect risk of chronic wound infection.**

A (Chang et al., 2013; McGuckin et al., 2003; N.I.C.E. 2001) High SOR =0.87, CVI =0.861

**I.B.1.a. Pre-operatively document appropriate patient nares culture(s) and use setting procedures to reduce wound exposure to recognized pathogens, such as Staphylococcus aureus.**

A (CADTH, 2010; Miranda et al., 2010) Moderate SOR = 0.74, CVI = **0.77**

**I.B.2. Document and address patient preoperative risk factors for wound infection such as I.B.2.a to .d below, including extremes of age, obesity, thick subcutaneous fat, malnutrition, diabetes, hyperglycemia, nicotine use, immunosuppression or radiotherapy, steroids or chemotherapy, limited tissue oxygenation, prior history of delayed healing, depression, homelessness self-mutilation or other pshycho-social factors that may compromise wound care.**

A (de Mestral & Nathans, 2013; Matsuda et al., 2009; Mehta et al., 2013; Mohammed et al., 2013; Neumayer et al., 2007) High SOR = 0.91, CVI = 0.88

**I.B.2.a. Rigorously prevent infection in subjects at extremes of age < 30 days or age > 70 years, or recent hospitalization or nursing home residency or antibiotic use.**

A (de Mestral & Nathans, 2013; Vogel 2010) High SOR = 0.93, CVI = 0.85

**I.B.2.b. Document obesity, defined as having a body mass index > 27 kg/m<sup>2</sup> or subcutaneous fat > 25 mm thick and address as feasible per institutional protocols before surgery.**

A. Kurmann et al., 2011; Mehta et al., 2013; Mohammed et al., 2013) High SOR = 0.93, CVI = **0.88**

**I.B.3. As feasible per institutional protocols and CDC guidelines, avoid pre-operative conditions (e.g. I.A.1-4) or procedures that increase surgical site infection (SSI) risk or length of hospital stay and those listed in I.B.3.a-e below:**

A (Ibrahim et al., 2103; Tanner et al., 2011; Weber et al., 2005; Young & Watson, 2006) High SOR = 0.95, CVI = 0.85

**I.B.3.a. Minimize the duration of the patient's pre-operative institutional stay to the least time required to stabilize or monitor patient.**

A Lau et al., 2010; Moro et al., 1991; Ridgeway et al., 2005; Seguin et al., 2006; High SOR = 0.78, CVI = 0.72

**I.B.3.b. Perform all pre-operative skin washing and operative site preparation per institutional protocols before the patient is in the operating room.**

C1 (Alexander et al., 2011; Tanner et al., 2011) High SOR = 0.75, CVI = 0.64

**I.B.3.c. Unless required to raise patient hematocrit or hemoglobin to safe levels, avoid a transfusion before surgery.**

C1 (Ibrahim et al., 2103; Lipsky et al., 2013; Sato et al., 2011; Weber et al., 2005) High SOR = 0.79, CVI = 0.70

**I.B.3.d. Avoid use of mechanical bowel preparation for elective colorectal surgery unless required for specific surgical procedures per institutional protocols.**

A (Güenaga et al., 2011; Jung 2007 RCT) Moderate SOR =0.62, CVI = 0.40

**I.B.3.e. Decontaminate hands of staff per CDC standards before and after all patient contact or after contact with body fluids or excretions, mucous membranes, non-intact skin and wound dressings.**

B (Allegranzi et al., 2013; Johnson et al., 2005; Johnson et al., 2012; Larson et al., 2005; Rutala et al., 2008) High SOR= 0.93, CVI = 0.95

**I.B.3.f. Clip skin for necessary pre-operative hair removal. Do not shave or use depilatory.**

A (Dizer et al., 2009; NICE 2013; Tanner 2006) High SOR = 0.82, CVI = 0.75

**I.B.4. Apply evidence-based “bundles” or institutional standards for preoperative preparation of patient and environment to prevent SSI, for example in I.B.4.a-s below.**

A (Alexander et al., 2011; Crolla et al., 2013; Ristić et al., 2010; Tanner et al., 2015) High SOR = 0.94, CVI = 0.91

**I.B.4.a. Use CDC- recommended high-level disinfectants according to package insert instructions to clean all environmental surfaces in the operating room that touch non-intact skin or mucous membranes.**

C1 (Alexander et al., 2011; Boyce et al., 2008 Rutala et al., 2008; Stiefel et al., 2011) High SOR =0.92, CVI = 0.90

**I.B.4.b. Between patients meticulously clean and steam sterilize instruments and scopes that enter body parts. If not feasible, clean them with CDC-recommended high-level disinfectants according to package insert instructions.**

C3 (Alexander et al., 2011; Calfee et al 2008; CDC 2008; Rutala et al., 2008) High SOR = 0.98, CVI = 0.98

**I.B.4.c. Between patients use low-temperature sterilization technologies (e.g., EtO, hydrogen peroxide gas plasma) according to CDC recommendations to sterilize critical patient-care equipment that is damaged by heat or moisture.**

C3 (CDC, 2008) High SOR = 0.90, CVI = 0.88

**I.B.4.d. Initiate appropriate prophylactic intravenous antibiotic within 1 hour (2 hours for Vancomycin or Fluoroquinolones) before surgical incision and complete within 24 hours after surgery . Laparoscopic cholecystectomy does not require this.**

A (Bhattacharjee 2013; Bratzler et al., 2006; Gillespie et al., 2010; Mohammed et al., 2013; Sanabria et al., 2010) High SOR = 0.92, CVI =0.87

**I.B.4.e. Do not count on use of antiseptic patient showering or surgical site cleansing within 24 hours before surgery to reduce SSI in clean surgery. Insufficient evidence supports efficacy of this procedure compared to using detergent or soap.**

A (NCC-WCH, 2008; Chlebicki et al., 2013; Dumville e al., 2013; Webster, 2007) High SOR = 0.79, CVI = 0.74

**I.B.4.f. Decontaminate operative staff arms and hands and surgical site preoperatively to reduce skin organisms by either rubbing with alcohol based sanitizer or scrubbing with chlorhexidine or povidone iodine before superficial or deep clean-contaminated surgery.**

A (Larson et al., 2005; Neuburger et al., 2009; Parienti et al., 2002; Pittet et al., 1999; WHO, 2009)  
High SOR= 0.84, CVI =0.79

**I.B.4.g. Avoid using adhesive surgical drapes as they are associated with increased risk of SSI and higher costs, compared to no incise drape. Insufficient evidence supports efficacy of iodophor-impregnated incise drapes as compared to no incise drapes or cost effectiveness of wound edge protectors compared to standard care.**

