AAWC Pressure Ulcer Summit (2018): A Recap

RUTH BRYANT PHD, RN, CWOCN
PRESIDENT ELECT, AAWC
DIRECTOR NURSING RESEARCH, ABBOTT NORTHWESTERN HOSPITAL
MINNEAPOLIS, MN

Disclosures

President –Elect: Association for the Advancement of Wound Care (AAWC)
Elsevier (royalties)
Bruin Biometrics (speaker)
ConvaTec (speaker)
Medline (speaker)
Single looking for my Knight in Shining Armor
Love country music and outdoor concerts
Wanna be golfer
Objectives

1. Describe the purpose of the AAWC 2018 PrU Summit.
2. Interpret the clinical significance of a conceptual framework for the mechanism of pressure induced tissue damage.
3. Identify opportunities to improve detection and description of pressure induced tissue damage, the process of PI/PU monitoring and risk assessment.
4. Discuss opportunities for collaboration among interprofessional organizations in the pursuit of reducing and eliminating pressure induced tissue damage.

AAWC

Mission:
To advance the care of people with and at risk for wounds.

Vision:
To set the standard and advocate for all wound care.

Membership:
the leading, nonprofit membership organization in the US dedicated to interprofessional wound healing and tissue preservation.
2400 members
RN, MD, PT, PA, Lay/Patients/Caregivers
AAWConline.org

A collaborative community championing for optimal care of those who suffer with wounds.

- Volunteer & leadership opportunities
- Discounts on education & resources
- Online wound care resources
- Exploring Relevant Wound Care (series)
- SAWC Spring and Fall discounts
- Scholarships
- Professional networking
- International representation
- More.....

AAWC PrU Summit:
Contributing Factors for Developing

1. Fall 2015- May 2016:
   - Change in language and definitions with minimal input/response by clinical and academic interprofessional experts.

2. Existing system for quantifying PrU severity continues to be flawed

3. Who speaks for pressure ulcer prevention and treatment?
   - Many clinical and academic professionals with expertise in wound management

4. Patients still get pressure ulcers!
AAWC Response

Mission: To advance the care of people with and at risk for wounds

Literature Search to explore still unaddressed commonly cited problems in the PrU research and clinical practice literature.

Strategies:

1. Assist in accurate assessment of PrU’s distinct from other common etiologies of skin damage AND to standardize a reliable method of determining PrU severity.

2. Create a forum for experts representing the diverse professional organizations dedicated to wound care to explore the most recent science regarding PrU formation.

Gaps Identified in PrU Prevention

1. Staging system:
   - Suggests progression of tissue damage from outside in
   - Based on visual assessment
     - Inter-rater reliability: 42% - 52% at Consensus Conference
     - 2012: Review of Literature (1488 patients extracted data)
       1. “Reliability limited and highly variable.”
       2. “Difficult for nurses to distinguish pressure from other types of wound.”

Gaps Identified in PrU Prevention

2. Definitions:

Granulation tissue is present in dermal wounds

- Superficial papillary dermis is avascular (heals by regeneration)
- Deep dermal damage involves blood vessel injury (healing is a mix of regeneration and repair)

Epibole in Stage 3 ???

- Epibole is a feature of an existing, long standing, chronic wound; NOT a wound with recent onset
- “…due to premature keratinization of the wound edges…”
- Hyperkeratotic (thickening of the epidermis)
- Rolled or curled-under wound edges


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Gaps Identified in PrU Prevention

2. Definitions:

1995:

**Stage II:** Partial-thickness skin loss involving epidermis, dermis, or both. Ulcer is superficial and presents as an abrasion, blister, or shallow crater.

2016:

**Stage 2:** Pressure Injury: Partial-thickness skin loss with exposed dermis. Partial-thickness loss of skin with exposed dermis. The wound bed is viable, pink or red, moist, and may also present as an intact or ruptured serum-filled blister. Adipose (fat) is not visible and deeper tissues are not visible. Granulation tissue, slough and eschar are not present. These injuries commonly result from adverse microclimate and shear in the skin over the pelvis and shear in the heel. This stage should not be used to describe moisture associated skin damage (MASD) including incontinence associated dermatitis (IAD), intertriginous dermatitis (ITD), medical adhesive related skin injury (Marsi), or traumatic wounds (skin tears, burns, abrasions).
Gaps Identified in PrU Prevention

2. Definitions:
   - **Stage 3 Pressure Injury: Full-thickness skin loss**
   - Full-thickness loss of skin, in which adipose (fat) is visible in the ulcer and granulation tissue and epibole (rolled wound edges) are often present. Slough and/or eschar may be visible. The depth of tissue damage varies by anatomical location; areas of significant adiposity can develop deep wounds. Undermining and tunneling may occur. Fascia, muscle, tendon, ligament, cartilage and/or bone are not exposed. If slough or eschar obscures the extent of tissue loss this is an Unstageable Pressure Injury.

