



QuickMedTechnologies

# MEDICAL TEXTILE FABRIC AS A BARRIER TO PATHOGEN TRANSMISSION

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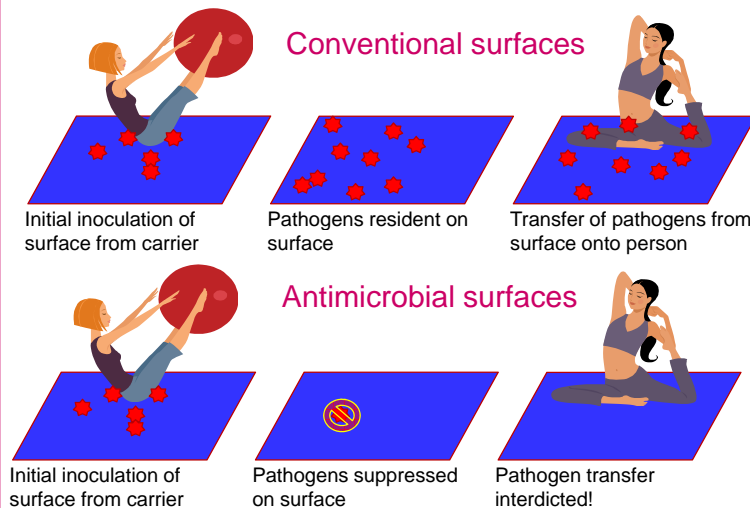
## Summary

Caregivers in a burn unit described some of the challenges faced by the staff in attending to the needs of the patients, and noted that antimicrobial clothing would be highly desirable for their use, to provide a secondary dressing that would act as an effective microbial barrier, while helping to secure a primary dressing.

Often burn patients suffer from compromised skin surfaces over large body areas. Wound coverings range from skin grafts to the use of antimicrobial dressings, or antimicrobial agents with conventional dressings. While most types of wounds offer a defined margin with healthy tissue that permits fixation of primary dressings, an added complication of burn wounds is that there may be no easy way to affix dressings. Due to the highly susceptible compromised surfaces involved in burn wounds, the use of an effective barrier fabric is of clear benefit to prevent possible infections. The use of many conventional secondary dressing types is very difficult with wound and body geometries that have to be covered in the case of burns – so secondary dressings in body conforming shapes are desirable for caregivers and patients to provide protection from pathogen transfer and nosocomial infections.

As shown below in **Figure 1**, various types of surfaces can act as transfer vectors for pathogens. Permanent antimicrobial finishes on surfaces can interrupt many of these transfer vectors that are held responsible for nosocomial infections by killing bacteria before they can colonize another surface or individual. Medical textiles that fit this description include uniforms (i.e. scrubs), linens, patient gowns, etc.

**Figure 1:** Image depicting antimicrobial surfaces capable of interdicting pathogen transfer. This image shows a physical therapy setting.



## Bacteriocidal Efficacy Testing: NIMBUS

**Table 1: antimicrobial efficacy of NIMBUS cotton per AATCC method 100 testing.**

Organism	% killed	ATCC#
<b>The most common wound-associated bacteria</b>		
<i>Staphylococcus aureus</i>	>99.9999%	12600, 6538
<i>Staphylococcus epidermidis</i>	>99.9999%	12228
<i>Enterococci spp</i>	>99.9999%	19433
<i>Escherichia coli</i>	>99.9999%	15597, 8739
<i>Pseudomonas aeruginosa</i>	>99.9999%	51447, 15442, 9027
<i>Enterobacter spp</i>	>99.9999%	13048
<i>Proteus spp</i>	>99.9999%	13115
<i>Klebsiella pneumoniae</i>	>99.9999%	13833
<i>Streptococci</i>	>99.9999%	10096
<i>Candida albicans</i>	>99.9995%	

