Putting Pieces of the Puzzle Together: Comprehensive Solutions for Pressure Injury Prevention, Mobility and SPH

President WFCCN

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ADVANCING NURSING THROUGH KNOWLEDGE & INNOVATION

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Disclosures

- Consultant-Michigan Hospital Association Keystone Center
- Subject matter expert CAUTI, CLABSI, HAPI, Safety culture
- Consultant and speaker bureau
  - Stryker's Sage business
  - Baxter healthcare
  - Potrero Medical

Objective

- Discuss transforming a culture that creates safety for the patient and staff while achieving evidence-based outcomes
- Outline evidence-based prevention strategies for mobility while protecting the patient's skin and providing safe handling
- Describe key care process changes that lead to a successful reduction of skin injury, improved mobility and prevent healthcare worker injury

Changing Culture-Critical to Success

“Culture does not change because we desire to change it. Culture changes when the organization is transformed; the culture reflects the realities of people working together every day."

Frances Hesselbein

Hesselbein, F. Leader to Leader, 1999: 1-7.

Culture of Safety

Fall Reduction Program

- Safety is avoiding both short- and long-term harm to people resulting from unsafe acts and preventable adverse events.[1]
- Current infrastructure “silos” safety programs, creating one for patients, another for workers, and yet another for others who may be at risk . (Quality department, Risk Management, Employee Health, SPH)[1,2]
- High Reliability: consistent performance at high levels of safety over long periods of time[3]
  - Possess collective mindfulness
  - Eliminate deficiencies in safety processes through the use of powerful tools to improve their processes
  - Create an organizational culture that focuses on safety, in which they remain constantly aware of the possibility of failure

Safe Patient Handling Program

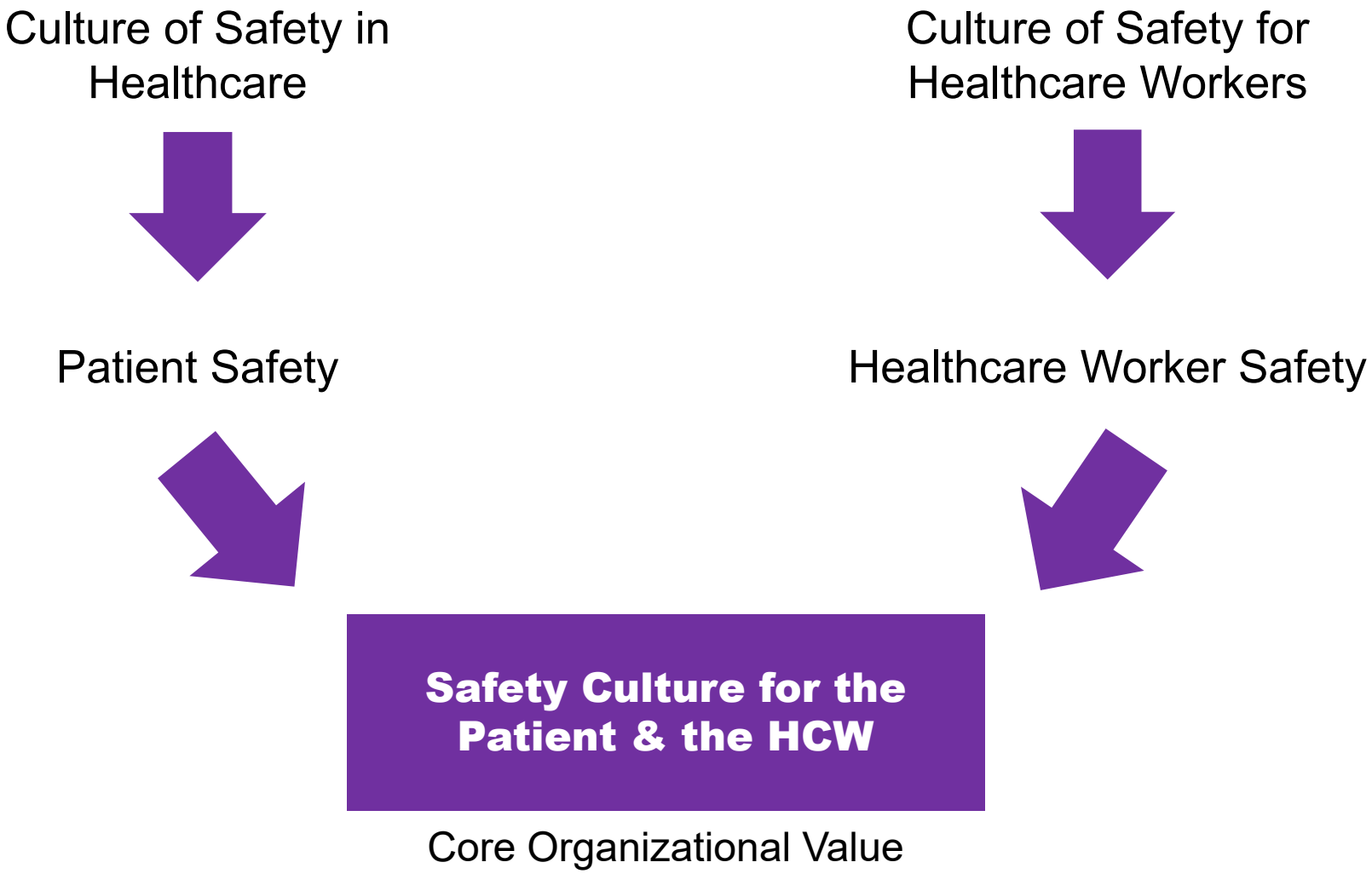
Early Mobility Program

Pressure Injury Prevention Program

1. The Joint Commission. Improving Patient and Worker Safety: Opportunities for Synergy, Collaboration and Innovation. Oakbrook Terrace, IL: Nov 2012. http://www.jointcommission.org/.
2. Black JM, et al. *Crit Care Nurs Q*. 2018;41(3):226-239
3. Chassin MR, et al. Health Affairs, 2011;30(4):559-568

What Does it Mean to be in a Safe Culture for You & Your Patient?

