**NPUAP Mission**

The National Pressure Ulcer Advisory Panel (NPUAP) serves as the authoritative voice for improved patient outcomes in pressure ulcer prevention and treatment through public policy, education and research.

**International Guideline**

NPUAP – in collaboration with the European Pressure Ulcer Advisory Panel (EPUAP) and the Pan Pacific Pressure Injury Alliance (PPPIA) – has worked to develop a NEW pressure ulcer prevention and treatment Clinical Practice Guideline and a companion Quick Reference Guide.

Purchase your copy today at www.npuap.org
NPUAP Monograph

Released in November 2012, the 254-page, 24 chapter monograph, Pressure Ulcers: Prevalence, Incidence and Implications for the Future was authored by 27 experts from NPUAP and invited authorities and edited by NPUAP Alumna Dr. Barbara Pieper.

The monograph focuses on pressure ulcer rates from all clinical settings and populations; rates in special populations; a review of pressure ulcer prevention programs; and a discussion of the state of pressure ulcers in America over the last decade.

Purchase the monograph today at www.npuap.org
- Hard Copy $75
- E-version $49
- Individual Chapters $19

©2015 National Pressure Ulcer Advisory Panel | www.npuap.org

Save the date

NPUAP Live Webinar!

Thursday, August 13, 2015
1:00 PM ET

Operating Room Ulcer: Who is at Risk: Can they be Prevented?

Debra Fawcett, PhD, RN
Susan Scott, MSN, RN, WOCN
Save the date

2016 APRIL 8–9
STAGING CONSENSUS CONFERENCE

NPUAP

CHICAGO
Hilton Rosemont/Chicago O’Hare Hotel

©2015 National Pressure Ulcer Advisory Panel | www.npuap.org

Save the date! SHY TUNED AT www.npuap.org

5TH CONGRESS
WORLD UNION OF WOUND HEALING SOCIETIES

WUWHS 2016
FLORENCE
ITALY
25 – 29 September

One Vision, One Mission

www.wuwhs2016.com
Faculty Disclosures

Dr. Kalowes does not have any conflicts to disclose.

Dr. Joyce Black is on the speakers bureau for Molnlycke Healthcare and Salter Labs.
Learning Objectives

1. Discuss current literature on Medical Device Related Pressure Ulcers (MDR PrUs).
2. Assess the factors that may lead to Device–related pressure ulcers.
3. Examine one hospital’s intentional focus on prevention of PrUs with a focus on MDRPrUs, resulting in an Evidence Based PrU Prevention Model & implementation strategies based on current science.
4. Select EB Treatment modalities based on patient cases that may best prevent MDR PrUs.

MDR Pressure Ulcer

- Localized injury to the skin or underlying tissue as a result of sustained pressure from a device (Black, 2010)
  - Tissue injury usually mimics the shape of the device
  - Tend to progress rapidly due to lack of adipose tissue
Background

- Described over 40 years ago
  - “Bedsore of the ear”
- As traditional ulcer rates have decreased
  - MDR PrU appear more prevalent
- May be more difficult to treat because device cannot always be moved or removed
- Devices are often rigid, elastic or secured with tight dressings
- Microclimate (heat and humidity of the skin also contributes
- Edema of tissue creates more pressure
- Inappropriate size and selection of product

Significance

- Incidence
  - Neck collars in place (Davis, 1995)
    - 5 days = 33% ulcer rate
    - Over 5 days = 44% with ½ full thickness wounds
  - Oximetry probes
    - 5%, most common in patients on vasopressors
  - Minnesota statewide reporting system
    - Nearly 1.3 of serious PrU were MDR (Apold, 2012)

- Seriousness
  - 74% of MDRPrU were not identified until they were a stage III, IV or unstageable
  - 63% of cases had no documentation of
    - Skin inspection
    - Device removal q shift
    - Pressure relief
  (Apold and Rydrych, 2012)
The first study

