Confidence in your Surface Selection Process

5 Steps to Consider

Enhancing outcomes for patients and their caregivers.

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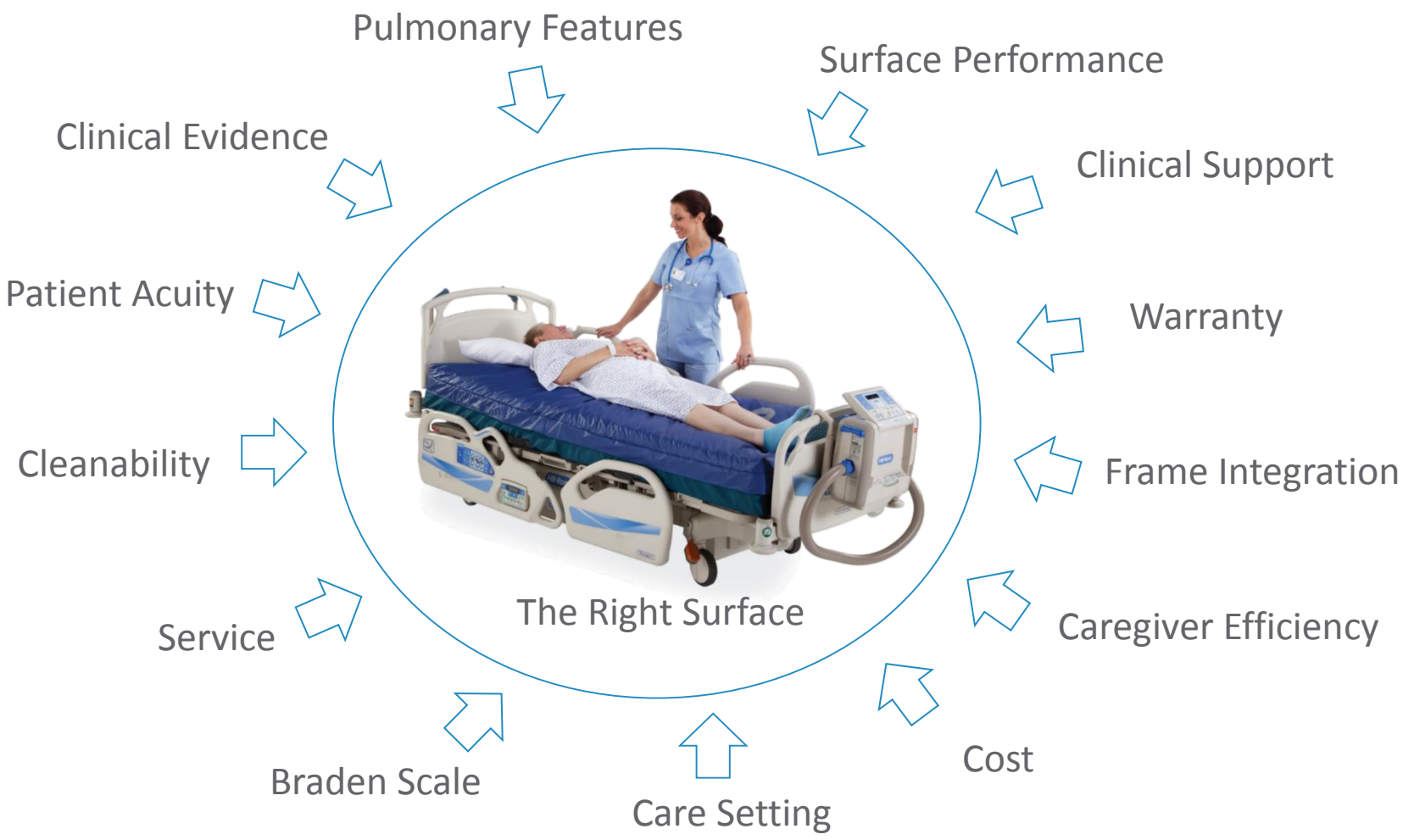
Selecting the Right Surface has Many Variables



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5-Step Surface Selection Process

Step 1: Determine Support Application	Step 2: Identify Patient Needs	Step 3: Determine Type of Surface	Step 4: Research Surface Performance	Step 5: Review Other Decision Points
Common Decision Points				
- Bed - Seat - Overlay	- Acute Care / ICU / LTC - Moisture - Mobility	- CLP / AP / AFT - LAL - Percussion - Vibration - Lateral Rotation	- Evaporation - Heat Withdrawal - Friction / Sheer - Pressure Redistribution	- Durability - "Cleanability" - Cost - Warranty - Service - Clinical Support

The Right Surface Solution

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Step 1 - Determine Support Application

Mattress	Integrated Bed System	Overlay	Overlay Seat Cushion	Seat Cushion
				

"Specialized devices for pressure redistribution designed for management of tissue loads micro-climate and or other therapeutic functions."

NPUAP, S3I Terms and Definitions, 2007

Determine Support Application → Identify Patient Needs → Determine Type of Surface → Research Surface Performance → Review Other Decision Points

Step 2 - Identify Patient Needs for a Support Surface

- Understand there are 5 “surface related” factors to skin care.
- Patient risk factors for moisture and mobility impact surface selection.
- The care setting and other patient acuities drive specific surface needs.

