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LWC + HILL-ROM

REDESIGNING THE HOSPITAL GOWN

Patient Wear

A New System for Patient Clothing in Health Care Environments

Progressive Recovery

Stage 1 - Low Mobility
"Works with Mattress Pad to reduce Friction and Shear"

Stage 2 - Medium Mobility
"Easy Open & Closure"

Stage 3 - High Mobility
"Transition to Physical Therapy"

Annual **cost** per hospital for treating facility-acquired **pressure ulcers** ranges from **$400,000 to $700,000**.
-- Client Data

>

Increasing **patient dignity** while providing **cost effective, quality care** with the overall goal to **reduce** the **risk** of **bedsores** (pressure ulcers).
-- Project Goal

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Patient Wear: A New System for Patient Clothing in Health Care Environments

opportunity space

Social Factors

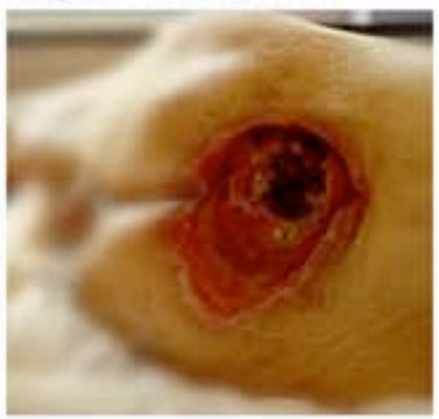
Staying in a hospital is already a serious, emotionally draining experience.

Patients' view the current hospital gown with mixed emotions. It is unisex, provides little coverage, and the prints and colors are representative of men's boxer shorts from the 1920's.
One Size Fits No One. Current gown design does not enhance Patient Dignity.

13.4% of hospital patients — 900,000 people — will develop a pressure ulcer each year.

60,000 of those patients will die from complications due to facility-acquired pressure ulcers . . . one of the top 3 in -hospital errors that lead to patient deaths.
-- Client Data

Stage V Pressure Ulcer



Client Image

Economical Factors

The timing for this research project is appropriately aligned with the latest Medicare announcement. Pressure ulcers are listed amongst eight preventable conditions for which Medicare will not reimburse hospitals after October 1, 2008.

Annual direct cost per hospital for treating facility-acquired pressure ulcers ranges from $400,000 to $700,000 per year.
-- Client Data

Technological Factors

Construction and material of gown could contribute to worsening skin conditions.

Patient gowns and linens can:
- Create pressure points
- Trap moisture
- Elevate temperature
- Introduce friction and shear

Increasing trend:
Antimicrobial textiles
New closure materials
Moisture absorption/wicking materials

*The **goal** of the project is to explore the fundamental **redesign** of **patient gowns** and the **mattress cover**, with the overall goal to **reduce** the **risk** of **pressure ulcers**.*

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Patient Wear: Overview of resources and concept goals

Scope of Resources

Interdisciplinary Student Teams
Industrial Design
Fashion Design
Product Development
Business (Finance/Marketing)
Bio-Medical Engineering

Interdisciplinary Faculty Team

Medical Staff Support
Nursing Consultants
Advanced Wound Care Manager

Concept Evaluation & Refinement
PhD Nursing Candidates

Universal Design Expert

Materials Science Expert


Current gown design dates back to the 1925

Concept Goals: Patient - Nurse Experience


PhD Nursing Candidates evaluate initial concepts.

patient

Adding value to the patient
- Increasing patient comfort
- Offering variety throughout stay
- Bringing home into hospital
- Designing for patient mobility
- Motivating with incentives

relationship

Fostering Relationships
- Promoting patient dignity
- Seamless design
- Overlap access

nurse

Enhancing Nurses' Efficiency
- Wrap access
- Seamless Pressure relief
- One piece construction
- Visible sizing and organization

Biomedical Engineering Research + Materials Testing

Braden Scale used to assess Pressure Ulcer Risk

The anatomical sites for pressure ulcers are the Sacrum, Ischium, Trochanter and Heel.

