

## **Infectious Aspects of Chronic Wounds** **Including Infection Control** (v 1.0)

Jeffrey M. Levine MD  
Center for Advanced Wound Care  
Beth Israel Medical Center  
www.jmlevinemd.com

### **Basic Terminology:**

**Inflammation:** Exogenous and endogenous mediators elicit localized vasodilatation and increased blood flow. Can be acute or chronic.

**Contamination:** Bacteria on the surface of a wound without multiplication.

**Colonization:** Replication of microorganisms in a wound without invasion of tissue and no inflammatory response.

**Critical colonization:** Proliferating bacteria on the wound surface delay wound healing but do not precipitate inflammatory response.

**Infection:** Invasion and multiplication of microorganisms in wound tissue resulting in pathophysiologic effects or tissue injury. Diagnosis is based on clinical signs and symptoms, in conjunction with wound cultures.

**Assessment for wound infection:** Examine the wound, the periphery of the wound, looking for pain, erythema, warmth, purulence. May be associated with systems such as fever, chills, elevated WBC. The classic signs may be absent in infected chronic wounds and people with comorbidities such as diabetes mellitus and other diseases causing compromised immune function.

### **Host factors favoring microbial proliferation:**

- Immunosuppression
- Diabetes mellitus
- Edema
- Malnutrition
- Any open wound
- Dead tissue
- Poor circulation

**Signs and symptoms of wound infection:**

- Increased pain
- Erythema
- Edema
- Warmth
- Exudate (purulent or serosanguinous)
- Delayed wound healing or worsening of the wound
- Discoloration
- Slough
- Odor

**NERDS and STONES to diagnose superficial and deep infection (see Sibbald et al):**

<b>SUPERFICIAL INFECTION</b>	<b>DEEP INFECTION</b>
<p><b>N</b>on-healing wounds  <b>E</b>xudate  <b>R</b>ed and bleeding wound surface  <b>D</b>ebris  <b>S</b>mell</p>	<p><b>S</b>ize bigger  <b>T</b>emperature increased  <b>O</b>'s Exposed bone  <b>N</b>ew or satellite areas of breakdown  <b>E</b>xudate, erythema, edema  <b>S</b>mell</p>

**The spectrum of infection:**

- Cellulitis: Can be bacterial, fungal, or both!
- Abscess
- Osteomyelitis
- Septic arthritis
- Sepsis
- Hematogenous seeding of distant structures: Endocarditis
- Necrotizing fasciitis

**When to culture:**

- All wound surfaces are contaminated!
- Specimens to the lab: swab (culturette), needle aspirate, wound tissue
- Swabs: best reserved for purulent discharge in the setting of high suspicion for infection

**Treatment of an infected wound:**

Treat underlying conditions: diabetes, poor nutritional state, cardiopulmonary disease

Pay attention to the wound periphery!

Protect the wound from contamination from urine, feces

Manage bioburden by removing devitalized tissue (debridement)

Debridement can be autolytic, chemical, mechanical, or surgical

Wound cleansing: Water, Saline, commercial cleansers, irrigation devices

Wound antiseptics: Generally discouraged but may have limited use in heavily contaminated wounds: Dakins solution, peroxide, Betadine

Topical antimicrobials:

Antifungals

Antibacterials:

Cadexomer Iodine compounds

Silver containing agents

Topical antibiotics: Bacitracin, Gentamycin, Bactroban

Systemic antibiotics: Depends upon suspected organism and clinical setting. Please use your ID consultant in ABT choice.

**When to transfer or hospitalize:**

Know your goals of care and advance directives!

Rapidly worsening wound with suspicion or evidence of underlying infection

Hypotension, elevated WBC, or altered mental status in setting of infected wound

Need for intravenous antibiotics

Diabetic or immunosuppressed with suspicion of deep or spreading infection

Suspicion of necrotizing fasciitis

Suspicion of osteomyelitis

## **INFECTION CONTROL AND CHRONIC WOUNDS**

Please check your local P/P Manual!

The purpose of precautions is to provide a guide to hospital staff to care for a patient with infectious condition in a safe and appropriate manner, and protect other patients, hospital personnel, and visitors.

The main emphasis must be on preventing transmission and removing the sources of bacteria. For nurses, this involves:

- Cleaning: for example, cleaning equipment and following hand-hygiene guidelines
- Using protective barriers, such as wearing gloves and aprons
- Isolating patients
- Educating staff, patients and caregivers

**Standard Precautions:** Use at all times

Hand hygiene is the most important factor in reducing the spread of infection

Please wash your hands before and after examining a patient, upon entering and leaving a work area

OSHA mandates use of gloves when in contact with body fluids of any patient. Please always use gloves when dressing/undressing a wound, examining a wound, handling specimens.

Gloves are not a substitute for hand hygiene.

Recommended hand hygiene technique:

Wet hands with water, apply soap, rub hands together for at least 15 seconds  
Rinse and dry with paper or disposable towel  
Use towel to turn off faucet

Recommended technique when using alcohol base hand rubs:

Apply alcohol based hand rub to palm of one hand, rub hands together covering all surfaces until dry

Use of gown when during procedures or activities where contact with blood or body fluids is anticipated.

**Contact Precautions:**

Patient does not require a private room unless otherwise stipulated by Infection Control

Applies to multi-drug resistant bacterial infection or colonization (MRSA, VRE, etc)

Requires gloves, handwashing, gowns depending upon what is appropriate to task. Must also consider organism and policy.

Physician responsibility:

- Written order for requirement for precautions

- Reporting of infection if necessary

Nurse responsibility:

- Institute appropriate precautions (nurse may initiate precautions prior to physician order)

- Education of patient and visitors

- Signage

- Supervise other caregivers

- Room assignment

- Ensuring proper equipment and supplies

- For PCA: Handwashing before and after handling food trays

- Proper handling of disposables and linens

Environmental services responsibilities:

- Routine cleaning and hand washing

- Disinfection of area after discharge

- Proper disposal of regulated medical waste

**References:**

Sibbald et al. Increased bacterial burden and infection: The story of NERDS and STONES. *Advances in Skin and Wound Care* 19(8): 447-461, 2006.

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CDC Precautions to Prevent the Spread of MRSA in Healthcare Settings  
<http://www.cdc.gov/mrsa/prevent/healthcare/precautions.html>

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