A (Webster et al., 2013) Moderate SOR = 0.68, CVI = 0.69

**I.B.4.h. If hair removal is required, clip hair from surgical areas shortly before surgery. Do not shave or depilate chemically.**

A (Alexander et al., 2011; Bratzler et al., 2006; Dellinger et al., 2005; Tanner et al 2011) High SOR = 0.82, CVI = 0.80

**I.B.4.i. Use nasal decontamination only with antimicrobial agents that have evidence of efficacy such as mupirocin or chlorhexidine gluconate.**

A (Kalmeijer 2002; Perl et al., 2002; Segers et al., 2006) [Survey respondents required adding « evidence of efficacy ». CVI and SOR do not reflect current, improved wording] Low SOR = 0.52, CVI = 0.51

**I.B.4.j. Administer parenteral antimicrobial prophylaxis as appropriate to patient and surgery to prevent infection, consistent with published guidelines. Initiate within 1 h before incision or within 2 hours before surgery for vancomycin or fluoroquinolones.**

C1 (Bratzler et al., 2006; Dellinger et al., 2005; Classen, 1992) High SOR =0.84, CVI =0.86

**I.B.4.k. Assure that staff removes hand jewelry artificial nails and nail polish and that nails are cut to CDC-recommended length.**

C3 (CDC, 2002; N.I.C.E., 2008) , High SOR = 0.90, CVI = 0.90

**I.B.4.l. Maintain homeostasis before, during and after surgery.**

C2 (Dellinger et al. 2005), High SOR = 0.94, CVI = 0.89

**I.B.4.l.i.1. Maintain normal patient body temperature (36-37°C ).**

A (Adriani et al., 2013; Dellinger et al., 2005; Kurz et al., 1996; Young & Watson, 2006) High SOR = 0.82, CVI = 0.77

**I.B.4.l.i.2. Maintain patient's blood oxygen saturation at more than 95% during the perioperative period. Filtering out white blood cells from a transfusion required for elective surgery does not affect surgical infections, but may reduce length of hospital stay and complications.**

A (van Hilten et al., 2004; Belda et al 2005; Brar et al., 2011; Chuang et al., 2004; Greif, 2000) High SOR = 0.92, CVI = 0.90

**I.B.4.l.i.3. Document and maintain normal patient blood glucose  $\leq 8$  mmol/L, serum creatinine concentration  $\geq 2$  mg/dL, and platelet count  $\geq 350\,000$  cells/mL<sup>3</sup>. Recognize that a platelet count  $> 350 \times 10^9$ /ml<sup>3</sup> may suggest osteomyelitis in patients with a chronic leg ulcer.**

A (Dellinger et al., 2005; Holm et al., 2004; Latham et al., 2001) High SOR = 0.88, CVI = 0.90

**I.B.4.l.i.4. Continue patient's prescribed beta blocker during the time frame 24 hours before surgery through recovery room stay.**

A (JCHO, 2011; Wiesbauer et al., 2007) Moderate COR = 0.77, CVI = 0.66

**I.B.5. Employ safe, effective staff preparation and operating room practice standards for all surgical procedures including wound debridement, e.g. in I.B.5.a-j below.**

A (Alexander et al., 2011; Hahler 2006; Khorgami et al., 2013) High SOR 0.95, CVU = 0.95

**I.B.5.a. Use staff gowns and patient covering materials which prevent liquid penetration**

C1 (Alexander et al., 2011; JCHO, 2011; Mangram et al., 1999; Pittet et al., 1999) High SOR = 0.90, CVI = 0.92

**I.B.5.b. Avoid perforation of surgical gloves in the operating room. Double glove if there is high risk of glove puncture or resulting SSI. Change gloves when perforation is observed.**

C3 (Alexander et al., 2011; NICE, 2008) High SOR = 0.98, CVI = 0.90

**I.B.5.c. Position incision and closure devices to minimize stress on the incision line in order to prevent dehiscence.**

B (Hahler 2006; Khorgami et al., 2013) High SOR = 0.95, CVI = 0.90

**I.B.5.d. Optimize surgical technique: e.g. scalpel type, wound temperature, asepsis.**

C2 (Alexander et al., 2011; Mangram et al., 1999; JCHO, 2011) High SOR = 0.95, CVI = 0.89

**I.B.5.e. Use suture material that resists infection or reduces suture tract bioburden.**

C1 (Alexander et al., 2011; Cruz et al., 2011) High SOR = 0.87, CVI = 0.82

**I.B.5.f. Wound infections and dehiscence are similar closing lower limb procedures with sutures or staples.**

A (Biancari et al., 2010) High SOR = 0.78, CVI = 0.76

**I.B.5.g. Minimize dead space within or below the skin where possible, avoiding pocket formation during surgical closure.**

C2 (Alexander et al., 2011) High SOR = 0.93, CVI = 0.93

**I.B.5.h. Minimize wound trauma by gentle tissue handling and limited use of electrocautery.**

C2 (Alexander et al., 2011) High SOR = 0.92, CVI = 0.90

**I.B.5.i. Remove devitalized tissue as appropriate to patient and wound without causing greater harm, per institutional protocols.**

C2 (Alexander et al., 2011) High SOR = 0.93, CVI = 0.95

**I.B.5.j. Use clinical judgment to inform decisions about implanting antibiotic-impregnated material before closing surgical wounds. Efficacy in reducing SSI has been shown for some clean or clean contaminated surgery. Insufficient evidence supports safety or efficacy in reducing SSI incidence following colorectal surgery or cardiac surgery for up to 90 days postoperatively.**

A (Bennett-Gurrero et al, 2010; Kamath et al, 2005; Milburn et al., 2008) [CVI, SOR do not reflect second sentence of recommendation and evidence added per survey respondents], Moderate SOR = 0.54, CVI = 0.59

**I.B.6. Document and minimize peri-operative conditions and procedures that increase SSI risk and are not recommended (e.g. see I.B.6.a to 6.e.),**

A (Gaynes et al., 2001; Kurz et al., 1996; Melling et al. 2001) High SOR = 0.81, CVI = 0.84

**I.B.6.a. Use personal protective wear to minimize patient contact with personnel known to be infected or colonized with pathogenic organisms.**



C2 (Alexander et al., 2011; CDC, 2009; JCHO, 2011) High SOR = 0.82, CVI = 0.74

**I.B.6.b. Avoid intra- and post-operative hypothermia by safely applying local or systemic warmth, such as forced air warming, to maintain a patient's core body temperature at or above 36.5 o C to prevent SSI and other surgical complications and reduce length of hospital stay.**

A (Adriani et al., 2013; Melling et al. 2001; Young & Watson 2006) Moderate SOR = 0.71, CVI = 0.72

**I.B.6.c. Use aseptic technique as appropriate to the setting, e.g. sterile technique for surgical wounds in the hospital or clean technique in home care or long term care settings for all wound care; as indicated by patient and wound condition and institutional policy.**

C3 (CDC, 2002; WHO, 2009) High SOR = 0.92, CVI = 0.88.