Changing the Paradigm

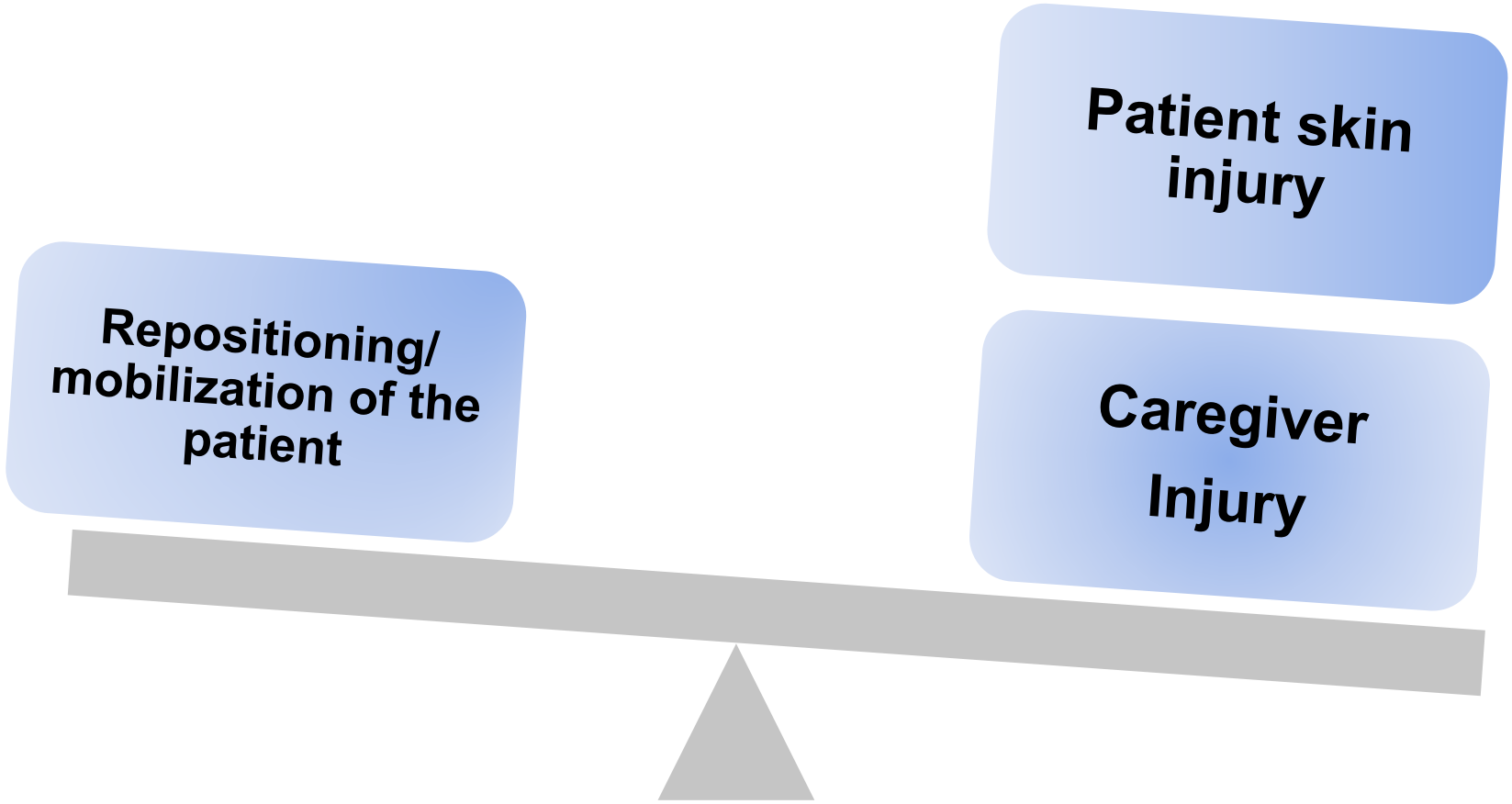


The Goal: Patient & Caregiver Safety

Black J, et al. Crit Care Nurs Q. 2018;41(3):226-239.

How well are we doing?

The Goal: Patient & Caregiver Safety



Facing the Facts about Mobility

- Mobility interventions are regularly missed
  - Nursing perceptions
    - Lack of time
    - Ease of omission
    - Belief it is PTs responsibility
  - Survey results
    - Concern for patients' level of weakness, pain and fatigue
    - Presence of devices – IVs and urinary catheters
    - Lack of staff to assist

Doherty-King, B et al. Gerontologist. 2011 Dec:51(6): 786-97

How Well Are We doing?

- Average ICU patients spends how much time in bed?

  99% - 100%

- Average medical-surgical patient spends how much time sitting or in bed?

  87% - 100%

Fazio S, et al. Applied Nursing Research. 2020;51

Cumulative Impact on Quality of Life

- "New Walking Dependence" occurs in 16-59% in older hospitalized patients[1]
- 65% of patients had a significant functional mobility decline by day 2[2]
- 27% still dependent in walking 3 months post discharge[1]

1. Mahoney JE, *J Gerontol A Biol Sci Med Sci*. 1998;53(4):M307-M312.
2. Hirsch CH, . *J Am Geriatr Soc*. 1990;38(12):1296-1303.

Skeletal Muscle Deconditioning

- Skeletal muscle strength reduces 5-10% every week of bed rest (1-1.3% per day)[1]
- Without activity the muscle loses protein[2]
- Healthy individuals on 5 days of strict bed rest develop insulin resistance and microvascular dysfunction[3]
- 2 types of muscle atrophy[2]
  - Primary: bed rest, space flight, limb casting
  - Secondary: pathology

1. Jolley SE, Moss M, Needham DM, et al. Point Prevalence Study of Mobilization Practices for Acute Respiratory Failure Patients in the United States. Crit Care Med. 2017;45(2):205-215.
2. Morris PE. *Crit Care Clin*. 2007;23(1):1-20.
3. Hamburg NM,. Arterioscler Thrombo Vasc Biol, 2007;27(12):2650-2656

Do We Even Achieve the Accepted Mobility Standard?