- 2079 patients in critical care, step down on general care units (Black, et al, 2010)
- Secondary analysis of 8 quarterly incidence studies
  - Overall PrU rate was 5.4%
    - 83 patients had 113 PrU
    - 34.5% were from medical devices
  - Depth of injury
    - 35% stage I – 32% stage II – 3% stage III
    - 24% unstageable – 6% DTI
  - Patients with medical device PrU were 2.4 times more likely to develop a PrU

Location, location, location

Distribution by Anatomic Sites

- Ears 23 (35%)
- Nose 3 (5%)
- Mouth/lips 2 (3%)
- Ribs 1 (1.5%)
- Arm 1 (1.5%)
- Thigh 3 (5%)
- Knee 3 (5%)
- Lower Leg 7 (11%)
- Ankle 3 (5%)
- Foot 3 (5%)
- Occiput 1 (1.5%)
- Buttock 2 (3%)
- Sacrum/Coccyx 2 (3%)
- Thigh 3 (5%)
- Knee 3 (5%)
- Lower Leg 7 (11%)
- Ankle 3 (5%)
- Foot 3 (5%)
- Heel 5 (8%)
- Toe 4 (6%)
Scope of the problem

- 3 LTACs prevalence
  - Data collected over 11 months
  - N = 304 HAPU
    - 44% were MDR PrU
    - 14% were stage I
    - 50% were stage II
    - 36% were stage III
  - Data from Long, 2011

<table>
<thead>
<tr>
<th>Type of Device</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heel/leg boots/braces/splints</td>
<td>26.6</td>
</tr>
<tr>
<td>O2 delivery</td>
<td>14.7</td>
</tr>
<tr>
<td>Tubing (urine/fecal)</td>
<td>14.7</td>
</tr>
<tr>
<td>PEG flange</td>
<td>5.6</td>
</tr>
<tr>
<td>Other</td>
<td>38.5</td>
</tr>
</tbody>
</table>

Extent of the problem

<table>
<thead>
<tr>
<th>Location</th>
<th>Device</th>
<th>Non Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head/face/neck</td>
<td>70.3%</td>
<td>7.8%</td>
</tr>
<tr>
<td>Other/multiple</td>
<td>21.9%</td>
<td>5.8%</td>
</tr>
<tr>
<td>Heel/ankle/foot</td>
<td>20.3%</td>
<td>16.9%</td>
</tr>
<tr>
<td>Coccyx/buttocks</td>
<td>7.8%</td>
<td>67.5%</td>
</tr>
<tr>
<td>Sacrum</td>
<td>1.6%</td>
<td>16.9%</td>
</tr>
</tbody>
</table>

Data from Apold and Rydrych, 2012
A closer look at MDR PrU

- **O2 delivery devices**
  - Trach collar/straps
  - BiPap/CPAP
  - Nasal cannula
  - ET tubes
- **Incidence 17–97%**
  - NIPPV major device
- **Issues**
  - Facial contour varied
  - Urgency to place
  - Need for tight seal

Locations and Devices

- **Incidence up to 70%**
- **Monitoring devices taped or strapped to the skin**
  - Neck collars
  - Pulse oximetry
  - Arterial lines
  - Wrist splint
Locations and devices

- Incidence up to 27%
- General care items
  - NG tubes
  - Bed trash
  - Suture
  - Bedpans

Elastic stockings

- Incidence up to 21%
- Elastic devices can impair blood flow to the legs, especially in patients with arterial disease
  - “TED sores”?
  - Ulcers on shin, toes, calf
Ulcers from Medical Devices

- The *leading cause* of pressure injury in children
  - Device applied prior to fluid resuscitation
    - When edema develops device is too tight
  - Device is taped down too securely
    - Leads to burn-like presentation
  - NIPPV incidence = 13% with 6% having necrosis of columella (Jatana, 2010)

MDRPrU in Bariatric Patients

- Many medical devices are not designed for bariatric patients
  - They are too small, too short, too narrow
  - What is our role here?

