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**DIMES<sup>©</sup>**

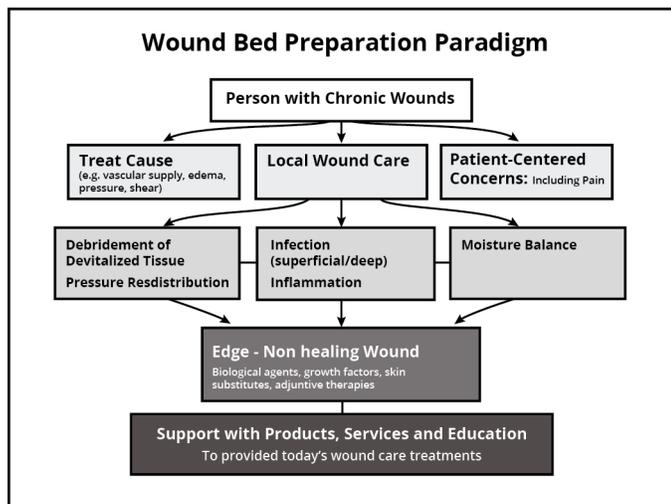
## DIMES<sup>®</sup>

The assessment and treatment of chronic wounds is a daily challenge. Clinicians need guidance in their wound care journey as they move between care settings with financial constraints, finite resources, and the need to optimize wound care.

### What do DIMES have to do with chronic wound care?

DIMES serves as an easy framework for planning and implementing an effective treatment plan for chronic wounds while saving money and using valuable resources wisely.

Preparation is the key to care. This is also true in preparing wounds for healing. The wound bed preparation (WBP) paradigm was created as a practical clinical guide for the treatment of chronic wounds. As always, the patient or resident comes first. Start by addressing patient-centered concerns, then treat the cause of the wound before optimizing local wound care.



The initial components of local care are:

- Debridement
- Infection/Inflammation
- Moisture balance

That gives us D-I-M. The E and S of DIMES stand for other aspects of advancing stalled chronic wounds. The E (or edge/environment) of non-healing wounds represents the use of advanced active therapies to

stimulate healing, while the S stands for support products, services and education in the wound healing bank. Remember: DIM before DIMES.

Clinicians are constantly making decision based on data from answers to vital questions about patients and residents. Some of these relevant questions relating to chronic wound management are:

1. **Patient-centered concerns:** Is pain an issue? What are the factors, including psychological, that might influence wound healing? What factors can affect a patient's or resident's adherence to treatment?
2. **Cause(s) of the wound:** What caused this wound? Is the cause treatable or correctable?
3. **Local wound factors:** First, think DIM. Is there necrotic tissue that needs removal by some method of debridement? Is there an undiagnosed infection or inflammation? Use the "Goldilocks Phenomenon" to assess the moisture level of the wound: Is there too much or too little moisture?
4. **DIM before DIMES:** Is there anything else that can be done to promote faster wound edge migration after local wound care has been optimized? What else is needed to support healing? This might include selecting products for stalled chronic wounds from a tool kit of additional options combined with patient or resident education to strengthen partnerships and promote adherence to treatment.

### Start the Wound Healing Journey

Much has been published on the importance of accurate wound diagnosis. Correcting the cause of the wound is the first step in wound healing. Next it is time to determine if the wound is expected to heal.

To determine the healability of a wound, clinicians must ascertain if the cause is treatable, the blood supply is adequate, and the coexisting conditions or drugs do not prevent healing.

Wound Prognosis	Treat the Cause	Blood Supply	Coexisting Medical Condition/Drugs
Healable	Yes	Adequate	Not prevent healing
Maintenance	No*	Adequate	+/- prevent healing
Non-healable	No	Usually inadequate	may inhibit healing

\*Due to lack of adherence to treatment or lack of resources

The individualized patient or resident concerns, wound healability (healable, non-healable, or maintenance), and causes of wounds in each situation will involve emphasis on pressure redistribution, addressing the medical conditions as well as local wound care.

Moist interactive healing is contraindicated in non-healable wounds. The care plan should include conservative debridement (which involves debriding the wound without cutting into living tissue and causing bleeding), bacterial reduction, and moisture reduction. When healing is not immediately possible—such as in cases of uncontrolled deep infection or where bacterial burden is more of a concern than tissue toxicity—antiseptics are a good treatment option.