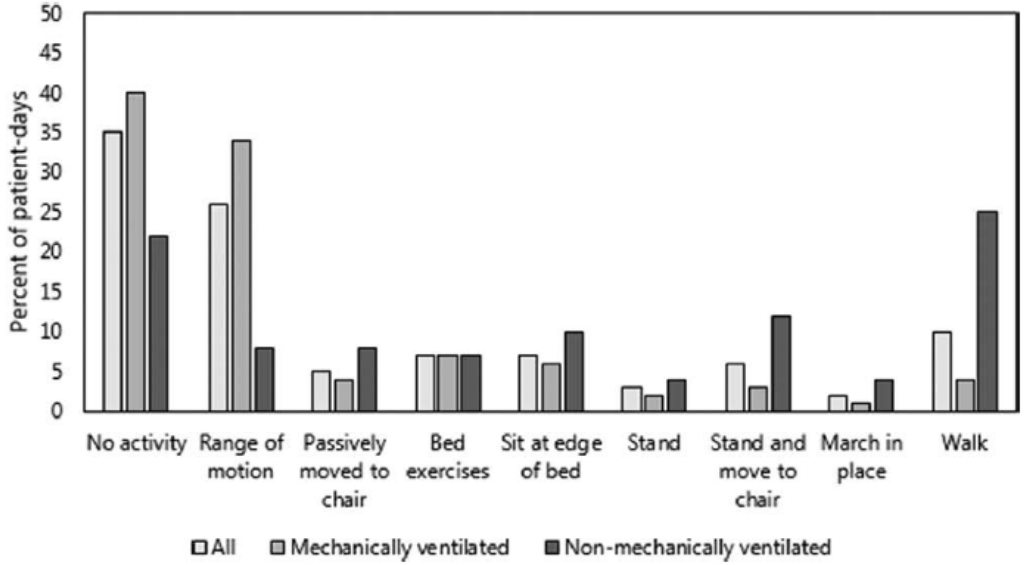
Q 2 Hour In Bed Mobility

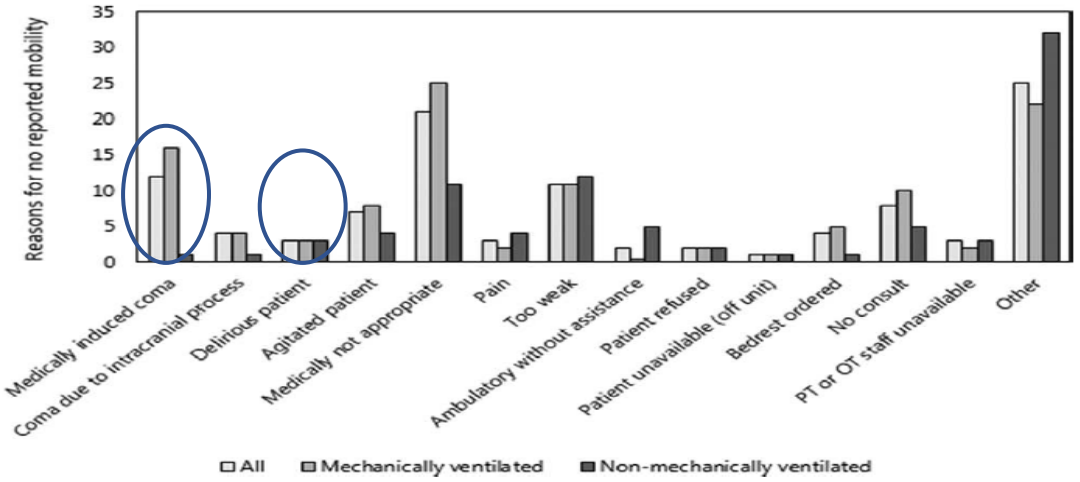
- Body position: clinical practice vs standard[1]
  - Study of 74 patients in which the change in body position was recorded every 15 minutes for an average observation time of 7.7 hours
  - 49.3% of observed time showed no body position change for >2 hrs, and 2.7% had every-2-hour demonstrable body position change
- Positioning prevalence[2]
  - Prospectively recorded, 2 days, 40 ICUs in the United Kingdom
  - Average time between turns, 4.85 hours

1. Krishnagopalan S, et al. *Crit Care Med*. 2002;30:2588-2592.
2. Goldhill DR, et al. *Anaesthesia.* 2008;63:509-515.

Point Prevalence of EM Practices in Acute Respiratory Failure Patients in US

- 42 ICU's across 17 ARDS network hospitals
- 2-day mobility prevalence
- Measured therapist provided mobility
- 770 patient days of data
- Patient data
  - Ventilated via ET 73% of patient days
  - Prevalence of PT/OT 32%
  - PT/OT involvement in mobility events associated with > out of bed
  - Ventilated patients: 16% out of bed mobility