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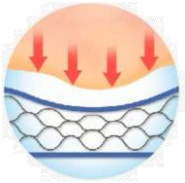
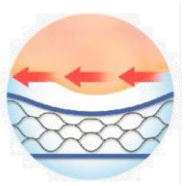
The Impact a Surface Can Have on the Skin



	Factors	Implications
Pressure (1,2,3,15)	• Pressure compresses tissue	• Tissue deformed and blood flow is impeded • Tissue may die as a result of lack of oxygen



Shear (1,4,5,6,15)	• Tissue is stretched	• Tissue deformation, blood flow is impeded due to stretching and distortion of vessels
Friction (1,7)	• Rubbing of surface or bedding against skin	• Broken skin is more susceptible to other factors of pressure, shear, and moisture

Heat (1,8,9, 12,13,14)	• Heat build-up can lead to perspiration	
Moisture (1,8,9,10,11)	• Excessive moisture impairs the ability of tissue to absorb oxygen and rid itself of waste	• Moist skin becomes more fragile and susceptible to forces of pressure, shear, and friction

Determine Support Application | **Identify Patient Needs** | Determine Type of Surface | Research Surface Performance | Review Other Decision Points

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Select the Right Surface Based on Risk Factors

Evidence based on WOCN® Support Surface Consensus[16]

BRADEN MOISTURE SUBSCALE SCORES	BRADEN MOBILITY SUBSCALE SCORES[a] 4 or 3 No limitation or slightly limited	 2 or 1 Very limited or completely immobile
4 or 3 Rarely or occasionally moist	• Reactive/CLP[b] (air, foam, gel, fiber, or viscous fluid, or combinations) • AMG sheepskin overlay (Prevention only)[c]	• Reactive/CLP • Active with AP feature
2 Very moist	• Reactive/CLP • Reactive/CLP with LAL feature	• Reactive/CLP with LAL feature
1 Constantly moist	• Reactive/CLP • Reactive/CLP with LAL feature	• Reactive/CLP with LAL feature • Reactive/CLP with AF feature (Treatment only)

AF = air fluidized; AMG = Australian Medical grade; AP = alternating pressure; CLP = constant low pressure; LAL = low air loss.

Determine Support Application | **Identify Patient Needs** | Determine Type of Surface | Research Surface Performance | Review Other Decision Points

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Select the Right Surface Based on Care Setting

Can the Surface Assist in:

- **Skin Care?**
- **Pulmonary Needs?**
- **Patient Mobility?**

ICU

- **Percussion and Vibration Features**
- **Lateral Rotation**
- **Frame Integration**

Acute Care / LTC

- **Pressure Redistribution**
- **Low Air Loss**
- **Air Fluidized Therapy**
- **Affordable Sleep Surface**

Can the Surface Assist in:

- **Moisture Management?**
- **Wound Healing?**
- **Patient Comfort?**

Determine Support Application | **Identify Patient Needs** | Determine Type of Surface | Research Surface Performance | Review Other Decision Points

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Step 3 - Determine the Type of Surface Needed

- Understand the NPUAP terms and definitions for a support surface.
- How each surface type works to provide therapy
- Determine therapeutic benefits of other surface features.

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NPUAP Surface Definitions

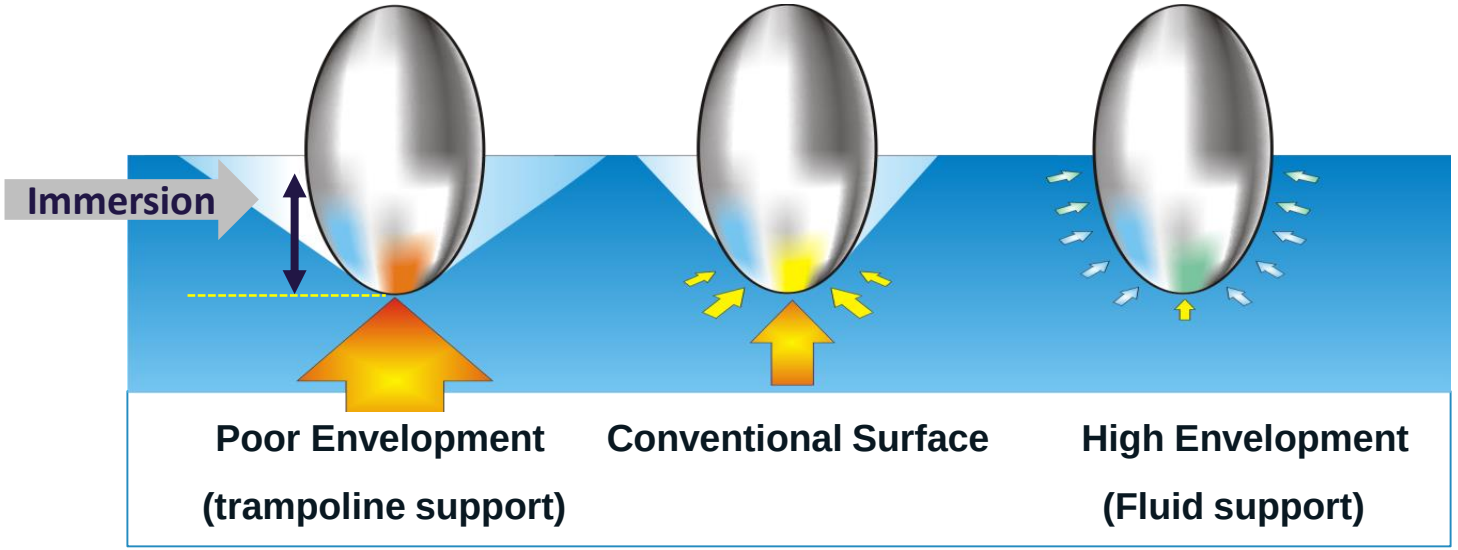
NPUAP* Term[16]	NPUAP Definition[16]
Constant Low Pressure (CLP) or Reactive	Consensus definition: A powered or non-powered support surface that provides pressure redistribution in response to an applied load (patient) through immersion and envelopment. *Includes alternative, contoured, or textured foam; gel or silicone; fiber; viscous fluid; static air-, water-, or bead-filled mattresses or overlays; and Australian Medical-grade sheepskin*
Alternating Pressure (AP) or Active	Provides pressure redistribution via cyclic changes in loading and unloading as characterized by frequency, duration, amplitude, and rate of change parameters.
Low Air Loss (LAL)	Provides a flow of air to assist in managing the heat and humidity (microclimate) of the skin.
Air Fluidized (AF)	Provides pressure redistribution via a fluid-like medium created by forcing air through beads as characterized by immersion and envelopment.

