MEDICAL TEXTILES FOR HEALTH & HYGIENE

STANDARDS
Uses of Medical Textiles

- Identity
- Professionalism
- Sterile field
- Barrier Protection
Uses of Medical Textiles

- **Barrier Protection**
  - decrease bio-burden
  - decrease microbe sustainability
PERSPECTIVE

Segregation

- UNIVERSAL PRECAUTIONS
- STANDARD PRECAUTIONS
We are using more

- Population – More People
- Demography – More People who need
- Income – More People who can afford
- Travel - Awareness
- Awareness – Increased use of hygiene products
- Medical tourism – Attitudes
- Growth of healthcare industry – demand
- Products – Increasing Range of products
SCENARIO

- Hygiene and medical textiles ~ 12% of the global TechTex market
- Applications - going beyond the usual wound care, incontinence pads, plasters etc
CATEGORIES OF MEDICAL TEXTILES

NON-IMPLANTABLE

IMPLANTABLE

HEALTHCARE & HYGIENE PRODUCTS
Requirements

- **In the Patient** – Biocompatible, Non toxic, Non Allergenic, *Sterility Standards of Highest Level*
- **On the Patient** – Non toxic, Non Allergenic, *Sterile, Biocompatibility ?!!*
- **Near the Patient** – Sterile, Lint free
- **For the Patient** – Clean
- **General Properties** – Strength, Elasticity, Durability, Fire Resistance, Antistatic, Biodegradability
HEALTHCARE AND HYGIENE PRODUCTS

The healthcare and hygiene products are not directly used in medical treatment but are used for healthcare and good hygiene applications:

- Surgical clothing – gowns, caps, masks, gloves, aprons
- Surgical covers – drapes, clothes
HEALTHCARE AND HYGIENE PRODUCTS

- Beddings – blankets, sheets, bed mattress, pillow
- Clothing garments/uniforms
- Incontinence diapers
- Sanitary napkins
- Clothes/wipes
HEALTHCARE AND HYGIENE PRODUCTS

- High anti-bacterial anti-viral resistance
- Aesthetic colours
- Comfort - breathability
- Soft, light-weight
- Hygienic
- Abrasion resistance
- Tear strength
- Tropicalization
Why we need them

STANDARDS
Standards

- ‘A set of rules for ensuring quality’
- ‘A technical specification approved by a recognized standardization body for repeated or continuous application, with which compliance is compulsory, aimed at the achievement of the optimum degree of order in a given context’
Why Standards?

MedTex products have crucial life-saving applications
Standards

- Confidence - positive impact on consumption
- Internationally competitive
- Decrease dependence on imports
- Regulation of use
BIOLOGICAL PROTECTIVE GARMENTS : BASIC REQUIREMENTS
BIOLOGICAL PROTECTIVE GARMENTS

- It should prevent infectious materials from passing through the skin and it should last long enough*
  - Affordable
  - Breathable
  - Comfortable
  - Dependable
  - Effective

*OSHA
BIOLOGICAL PROTECTIVE GARDMENTS (OSHA)

DEFINITION: Personal protective clothing will be considered appropriate only if it does not permit blood and other infectious materials to pass through to reach an employees' work clothes, street clothes, undergarment, skin, eyes, mouth or other mucous membranes under the normal conditions of use and for the duration of time the protective equipment will be used.
Barrier Requirements

- Rapid increase in blood borne dis- HBV, HCV, HIV.

- Coating and Laminating technologies - lighter, comfortable, more protective clothing for superior protection of operating room staff and patients.

- Products that consistently pass the viral barrier test are fabrics reinforced with impervious film.
Various types of textiles in medical care

I. Natural
II. Woven
III. Sterile
IV. Disposable
V. Patient
VI. Implantable

Man Made
Non-Woven
Unsterile
Re-useable
Non-Patient
Non-implantable
Non Woven Fabrics

- **Advantage**
- manufactured directly from fibres - lower cost
  - Suitable for disposable products
- Special breathable films are added to fibres and fabrics
- Adhesive bonded non woven fabrics are used for hospital and sanitary applications, including nappy liners and complete throwaway items.
Non Woven Fabrics

- Cloth-like characteristics - softness, opacity, substance, absorbency, low static, comfort, acoustic deadness, porosity and improved liquid holding capacity, and fast drainage
Antimicrobial Fibers