Gaps in PrU Prevention

3. Collaboration among Clinical and Research Experts
   - Based on current research: bench and bedside
   - Based on current experience of expert clinicians
   - Do we know what each is doing?
AAWC PrU Summit: Mission

Bring together wound care leaders and stakeholders to:

1. Review the latest research.
2. Explore challenges and innovations in clinical care.
3. Identify opportunities in advancing the science of pressure ulcer prevention and management.
4. Seek to identify pathophysiological models that clinicians can understand and use to make bedside decisions.
5. Compare and contrast recent science with our current practice patterns to identify opportunities for improvement.

Proceedings of the Association for the Advancement of Wound Care’s First Annual Pressure Ulcer Summit

OWM, 64:4 (April 2018)

Validity Testing of the Pressure Ulcer Description (PUDT) Tool

Investigators:

Ruth A. Bryant PhD, RN, CWOCN
Director Nursing Research, Abbott Northwestern Hospital, Minneapolis, MN

Kara Couch MS, CRNP, CWS
George Washington University Hospital Medical Faculty Associated Wound Healing and Limb Preservation Center, Washington, DC

Members PUDT Task Force:

Funded in part by a generous Research and Education Grant from Medline Industries

Purpose of PUDT

- Guide the bedside clinician through the assessments necessary to determine the most likely etiology of the current skin condition in the peri-rectal and fleshy buttocks area.

- Quickly and simply determine the type of skin damage present (i.e., pressure ulcer, incontinence associated dermatitis, virus, etc.).

- NOT a severity scale
Structure of the PUDT

Three (3) Domains:

1. Skin damage without open ulcer
   - White
   - Red
   - Purple/blue/Gray
   - Deeper hue of individual’s usual skin tone
   - Change in individual skin characteristics (edema, induration, etc.)

2. Blisters
   - Serum
   - Blood

3. Skin damage with open ulcer
   - Superficial open ulcer
   - Deep open ulcer
   - Necrotic Ulcer
### Relevance Ratings by Expert Panel N = 41

<table>
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<tr>
<th>PUDT Item</th>
<th>Item Revision?</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Combined rating of 3-4</th>
<th></th>
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<tr>
<td>White</td>
<td>not clinically relevant, delete</td>
<td>1 (2.4)</td>
<td>6 (14.6)</td>
<td>11 (26.8)</td>
<td>22 (53.7)</td>
<td>33 (80.5%)</td>
<td>Yes</td>
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<tr>
<td>Red</td>
<td>confusing unable to assess relevance without further information</td>
<td>1 (2.4)</td>
<td>4 (9.8)</td>
<td>15 (36.6)</td>
<td>20 (48.8)</td>
<td>35 (85.4%)</td>
<td>Minor edits</td>
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<tr>
<td>Purple</td>
<td>clinically relevant, needs minor improvements on wording</td>
<td>3 (7.3)</td>
<td>13 (31.7)</td>
<td>24 (58.5)</td>
<td>37 (90.2%)</td>
<td>37 (90.2%)</td>
<td>Minor edits</td>
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<tr>
<td>Deeper hue</td>
<td>clinically relevant as written</td>
<td>8 (19.5)</td>
<td>14 (34.1)</td>
<td>18 (43.9)</td>
<td>32 (78%)</td>
<td>32 (78%)</td>
<td>Yes</td>
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<tr>
<td>Change in individual skin characteristics</td>
<td></td>
<td>4 (9.8)</td>
<td>10 (24.4)</td>
<td>26 (63.4)</td>
<td>36 (87.8%)</td>
<td>36 (87.8%)</td>
<td>Minor edits</td>
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<tr>
<td>Blister serum</td>
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<td>4 (9.8)</td>
<td>11 (26.8)</td>
<td>25 (61)</td>
<td>36 (87.8%)</td>
<td>36 (87.8%)</td>
<td>Minor edits</td>
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<tr>
<td>Blister blood</td>
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<td>4 (9.8)</td>
<td>8 (19.5)</td>
<td>28 (68.3)</td>
<td>36 (87.8%)</td>
<td>36 (87.8%)</td>
<td>Minor edits</td>
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<tr>
<td>Superficial open</td>
<td></td>
<td>2 (4.9)</td>
<td>10 (24.4)</td>
<td>28 (68.3)</td>
<td>38 (92.7%)</td>
<td>38 (92.7%)</td>
<td>Minor edits</td>
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<tr>
<td>Deep open</td>
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<td>-</td>
<td>-</td>
<td>7 (17.1)</td>
<td>33 (80.5)</td>
<td>40 (97.6%)</td>
<td>Minor edits</td>
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<tr>
<td>Necrotic ulcer</td>
<td></td>
<td>-</td>
<td>-</td>
<td>3 (7.3)</td>
<td>8 (19.5)</td>
<td>29 (70.7)</td>
<td>37 (90.2%)</td>
</tr>
</tbody>
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### PUDT Validity: Qualitative Analysis of Themes