## Debridement

For wounds with the ability to heal, adequate and repeated debridement is an important first step in removing necrotic tissue such as eschar and slough. Eschar provides a pro-inflammatory stimulus inhibiting healing while the slough acts as a culture media for bacterial proliferation. Debridement may also help healing by removing both senescent cells that are no longer capable of normal cellular activities and biofilms that shield the bacteria colonies. While sharp debridement is the quickest, this method might not always be desirable due to pain, bleeding potential, cost, and the lack of clinician expertise.

Autolytic debridement is facilitated by modern moist interactive dressings. These dressings provide a moist wound environment that enhances endogenous enzymes that digest non-viable tissue or eschar. Mechanical debridement utilizes saline wet-to-dry dressings, but this method is often associated with local trauma and pain. CMS has given clinicians a clear indication of its rationale for recommending the limited use of mechanical debridement with wet-to-dry dressings and even refer hospitals to Tag F314 for direction about this aspect of care.

Polyacrylate debridement with the use of activated polymer dressings is a valuable alternative to wet-to-dry dressings. Enzymatic debridement using topical wound medications (collagenase or papain urea) is another method for the removal of dead tissue from the wound bed. Remember that CMS will only reimburse for collagenase if it qualifies under Medicare Part D. Newer and emerging technologies

to remove wound bed eschar and slough include ultrasonic devices, pulsating lavage, and biological (maggot) therapy.

## Infection

All chronic wounds contain bacteria. The level of bacterial damage may include contamination (organisms present), colonization (organisms present and may cause surface damage if critically colonized), or infection (deep and surrounding skin damage). Wound infection is a clinical diagnosis based on signs and symptoms rather than the presence or number of bacteria obtained from a surface swab.

The risk of infection is determined by the number and nature of invading bacteria as well as host resistance, and is determined by using the equation of number of organisms times organism virulence, divided by host resistance.

$$\text{Infection} = \frac{\text{Number of organisms} \times \text{Organism virulence}}{\text{Host resistance}}$$

Host resistance is the most important factor in the equation. This refers to the host immune response to resist bacterial invasion and prevent bacterial damage. For example, individuals with diabetes have at least a tenfold greater risk of being hospitalized for soft tissue and bone infections of the foot than those individuals without diabetes.

Identification of infection as either superficial increased bacterial burden or deep into the tissue helps guide clinicians in deciding appropriate treatment. Wounds with increased superficial bacterial burden may respond to topical antimicrobials while those with deep infection usually require systemic antimicrobial agents.

The mnemonics NERDS® and STONEES® have initials that spell out the key signs categorizing the two levels of bacterial damage or infection. Two or three of these signs should be sought for the diagnosis in each level. If increased exudate and odor are present, additional signs are needed to decide if bacteria are superficial, deep, or at both levels



## NERDS

- **N**on-healing wound
- **E**xudate wound
- **R**ed and bleeding wound
- **D**ebris in the wound
- **S**mell from the wound

## STONEES

- **S**ize is bigger
- **T**emperature increased
- **O**s (probes to or exposed bone)
- **N**ew areas of breakdown
- **E**xudate
- **E**rythema and/or edema
- **S**mell

STONEES is an easy reminder of deeper infection. STONEES sink to the bottom, or are the characteristics that you will find when bacteria are deep within the chronic wound tissue or have penetrated the surrounding skin. Early recognition of infection is crucial to institute appropriate systemic treatment and prevent further damage.

There are many antimicrobial products available to treat and prevent infection, and no one product is going to be right for all patients or residents. Silver needs to have moisture for ionization, and it is only the ionized form of silver that is an effective antimicrobial agent. Silver is therefore not appropriate for non-healing or maintenance wounds. Clinicians need to match appropriate product characteristics with the clinical features of the wound bed.

As a reminder, do not use topical or systemic antibacterial agents long-term without weighing the risks and benefits. Discontinue antibacterial agents after the wound is in bacterial balance unless the patient is prone to reinfection due to local or systemic factors such as immune-compromise.

Surrounding tissue infection is referred to as cellulitis. Classically, pain is associated with increased temperature, edema, and erythema. Cellulitis greater than 2 cm on the leg or foot of a person with diabetes can be associated with limb-threatening infection.