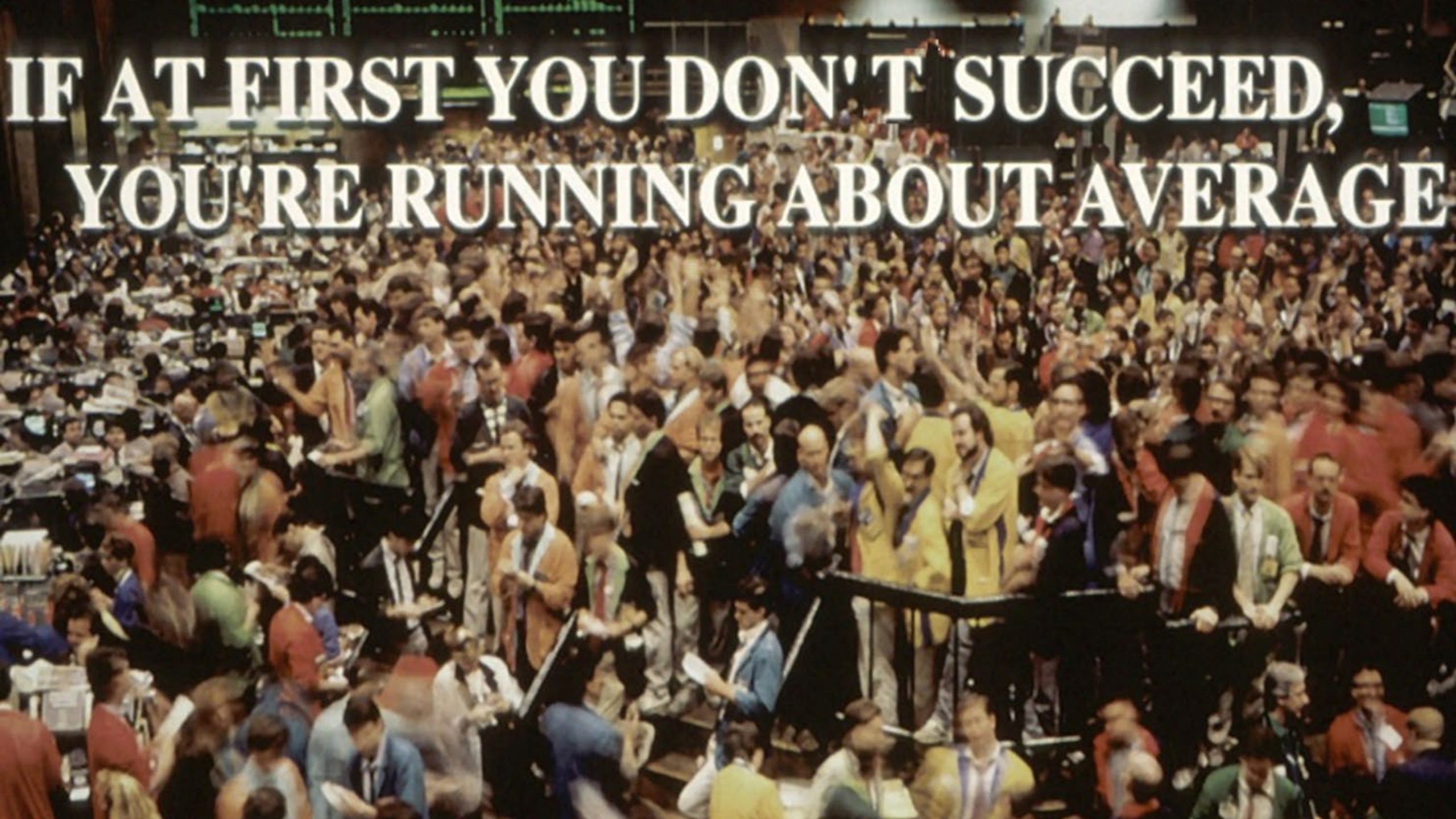


Jolley SE, et al. Crit Care Med 2017; 45:205-215

Outcomes of Early Mobility Programs

- ↓ incidence of VAP[1]
- ↓ time on the ventilator[2,3,4]
- ↓ days of sedation[4]
- ↓ incidence of skin injury[5]
- ↓ delirium[4]
- ↑ ambulatory distance[6]
- ↑ function[4]
- ↓ in hospital readmissions[5]
- ↓ ICU & hospital LOS[3]

1. Staudinger t, et al. Crit Care Med, 2010;38.
2. Bassett RD, et al. Intensive Crit Care Nurs, 2012 Apr;28(2):88-97
3. Morris PE, et al. Crit Care Med, 2008;36:2238-2243
4. Schweickert WD, et al. Lancet, 373(9678):1874-82.
5. Azuh O, et al. Am J Med. 2016;129(8):866-871.
6. Pohlman MC, et al. Crit Care Med, 2010;38:2089-2094


IF AT FIRST YOU DON'T SUCCEED,
YOU'RE RUNNING ABOUT AVERAGE

Pressure Injury Harm

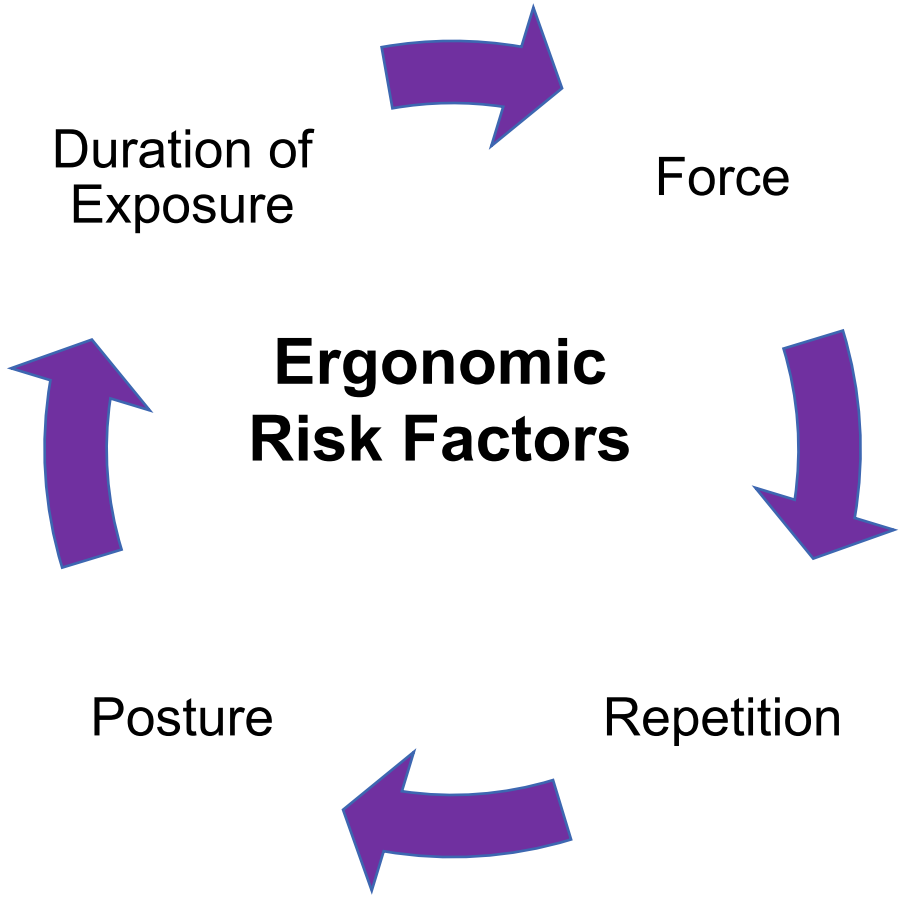
Pressure Injury Impact

- 2.5 million patients are treated for HAPU annually in acute care[1]
- Acute care: 0-12%, critical care: 3.3% to 23.8% (International Guidelines)[2]
- Most severe pressure ulcer: sacrum (44.8%) or the heels (24.2%)[1,2]
- Cost pressure injury $10 708[3]
  - 17,000 lawsuits are related to pressure ulcers annually[1]
  - Targeted pressure injury prevention to patients with low Braden scores < 15 vs standard care does save money and results in better quality per life year (QALYs)[4]
- 60,000 persons die from pressure ulcer complications each year in US/Pain & Suffering[1]
- National healthcare cost $26.8 billion per year in US[3]

