Helping put your best foot forward.
The problem: Diabetes is a global epidemic.

Diabetes affects 451 million adults globally, expected to increase to 693 million by 2045.

Diabetes affects 30.3 million people in the United States or 1 in 10.

Research has shown that patients with diabetes have up to a 25% lifetime risk of diabetic foot ulceration (DFU), one of the most common frequently recognized complication of diabetes.

DFUs are the leading nontraumatic cause of lower extremity foot amputations worldwide. >1 million diabetic related amputations annually.

Risk of death at 5 years with DFU is higher than patient with diabetes without a foot ulcer.

U.S. financial burden

- 2017 total cost of diagnosed diabetes is $327 billion (includes direct medical costs and reduced productivity)
- DFU costs range from $9–13 billion additional costs
Current experts in the field of wound care recommend a heightened awareness of biofilm presence in DFUs because of the potential for serious consequences. Global Wound Biofilm Expert Panel Members recommended that when a biofilm is suspected in a nonhealing wound, clinicians should initially focus on aggressive debridement and comprehensive biofilm and antibiofilm management strategies. A “step-down/step-up” approach has recently been proposed as the current best antibiofilm treatment strategy.

The principle of this strategy is to aggressively initiate therapies to rapidly and effectively reduce wound biofilm levels and reduce inflammation, reactive oxygen species, and protease levels. Once the wound transitions out of the inflammatory stage, therapy would be gradually stepped down to include advanced wound care therapies, debridement, and continued management of host factors. Goals of the “step-down/step-up” approach are to successfully speed wound healing, lower overall cost, and reduce the risk of amputation.

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| Initiate multiple therapies in combination | Optimize/personalize therapy according to healing status and response | De-escalate treatment as wound improves |
|------------------------------------------|---------------------------------------------------------------|
| Aggressive debridement                   | Assess inflammation and healing status                       | Evaluate wound healing and decide |
| Empiric topical antiseptics and systemic antibiotics | Appropriate debridement                                      | Advanced therapies: |
| Manage host factors (off-loading compression, diabetes, nutrition) | Optimize/personalize topical antiseptics and systemic antibiotics | ✓ Growth factors |
| DNA identification of microorganisms and point-of-care diagnostics | Continue management of host factors                           | ✓ Skin grafts |
| ~days 1–4                                | Continue management of host factors                           | ✓ Combination products |
|                                           |                                                                | ✓ Negative pressure wound therapy |
|                                           |                                                                | Continue until healed |

**Off-loading**

Lower-extremity neuropathic disease, frequently seen in the diabetic population, often results in loss of protective sensation and foot deformities. This leads to increased pressure and repetitive stress and strain during daily activities such as walking. These forces can lead to lower extremity ulcer formation. Off-loading, defined as pressure redistribution and reduction of repetitive shear, is critical for prevention of further tissue inflammation and damage, lower extremity amputations, and healing of existing ulcers. Total Contact Casting (TCC) is considered the gold standard for off-loading and effective healing rates. Additional modalities, or alternatives to TCC, may include bed rest, removable cast walkers, healing sandals, surgical shoes, custom sandals, crutches, walkers, and wheelchairs.13

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**3M’s four-step solution to DFU management**

Select one for each step:

<table>
<thead>
<tr>
<th>Step 1: Protect skin</th>
<th>Step 2: Manage biofilm/bioburden</th>
<th>Step 3: Optimize wound environment</th>
<th>Step 4: Off-load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routine Skin Protection</td>
<td>Biofilm</td>
<td>Manage Exudate</td>
<td>Off-load</td>
</tr>
<tr>
<td>3M™ Cavilon™ No Sting Barrier Film</td>
<td>BlastX™ Antimicrobial Wound Gel†</td>
<td>PROMOGRAN PRISMA™ Matrix</td>
<td>Determine appropriate plan of care/off-loading device, based on patient assessment, functional status, wound condition and frequency of reassessment. Follow facility policies and procedures.</td>
</tr>
<tr>
<td>or</td>
<td>Disrupt, destroy, and defend against biofilm reformation or biofilm recolonization</td>
<td>and/or</td>
<td><strong>Caution: Federal Law (U.S.A.) restricts the device to sale by or on order of a licensed health care professional.</strong></td>
</tr>
<tr>
<td>3M™ Cavilon™ Advanced Skin Protectant***†</td>
<td>or</td>
<td>3M™ Tegaderm™ Silicone Foam**</td>
<td></td>
</tr>
<tr>
<td>or</td>
<td>KERRACEL™ Ag Gelling Fiber Silver Dressing†</td>
<td>3M™ Tegaderm™ High Performance Foam Dressing</td>
<td></td>
</tr>
<tr>
<td>or</td>
<td>SILVERCEL™ Dressing Family</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Warnings and precautions: When using BlastX™ Antimicrobial Wound Gel, do not use alginate dressings.

**3M™ Tegaderm™ Silicone Foam can be used for wound management and as part of a comprehensive pressure injury prevention program.

***This is not an analgesic.
Evidence-based practices for diabetic foot ulcers (DFU) wound management

Biofilm is present in most chronic wounds

Acute wounds: 6% Biofilm present, 94% Biofilm NOT present
Chronic wounds: 10% Biofilm present, 90% Biofilm NOT present

A recent study identified biofilm in 100% of Diabetic Foot Ulcers assessed.

Skin protection
Adverse skin changes can be noted when dressings are unable to manage the volume of drainage, or not changed often enough. Routine periwound skin protection from excess exudate and mechanical trauma, and protection of at-risk compromised skin are essential components of wound management and wound bed preparation.

Disrupt biofilm and manage bioburden
Diabetic foot ulcers and chronic infections can be highly prevalent for patients with diabetes. Biofilm has been shown to exist in most diabetic foot ulcers. One study of 65 DFUs showed 100% contain biofilm. The presence of biofilm in chronic wounds perpetuates inflammation, delaying wound healing. Emerging research focuses on biofilm-directed care. Anti-biofilm strategies should be implemented at the start of wound management. Treatments should address disrupting the biofilm matrix, decreasing bacterial burden, and preventing biofilm reformation.

Key components of best practice wound management of the diabetic foot ulcer
- Treatment of underlying disease process
- Ensure adequate blood supply
- Local wound care, including infection control
- Pressure off-loading

Local wound care
Tissue debridement and callus removal — autolytic, mechanical, larval, sharp surgical, hydrosurgical and ultrasonic.

Biofilm delays healing of diabetic foot ulcers
Biofilm can disrupt the healing process resulting in delayed healing, higher health care costs, and increased risk for further complications, including the spread of infection. Osteomyelitis, a common consequence of diabetic foot infections, increases the risk of amputation.
For more information: Contact your local 3M Account Manager, call the 3M Health Care Helpline at 1-800-228-3957, or visit 3M.com/Medical.

References