- Combination of antimicrobial compounds, based on metallic salts.
- Prevent hazardous bacteria from build up
- Applications in the fields of personal hygiene
- Compounds are embedded in the matrix of fibres which renders it impervious to washing and wear.
Sterilization Stability

- **Methods**
  - Steam
  - Dry Heat
  - Ethylene oxide
  - Irradiation process
  - Peroxide Plasma

**121 – 138 C**

Sterilization brings changes in properties
- Strength
- Absorbency
- Appearance
Testing of healthcare garments

- **Methods** – Repellency
  - Launderability (recyclable)
  - Burst strength
  - Tear strength

- These methods assist in characterisation whether product is
  - Blood resistant
  - Blood proof
  - Viral proof
Reusable Vs Disposable

- Functional Requirements
  - Cost
  - Protection
  - Comfort
- Environmental Impact
- Economics
- No clear superiority of either
- Need Life Cycle studies
Gowns, Drapes & Caps

- Various designs – Unreinforced
  - Reinforced
- Performance features
  - Tear resistance
  - Fluid barrier
  - Abrasion resistance
  - Breath-ability
Barrier Requirements:

**Drapes**

- Barrier to moisture and bacteria
- Able to withstand prolonged handling & lengthy procedures.
- Non-slip surface
- Flammability compliance
- Tough & waterproof – even when **wet**.
- Flexible - readily conforming to the patient's shape
- Dyes used must be fast and non-irritant
- No glare
Barrier Requirements:

**Drapes**

- Able to hold towel clips without tearing.
- Should not give rise to wetness or sweat from the patient's skin.
- Anti-static compliance.
- Burnable for disposal
- Lint-free
- Economical
Incontinence care products

- Soft polyesters – absorb all moisture
- Vinyl centre – prevents passage of fluids
- Dignity Pants – for secure leak proof and bowel protection.
- Light incontinence - use of short fibre, air laid cellulose and super absorbent cores used in products
Medical face Masks

- **US market** – 6% of yardage consumption ($60 ml)
- **Material** – Inner and outer lining
  - Filtration media
  - Ties
Clothes and Wipes

Made from non woven bonded fabrics which may be soaked with an antiseptic finish. The cloth or wipe may be used to clean the wounds or the skin prior to wound dressing application, or to treat rashes or burns.
Sutures & Ligatures

- Easy to handle
- Good knot security
- Minimal tissue reaction
- Unfriendly to bacteria
- Strong yet small
- Won’t tear through tissues
- Affordable

- Absorbable / Non-abs
- Natural / Synthetic
- Mono / Multi-filament

- Double – barbs
- Anti-bacterials
- Staplers
- Glue
Surgical Hoisery

- **Purposes** – Light support to a limb
  - Treatment of venous disorders

- **Knee and elbow caps** – Support and compression
Dressings

- Cover
- Stop bleeding
- Aid healing
- Prevent infection
- Non-linting
- Soft on granulation tissue
- Drug delivery
- Easy to remove
- Affordable
Vascular Grafts, Mesh, Soft tissue implants

- Bio-compatibility
- Anti-coagulant
- Flexibility, resilience
- Porosity
- Texture
- Mech strength
INNOVATIONS
Innovations

- Metallized textiles
- Nanotechnology
- Anti-microbial fabrics
- Fire retardant fabrics
- Bones - Textiles are replacing metal implants
- Nerve guidance channels
- Smart / intelligent
  - Switches, Sensors, Secretions
- Tissue Engineering
  - Scaffolds
  - Embroidery technology

- Spray on Surgical Drapes
- Nano-silver treated hospital linen for burn patients
- Controlled drug release
ISSUES
Quality Standards

D&CA – schedule F2: Cotton, Bandages & Gauze

- Nonwovens
- Fibre, yarn, fabrics, final product
- Raw material suppliers
- Innovation
“To die for your country”
“The object of war is not to die for your country but to make the other b*****d die for his”.

George Patton
Tourniquet
Conclusion

- Textile-based materials for medical use are helping to *improve* people’s lives—and in some cases *transform* them.
- We have to leverage innovations in this field to improve health care delivery and make it affordable & safe.
- *Standards are essential*
THANK YOU