### Additional common bacterial species associated with burn wounds

<i>Serratia marcescens</i>	>99.9999%	13880
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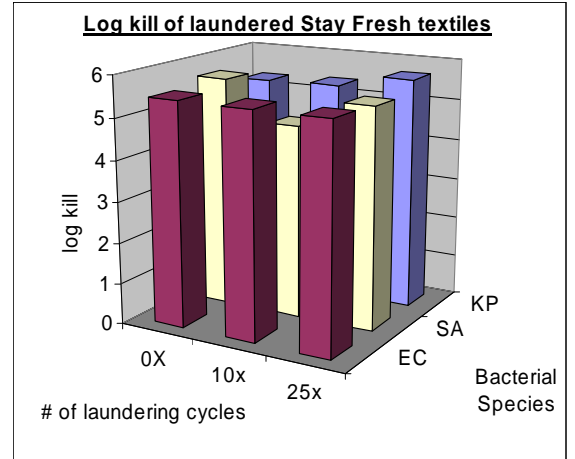
### Additional common bacterial species associated with [body] odor

<i>Corynebacterium xerosis</i>	>99.9999%	7711
<i>Corynebacterium diphtheriae</i>	>99.9999%	43145
<i>Micrococcus luteus</i>	>99.9999%	21102
<i>Proteus vulgaris</i>	>99.9999%	13115

\*\*CDC, 1996, common bacterial species associated with wound infections

## Durability to laundering

Chart at right shows log kill of laundered Stay Fresh textiles. Log kill represents bacterial reduction in testing compared to an untreated control: 1 log kill = 90% bacterial kill vs. control, 2 log kill = 99% bacterial kill, etc. Stay Fresh materials showed better than 99.99% bacterial kill after 25x laundering against species cited.



**Chart 1:** Chart depicting the performance of Stay Fresh textile after number of laundering cycles indicated. Log kill per AATCC method 100, using *Staphylococcus aureus* (SA, ATCC# 6538), *E coli* (EC, ATCC # 15997) and *Klebsiella pneumoniae* (KP, ATCC# 13833). Other species tested as highly effective after 10 or more laundering cycles, but not included in this chart because complete data is not yet available include *Staphylococcus epidermidis* (ATCC# 12228) and *Micrococcus luteus* (ATCC# 21102).

## QMT Antimicrobial Medical Textiles

Quick-Med Technologies (QMT) offers a selection of antimicrobial technologies that are designed to interrupt the transfer of pathogens by imparting a permanently bound antimicrobial surface to treated articles.

**NIMBUS®.** Quick-Med's NIMBUS® technology has recently been cleared by FDA for use as a primary wound dressing. This technology is also well suited for secondary dressings in convenient forms, such as disposable t-shirts, bed-clothes and garments to cover and help secure primary dressings. Manufacturing tests have been successfully completed, and efficacy for this chemistry is shown in **Table 1** above. NIMBUS® technology forms the basis for the **Derma Science Bioguard™** wound dressing line.

**Stay Fresh™.** The Stay Fresh chemistry is a technology designed to be durable to repeated laundering cycles, while proving excellent antimicrobial efficacy. Excellent institutional applications for Stay Fresh materials are items that are repeatedly laundered such as linens, scrubs, uniforms, etc. These are items that cover a large portion of the patient and caregiver contact surfaces, and the reduction of pathogen transfer on these surfaces can provide a significant safety benefit for the facility and its population. The high durability to laundering (see **Chart 1**) extends the service life of the textile, while the high antimicrobial efficacy can serve to extend the maintenance interval.

## Barrier Function

The barrier function of these materials is provided by highly effective antimicrobial chemistries. These chemistries are durable, long-lasting, and since they are non-leaching they continue to work after repeated inoculations. Since the antimicrobial chemistries are permanently bonded to the materials' surface, there is no depletion of activity over time. The mechanisms of antimicrobial activity are by compromise of the bacterial cell walls – a mechanism to which bacteria cannot generally grow resistant. The interruption of pathogen transfer can help to preserve public health by interrupting pathogen transfer vectors that involve surfaces.

**Competing products.** Our own testing (AATCC method 100) of competing products using the same laundering procedures (adapted from AATCC methods 61, 142 and 143) shows that silver, triclosan, silane monoquats and biguanide agents tested lost efficacy against gram negative species after 5 or fewer laundering cycles.

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