

Adoption of Protective Uniforms

An Rational Strategy for Reducing
Microbial Burden, Acquisition and
Transmission in Healthcare
Settings

Challenges of HCA Infections

The rates of nosocomial infections, especially those caused by antibiotic-resistant bacteria, are increasing at an alarming rate.

Nosocomial infections are now also spreading from the hospital environment into the community

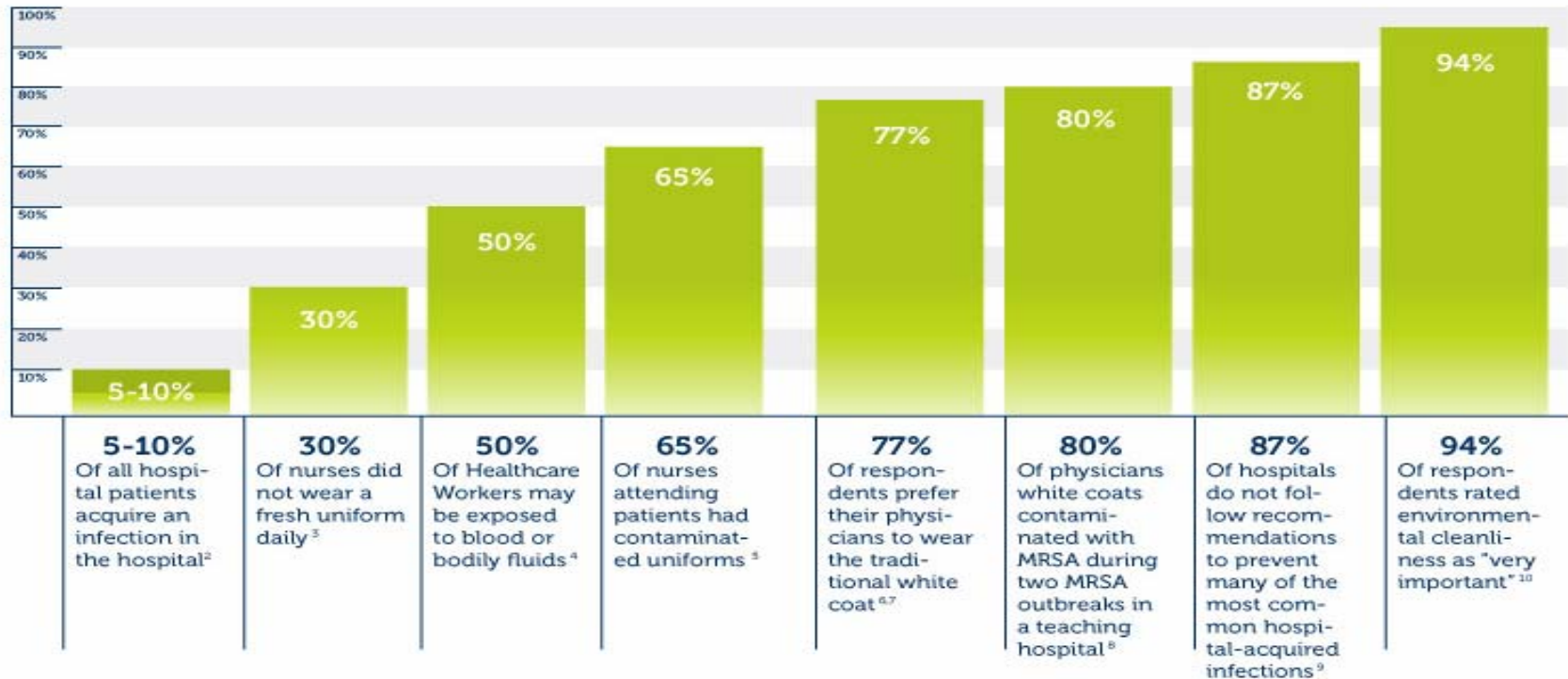
Antibacterial agents may be completely ineffective against an expanding array of bacterial pathogens

Challenges of HCA Infections

Hand washing is the most important method to decrease HCA infections; however, this hygiene action is often lacking.

Current modalities to reduce nosocomial infections are insufficient.

Interface between Uniforms and Infection Control



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Microbial Proliferation on HCA Fabrics

Textiles used in the healthcare environment are an excellent substrate for bacterial growth due to the moisture and temperature conditions.

Patients shed bacteria and contaminate their clothing and sheets

Healthcare workers also have been shown to acquire, carry and spread pathogens.

Medical personnel in direct or indirect contact with contaminated surfaces, including textiles, are a source of transmission of the micro-organisms to and from susceptible patients

What are the Challenges of Acquisition and Transmission?

- Current CDC Guidelines state, “health care personnel who have contact with patients, body fluids, or specimens have a higher risk of acquiring or transmitting infections.
- Health care personnel may also acquire infections from or transmit infections to patients, other personnel, household members, or other community contacts.”

New Strategies

- Healthcare worker uniforms, which are made of textiles treated with an effective fluid barrier combined with an antimicrobial may be an effective environmental control to protect health care personnel from unpredictable and unexpected exposures to blood, bodily fluids and other potentially infectious materials that occur during patient care.

New Strategies: VTT-003

- VTT-003 is a textile technology which impregnates natural, synthetic and blended fabrics with
- a fluoroacrylate copolymer emulsion, which prevents the acquisition of blood, body fluids, and other potentially infectious materials, and
- an organosilane-based quaternary ammonium antimicrobial agent to reduce organism acquisition.

Vestex as a Model Antimicrobial Textile

What are the Properties of Vestex?