Systemic antimicrobial therapy depends on local best practice recommendations and the type of bacteria. In general, chronic wounds are affected by gram-positive bacteria in the first month. After that, both gram-

negative bacteria and anaerobes may invade the tissue as host resistance diminishes. The diagnosis of infection is made clinically and swab results are used to identify organisms and their antimicrobial sensitivities. Use the Levine technique when taking swab cultures

### The Levine technique

This method relies on the swab being placed on a central location free of necrotic eschar and debris in the wound base. The swab is pressed firmly on the tissue to extract exudate and then rotated 360 degrees. If the tissue is relatively dry, the swab can be placed in the culture media prior to taking the sample to increase the yield on culture.

The optimal use of a silver dressing requires the need for decreased bacterial burden (ionized silver) combined with the appropriate moisture-balancing dressing.

### Moisture balance

Cells (fibroblasts and keratinocytes) and the various cellular signals (growth factors, cytokines) all need the right amount of moisture to move across the wound bed. Achieving moisture balance is a delicate act. Too much moisture can damage the surrounding skin, leading to periwound maceration and skin breakdown. Conversely, too little moisture in the wound environment can impede cellular activities and promote eschar formation, resulting in poor wound healing. A moisture-balanced wound environment is maintained primarily by modern dressings with occlusive, semi-occlusive, absorptive, hydrating and hemostatic characteristics, depending on the surface exudate and the need for moisture balance on the wound bed.

### Edge/environment

Once D-I-M has been addressed, attention can be shifted to the wound edge and DIMES. Wound edges tell an important story about the wound's healing journey. A non-healing wound may have a cliff-like edge. Think of this as the stalled keratinocytes piling up because they are incapable of moving forward. This is in contrast to a healing wound with tapered edges like the shore of a sandy beach. If the wound edge is not migrating after appropriate wound bed preparation (debridement, infection/bacterial balance, moisture balance) and healing is stalled, then advanced therapies should be considered. The first step prior to initiating the edge effect therapies is a reassessment of the patient or resident to rule out other causes and co-factors.



Clinicians need to remember that wound healing is not always the primary outcome. Consider other wound-related outcomes, such as reduced pain, reduced bacterial load, reduced dressing changes, and an improved quality of life.

1. Learning and change management models. Available at: <http://www.leopard-learning.com/changemanagementmodels.html>. Accessed April 28, 2014.
2. Bridges' Transition Model. Available at: <http://www.mindtools.com/pages/article/bridges-transition-model.htm>. Accessed May 7, 2014.
- 3.

always the primary outcome. Consider other wound-related outcomes, such as reduced pain, reduced bacterial load, reduced dressing changes, and an improved quality of life.

Several edge effect therapies support the addition of missing components: growth factors, collagen, fibroblasts or epithelial cells, or matrix components,

## Support with products, services, and education

There are other products that complement DIMES but do not fit into one of these immediate categories. Therefore, always consider the other supportive products that complete the treatment. For instance, for a patient or resident with fragile skin, an elastic net may be used as a secondary dressing versus tape. The secondary dressing is important to the care plan. Nutrition products are also part of treating the whole patient and not just the hole in the patient.

Connecting the right product to the right application is critical. However, ongoing education is paramount to achieving the best possible outcome. Education is not just for clinicians so they know and use the latest evidence base in their practice, but is essential for patients, residents, and their families. Making sure that patients, residents, and their families are taught the expected outcomes and the plan to achieve them is vital for successful wound treatment. Support with products, services, and education can make the right treatment plan even better.

## DIMES helps heal chronic wounds

It's important to understand DIMES not just as an acronym, but as a roadmap for practice. How can the guideposts from DIMES assist in choosing the right products at the right time for patients' or residents' wounds? What steps should be taken in order to arrive

at the best outcome for the patient or resident and get there in a cost-effective way? It's not always easy. Any journey—including treating chronic wounds—can be lengthy. The right support and services are vital in helping reach the destination.

Education about the journey of healing helps clinicians avoid costly detours from the healing path. By adopting an organized and consistent approach to care and incorporating the DIMES components of wound bed preparation, the healing journey can stay on track to help patients and residents reach the destination of wound bed preparation in a safe and less costly way.

## Summary

In summary, the concept of wound bed preparation includes the treatment of the whole patient before the hole in the patient by treating the cause and patient-centered concerns. Local wound bed preparation includes DIM—which is debridement, infection/inflammation, and moisture balance—before DIMES, which is DIM plus advanced edge effect therapies for wounds with the ability to heal. Support in the way of other products, services, and nutrition is also needed. Finally, always remember that education is the scaffold for practice. Without it, clinicians cannot advance practice and improve patient and resident wound healing outcomes.



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