**I.B.6.d. Minimize invasiveness of surgery and limit duration of operation and anaesthesia procedures to less than 180 minutes.**

B (Fullum et al., 2010; Gaynes et al., 2001; Segers et al., 2007; Sato et al., 2011; Vowden et al.2008)  
High SOR = 0.83, CVI = 0.68

**I.B.6.e. Monitor and minimize microbial burden of operating and patient room air and surfaces by effective air filtration or treatment and surface sterilization techniques and by minimizing operating room personnel and using effective staff protective wear such as hand, shoe and hair covers, though face mask use may not consistently reduce surgical site infections .**

A (Bahli, 2009; Alexander et al., 2011; Botzenhart et al., 1976; Passaretti et al., 2013) High SOR = 0.87,  
CVI = 0.78

**I.B.7. Recognize and address post-operative conditions increasing wound infection risk such as high endemic prevalence of antibiotic-resistant S. aureus or P. aeruginosa organism strains or patient risk factors listed in I.B.4) or low subcutaneous oxygen tension associated with obesity or anesthesia-induced hypothermia.**

A (Duarte et al., 2012—CO; Kabon et al 2010; Kabon et al 2004; Melling et al. 2001) High SOR = 0.86, CVI = 0.84

**I.B.7.a. As feasible, while adhering to institutional protocols, prevent or manage gross contamination of wounds from urine, stool and environmental contaminants including personnel who come into contact with the patient.**

C2 (Alexander et al., 2011; Duarte et al., 2012; JCHO, 2011), High SOR = 1.00, CVI = 0.98

**I.B.7.b. Apply CDC Contact Precautions for patients colonized or infected with known highly transferable pathogens such as MRSA and monitor closely for SSI during at least 10 days post-operatively.**

C2 (Alexander et al., 2011; Calfee et al., 2008 Duarte et al., 2012) High SOR = 0.95, CVI = 0.95

**I.B.8. Consistently apply effective post-operative care standards including 8.1 to 8.10 below.**

C2 (Keenan et al., 2014—HCT) High SOR = 0.97, CVI = 0.96

**I.B.8.a. Engage patient, family and caregivers in discharge planning and patient- and caregiver-appropriate instruction.**

C3 (Mangram et al., 1999; JCHO 2011) High SOR = 0.95, CVI = 0.93

**I.B.8.b. Use institutional protocols for evidence-based incision care including routine assessment of infection signs, edema management and wound drainage collection.**

A (JCHO, 2011; Kaplan et al., 2009; Stannard et al.,2012; Towfigh et al., 2011) High SOR = 0.95, CVI = 0.93

**I.B.8.c. Discontinue prophylactic antibiotic use within 24 h (48-72 h for cardiac surgery) after surgery ends, unless there is a specific reason for continued use (e.g.; fever or other signs of infection).**

A (Bratzler et al., 2006; Gupta, et al., 2010; Lador et al., 2012; van Kasteren et al., 2007) High SOR = 0.92, CVI = 0.92

**I.B.8.d. Avoid stress on the incision line to reduce the likelihood of dehiscence, adding binders or retention sutures through multiple layers of subcutaneous tissue if feasible and patient-appropriate.,**

B (Hahler 2006; Khorgami et al., 2013) High SOR = 0.95, CVI = 0.93

**I.B.8.e. Protect surgical or surgically debrided wounds with a sterile dressing for 24-48 h after surgery, with evidence supporting reduced wound infection incidence compared to traditional gauze, e.g. moisture-retentive occlusive wrap or hydrocolloid or honey impregnated dressings.**

A (Brölmann et al. 2013; Hutchinson & McGuckin 1990; Kamaratos et al., 2012; Rosenfeldt et al., 2003; Siddique et al., 2011) High SOR = 0.90, CVI = 0.83

**I.B.8.f. In patients with multiple comorbidities, do not depend on negative pressure wound therapy to reduce SSI compared to dry gauze**

C1 (Masden et al., 2012) High SOR = 0.90, CVI = 0.83

**I.B.8.g. Use aseptic or clean technique as appropriate for changing or removing postoperative surgical wound dressings taking all possible precautions to avoid wound contamination with additional microorganisms.**

C1 (N.I.C.E., 2001; Stotts, et al. 1997) High SOR = 0.90, CVI = 0.90

**I.B.8.h. Before dressing placement after surgery or if sterile dressing has been removed within 48 hours after surgery, an open or closed traumatic or surgical wound may be safely cleansed with sterile or non-sterile, drinkable water or clean, wound-appropriate solution. Cleansing does not affect SSI risk compared to non-cleansing.**

A (Fernandez et al., 2012; Goldberg, 1981; Neues et al., 2000; Riederer et al., 1997; Tijerina et al., 2010) High SOR = 0.74, CVI = 0.68

**I.B.8.i. Advise patients that they may shower safely with clean tap water 48 hours after a surgical wound is closed or covered with a moisture-retentive dressing or as instructed per institutional protocols for specific procedures and wound management methods.**

A (Neues et al., 2000; Riederer et al., 1997; Voorhees et al., 1982; Fernandez et al., 2012—SR) High SOR = 0.74, CVI = 0.68

**I.B.8.j. Dress acute or surgically debrided chronic wounds with non-gauze moisture-retentive materials such as hydrocolloid, film, or silicone dressings to decrease likelihood of SSI, healing time and pain.**

A (Brölmann et al., 2013; Hutchinson & McGuckin 1990; Segers et al., 2007; Viciano et al., 2000; Wiechula 2003) High SOR = 0.85, CVI = 0.79

**I.B.8.k. In medically appropriate settings, gently use no-rinse 2% chlorhexidine to reduce central line-associated bloodstream infections and SSIs. This has not been shown effective on infections caused by acinetobacter, VRE or MRSA.**