- Skin folds may obscure medical devices
Best practices to prevention device related ulcers

- What is a “medical device”?
- Fit the device to the patient
  - Measure TEDs
  - Use proper sized boots
- Pretreat the skin with foam dressings
- **Remove or move daily to see the skin**
- Be aware of edema
- Devices can be “lost” in bariatric patient skin folds

Guideline on MDR

- Consider using a prophylactic dressing for preventing medical device related pressure ulcers. (SoE B; SoR)
  - Evidence
    - Soft silicone reduced trach site ulcers (Kuo, 2012)
      - N = 134 children
    - Foam reduced sore heels in casted limb (Forni, 2011)
      - N = 156
    - Gel sheeting reduced nasal ulcers in CPAP (Chidini, 2010)
      - N = 187
    - Hydrocolloid reduced nasal ulcers in NIV mask (Weng, 2008)
      - Time to ulcerate was less in group with dressings
**Inspect the skin beneath medical devices according to institutional policy or standards of care (SOE=C)**

- Incidence of pressure ulcers in patients with medical devices
  - 35%–96% in adults, 50% in children

**Consider the use of dressings that demonstrate pressure redistribution for body areas in contact with medical devices (SOE = B)**

- Dressings shown to reduce ulcer incidence
  - Tracheostomy 8.1% to 3.4% (Boesch, 2012)
  - Oxygen tubing 37% to 0% (Turgania, 2011)
  - NIPPV (Weng, 2012)
    - Film dressing 53.3%
    - Hydrocolloid 40%
    - No dressing 96.7%
In addition to dressings applied beneath medical devices, continue to lift and/or move the medical device to examine the skin beneath it and reposition for pressure relief. (SOE= C)

- Skin inspection should be on each nursing shift (tour)

Elastic compression stocking rolled down behind the knee

Reducing MDRs– Trach collar/straps

- 66.7% of ulcers in skilled care were due to trach ties (Jaul, 2011)

Issues
  - Airway is #1
  - Face plate often sutured in place
  - Trach ties often tied tightly to secure trach tube
  - Ties lost in obese skin folds
  - Proxemics to major vessels can create fatal erosion
Trach collar pressure ulcers

- **Prevention**
  - Work with MDs who place the trachs
    - Can sutures come out after 5 days?
  - Work with RT
    - Frequency of securement device changes
    - Change ties with trach care
  - Nursing
    - Use thicker, wider foam collar straps to pad skin
    - Pad skin around stoma
    - Check for ulcers beneath straps on each shift
    - Look closely at securements in neck folds
    - Find ties and move them daily
    - Line entire neck with dressings
      - Silver dressings reduced ulcers and peristomal skin injury (Kuo, 2013)

CPAP–BiPap Facial Ulcers

- **Issues**
  - Develop quickly due to thin tissue
  - Device applied tightly to maintain O2 sats
- **Prevention**
  - Work with RT to apply dressing prior to O2
  - Line nasal bridge and cheeks with foam dressings before placement
  - Switch to total face mask before 12 hours (Lemyze, 2013)
Oral Mucosal Pressure Ulcers

- **Issues**
  - Airway is priority #1
  - Severity underappreciated
    - May not be seen as serious since scar seldom develops

- **Prevention**
  - Rotate device
    - RT to help with ET tubes
    - Move with each position change
      - Check length before securing
  - Use securement devices that can be loosened

- Incidence up to 37%

Oxygen Tubing Ulcers

- Incidence up to 37%

- **Issues**
  - O2 by NC tends to move out of nares
  - Causes tightening of device

- **Prevention**
  - Inspect skin on each shift
  - Educate patient to report discomfort
  - Pad high risk areas
    - Bundle device to O2 tubing
  - Use silicone O2 tubing
Pulse oximetry

- Issues
  - Pressure is intense (Goodell, 2012)
  - Softer devices do not register in ICU patients with poor flow
  - Appear like a burn, so may not be identified as a pressure ulcer

- Prevention
  - Move device each time patient moves in bed
  - Is this a manufacturing issue?