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- a fluoroacrylate copolymer emulsion, which prevents the acquisition of blood, body fluids, and other potentially infectious materials, and
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What are the Properties of the Antimicrobial Agent?

- The organosilane quaternary ammonium antimicrobial agent is related to the general class of microbicidal disinfectants.
- The action of antibiotics and the action of disinfectants differ fundamentally.
- Antibiotics are selectively toxic and generally have a single target site in bacteria, thereby inhibiting a specific biosynthetic process.
- Microbicidal disinfectants, including quaternary ammonium compounds, are nonspecific antimicrobial agents because of the multiplicity of toxic-effect mechanisms and cell membrane-based target sites.

What are the Properties of the Antimicrobial Agent?

- The quaternary ammonium chloride-based agent's potent, broad spectrum is active against 40 bacteria, 26 fungi, eight algae, two yeasts and has documented antiviral activity.

What are the Properties of the Fluoroacrylate?

- Vestex consists of a fluoroacrylate copolymer emulsion substantially similar to FDA 510-K (K091357), MicroCool™ Surgical Gowns.
- The performance of Vestex Fluid Barrier meets AAMI Level I criteria for fluid barrier protective repellency.
- Research presented by Elam *et al* at the Society of Health Care Epidemiology Annual Scientific Meeting April 1-4, 2011 demonstrates the repellent properties of Vestex to water, synthetic blood and bacterial penetration.

Cross-Over Trial to Determine the Efficacy of Antimicrobial Surgical Scrubs

4 month, cross-over trial in a medical ICU

Crossovers occurred every 4 weeks

31 HCWs randomized to identical study vs. standard scrubs

Study scrubs (Vestex³) utilized a proprietary organosilane-based quaternary ammonium ion antimicrobial technology

Weekly microbiology samples were obtained from: Scrub abdominal area, leg cargo pocket HCW hands

Mean log (CFU Count) was calculated

Compliance with hand hygiene (HH) was assessed

Apparel and hand CFU counts were compared between study and surgical scrubs

Cross-Over Trial to Determine the Efficacy of Antimicrobial Surgical Scrubs

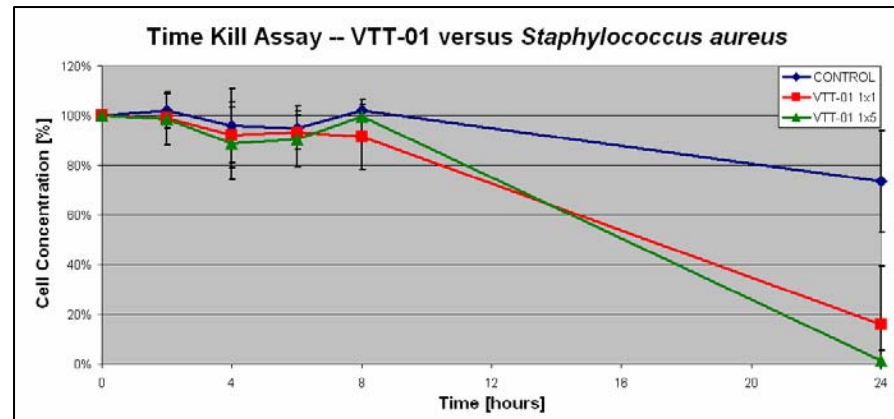
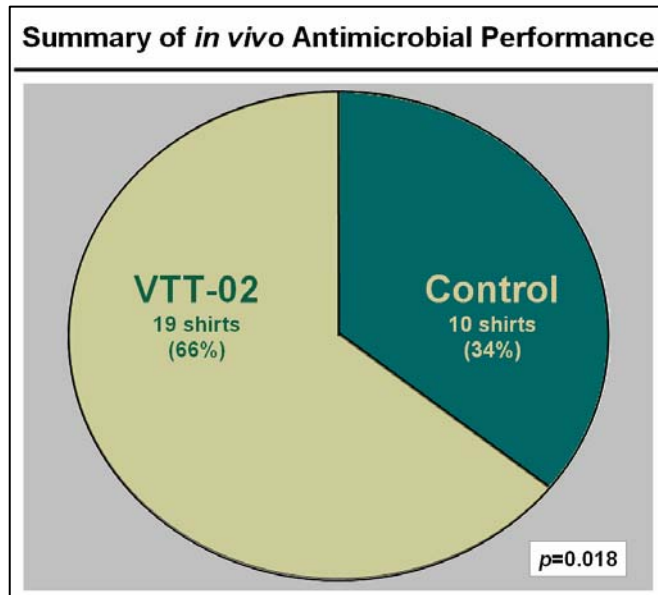
Study scrubs were associated with decreased 5-log MRSA burden

No impact was seen on HCW hand colonization

Antimicrobial impregnated scrubs may limit the bacterial burden of apparel

Antimicrobial impregnated scrubs may serve as an adjunct measure to infection prevention best practices

Internally Controlled Fabric to Determine the Efficacy of Antimicrobial Surgical Scrubs



Antimicrobial Susceptibility of *Clostridium difficile* (*C. diff*) to Semeltec™ and VTT003

- **Fabric, embedded with Semeltec and a hydrophobic barrier, was 100% effective at reducing vegetative growth of both Serogroup D and Ribotype 027 *C. diff***
- **VTT003 fabric had no effect on the growth of Serogroup D and Ribotype 027 spores**

Can Emergence of Resistance Occur to the Antimicrobial Agent?

- Tolerance to disinfectants may develop in response to disinfectant exposure.
- However, the level of tolerance is not important in clinical terms because it is low and unlikely to compromise the effectiveness of disinfectants, which are used in much higher concentrations