1. Are we ready for this change?. Content last reviewed October 2014. Agency for Healthcare Research and Quality, Rockville, MD. https://www.ahrq.gov/patient-safety/settings/hospital/resource/pressureulcer/tool/pu1.html
2. European Pressure Ulcer Advisory Panel/ National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention & treatment of pressure ulcers/injuries Clinical Practice Guideline. Emily Haesler (Ed).EPUAP/NPIAP/PPPIA. 2019
3. Padula WV, et al. *Int Wound J*. 2019;16(3):634-640.
4. Padula WV. Et al BMJ Qual Safety, 2019;28:132-41

Caregiver Harm

What are Ergonomic Risk Factors?



Black JM, et al. Crit Care Nurs Q. 2018;41(3):226-239

Oh, my aching back!

- Back pain incidence in nursing:
  - 8 out of 10 nurses work despite experiencing musculoskeletal pain[1]
  - 62% of nurses report concern regarding developing a disabling musculoskeletal injury[1]
  - > 50% of nurses report musculoskeletal pain made worse by their job[1]
  - Nursing assistants experience the highest non-fatal occupational injuries and illnesses of ANY industry sector (including manufacturing and construction) and RNs experience a high rate as well[2]

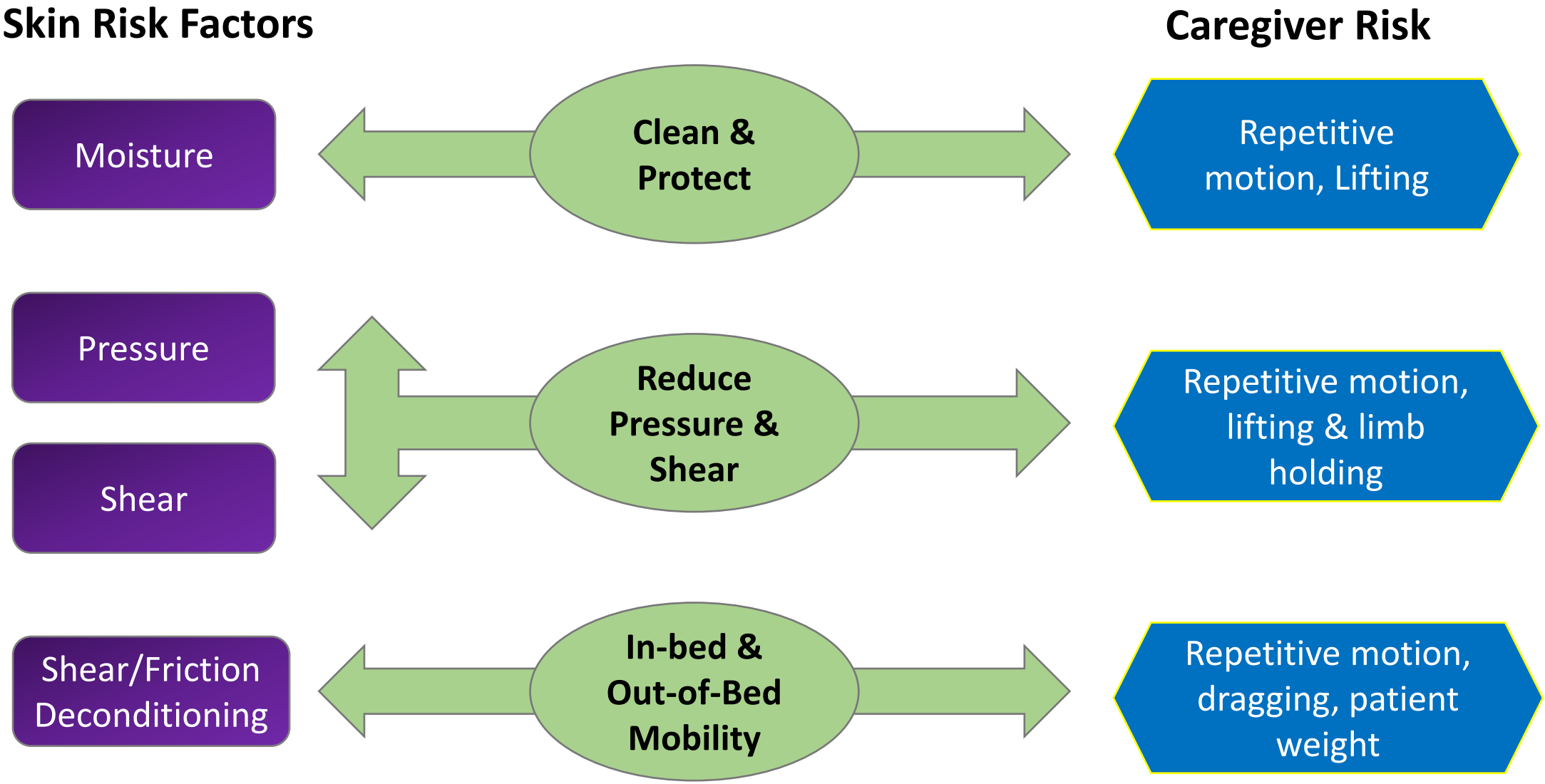
1. American Nurses Association. (2013). ANA Health and Safety Survey.
2. U.S. Department of Labor, Bureau of Labor Statistics. (2014).