Arterial line tubing

- Issues
  - Device often placed while patient is "dry"
  - During edema from fluid resuscitation, securement and line become tight

- Check for placement and tightness every shift
- Loosen and re-tape tight lines
**Elastic stockings**

- **Issues**
  - Should not be used on patients with PVD!
  - Fitted without measurement
  - Fitted while patient is dry, become tight with edema

- **Prevention**
  - Measure first
  - Remove daily—twice daily to inspect skin
    - Especial thighs

**Cervical collars**

- **Incidence** (Davis, 1995)
  - Days 0–4 = 33%
  - Days over 5 = 55%

- **Found on**
  - Occiput, face, chin, chest

- **Prevention**
  - Change to soft collar
  - Ensure collar fit
  - Assess skin (remove device)
  - Pad occiput
    - 89% reduction in PrU (Jacobson, 2008)
  - Change pads
NG tube ulcers

- **Prevention**
  - Change to soft feeding tubes when able
  - Securement to be free floating in nare
  - Move tube when head turned to the side
  - Check placement of NG daily

Genital MDR PrU

- **Issues**
  - tubing too short to reach side of bed
- **Prevention**
  - Use indwelling for urinary monitoring only
  - Intermittent cath preferred
  - Check location of tubing with each reposition
    - Leave slack in tubing
  - Tape Foley to lower abdomen in males
    - Prevents penile shaft tears
The role of manufacturing

- Do we tell the product manufacturer of the issue with MDR PrU?
- My experiences have been both positive and negative
One Hospital’s Journey to Prevent Medical Device Related Pressure Ulcers
Opportunities and Successes

Reducing Medical Device Related Pressure Ulcers: An Interprofessional Approach Using Data and Innovation to Improve Adult/Pediatric Outcomes

Peggy Kalowes RN, PhD, CNS, FAHA
Director, Nursing Research and Innovation
Raquel Paige MSN, CNS, CPN, CRRN
Valerie Messina RN, BSN, CWCN
BACKGROUND

- NPUAP recognizes that PrUs can occur on any tissue under pressure, including beneath MD used for diagnostic/therapeutic purposes.\(^1\)
- Past two years our hospital has reduced our incidence of PrUs (sacral, coccyx, heel) from 5.9 to ‘zero to 0.1%’ using an Evidence Based (EB) Skin Bundle and a 5-Layered Border\(^*\) Sacrum Dressing(s)—thus MDR PrUs significance became much more transparent.

PROBLEM:

- In 2012–13, we examined our CALNOC (Collaborative Alliance for Nursing Outcomes) nursing data, and noted a surge of MDR PUs >benchmark in Pediatrics/Adult units.

<table>
<thead>
<tr>
<th>Devices</th>
<th># of Patients</th>
<th>Devices</th>
<th># of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>NG tube</td>
<td>3</td>
<td>Chest tube</td>
<td>1</td>
</tr>
<tr>
<td>Collar</td>
<td>3</td>
<td>Abdominal binder</td>
<td>1</td>
</tr>
<tr>
<td>Cast</td>
<td>2</td>
<td>Splint</td>
<td>1</td>
</tr>
<tr>
<td>IV hub /tubing</td>
<td>2</td>
<td>Endotracheal tube</td>
<td>1</td>
</tr>
<tr>
<td>NIVM</td>
<td>2</td>
<td>Tracheostomy tube</td>
<td>1</td>
</tr>
<tr>
<td>Orthotic</td>
<td>2</td>
<td>EKG cable</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ECMO</td>
<td>1</td>
</tr>
</tbody>
</table>

Molyneux Health Care\(^*\)

DRILL DOWN ON WHY MDR-PrUs

- As our organizational “Traditional Pressure Ulcer” rates decreased MDR PrUs became much more apparent
- We discovered MDRPrUs often were misidentified
- Not typically tracked, trended and reported (now required to report by CALNOC)
- MDR PrUs often more complicated than preventing usual PUs as the device may be an essential diagnostic/therapeutic component of treatment
- Although most are avoidable, not all are
**Plan, Do, Study, Act (PDSA Cycle)**

**Call To Action**

**PLAN-using PDSA**
- Develop an actionable plan to sustain improvement – using **Plan** (change) **Do** (change) **Study** (analyze results) **Act** (results–next steps)–

**Objective**
- Establish an interprofessional team (Peds CNS; Director of Nursing Research, RNs, MDs, PT and Wound Program Director) to design a performance improvement (PI) process to examine our on–going rate of MDRPrUs in peds/adult patients and develop Actionable Plan

**DO – Initial small tests of change**

- **Widespread testing** (immediately deployed bordered silicone foam beneath all tracheostomy plates and other respiratory devices, particularly in NICU/PEDS.