**PUDT-W:**

**PUDT-R:** ADD: deep red, dark skin, warmth/temperature?

**PUDT-P:** EDIT: Bruising ADD: dark purple, deep red

**PUDT-C:** OMIT: too much one item ADD: needs more description/detail ??: confusing

**PUDT-D:** EDIT: distinguish purple, OMIT: remove dark skin, ADD: more description/all skin

**PUDT-BS:** EDIT: change BS, OMIT: remove not over bony ADD: clarify blister terms ??: concerns related to MASD

**PUDT-BS:** EDIT: separate blood/serum? ADD: needs more description/clarity ??: r/o pressure component

**PUDT-SU:** EDIT: define PT/layers, OMIT: depth of skin involve, delete superficial, ADD: tissue description

**PUDT-DU:** EDIT: quantify deep, expand description (granulation, necrotic), OMIT: delete granulation tissue, ADD: deeper structures, necrotic tissue explanation,

**PUDT-NU:** EDIT: Delete fibrin/slough terms
PUDT: Next Steps

1. Validity Testing
   - First pass: 85% of respondents minor or no changes
   - Second pass: 90% no changes
   - Wording finalized

2. Reliability Testing
   - Finalize best pictures to use
   - Design protocol to use tool in variety clinical settings with variety different clinicians

3. Present to CMS

Stakeholders in Changing the PrU Paradigm
Staging Guidelines, Consensus Panels, and Pathophysiologic Models: Historical Context and Notable Changes

Thomas P. Stewart, PhD
- SUNY at Buffalo;

Lisa Corbett, DNP, APRN, CWOCN
- Hartford Healthcare, Hartford, CT

Nancy Overstreet, DNP, GNP-BC, CWOCN, CDP
- Lynchburg College, Lynchburg, VA
- AMDA

1. Validity of present staging system, pathophysiological models, and assessment tools.

2. Longstanding inconsistencies exist in PrU risk assessment, staging definitions, classifications for adverse event reporting, and definitions for quality metrics across health care settings

3. These contradictions place a daily burden on clinical resources in health care organizations and have not significantly advanced the mission of improved patient safety.

4. Unclear how recent changes in pressure ulcer staging will cascade to provide clarity or what alternative approaches can improve this gap.
Mechanisms of Pressure Induced Tissue Damage: Historical Approach

Ruth Bryant PhD, RN, CWOCN

- Histopathological process?
- Cone shaped pressure gradients at the bone/soft tissue interface?
- Is the epidermal or shallow dermal ulcer a different co-occurring condition?
- Model needed to convey the series of events associated with pressure induced tissue damage:
  - Vessel occlusion
  - Thrombosis
  - Tissue hypoxia/ischemia
  - Metabolic accumulation of wastes
  - Interstitial fluid accumulation
  - Reperfusion injury

At the skin
- Visible tissue changes e.g., rubor
- Epidermal tissue rupture e.g., Stage II-IV PU
- Tactile tissue changes e.g., calor, tumor

Subepidermal tissue damage
- Hypoxia
- Vascular permeability
- Apoptosis/necrosis

Interstitial fluid accumulation

Below the skin surface
- Oxidative Stress
- Nutrient depletion
- Ischemia
- Lymphatic dysfunction

Mechanical loading and tissue compression

Manifestation threshold

Window of prevention

Damage threshold

Nutrient depletion

Inflammatory Processes
- Toxic metabolites

Reperfusion injury

Deformation
Focusing PU Prevention Research on Informing Clinical Interventions

Stephen Sprigle, PhD, PT
Rehabilitation Engineering and Applied Research Lab
Georgia Institute Of Technology

1. Individualized PU risk can be defined as a person's Biomechanical risk
   ◦ The characteristic of an individual's soft tissue to deform in response to external forces
   ◦ Hypothesis: A person with greater biomechanical risk is more vulnerable to PrUs

2. Advocate for prevention research: The imbalance between prevention and treatment is embarrassing

3. PrUs, by definition, are caused by external forces. Thus research should seek an understanding of external forces as a means to ameliorate their effects within clinical interventions.