Contributing Factors to Injury

- Healthcare is probably the only industry that considers 100 pounds to be a “light” weight
- Other professions use assistive equipment when moving heavy items
- On average, nurses and assistants lift 1.8 tons per shift[1]

1.Nelson A, Baptiste AS. Evidence-based practices for safe patient handling and movement. *Online J Issues Nurs*. 2004;9(3):4.

Skin & Immobility Prevention Strategies



The Goal: Patient & Caregiver Safety

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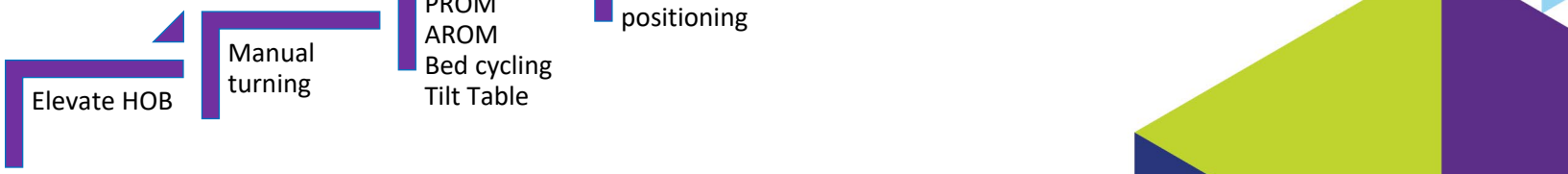


Patient Progressive Mobility[1]

1. Bassett RD, Vollman KM, Brandwene L, Murray T. Integrating a multidisciplinary mobility programme into intensive care practice (IMMPTP): a multicentre collaborative. Intensive Crit Care Nurs. 2012;28(2):88-97.

Early Physical and Occupational Therapy in Mechanically Ventilated Patients

- Prospective randomized controlled trial from 2005-2007
- 1,161 screen, 104 patients mechanically ventilated < 72hrs, functionally independent at baseline met criteria
- Randomized to:
  - Early exercise of mobilization during periods of daily interruption of sedation (49 pts)
  - Daily interruption of sedation with therapy as ordered by the primary care team (55 pts)
  - Primary endpoint: number of patients returning to independent functional status at hospital discharge able to perform activities of daily living and walk (independently)

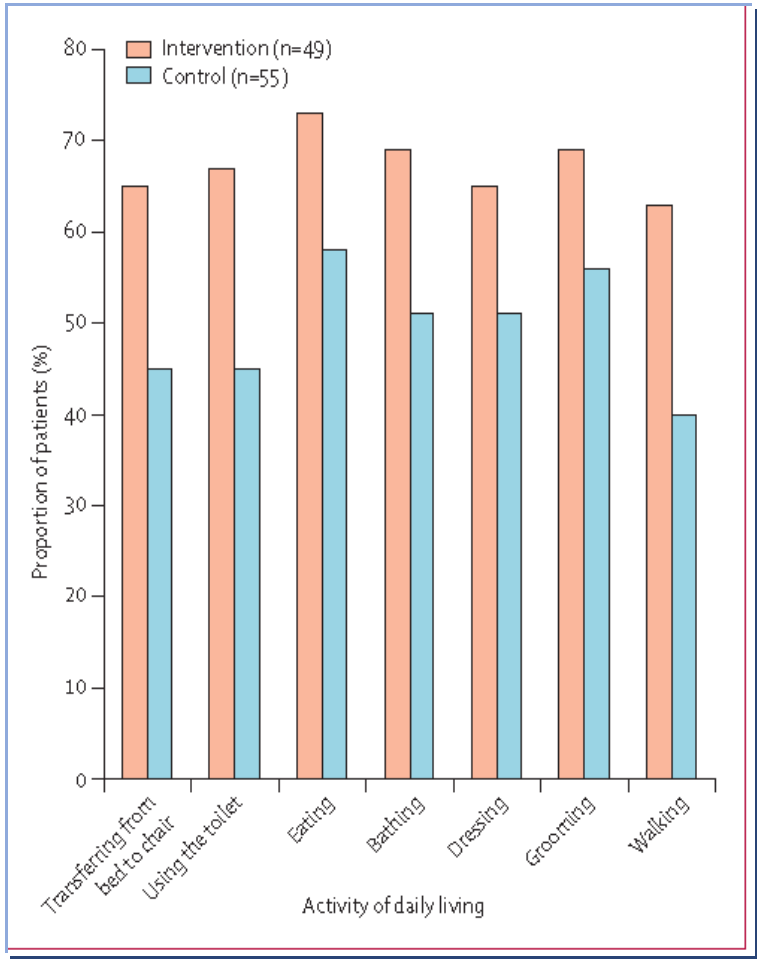
Schweickert WD, et al. Lancet, 2009 373(9678):1874-82.

Early Physical and Occupational Therapy in Mechanically Ventilated Patients

	Intervention (n=49)	Control (n=55)	p value
Time from intubation to first PT/OT session (days)	1·5 (1·0–2·1)	7·4 (6·0–10·9)	<0·0001
Independent ADLs total at ICU discharge	3 (0–5)	0 (0–5)	0·15
Independent ADLs total at hospital discharge	6 (0–6)	4 (0–6)	0·06
MRC examination score at hospital discharge	52 (25–58)	48 (0–58)	0·38
Hand-grip strength at hospital discharge (kg-force)	39 (10–58)	35 (0–57)	0·67
Greatest walking distance at hospital discharge (m)	33·4 (0–91·4)	0 (0–30·4)	0·004
Time from intubation to milestones achieved (days)			
Out of bed	1·7 (1·1–3·0)	6·6 (4·2–8·3)	<0·0001
Standing	3·2 (1·5–5·6)	6·0 (4·5–8·9)	<0·0001
Marching in place	3·3 (1·6–5·8)	6·2 (4·6–9·6)	<0·0001
Transferring to a chair	3·1 (1·8–4·5	6·2 (4·5–8·4)	<0·0001
Walking	3·8 (1·9–5·8)	7·3 (4·9–9·6)	<0·0001