- **Began work to re-conceptualize our Pressure Ulcer Prevention Program** to have a more Comprehensive Assessment & Preventive approach for MDR PrUs.
STUDY: Root Cause Analysis (RCA)

- Interprofessional Team examined all 21 MDR PUs occurring in FY-12-13 (reviewed stage, location, device involved, and compliance with our SKIN Bundle).
  - NPUAP Pressure Ulcer Root Cause Analysis (RCA) Template Available

- Identified most common Medical Devices used, and created a Clinical Guide for easy identification,

- Reviewed the literature, developed a ‘Prevention Model’ in late 2013, to include MDR PrU elements on the Bundle with EB interventions, including frequent skin/device assessments, moisture-reducing device interface and pressure-free device interface with bordered silicone foam dressings

- Revised Skin Assessment Policy & Procedure and Re-examined our SKIN Bundle

Types of Medical Devices Used For Therapeutic Care: A Clinical Guide

MEDICAL DEVICES RELATED TO PRESSURE ULCER (Know Risks)

Check for potential skin breakdown under areas with the following devices:
- Arterial lines and securement devices
- Central venous & dialysis catheters
- Compression leg devices/stockings
- Drain Devices (any type)
- GI / GU Devices
- Intra-aortic balloon pumps
- Line device (tubing, or any securement device of any kind)
- Monitoring devices
- Oxygen Delivery Devices
- Orthopedic / Neuro Device
- Soft restraints (ankle/wrist)
- Velcro straps

Oxygen Delivery Type
- BIPAP
- CPAP
- Endotracheal tube
- Face mask
- Nasal cannula
- Trach plate
- O2 tubing/nasal cannula

GI/GU Devices
- Abdominal Binder
- Fecal tube/pouch
- G or J Tube
- NC Tube
- Ostomy equipment
- PEG tube
- Urinary catheter

Monitoring Equipment
- Blood Pressure Cuffs
- Electrodes
- Pulse Oximeter
- ICP Catheters

Orthopedic / Neuro Devices
- Any splints for immobilization
- Brace
- Cervical collars
- Orthotic foot splints
- External Fixation
- Halos

Protect Your Patient’s SKIN
Pressure Ulcer Prevention

**SKIN** Bundle

**Surface:** Specialty Mattress; Z-flo, Waffle cushion

**Keep Turning:** Offload heels
Apply Border Silicone Dressing to sacrum / or other pressure points

**Incontinence:** Perineal care every two hours
Moisture barrier; Avoid diapers except for excessive stool, urine

**Nutrition:** Dietary consult for nutritional deficits;
Carry out orders

**TISSUE INJURY MORE THAN SKIN DEEP**

ACT (Results)
- Pressure Ulcer Prevention Model® was fully launched at end of 2013 – January of 2014. We’ve closely tracked incidence and prevalence (CALNOC data); along with compliance with the Prevention Model® Interventions, including MDR PrUs; and SKIN bundle for past 6-Qs.
- There was an outright reduction of MDR PUs from 0.06% incidence of stage 3+ MDR HAPU’s per 1,000 patient days to “zero” in pediatrics (benchmark 0.0 – 0.04%).
- Among adults from 0.28% incidence to “zero” with (benchmark 0.05–0.09 %,) after ‘Prevention Model’ with EB Bundle strategies.

Where Are We Today?
- Since implementation of the PU/MDR prevention program, we have sustained a ‘zero zone’ incidence among adults and pediatric patients. We have had a few MDR PrUs pop up on occasionally, especially in pediatrics, in our past two quarters (4th Q 2014–1st Q15).