Reactive / Constant Low Pressure (CLP)

Pressure Redistribution through Immersion & Envelopment

Immersion = Depth of Penetration into Surface

Envelopment = Ability to conform to Irregularities and Contact Area for Level of Immersion



Determine Support Application | Identify Patient Needs | **Determine Type of Surface** | Research Surface Performance | Review Other Decision Points

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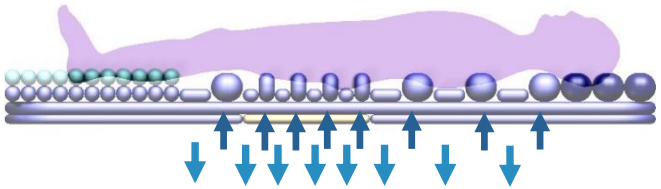
Alternating Pressure vs. Continuous Low Pressure

	Alternating Pressure (AP) **(Active)** (*Moves* w/o patient on surface)	**Continuous Low Pressure (CLP)** **(Reactive)** (*Does Not Move* w/o patient on surface)
	Alternating Pressure	**Single-Zone Foams and Gels**
		**Multi-Zone Foams and Gels**
		Self-Adj. Technology
		Static Air
		Low Air Loss
		Air Fluidized Therapy
Pressure management	Periodic Load Reduction	Immersion & Envelopment
Shear management	Periodic Shear Reduction	Low Friction /Compliant Materials

Determine Support Application → Identify Patient Needs → **Determine Type of Surface** → Research Surface Performance → Review Other Decision Points

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Low Air Loss (LAL)[17,18]

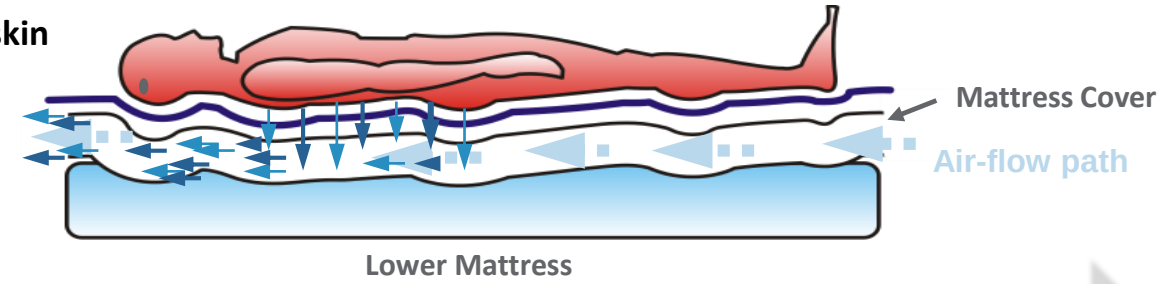
Uses the flow of air to combat the build-up of heat and humidity on skin

Mild Skin Cooling

- **Cooler skin has a reduced need for nutrients, making it less vulnerable to wounds caused by unrelieved pressure**
- **Maintains skin temperature below threshold for local perspiration**
- **Normally increases comfort**

Removal of Moisture

- **Helps maintain strength of skin**
- **Reduces Friction**



Determine Support Application | Identify Patient Needs | **Determine Type of Surface** | Research Surface Performance | Review Other Decision Points

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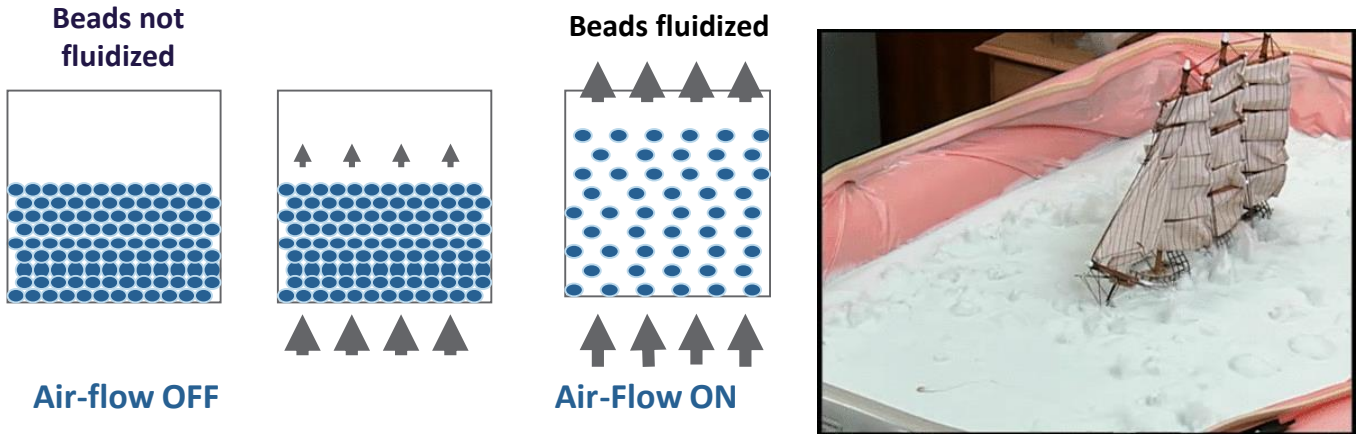
Air Fluidized Therapy