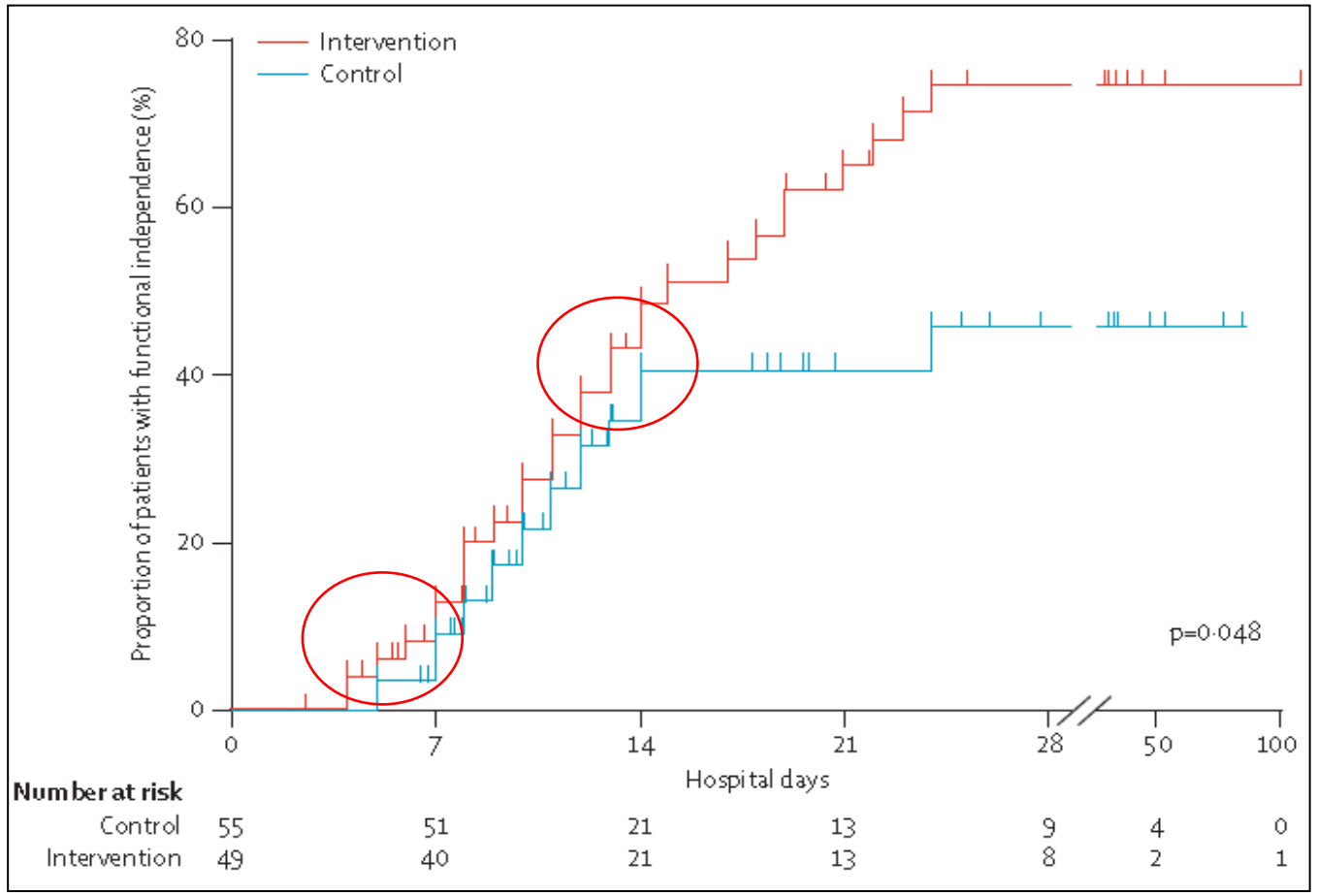
Data are median (IQR). ADLs=activities of daily living. ICU=intensive care unit. MRC=Medical Research Council. PT/OT=physical therapy and occupational therapy. MRC examination scale 0–60.

Table 4: Function and muscle strength outcomes according to study group



Schweickert WD, et al. Lancet, 2009; 373(9678):1874-82.