Braden Scale Categories

- Sensory Perception
- Moisture
- Activity
- Mobility
- Nutrition
- Friction and Shear

Demographic Risk Factors

Top 5 Factors

1. Over age 60
2. Diabetes
3. Smoking
4. Obesity (MBI>30)
5. Skinny (MBI<18.5)

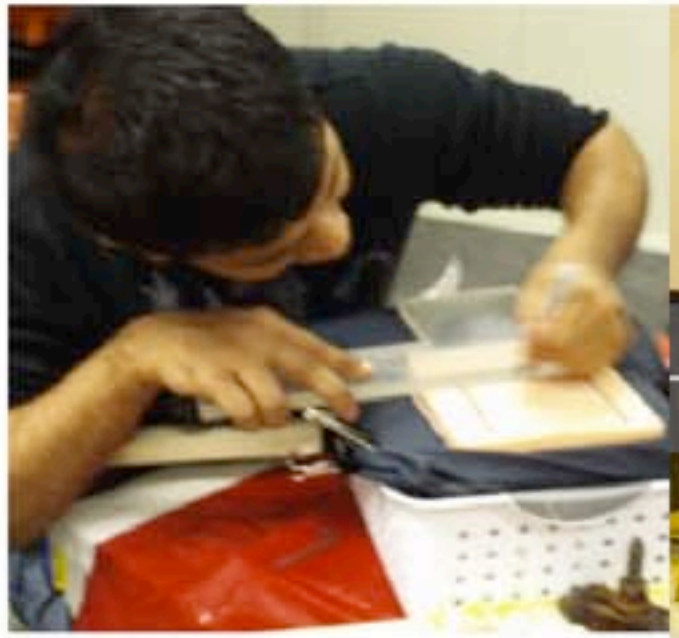
Mechanical Risk Factors

- Moisture Accumulation
- Increased Temperatures
- Shear Force on the Skin
- Excessive Pressure on the Skin

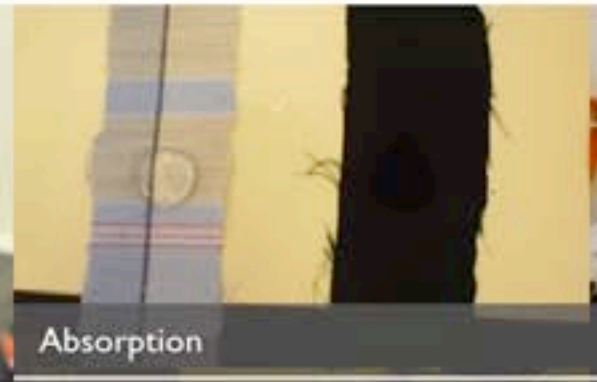
Based on the identified risk factors the team decided to evaluate fabric samples on the following tests to the right. >>

Final Fabric Test Results

- Polyester based materials are good at moisture wicking, but may be high shear.
- Bamboo is very good at water absorption.
- Nylon is low shear.
- Weave and construction of materials play as much of a role in moisture control and shear as the material itself. This is an area of further investigation.



Engineering Student preparing Test



Absorption

Wicking

Evaporation

Shear

Enhancing the Outcome for Patients and their Caregivers

Meet Judy

- 68 years old
- Happily married with two children
- **Active**, enjoys running 10K races
- Retired business professional
- Healthy aside from **chronic knee problems**

Judy has developed **osteoarthritis** of the knee due to many years of wearing high heels and running. Lately she has been experiencing an increasing amount of pain and has elected to have a total **knee replacement** to take care of the problem. Currently she is investigating the best possible hospital experience.

Stage 1 - Low Mobility

01 As Judy gets ready for surgery, she puts on the OPEN-FIT backless gown. After surgery, Judy will be in immobile for 1-2 hours.

A pressure ulcer can form within 2 hours. The backless gown, paired with the GRAB-IT antimicrobial contact sheet and a mattress that reduces interface pressure while controlling microclimate is the key to avoid bed sores.

Stage 2 - Medium Mobility

01 Since Judy will be in the hospital for several days after surgery, she will change into a JUMP-FIT gown to promote movement and dignity. When she feels cold the nurse provides WARM-FIT arm and leg warmers.

02 Judy will be encouraged to begin walking short distances with assistance (walker and caregiver). A physical therapist will start Judy on a recovery routine in bed.

Stage 3 - High Mobility

01 Judy is progressively recovering. After rehabilitation allows her to walk on her own again she is now at home wearing the FLEX-FIT separates (shirt and pants).

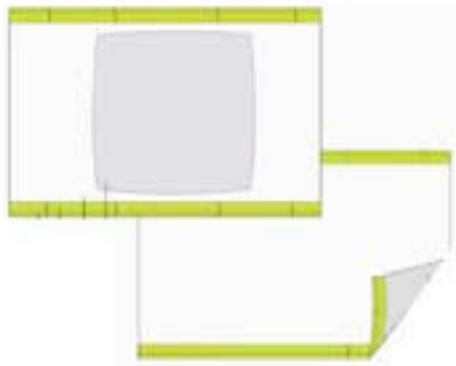
02 The physical therapy program will continue for a few weeks to ensure a full recovery.