4. Focus on individual difference of external force effects

5. Develop and deploy sensors.

6. Providers and payers need to take the lead to work together to extend the state of the science.

Amit Gefen, Ph.D.
Professor of Biomedical Engineering
The Herbert J. Berman Chair in Vascular Bioengineering
Department of Biomedical Engineering
Faculty of Engineering
Tel Aviv University

Sustained deformation lethal to tissues

The skeleton of the cell (cytoskeleton) breaks down

Deformation is a cell killer!

Weihs and Gefen, Medical Engineering & Physics 2016
Direct deformation damage onsets faster than damage due to an ischemic insult

**Ischemia**
- Impaired perfusion
- Reduction in oxygen
- Change in metabolism
- Accumulation of waste products
- Decrease in pH
- Cell death

**Deformation**
- Deformation of cells
- Disruption of the cytoskeleton
- Cell membrane failure
- Cell permeability increases
- Loss of homeostasis
- Cell death

**Deformation is a cell killer**

**Tissue Biomarkers: Pressure Mapping Not Enough**

Kath Bogie, PhD  
Case Western Reserve University  
Cleveland, OH

- Muscle quality, specifically fat infiltration, impacts local tissue quality and resilience
- Muscle composition impacted skin blood flow component with significant correlations with gluteal intramuscular fat

**Pressure**  
**Time**  
**Muscle quality**  
A Missing Key Factor?
Biomechanics and Age: Inflammasome Role

Stojadinovic Olivera, MD
Department of Dermatology & Cutaneous Surgery
University of Miami Miller School of Medicine
Jackson Memorial Hospital

- Focal disruptions along basement membrane in elderly skin together with change in orientation of collagen fibers may identify initial changes that lead to development of pressure ulcers in elderly population.
- Inflammasome is multiprotein complex
  - Expressed in keratinocytes
  - Component of Innate immune system
  - Responsible for activation of inflammatory processes \(\rightarrow\) IL1
  - IL1 suppressed in aged and loaded skin
- Inflammasome components are suppressed in elderly indicating greater risk for PrUs

Quality Metrics

Matt Scanlon MD, CPPS
Professor of Pediatrics, Critical Care
Medical College of Wisconsin

Indicators (gas tank or oil level) VS Measures (thermometer)

Accuracy of coding: 97 per Nursing Documentation \(\rightarrow\) 6 MS documented \(\rightarrow\) 10 with ICD 9 codes

Rate of coding Stage 2 or higher:
- Administrative data: 0.15%
- Surveillance data: 2%

- Although these quality metrics may be useful, they lack validity, and more data analysis is needed to define which factors are truly related to nursing quality
- The comparative analysis of quality metrics should be used to drive future policy in the identification and prevention of PrU in all settings
Typical Healthcare Safety Approach

Identify Harm (or errors) ➔ Retrospective Investigation ➔ Report # Bad Things

# of bad things
# of patient days

Matt Scanlon MD, CPPS
Professor of Pediatrics, Critical Care
Medical College of Wisconsin

Typical Non-Healthcare Safety Approach

Identify Hazards ➔ Eliminate Hazards/Mitigate Harm ➔ Report # Successes

# of eliminated hazards
# of identified hazards

Matt Scanlon MD, CPPS
Professor of Pediatrics, Critical Care
Medical College of Wisconsin
Pressure Ulcers are Nursing Sensitive Indicator

Health care is a team sport and pressure ulcer prevention is a team responsibility!

Vasopressors
Mobility orders
Nutrition orders
Cooling Blankets
Braces
Oxygen

Do Nurses order these or the Provider?