Air cushions between beads allow them to move independently

High Air-Flow and Fluidized Bath

- **Excellent envelopment and immersion (low interface pressure)**
- **Low Shear**
- **High heat and moisture management capability (high evaporative capacity)**



Determine Support Application | Identify Patient Needs | **Determine Type of Surface** | Research Surface Performance | Review Other Decision Points

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Other Features of Support Surfaces

Therapy	Feature
Patient Support	Weight-based Pressure Redistribution
	Shear Relief Features
Pulmonary	Percussion / Vibration
	Lateral Rotation
Patient Handling	Turn Assist
	Chair Egress
Patient Safety	Bed Exit Alarm
	Welded Seams / No Removable Parts

Step 4 – Research Surface Performance Testing and Results

- What is the NPUAP Support Surface Standards Initiative
- Understand how each test is performed and interpret the results
- Know why pressure mapping is not a valid method of measurement

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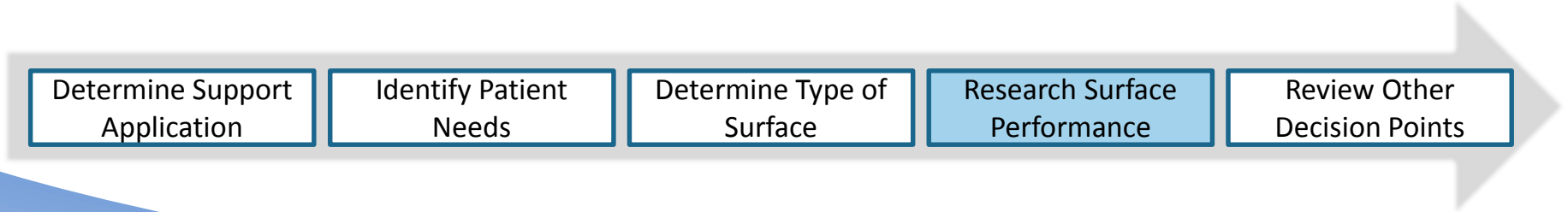
Surface Performance Testing – Why do it?

- The importance of a support surface and it's impact on the skin

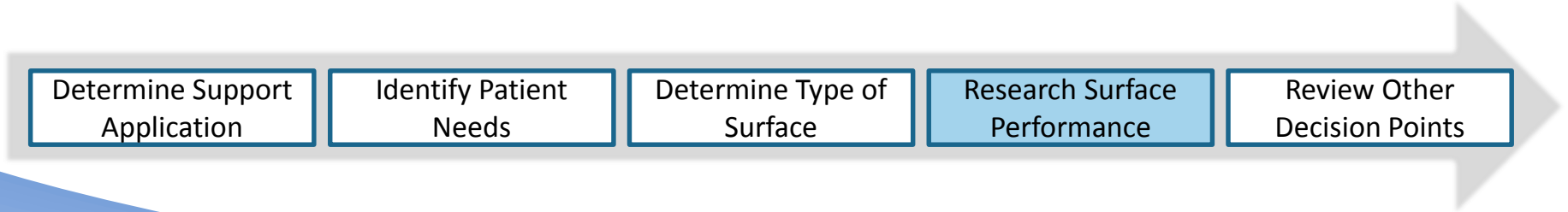
- The need to have a standardized method to compare surfaces to **empower the caregiver in product selection**



Support Surface Standards Initiative (S3I) - NPUAP

- The Support Surfaces Standards Initiative (S3I) was founded in 2001 by the NPUAP to develop:
  - uniform terminology
  - test methods
  - reporting standards

- These guidelines provide an objective means for evaluating and comparing support surface characteristics to make an educated surface choice.



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S3I Test Methods

Test methods address key surface-related pressure ulcer risk factors:

Pressure*

Peak Sacral Pressure

measures pressure of different weightloads with a sensored Indenter.

Shear / Friction

Horizontal Stiffness

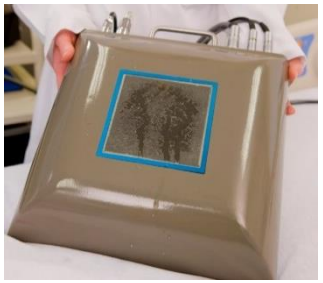
measures shear forces using an Indentor 'pulled' across the surface.

Heat

Heat Withdrawal 'Dry Flux'

measures the amount of heat withdrawn from the surface.

Moisture



Evaporative Capacity 'Wet Flux'

measures the amount of moisture removed from surface.

* *Awaiting Approval*

Determine Support Application | Identify Patient Needs | Determine Type of Surface | **Research Surface Performance** | Review Other Decision Points