GRAB-IT

[Contact/Transfer Sheet]

Features

- Comfortable Top Layer
- Moisture Wicking SeaCell
- Rip-stop Nylon Backing
- Removable Incontinence Pad
- Tube Handling
- Grip Edging
- One Piece



> " We are always being taught good body mechanics. "
>
> Nursing consultant

Concept Features

Simple Silhouette
Seamless Design
Overlap Access
Integrated Closures
One Piece Construction
Micro Adjustable Fit
Systematic Sizing
(color coded closures)

>> Progressive Recovery Concept Collection >>

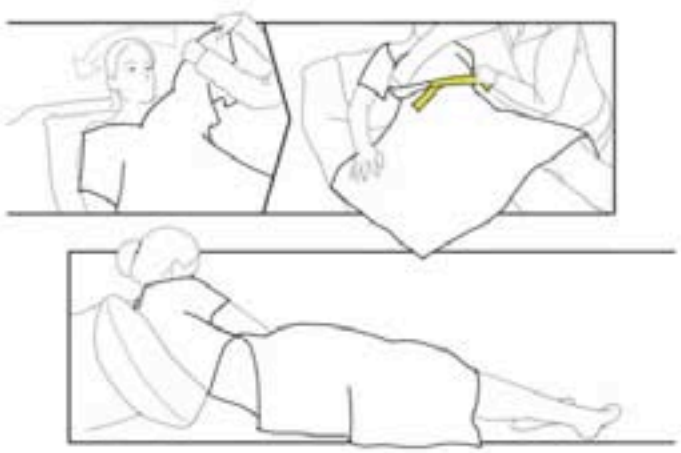
Immobile

OPEN-FIT

[Backless Gown]

Features

- Skin to Sheet Contact
- Drape Coverage
- Lateral Change
- Tear Away Sleeve
- Dignified Shrug Back



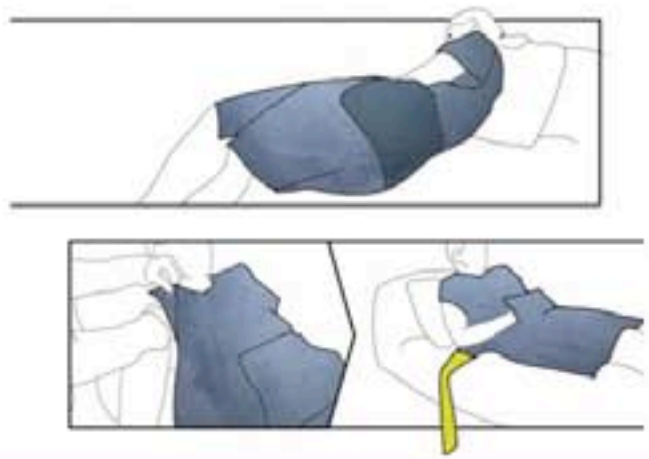
Partially Mobile

JUMP-FIT & STICK-FIT

[Wrap Gown]

Features

- Wrap Closure
- Tie Comfort
- Protection Patch
- Integrated Pocket
- Soft Construction
- Seamless Magnet Closure



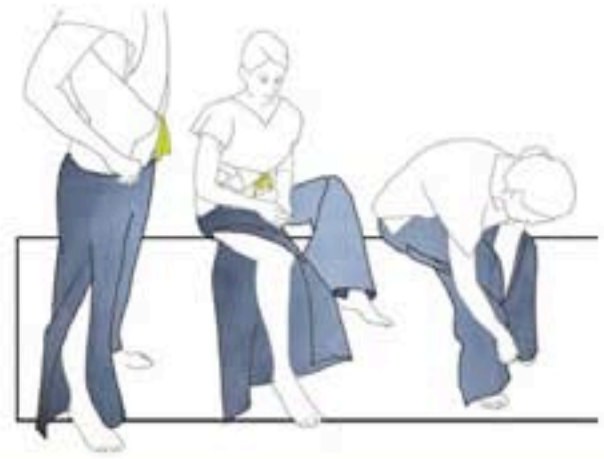
Partially/Fully Mobile

FLEX-FIT

[Active, Separates]

Features

- Intuitive
- Flexible Mobility
- Open Access
- Dignified Coverage
- Seamless Comfort
- Lifestyle Relevant



Nurse Quotes

" Let the mattress be the mattress. "

" Tangled closures means a gown must be cut and then thrown away which renders them useless. "