A (Chlebicki et al., 2013; Karki & Cheng 2012; Levin et al., 2011; Noorani et al., 2010) High SOR = 0.84, CVI = 0.82

**I.C. Prevent trauma or burn wound infection or infection transmission by doing and documenting the following**

**I.C.1. Determine goals of care as early as possible and provide initial care feasible to stabilize injured person vital functions and fractures from causing open wounds prior to evacuation and transport if possible.**

C3 (Hospenthal et al., 2011) High SOR = 0.92, CVI = 0.90

**I.C.2. Use CDC Guidelines or universal precautions and sterile procedures according to institutional protocols when feasible to apply clean or sterile dressings to open wounds.**

A (Hospenthal et al., 2011; Chaby G, et al. 2007. SR) High SOR = 0.92, CVI = 0.88

**I.C.2.a. Allow unclean wounds such as bites or punctures to heal using secondary closure with optional negative pressure to avoid trapping foreign matter or microorganisms, which can result in infection.**

B (Leininger B et al. 2006; Velmahos et al., 2002) High SOR = 0.92, CVI = 0.88

**I.C.3. Cleanse wound to remove contamination and foreign matter such as soil, wood or metal using low pressure (1-15 psi). Gently, thoroughly irrigate open wound tissue with sterile water or normal saline or clean tap water, warmed to body temperature, Avoid bacitracin solution, which may delay healing. Depending on wound size, severity and contamination this may require 3-9 liters if using negative pressure with instillation.**

A (Gabriel et al., 2008; Moscati et al., 2007; Rodeheaver et al., 1975; Valente et al., 2003) High SOR = 0.89, CVI = 0.80

**I.C.3.a. Cleanse wound to remove contamination and foreign matter such as soil, wood or metal using low pressure (1-15 psi). Gently, thoroughly irrigate open wound tissue with sterile water or normal saline or clean tap water, warmed to body temperature, Avoid bacitracin solution, which may delay healing. Depending on wound size, severity and contamination this may require 3-9 liters if using negative pressure with instillation.**

A (Gabriel et al., 2008; Moscati et al., 2007; Rodeheaver et al., 1975) High SOR = 0.89, CVI = 0.80

**I.C.3.b. To cleanse serious, complex, infected or heavily contaminated wounds use a wound-safe, patient-appropriate antimicrobial agent or surfactant (not bacitracin or castile soap) solution per institutional protocols.**

A (Anglen et al., 2005; Bhandari et al. 2016; Gabriel et al., 2008 Rodeheaver et al., 1975) High SOR = 0.83, CVI = 0.86

**I.C.4. Provide appropriate intravenous antimicrobials according to CDC Guidelines within 3 hours or as early as possible after wounding for serious open trauma, fracture or burn wounds such as: crush wound, puncture, dog bite, degloved, mangled, or pulseless extremity wounds; penetrating injuries of head, neck, trunk, torso and extremities to elbow or knee; amputation proximal to wrist or ankle or chest wall instability or deformity.**

A (De La Cal et al., 2005; Hospenthal et al., 2011; Patzakis et al., 2000; Poole D et al. 2014) High SOR = 0.89, CVI = 0.87

**I.C.4.a. Provide tetanus toxoid according to institutional protocols for the type and depth of wound unless patient already has documented valid vaccination.**

C3 (Hospenthal et al, 2011) High SOR = 0.90, CVI = 0.93

**I.C.4.b. Evaluate institutional protocol options to meet goals of care and perform patient-appropriate surgical procedures for trauma or burn injuries as soon as possible.**

C3 (Hospenthal et al, 2011) High SOR = 0.92, CVI = 0.92

**I.C.4.c. Re-dose antibiotic prophylaxis if surgical procedure duration exceeds 4 h or two half-lives of the antimicrobial or blood loss and/or replacement is > 1500 ml**

C2 (Bratzler et al, 2006; Bratzler et al., 2013; Sato et al., 2011; van Kasteren et al., 2007) High SOR = 0.76, CVI = 0.74

**I.C.4.d. Do not obtain cultures unless valid signs of infection are observed or there is valid medical need to know antibiotic sensitivities of the wound bioburden.**

C2(Bruce et al., 2001; Thomson P, 1994). High SOR = 0.85, ve 0.83

**I.C.4.e. Re-approximate skin flaps or skin tear edges as feasible and secure with adhesive strips before applying a low-adhering dressing as soon as possible (ideally < 6 h) after wounding, to prevent infection.**

A (LeBlanc et al., 2013; Meuleneire. 2002; Thomas et al., 1999; Zempsky et al., 2004) High SOR = 0.82, CVI = 0.78

**I.D. Do and document the following procedures to prevent chronic wound infection or infection transmission (per evidence cited below)**

**I.D.1. Debride devitalized tissue if patient-appropriate (See Section III-C for detail),**

C1 (CDC, 2008; Bradley et al., 1999; Chow et al., 1977; Steed et al., 1996) High SOR = 0.98, CVI = 0.98

**I.D.2. Dress wounds with moisture retentive wound dressings to reduce healing time, wound pain and likelihood of infection**

A (Boulton et al., 1999; Gilchrist & Reed, 1989; Hutchinson & McGuckin, 1990; Hutchinson 1993) High SOR = 0.93, CVI = 0.88

**I.D.2.a. Use microbial barrier dressings with evidence that they improve healing, protect from external contamination and/or reduce microbial burden (See Section III-B for detail)**

A (Gulati et al., 2012; Hutchinson et al., 1990; Jude et al., 2007; Woo et al., 2012) High SOR = 0.85, CVI = 0.85

**I.D.2.b. Do not use platelet rich plasma to prevent infection.**

A (Martinez-Zapata et al., 2012) Moderate SOR = 0.69, CVI = 0.69

**I.D.3. Reduce chronic wound susceptibility to infection by alleviating its primary cause and preventing tissue breakdown, e.g. by doing II.C.3.a-d.**

A (per evidence cited for each recommendation below) High SOR = 0.97, CVI = 0.97

**I.D.3.a. Off-load diabetic foot ulcers with an effective, patient-appropriate intervention that consistently protects the ulcer from pressure. Some patients may require a total contact cast or other non-removable off-loading device to reduce healing time and likelihood of infection.**

A (Armstrong et al., 2005; Boulton et al., 1990; Mueller et al. 1989; Suriadi et al., 2007; Zangaro et al., 1999) High SOR = 0.98, CVI = 0.98

**I.D.3.b. Provide adequate sustained compression sufficient to reduce edema for patients with venous ulcers unless compression is contra-indicated.**