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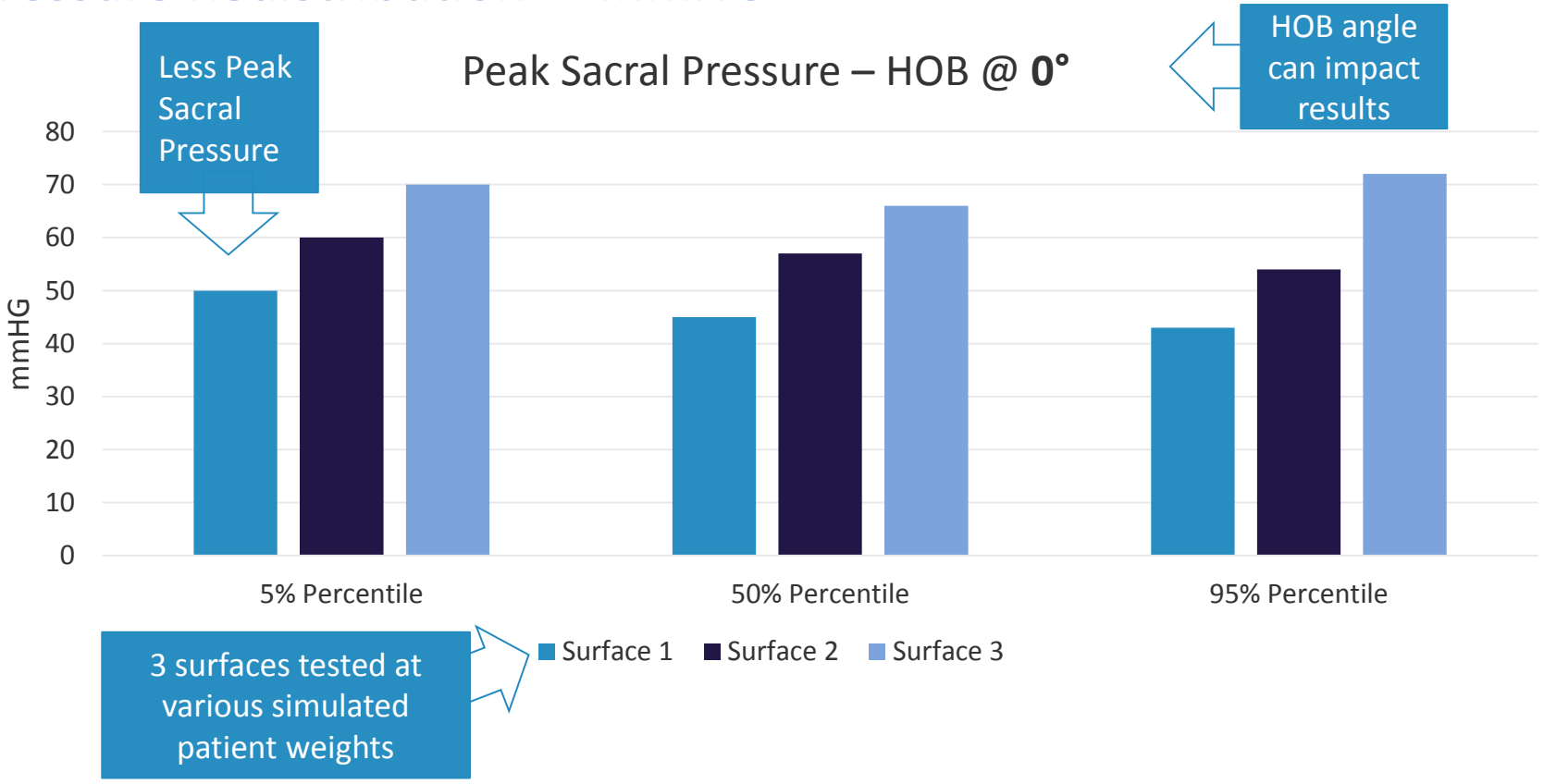
Pressure Redistribution - mmHG

Pressure

Peak Sacral Pressure Test
measures pressure of different weightloads with a sensored Indenter.

- **How is it done?** Pelvic shaped indenter attached to force and immersion measuring device. Indenter is impressed into seat section with a force appropriate for patient weight and HOB angle.
- Multiple trials conducted to spatially sample the seat region
- **How to interpret results?** Peak pressure measured in mmHG and higher numbers indicate increased risk of skin breakdown.

Pressure Redistribution - mmHG



Determine Support Application | Identify Patient Needs | Determine Type of Surface | **Research Surface Performance** | Review Other Decision Points

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Shear / Friction - Newtons of Pushback Force

Shear

Horizontal Stiffness Test
measures shear forces using an Indentor 'pulled' across the surface.

- **How is it done?** Pelvic indenter pulled toward foot of bed 10mm by force measuring device.
- Pushback force measured every 60 seconds for 5 minutes.
- **How to interpret the results?**
  - Peak shear at 0 min indicates instantaneous maximum pushback force
  - Pushback force at 5 min indicates high sustained shear

Determine Support Application | Identify Patient Needs | Determine Type of Surface | **Research Surface Performance** | Review Other Decision Points