" Our goal is to get the patient mobile and back into their civilian clothes as quickly as possible. "

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Accessories

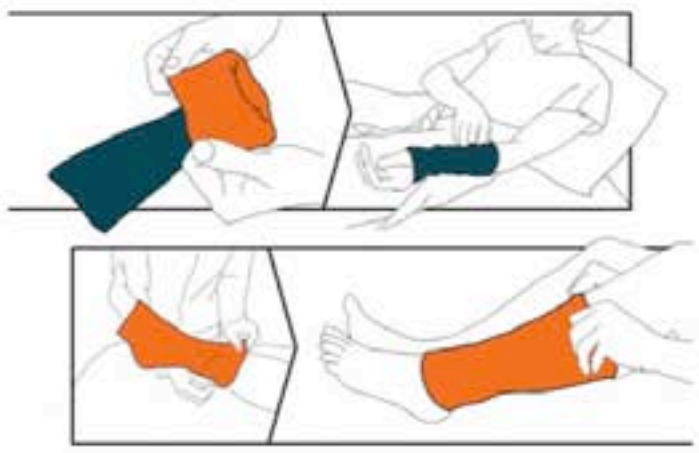
Based on compensational behaviors found during research.

WARM-FITS

[Arm + Leg Accessories]

Features

- Reversible
- Color Therapy
- One Size Fits All
- Enables Access
- Warmth
- Choice

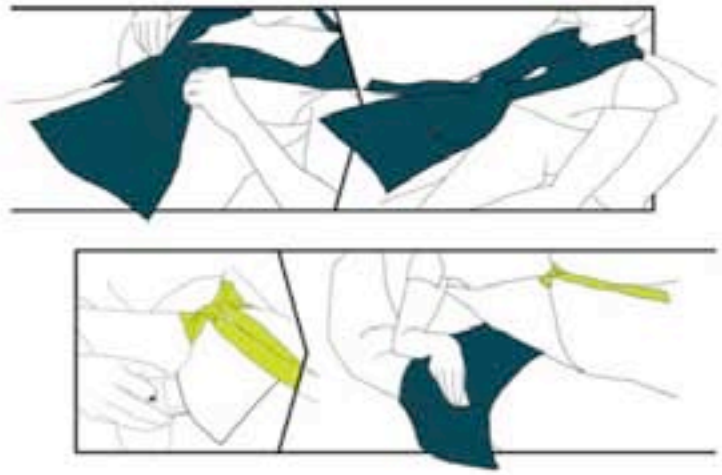


STASH-IT

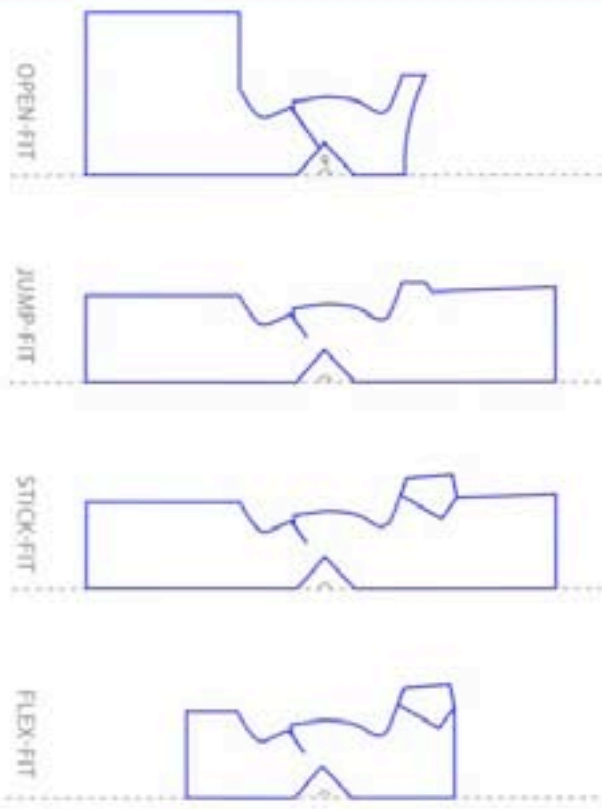
[Scarf Accessories]

Features

- Reversible
- Storage
- Warmth
- Choice



Gown Pattern Derivation



Nurse Quotes

" We often cut off long socks to give to patients for warmth and comfort. "

" We are always looking for ways to stash things. Patients expect the same things they have at home... phone, ipod, blackberry... "

The use of similar patterns saves cost during manufacturing.

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THANK YOU.