A (Hutchinson 1993; Margolis et al., 2000; Phillips et al., 2000) High SOR = 0.98, CVI = 0.95

**I.D.3.c. Redistribute pressure with appropriate surface(s) and frequency to prevent pressure ulcers from deteriorating or becoming infected.**

C2 (Braga et al., 2013; Redelings et al., 2005; Vowden & Vowden 2009) High SOR = 0.98, CVI = 0.98

**I.D.3.d. Assess and improve vascular perfusion for ischemic ulcers with patient-appropriate, effective interventions, medications or surgery, where feasible reasonable and consistent with patient goals**

A (Claeys et al., 1996; Delis et al., 2002) High SOR = 0.98, CVI = 0.93

**I.E. Educate professional and non-professional wound healthcare providers, including the person with a wound and family caregivers on how to prevent wound infection and when to seek professional treatment**

**I.E.1. Educate healthcare personnel about MRSA or other drug-resistant organisms, including risk factors, routes of transmission, outcomes associated with infection prevention measures as well as local epidemiology and appropriate antibiotic agents,**

C1 (Calfee et al., 2008; Duarte et al., 2012; Hatipoglu et al., 2014; Li et al., 2003) High SOR = 0.98, CVI = 0.93

**I.E.2. Use age- and education-appropriate methods to educate patients, caregivers and families throughout all stages of their care about actions they can take to reduce likelihood of infection.**

C2 (CDC, 2002; NICE, 2001; Rennert et al. 2009) High SOR = 0.98, CVI = 0.95

**I.E.3. Instruct the person with a chronic wound, appropriate family member(s) and caregiver(s) to seek professional care quickly if they see signs of wound infection (increased pain, redness, swelling, heat, odor, fluid or unexplained increase in wound area)**

C2 (Golinko et al., 2009) High SOR = 0.98, CVI = 0.95

**I.E.4. Inform the person with a chronic wound or appropriate family member(s) and caregiver of antibiotics and other medications planned and/or given and check patient allergies.**

C3 (NICE, 2001) High SOR = 0.98, CVI = 0.95

**II. DIAGNOSE AND SCREEN FOR WOUND INFECTION BY ASSESSING AND DOCUMENTING THE FOLLOWING ASPECTS OF THE WOUND AND SURROUNDING SKIN FOR INFECTION (per evidence cited below)**

**II.A. Qualified staff or interdisciplinary wound care team member conduct wound and skin infection assessments as appropriate and consistent with facility protocols and communicate to those responsible for the patient's care.**

C3 (VA/DOD, 2007) 0.98, 0.98

**II.B. Assess wound and surrounding skin for unexplained increase in wound area or delayed healing, increasing pain, or drainage, friable granulation tissue, foul odor, wound breakdown or undermining and for local and systemic signs of infection (edema, erythema, warmth, foul odor, and pain or tenderness) to rule out or confirm infection.**

A (Bruce et al., 2001; Gardner, et al., 2001; Golinko et al., 2009; Rennert et al., 2009) High SOR = 0.97, CVI = 0.98

**II.C. If no valid signs or symptoms of infection are present do not perform microbial wound culture or other invasive or non-invasive tests unless required for surveillance or per institutional protocols.**

A (Bruce et al., 2001; Nelson et al., 2006; Thomson & Smith, 1994) High SOR = 0.88, CVI = 0.93

**II.D. For chronic wounds, distinguish between inflammation and infection. Assure accurate diagnosis and alleviation of all causes of tissue damage, recognizing that chronically repeated or sustained pressure, injury or accumulation of edema can cause inflammation that may be mistaken for infection or that inflammation may be suppressed by some conditions or medications.**

C2 (Gottrup et al., 2005; McGuckin et al., 2003) High SOR = 0.90, CVI = 0.81

**II.D.1. Classify diabetic foot ulcer infection as 0-not infected; 1-mild local (local edema, pain or warmth, 0.5-2 cm erythema), 2-moderate (local + > 2 cm erythema, involving structures deeper than skin), or 3-severe (accompanied by systemic signs of infection or metabolic changes).**

C3 (Lipsky et al., 2013) High SOR = 0.87, CVI = 0.78

**II.D.2. Determine presence of invasive aerobic or anaerobic pathogens and their antibiotic susceptibilities per institutional protocols by culture and sensitivity testing of deep tissue biopsy or Levine quantitative swab only if valid clinical signs of infection are present.**

A (Bruce et al., 2001; Nelson et al., 2006; Ratliff et al., 2002; Thai et al., 2005; Vermeulen et al., 2007) High SOR = 0.98, CVI = 0.95

**II.D.3. Assess a diabetic foot ulcer (DFU) as infected if it has at least 2 classic signs of infection, such as erythema, edema warmth, pain or purulent discharge.**

A (Lipsky et al., 2013; Woo et al., 2009) High SOR = 0.84, CVI = 0.85

**II.E. Interpret unexplained delayed healing despite use of best evidence-based practice or persisting or increasing pain, friable granulation tissue, foul odor, wound undermining or breakdown as suspected infection or osteomyelitis.**

A (Gardner et al., 2001; Golinko et al., 2009; Smith et al., 2009) High SOR = 0.95, CVI = 0.93

**II.E.1. Monitor wound area every 2 weeks to assure that a wound is on a path to healing.**

A (Kantor & Margolis 2000; Lipsky et al., 2009; Phillips et al., 2000; Sheehan et al., 2003; van Rijswijk, Polansky,, 1994) High SOR = 0.98, CVI = 1.00

**II.E.2. Measure wound length, width and depth consistently within and across institutions to assess and address risks of delayed healing.**

A (Bates-Jenson 1996; Bolton et al., 2004; Falanga et al., 2006; Lipsky et al., 2009) High SOR = 0.98, CVI = 0.95

**II.E.3. Measure longest length x width if required by setting protocols, consistently as a reliable estimate of planimetric wound area measurements to identify wounds not on a normal healing path.**

A (Kantor & Margolis 1998; Kantor & Margolis, 2000) High SOR = 0.84, CVI = 0.78

**II.E.4. Suspect delayed healing if a chronic wound's area has not decreased by at least 50% during 4 weeks despite addressing all causes of delayed healing including impaired circulation and possible malignancy.**

A (Phillips, et al., 2000; Sheehan et al., 2003; van Rijswijk, 1993) High SOR = 0.92, CVI = 0.82

**II.F. If Levine swab or radiologic imaging is inconclusive in the presence of wound infection signs above, use invasive techniques (sterile tissue or bone biopsy for culture or histology) or probing to bone, to confirm wound infection, osteomyelitis or surgical site infection.**