Matt Scanlon MD, CPPS
Professor of Pediatrics, Critical Care
Medical College of Wisconsin
<table>
<thead>
<tr>
<th>Safety Issue</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>IF this patient has decreased mobility from baseline, an expected length of stay &gt; 24 hours, and TWO additional risk factors then she is considered HIGH RISK for VTE (venous thromboembolism) and prophylaxis is recommended. Hyperlink to VTE additional risk factors: <strong>Risk Factors</strong>&lt;br&gt;<strong>Venous Thrombus Embolism</strong>&lt;br&gt;<strong>Pressure Ulcer Screening</strong> Risk&lt;br&gt;<strong>Factors</strong>&lt;br&gt;<strong>Nutrition</strong> [(CHW PRESSURE ULCER PICK LIST: 30428206)](CHW PRESSURE ULCER PICK LIST: 30428206) [(CHW CC Tube Feed Assessment: 23014)](CHW CC Tube Feed Assessment: 23014)</td>
<td></td>
</tr>
</tbody>
</table>

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**Braden Q < 16**

**Patient on pressors/inotropes**

**Cooling mattress in use**

**Cervical collar in place**

**Patient with significant movement disorder**

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**Matt Scanlon MD, CPPS**
Professor of Pediatrics, Critical Care
Medical College of Wisconsin
“Not everything that counts can be counted, and not everything that can be counted counts.”

William Bruce Cameron

“Because measurement without improvement is just harassment”

W. Edwards Deming

Matt Scanlon MD, CPPS
Professor of Pediatrics, Critical Care
Medical College of Wisconsin

Early Detection: DTI
Richard Simman, MD, FACS, FACCWS

Technology: Long-Wave Infrared Thermography

**Easy to Use**
- Handheld, lightweight and ergonomic
- Non-radiating and non-contacting
- Can scan multiple areas/wounds in ~5 minutes

**Observe & Evaluate the Invisible**
- Reveals pathologic markers invisible to naked eye
- Objectively visualize & quantitatively measure circulation, perfusion, and metabolic activity

**The Benefits**
- Assess signs/symptoms of DTI and infection
- Assess wound healing/response to treatment
- Assess amputation levels
- Others

Non-visible signs/symptoms of DTI (Ischemic response)
Non-visible signs/symptoms of DTI (Inflammatory response)
REMINDER: Definitions of Deep Tissue Injury (DTI)

According to NPUAP (abv.):
Intact or non-intact skin with localized area of persistent non-blanchable deep red, maroon, purple discoloration or epidermal separation revealing a dark wound bed or blood filled blister.

Pain and temperature change often precede skin color changes.

According to CMS (abv.):
Localized area of discolored intact skin. Area of discoloration may be preceded by tissue that is painful, firm, mushy, boggy, or...

...warmer or cooler as compared to adjacent tissue.

**KEY LANGUAGE:**
a sign/symptom that precedes visual recognition

Richard Simman, MD, FACS, FACCWS

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Early Detection:

Recall the Paradigm of Pressure Induced Tissue Damage

How Can We Detect the Damage occurring before we can see it a the skin level?
The cascade from microscopic to macroscopic edema

Sub-epidermal moisture (SEM), which cannot be detected through visual skin assessment, is the early sign of macroscopic edema.

Localized edema onsets at sites of cell breakdown and then evolves.

Pending FDA decision, not for sale in the US.

THE WORD “INJURY”

NORRIS CUNNINGHAM, ESQ.
KATZ KORIN CUNNINGHAM, PC
INDIANAPOLIS, INDIANA

Injury is not just a medical term. It is also a legal term used in and defined by Jury Instructions.

The harmful connotation is compounded when used in conjunction with the term “Never Event.”

May imply “harm” and/or abuse:
- Many cases involving pressure wounds also include claims of elder abuse and neglect.

Not the same as Traumatic Brain Injury or Spinal Cord Injury:
- These injuries rarely, if ever, occur while in the care of a healthcare provider while pressure wounds routinely do.
Summary Key Points

1. Tissue and cellular deformation matter—system physiology can not be ignored.

2. Human physiology is based on a hierarchy of micro-and macroscopic systems that are all acting at different time scales. Thus, one cannot extrapolate phenomena happening in a patient from what is observed in cellular systems.

3. It is likely that existing definitions and categorizations for PrU do not account for what is happening below the skin. Simply observing the skin might not be enough. Tools are in development.

4. More collaborative work and discussions are needed!

Save the Date!

Pre-Conference February 7th
Building a PrU Prevention Program

The Westin Atlanta Airport
4736 Best Road, Atlanta GA
Thank you!

Ruth Bryant PhD, RN, CWOCN
ruth.bryant@allina.com