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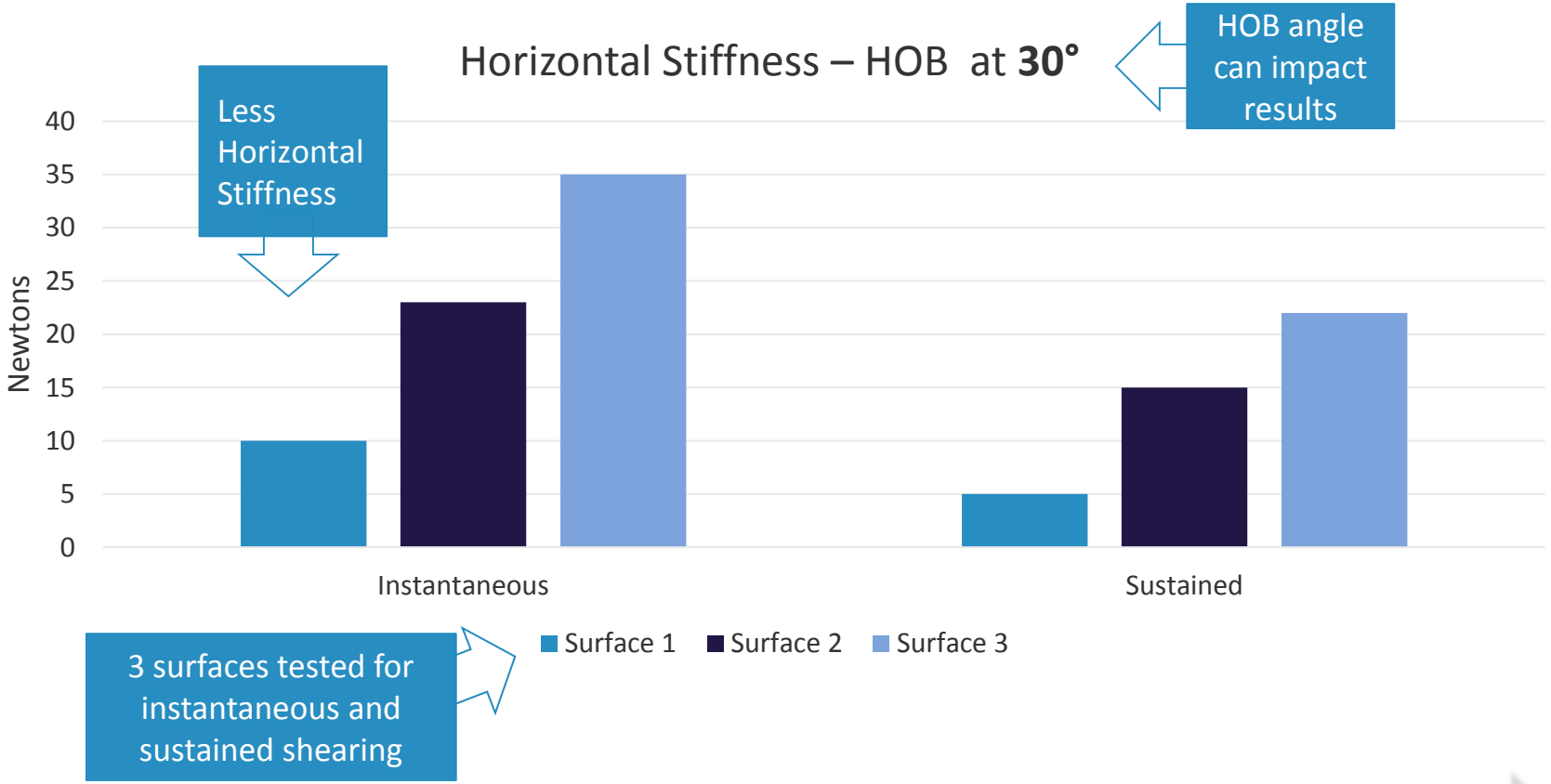
Shear / Friction - Newtons of Pushback Force



Determine Support Application | Identify Patient Needs | Determine Type of Surface | **Research Surface Performance** | Review Other Decision Points

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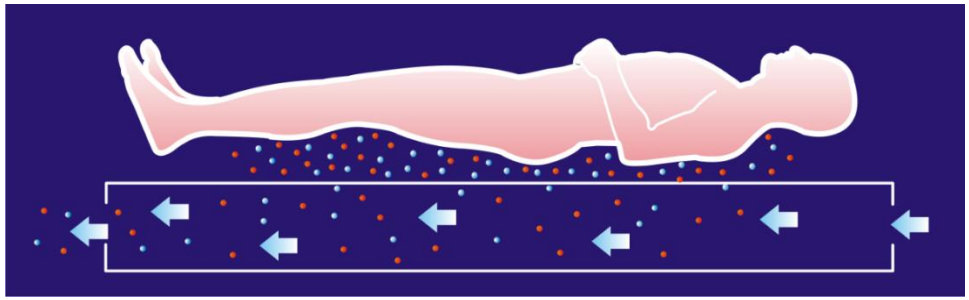
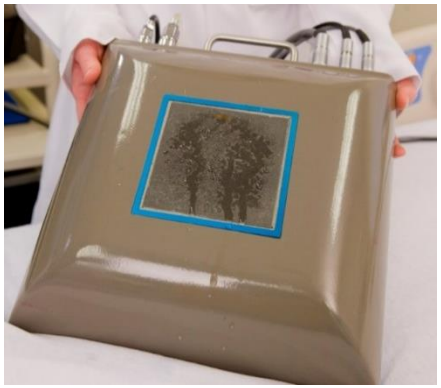
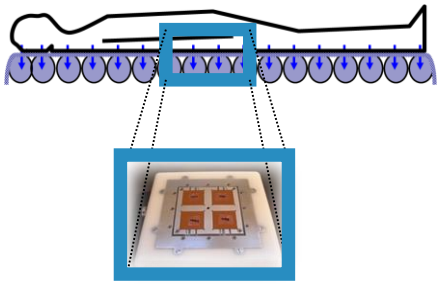
“Sweaty Butt” - Sweating Guarded Hot Plate



Measures equilibrium rates at which **heat and moisture** pass through surface.[19]





Determine Support Application | Identify Patient Needs | Determine Type of Surface | Research Surface Performance | Review Other Decision Points

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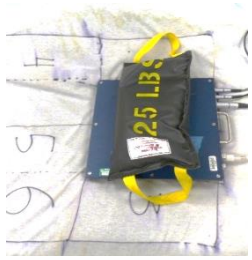
*. Nicholson, G, Scales, J, Clark, R, de Calcina-Goff, M. A method for determining the heat transfer and water vapor permeability of patient support systems. *Med Engineer Phys.* 1999;21:701–712.

Temperature - Watts/meter^2 Heat

Heat



Heat Withdrawal 'Dry Flux' Test
measures the amount of heat withdrawn from the surface.