A (García Morales et al., 2011; Grayson et al., 1995; Han et al., 2002; Morales-Lozano et al., 2010; Smith et al., 2009) High SOR = 0.78, CVI = 0.85

**II.F.1. Interpret high microbial diversity and density of biopsies or quantitative or semi-quantitative wound surface swabs as potentially related to infection and/or non-healing of chronic ulcers only if other clinical signs of infection are present.**

A (Davies et al., 2007; Ratliff et al., 2002; Thomson & Smith, 1994) High SOR = 0.93, CVI = 0.93

**II.F.2. Recognize Pseudomonas aeruginosa and gram-positive anaerobic cocci as organisms associated with delayed wound healing.**

C1 (Gjødsbøl et al., 2006; Wall et al., 2002) High SOR = 0.93, CVI = 0.90

**II.F.3. When feasible and appropriate, use non-invasive radiological, hematological and microbiologic techniques to diagnose deep-tissue or bone-related infection, though, if patient-appropriate, direct bone biopsies have more validity for diagnosing osteomyelitis in pressure ulcers or diabetic foot ulcers.**

A (Boutin et al, 1998; Embil et al., 2006; Morales Lozano et al., 2010; Strobel & Stumpe, 2007) High SOR = 0.84, CVI = 0.78

**II.G. Monitor patient for elevated body temperature. Identify source(s) of infection, including possible wound infection and treat appropriately.**

A (Bruce et al., 2001; Golinko et al., 2009; Gardner et al., 2001) High SOR = 0.88, CVI = 0.90

**II.G.1. Monitor surrounding skin temperature. An Increase of 1.0° C may indicate infection or tissue injury.**

A (Fierheller et al., 2010; Lipsky et al., 2009; Nakagami et al., 2010; Woo et al, 2009) High SOR = 0.88, CVI = 0.90

**II.H. Monitor and document wound drainage by pressing gently on surrounding intact skin after wound cleansing. Suspect infection if it looks purulent or bloody without fresh injury or it has an unusual color or odor.**

A (Bates-Jenson 1996; Falanga et al., 2006; Gardner et al., 2001; Golinko et al., 2009) High SOR = 0.95, CVI = 0.88

**II.I. Monitor skin inflammation of the wound perimeter. After addressing all other causes of wound breakdown, suspect infection or continued deterioration if there is increasing peri-wound inflammation documented as increased temperature, edema, induration and erythema of the skin surrounding the wound.**

A (Bates-Jenson 1996; Duarte et al., 2012; Golinko et al., 2009—CO; Falanga et al., 2006—CO; Gardner, et al., 2001) High SOR = 0.92, CVI = 0.95

**II.J. Monitor wound edges. Documented areas where healing tissue is not advancing or is undermined, forming tunnel(s) or sinus tract(s) after addressing all risk factors for delayed healing (Section I. A.) suggest wound has high infection potential.**

A (Bates-Jenson 1996; Duarte et al., 2012; Gardner, et al., 2001; Golinko et al., 2009) High SOR = 0.95, CVI = 0.95

**II.K. Document wound bed tissue, and suspect chronic wound infection if granulation tissue is pale, friable or being replaced by necrotic tissue in absence of trauma or vascular occlusion or other causes of delayed healing.**

A (Bates-Jenson 1996; Cutting et al., 1994; Falanga et al., 2006; Gardne, et al., 2001) High SOR = 0.97, CVI = 0.95

**III. ASSESS, DOCUMENT AND COMMUNICATE WOUND AREA AND INFECTION SIGNS CONSISTENTLY TO WOUND CARE PERSONNEL OR INTERDISCIPLINARY WOUND TEAM**

**III.A. Responsible wound care providers assess, manage and document chronic or acute wound infection incidence and prevalence consistently using valid, standardized methods and metrics and communicate details per institutional infection surveillance protocols, provide appropriate, timely feedback to all professionals responsible for diagnosing, preventing or treating wound infection.**

C3 (JCHO G; Calfee et al 2008) High SOR = 0.92, CVI = 0.93

**III.A.1. Institutional management establish communication links to inform all involved in the care of each chronic or acute wound of changes in area (at least every 14 days) or infection signs (per CDC protocols) to improve healing outcomes.**

A (Kurd et al., 2009) High SOR = 0.98, CVI = 0.98

**III.A.2. Maintain wound infection surveillance for at least 30 days after the wound was first documented as completely closed or per institutional wound infection surveillance protocol.**

A (Alexander 2011; Bruce et al., 2001; Cainzos, 2008; Gardner et al., 2001; McGuckin et al., 2003) High SOR = 0.83, CVI = 0.87

**III.A.3. Consistently use validated wound-appropriate tools to monitor and communicate facility incidence and prevalence of infection (e.g. CDC definitions, signs and symptoms or valid tools such as ASEPSIS or Southampton Scoring System for acute wounds or CORE Clinical Signs / Symptoms Checklist for chronic wounds.**

A (Bruce et al., 2001; CDC, 2008; Cutting & Harding, 1994; Gottrup et al., 2005) High SOR = 0.83, CVI = 0.82

**III.A.4. Do not rely solely on bacterial culture results to diagnose wound infection as positive cultures are often isolated from healing wounds without clinical infection signs and often not isolated when cultured from early clinical infections.**

A (Bruce et al., 2001) High SOR = 0.89, CVI = 0.87

#### **IV. MANAGE WOUND INFECTION,**

**IV.A. Evaluate address and document wound burden factors (duration, edema, contaminants, inflammation, innervation, nutrition, oxygenation, trauma and metabolism) regularly.**

A (Lazarus et al., 1994; Margolis et al., 2000; Phillips et al., 2000; Schneider et al., 2004) High SOR = 0.97, CVI = 0.98

**IV.A.1. Follow patient- and pathogen-appropriate Centers for Disease Control and Prevention (CDC) isolation measures as recommended by institutional protocols of care.**

C2 (CDC, 1999; Wilson et al., 1988) High SOR = 0.95, CVI = 0.95

**IV.A.2. Use moisture-retentive wound dressings such as hydrocolloids that provide microbial and viral barriers to help isolate wounds as appropriate.**

C2 (Bowler et al., 1993; Brölmann et al., 2013; Lawrence et al., 1992; Mertz et al., 1985; Wiechula, 2003; Wilson et al., 1988) High SOR = 0.86, CVI = 0.89