STRATEGIES FOR PREVENTION:
Skin Surveillance Team
- Our Hospital developed an interdisciplinary “Skin Surveillance Team” that reviews and discusses patients that are at high risk for skin breakdown. Rounding occurs every Tuesday/Thursday’s in Pediatrics; and Monday’s/Thursdays in Adult ICUs.
- Patient and family education is also provided at this time about preventative measures to protect the skin during the hospitalization and at home
- Team Members: WOCN, CNS, Clinical Educator, Wound Care Champions (RNs), PT, Dietitian, Specialty bed representative
**Patient Selection Criteria for Skin Surveillance (SS) Rounds**

- Patients with a Braden score of \( \leq 18 \) / Braden Q score \( \leq 16 \)
- Patients with an existing pressure ulcer or wound
- Patients who are on a specialty support surface due to immobility
- Patients with multiple medical devices
- Patients with moisture related skin damage
- Patients with nutritional deficits

**What Occurs During SS Rounds?**

- Team inspects patient’s skin on bony prominences with the primary RN (including the removal of devices, if appropriate)
- Assists primary RN with repositioning patient or with diaper changes to monitor any signs of moisture related skin damage
- Starts/discontinues use of specialty support surfaces
- **Evaluates accuracy of SKIN bundle documentation**
- Consults with nutrition for wound healing vitamins and to ensure patient is on adequate nutrition therapy
**ANOTHER INNOVATION**
**DESIGNED A PATIENT/FAMILY PRESSURE ULCER PREVENTION TOOLKIT**

- **Specialized Bag with:**
  - Patient/Family Education Booklet on “Prevention Guidelines on Protecting Skin for Adults/Peds”
  - Skin care products
  - Samples of our various Silicone Border Dressings used under devices are provided. We also educate on how to partially lift dressing to check skin.
  - Clock to keep track of turning schedule

- Toolkit Bag Trial to 250 Adults/250 Pediatric Families (N=500) (Spanish and English) in-progress.

**Effectiveness of Toolkit:** Currently trialing the Toolkit to high-risk patients discharged from a 30-bed Acute In-Patient Rehab and a 75-Bed (Med/Surg; Diabetes / Respiratory Units) and our General Pediatrics unit.

After distribution of the bags we follow-up by telephone and conduct a Post-Discharge Satisfaction Survey (30-Days); Outcomes we are tracking are 30-Day Re-Admissions; development of Pressure Ulcers at admission. Data is pending.
Evidence-Based Prevention of Medical Device Pressure Ulcers
It takes a Team Effort

Best Practices for Prevention of Medical Device-Related Pressure Ulcers

- Choose the correct size of medical device(s) to fit the individual
- Cushion and protect the skin with dressings in high risk areas (e.g., nasal bridge)
- Remove or move the device daily to reassess skin
- Avoid placement of device(s) over sites of prior, or existing pressure ulceration
- Educate staff on correct use of devices and prevention of skin breakdowns
- Be aware of edema under device(s) and potential for skin breakdown
- Confirm that devices are not placed directly under an individual who is bedridden or immobile

Used with Permission from NPUAP, 2015
Nurse executives /managers; APRNs are leading the way.

- **TEAMWORK** - House wide Interprofessional PrU Prevention team;
  - Dashboards / Visibility boards displaying data


- Quarterly house-wide PrU prevalence study, focus on MDR PrU prevention.
- Use and audit EMR for adherence to SKIN Care BUNDLE
- Skin Surveillance rounds/Daily Care Briefing Huddles All units; Skin champions.
- Application of Prophylactic Dressings per protocol for cushioning beneath devices and to prevent other PrUs.

- **Hourly Intentional Rounding (patient/family education)**
References


CEU Information

To earn the 1.0 continuing education credit from today's webinar please visit the link below.
This information will also be emailed out to participants at the conclusion of the webinar.

https://blueq.co1.qualtrics.com/SE/?SID=SV_bPMXKaFuuXAsBljL