- **How is it done?** "Sweaty butt" test device placed in seat section of support surface.
- Measures heat withdrawal characteristics of the surface.
- **How to interpret the results?**
  - High levels of heat withdrawal indicate high level of skin cooling
  - Degree of skin cooling can affect patient comfort, tissue ischemia and local perspiration

Determine Support Application | Identify Patient Needs | Determine Type of Surface | **Research Surface Performance** | Review Other Decision Points

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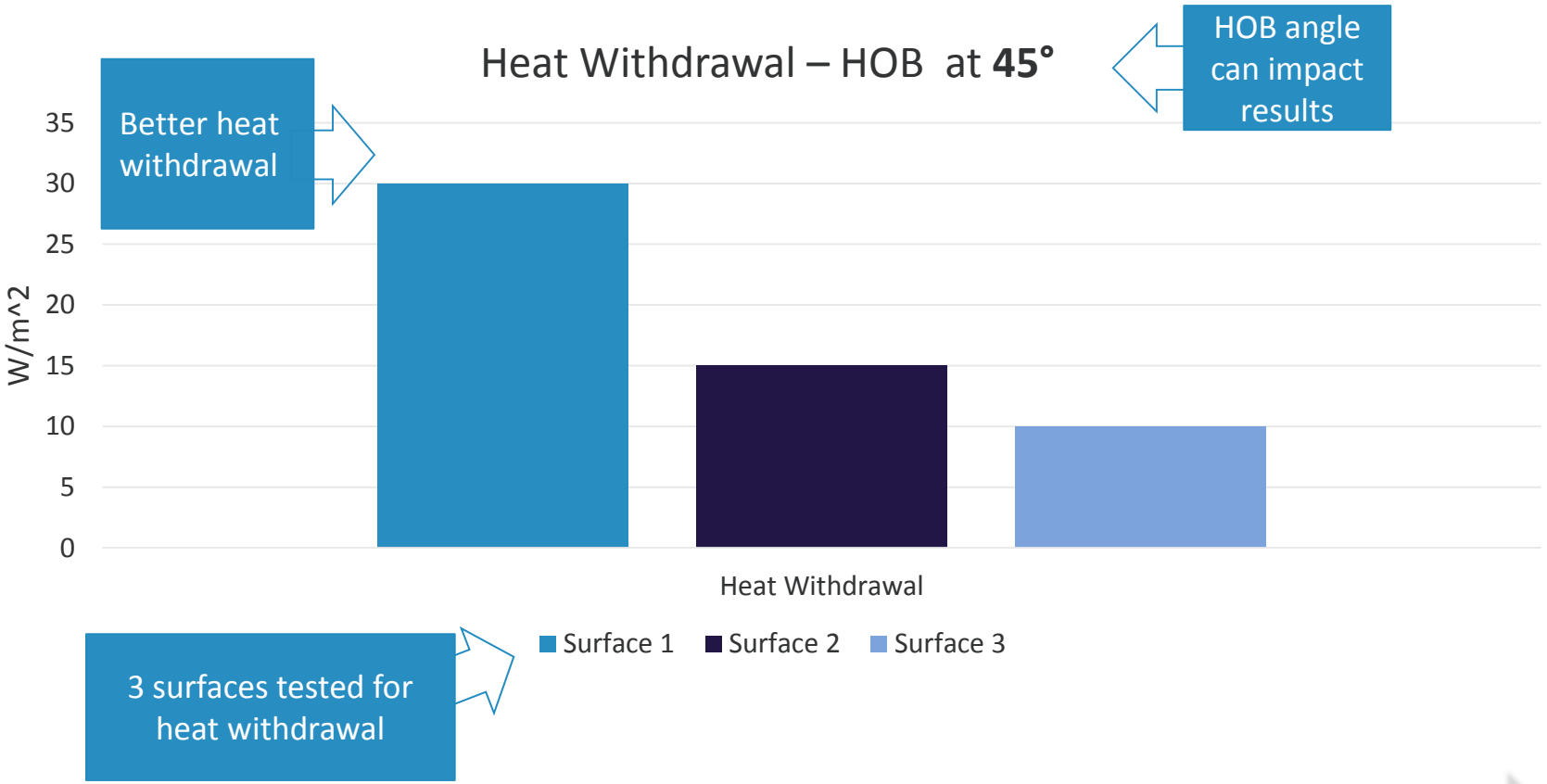
Temperature - Watts/meter^2 Heat



Determine Support Application | Identify Patient Needs | Determine Type of Surface | **Research Surface Performance** | Review Other Decision Points

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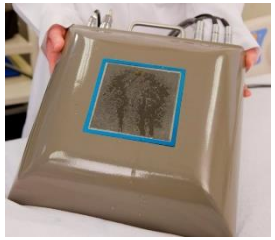
Moisture - Grams/meter^2 H2O

Moisture



Evaporative Capacity 'Wet Flux' Test
measures the amount of moisture removal from surface with simulated 'Sweaty Butt'.

- **How is it done?** "Sweaty butt" test device placed in seat section of support surface.
- Measures moisture withdrawal characteristics of the surface.
- **How to interpret the results?**
  - High levels of moisture withdrawal indicate ability to evaporate moisture effectively
  - Effective LAL products are meant to evaporate sweat but not incontinence

Determine Support Application | Identify Patient Needs | Determine Type of Surface | **Research Surface Performance** | Review Other Decision Points