**IV.A.3. Reduce wound microbial burden, using one or more of the following procedures.**

C2 (Bergstrom et al., 1994; Whitney et al., 2006) High SOR = 0.88, CVI = 0.89

**IV.A.3.a. As patient-, culture- and wound-appropriate add a daily topical application of gentamicin collagen sponge to standard protocol of care for moderately infected diabetic foot ulcers including appropriate systemic antibiotics and off-loading to help abolish infection.**

C2 (Lipsky et al., 2012—RCT) Low SOR = 0.45, CVI = 0.33

**IV.A.3.b. Discontinue topical antimicrobial agents once bacterial balance has been restored to decrease risks of toxicity and of bacterial resistance.**

A (Byren et al., 2012; Lipsky et al., 2012) High SOR = 0.87, CVI = 0.76

**IV.A.3.c. If proper standard of care has been followed and a chronic ulcer is not healing, with increasing pain or other symptoms of infection, apply appropriate topical or systemic antibiotic according to package insert.**

C1 (Bergstrom et al., 1994; Haraway et al., 2013; Lipsky et al., 2008) [Note: CVI and SOR are no longer accurate after modifying recommendation per respondent comments.] Low SOR = 0.35, CVI = 0.39

**IV.A.3.d. Use 10 to 100 times higher doses of topical antimicrobial agents for bactericidal efficacy for biofilms than for ordinary planktonic bacteria**

C2 (Bjarnsholt et al., 2007) Low SOR = 0.32, CVI = 0.34



**IV.A.3.e. Immediately drain or reduce excess fluid trapped inside wounds or abscesses using sterile surgery, daily wound probes, drains or safe levels of negative pressure. Add patient- and organism- appropriate antibiotics for abscesses.**

A (Fujioka et al., 2008; Kaplan et al., 2009; Stannard et al., 2012; Towfigh et al., 2011) Moderate SOR = 0.74, CVI = 0.66

**IV.A.3.f. Obtain bacterial balance before surgical closure if feasible.**

C2 (Whitney et al., 2006) Moderate SOR = 0.75, CVI = 0.70

**IV.A.3.g. To the extent possible in medically appropriate patients, restore blood flow to control infection in wounds with arterial insufficiency.**

C2 (Henke et al., 2005) High SOR = 0.92, CVI = 0.93

**IV.B. Once infection is confirmed or highly suspected based on clinical signs of infection and confirmed by biopsy or quantitative Levine swab, prescribe patient-appropriate antibiotic or antimicrobial intervention to which infecting organism(s) are sensitive.**

A (Gardner et al., 2006; O'Meara et al., 2000; Vermeulen et al., 2008; White et al., 2006) High SOR = 0.95, CVI = 0.92

**IV.B.1. Use clinical judgment in selecting local antibiotic or antimicrobial agents as there is currently insufficient evidence supporting use of any one agent compared to any other at concentrations that permit normal healing for clinically infected wounds.**

C3 (O'Meara et al., 2010), Moderate SOR = 0.71, CVI = 0.68

**IV.B.2. Use CDC and IDSA guidelines for antibiotic use for non-healing ulcers, carefully weighing risk of antibiotic resistance and administering patient-appropriate antibiotics. Avoid patient harm due to allergens or other health issues, such as delayed healing or renal failure when determining need for selecting antibiotic treatment.,**

C2 (Ennis & Meneses, 1996; O'Meara et al., 2000) High SOR = 0.95, CVI = 0.95

**IV.B.3. Hospitalize severe or ischemic wound infections if appropriate to patient's condition and treat with patient- and organism-appropriate parenteral broad-spectrum antibiotics. Use surgical intervention if appropriate, carefully weighing patient-centered benefit and harm.**

C3 (Gurusamy et al., 2013; Whitney et al., 2006) High SOR = 0.87, CVI = 0.85

**IV.B.4. Use narrow-spectrum antibacterial agents when feasible for non-severe infections to avoid risk of developing antibiotic-resistant pathogens.,**

C2 (Duarte et al., 2012; O'Meara et al., 2010) High SOR = 0.78, CVI = 0.68

**IV.B.5. If osteomyelitis, does not respond rapidly to patient-appropriate, culture-directed antibiotic therapy and wound management according to institutional protocols, aggressively resect infected bone. Similar outcomes result from surgery or antibiotic treatment.**

B (Embil et al., 2006; Freeman et al., 2007; Henke et al., 2005; Lazaro et al., 2013) High SOR = 0.86, CVI = 0.87

**IV.C. Debride necrotic tissue and foreign matter from infected wounds, managing related patient pain.**

C1 (Bradley et al., 1999; Briggs et al., 2012; CDC, 2008; Chow et al., 1977) High SOR = 0.80, CVI = 0.77

**IV.C.1. Choose a patient- and wound-appropriate technique (e.g. autolytic, surgical [sharp], enzymatic [chemical], or larval) appropriate to wound status or individual comfort ,condition and goals of care, to debride foreign matter or devitalized tissue from the wound as it may harbor biofilms unresponsive to topical antimicrobial agents and potentiate infection.**

A (Chow et al., 1977; ConvaTec, 2013; N.I.C.E., 2001; Opletalová et al., 2012; Ramundo & Gray, 2008) High SOR = 0.98, CVI = 0.95

**IV.C.2. Mechanical debridement using wet-to-dry gauze in the presence of viable tissue or when pain control cannot be established is considered substandard practice.**

A (N.I.C.E., 2001—SR; N.I.C.E., 2008; Ovington, 2002; Spear, 2008; Wodash, 2012) High SOR = 0.86, CVI = 0.87

**IV.C.3. Use operating room when if surgically debriding large amounts of necrotic tissue so as to ensure pain management and bleeding control carefully weighing patient risks, harms, costs and benefits.**

B (Lee et al., 1989; N.I.C.E., 2001, 2008; Ramundo & Gray, 2008) High SOR = 0.92, CVI = 0.87

**IV.C.4. Pre-medicate for topical pain management before debriding devitalized tissue or removing painful dressings, as adjacent viable tissue may feel pain.**

A (Briggs, Nelson, Martyn-St James, 2012; Evans & Gray, 2005) High SOR = 1.00, CVI. = 0.95

**IV.D. Cleanse wound to reduce bioburden**

**IV.D.1. Cleanse wounds with saline, tap water or a safe antiseptic or antibiotic using an optimal pressure of 4-15 pounds per square inch. There is insufficient clinical evidence supporting the choice of or need for acute or chronic wound cleansing unless the wound contains foreign matter.**