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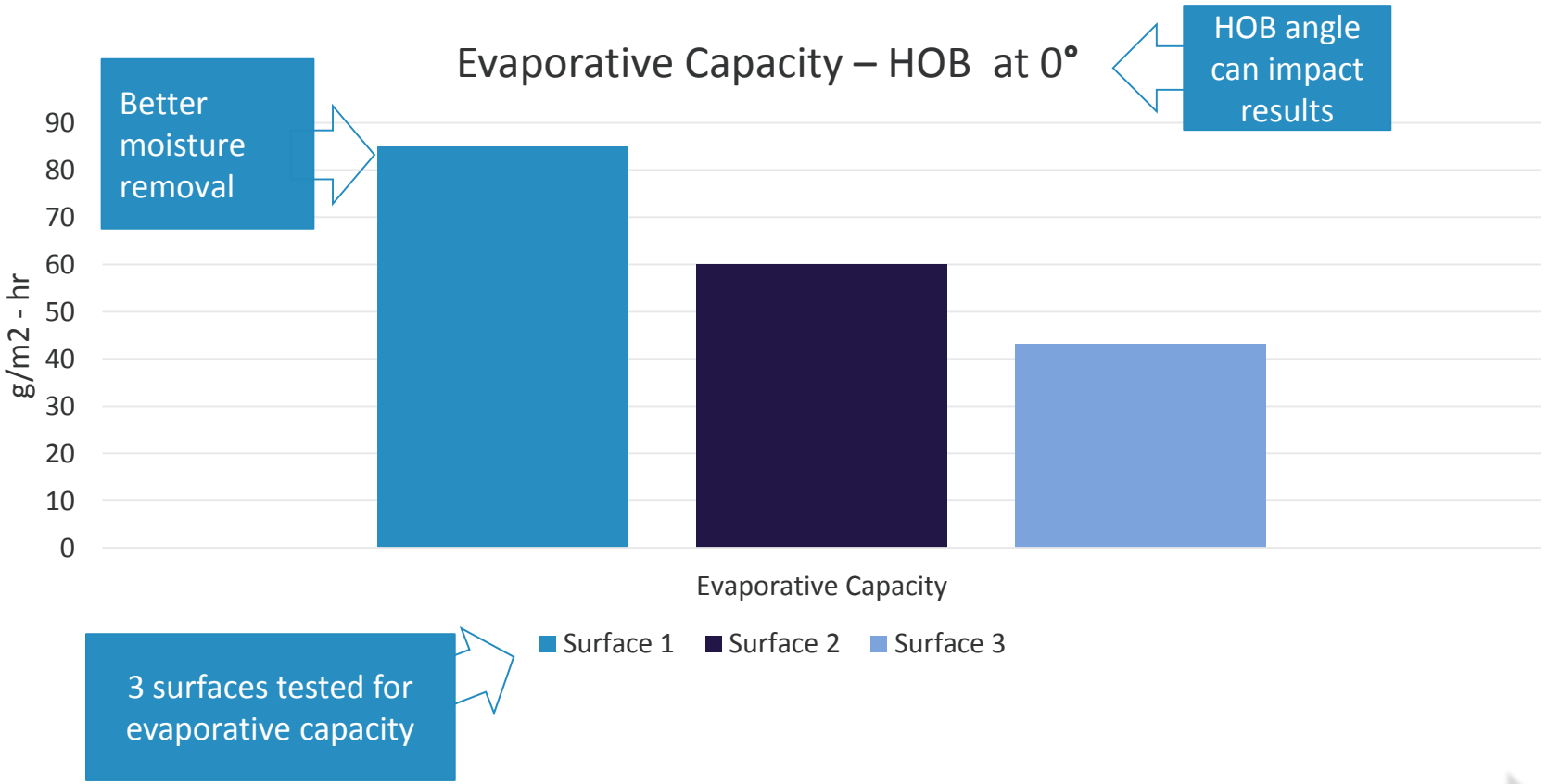
Moisture - Grams/meter^2 H2O



Determine Support Application | Identify Patient Needs | Determine Type of Surface | **Research Surface Performance** | Review Other Decision Points

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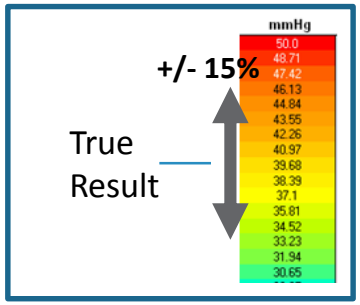
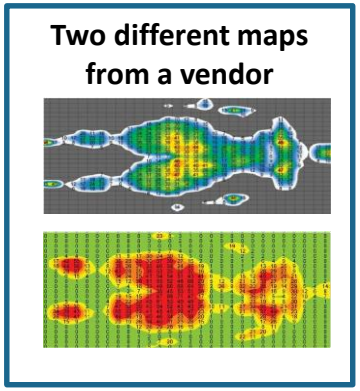
Why not Pressure Mapping?

- **Lack of precision**
  - Peak Sacral Pressure Testing results → +/- 1% variance

    Vs.
  - Pressure Mapping Results → +/- 15% variance *(no difference between "green" and "orange")*



- **Pressure Mapping Pads affects surface performance**
  - Thick and non-conforming to surface
  - Impacts true immersion and envelopment



- **Different patients for every test = lack of comparability**
  - Every test patient has different body type
  - BMI, muscle mass, height, weight etc.

Determine Support Application | Identify Patient Needs | Determine Type of Surface | **Research Surface Performance** | Review Other Decision Points

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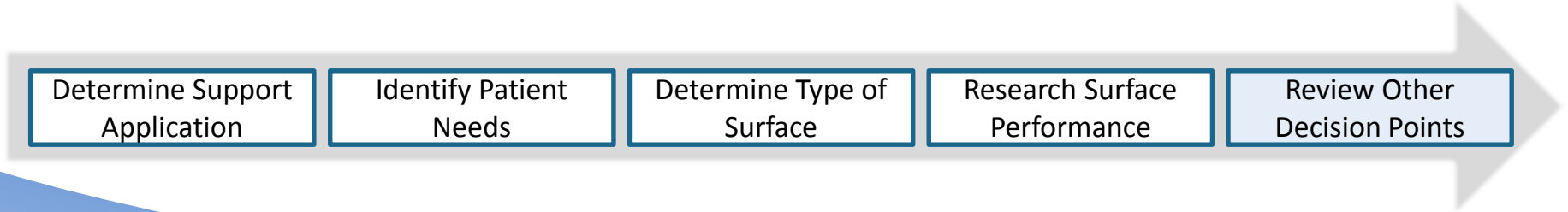
Step 5 - Other Factors to Consider

- Durability
- “Cleanability”
- Cost
- Warranty
- Service
- Clinical Support



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