A (Fernandez et al. 2012; Griffiths et al., 2001; Moore & Cowman, 2013; Rodeheaver & Ratliff 2007) High SOR = 0.81, CVI = 0.82

**IV.D.2. Use clinical judgment in choosing a surfactant solution to remove foreign matter from acute contaminated wounds, as this reduced *in vivo* wound infection incidence compared to water or saline, but has not been confirmed in contaminated clinical wounds.**

C1 (Moscati et al., 2007; Rodeheaver et al., 1975) A, Moderate SOR = 0.73, CVI = 0.68

**IV.E. Dress wounds to retain moisture and provide microbial barriers**

**IV.E.1. Use moisture-retentive dressings that reduce likelihood of external contamination and barrier dressings to reduce likelihood of infection in acute or chronic wounds and avoid gauze dressings which allow transfer of moisture and bacteria to the wound from the external environment and increase the likelihood of wound infection.**

A (Brölmann et al., 2013; Hutchinson & McGuckin, 1990; Hutchinson, 1993; Wiechula, 2003) High SOR = 0.89, CVI = 0.77

**IV.E.2. Use antimicrobial dressings after carefully weighing benefits and harms to patient and evidence of the dressing's efficacy in reducing wound bioburden or providing a microbial barrier over the wound.**

A (O'Meara et al., 2010) High SOR = 0.81, CVI = 0.80

**IV.E.2.a. Use dressings containing cadexomer iodine as appropriate, after determining that the patient is not allergic to iodine or has no medical condition contraindicating iodine exposure, e.g. affecting the hypothalamic-pituitary-thyroid axis. Recognize that topical cadexomer iodine does not increase complete healing or % healing per week compared to hydrocolloid dressings**

A (Hermans, 1993; O'Meara et al., 2010; Towfigh et al., 2008) High SOR = 0.87, CVI = 0.83

**IV.E.2.b. Use dressings that release silver ions, recognizing that there is insufficient evidence of their efficacy in preventing or treating wound infection, though they can reduce wound odor, pain, bioburden, depth or other healing parameters and improve quality of life of chronic wound patients.**

A (Jørgensen, et al., 2005; Jude et al., 2007; Lo et al., 2009; Storm-Versloot, 2010; Toy et al., 2011)  
Moderate SOR = 0.73, CVI = 0.77

**IV.E.2.c. Use dressings impregnated with medically appropriate honey to reduce wound healing time and bioburden for qualifying chronic wounds and partial- thickness burns.**

A (Gulati et al., 2012; Kamaratos et al., 2012; Wijesinghe et al., 2009) High SOR = 0.77, CVI = 0.69

**IV.F. Apply surgical interventions with evidence of efficacy**

**IV.F.1. Use secondary closure for heavily contaminated or infected wound using a staged primary closure approach at a later date if appropriate to patient and consistent with institutional procedures.**

C2 (Altindas et al., 2008; Cohen et al., 2001; VA/DOD 2007; Whitney et al., 2006) , High SOR = 0.95, CVI = 0.90

**IV.F.2. Debride confirmed osteomyelitis and if patient- and site-appropriate cover with flap containing muscle or fascia while administering a course of patient-appropriate culture-guided systemic antibiotics of duration consistent with institutional protocols.**

C2 (Embil et al., 2006; Freeman et al., 2007; Henke et al., 2005; Stengel et al., 2001) High SOR = 0.76, CVI = 0.68

**IV.F.3. Use well-perfused tissue (typically muscle) for wound coverage if performing flap coverage.**

B (Embil et al., 2006; Freeman et al., 2007; Henke et al., 2005; Murphy et al., 2986; Whitney et al. 2006) B,  
High SOR = 0.89, CVI = 0.85

**IV.F.4. If appropriate for the patient, close wound surgically to limit fluid and protein loss and likelihood of infection., if it does not start to heal after 4 weeks of optimal care (e.g. off-loading, pressure redistribution or compression, as appropriate to address wound etiology). Before surgical closure, rule out malignancy.**

C2 (Whitney et al. 2006) Moderate SOR = 0.71, CVI = 0.68

**V. CONDUCT REGULAR WOUND INFECTION SURVEILLANCE AND DOCUMENT PATIENT RESPONSE TO TREATMENT IN ALL SETTINGS**

**V.A. Conduct chronic wound surveillance across settings per institutional protocols.**

**V.A.1. Follow patients with an open wound and a history of osteomyelitis or 2-stage revisional surgery complicated by dehiscence, arthritis, hematoma or persistent gram negative rods, at least once per month during wound healing by documenting and addressing osteomyelitis or wound status using wound- patient- and setting-appropriate laboratory studies per institutional protocols, such as leukocytosis [WBC 3.8-11 x10<sup>3</sup> per mm<sup>3</sup>], erythrocyte sedimentation rate [ESR > 70 mm/h], C-reactive**

**protein [CRP <3.0 mg/dL]. (Values cited are for adults.) Consider x-rays, magnetic resonance imaging (MRI), or bone scans, depending on symptoms.**

A (Aragón-Sánchez et al., 2013; Mutluoglu et al., 2012) High SOR = 0.92, CVI = 0.92

**V.A.2. Perform follow-up of patients with a history of healed osteomyelitis every 3 to 6 months according to institutional protocol to evaluate for recurrence.**

A (Embil et al., 2006; Han et al., 2002; Lázaro-Martínez et al., 2013; Smith et al., 2009) High SOR = 0.97, CVI = 0.95

#### **V.B. Surgical wound surveillance**

**V.B.1. Monitor post-operative superficial SSI for at least 30 days for appropriate patients or deep infection up to 90 days across all settings including home or community care and long term care.**

A (Darouiche et al., 2010; Dumville et al., 2013; HPA, 2013; Tijerina et al., 2010) High SOR = 0.91, CVI = 0.91

#### **V.C. Surveillance for all wounds**

**V.C.1. Monitor and manage pain, infection, bleeding, odor, pruritis, drainage, and psychosocial distress as appropriate to each wound patient in all settings including acute care, home or community care, palliative care and long term care.**

A (Letizia et al., 2010; McDonald & Lesage, 2006; Moro et al., 1991; van Kasteren et al., 2007) High SOR = 0.97, CVI = 0.95

**V.C.2. Do not mistake general skin failure, which may occur at end of life, for a chronic wound infection or pressure ulcer.**

C2 (Beldon, 2011; Langemo & Brown, 2006; Sibbald et al. 2010) High SOR = 0.90, CVI = 0.83