Early Physical and Occupational Therapy in Mechanically Ventilated Patients

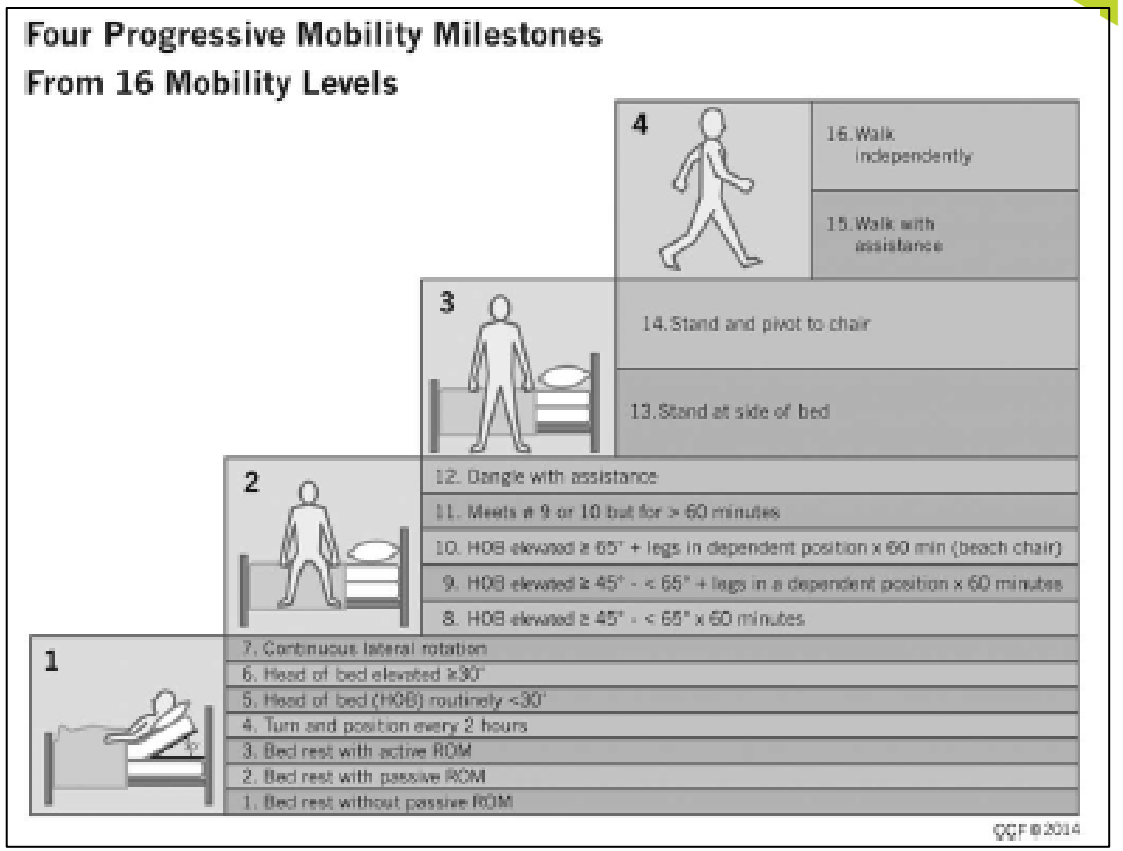


- Safe
- Well tolerated
- ↓ duration of delirium
- ↑ VFD
- Functional independence at discharge:
  - 59% protocol group
  - 35% in control arm

Schweickert WD, et al. Lancet, 373(9678):1874-82.

Protocol Driven Mobility Program: Impacting Neurological Outcomes

- Pre-post intervention study
- Large academic NICU
- 637 patients
  - 260 pre
  - 377 post
- Intervention: Early Progressive Mobility Protocol
  - Exclusion criteria
  - Readiness criteria
  - Started on admission
  - Encouraged to use ICU bed features & lifts to assist
  - Protocol placed at bedside



Klein K, et al. Crit Care Med. 2015;43(4):865-873.

Protocol Driven Mobility Program: Impacting Neurological Outcomes

Multivariate analysis done to control for group differences:

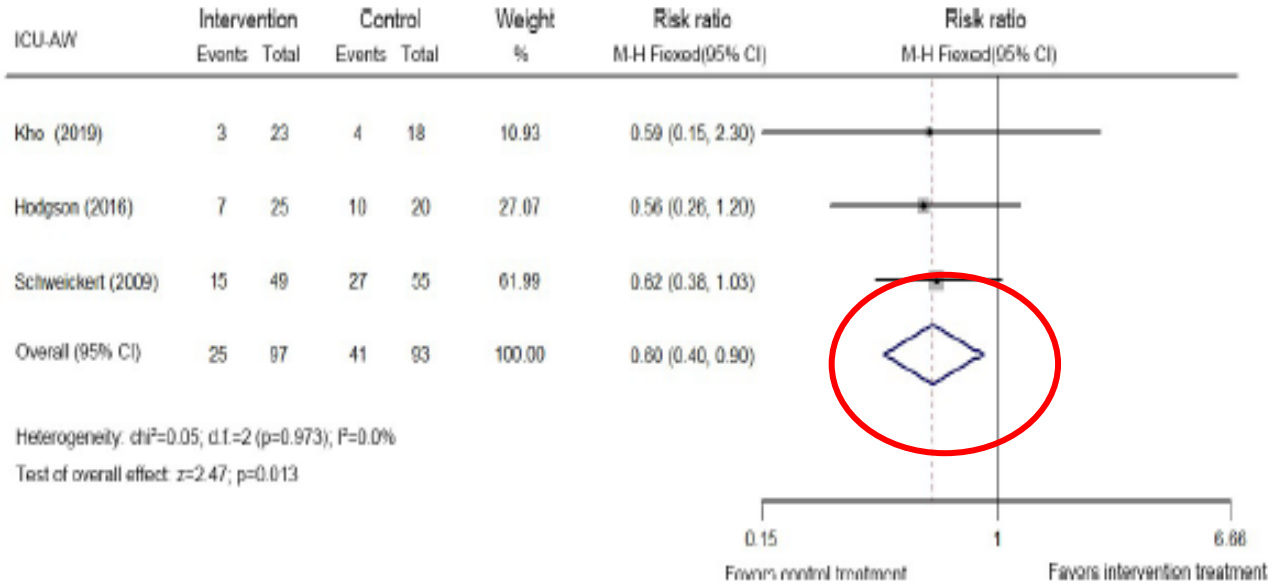
Factor	Adjusted Model Mean (SEM)		p
	Preintervention	Postintervention	
Acute Physiology and Chronic Health Evaluation III score[b]	59.0 (2.64)	58.7 (2.54)	0.90
Length of stay			
Hospital, d (SD)	15.16 (0.96)	10.21 (1.04)	< 0.001
Neurologic ICU, d (SD)	7.37 (0.68)	4.75 (0.64)	< 0.001
Psychologic factors			
Depression, mean (SD)	0.76 (0.22)	0.51 (0.22)	0.12
Anxiety, mean (SD)	0.69 (0.21)	0.42 (0.21)	0.088
Hostility, mean (SD)	0.38 (0.14)	0.27 (0.14)	0.31
Combined, mean (SD)	1.80 (0.50)	1.21 (0.48)	0.11
Factor	**Postintervention Odds Ratio (95% CIs)**		**p**
Highest mobility achieved			
> Level 7[c]	1.63 (1.16, 2.33)		0.005
3 levels[d]	1.92 (1.43, 2.58)		< 0.001
4 levels[e]	1.78 (1.32, 2.41)		< 0.001
Mortality, 30 d	0.96 (0.58, 1.59)		0.87
Discharge home	1.53 (1.03, 2.27)		0.033
Deep vein thrombosis	1.90 (1.00, 3.60)		0.05
Deep vein thrombosis[f]	1.73 (0.95, 3.15)		0.072
Deep vein thrombosis[g]	1.52 (0.83, 2.80)		0.18

Klein K, et al. Crit Care Med. 2015;43(4):865-873

Systematic Review of Early Rehabilitation in the ICU

- 23 studies/2308 patients
- Inclusion criteria
  - Adults
  - RCT's
  - Intervention group received early mobilization
    - Defined as stable CV, resp and neuro
    - Earlier than control group
- Outcomes:
  - Muscle strength, duration of MV, VFD, LOS, D/C home, adverse events, morality

Presence of ICUAW at D/C



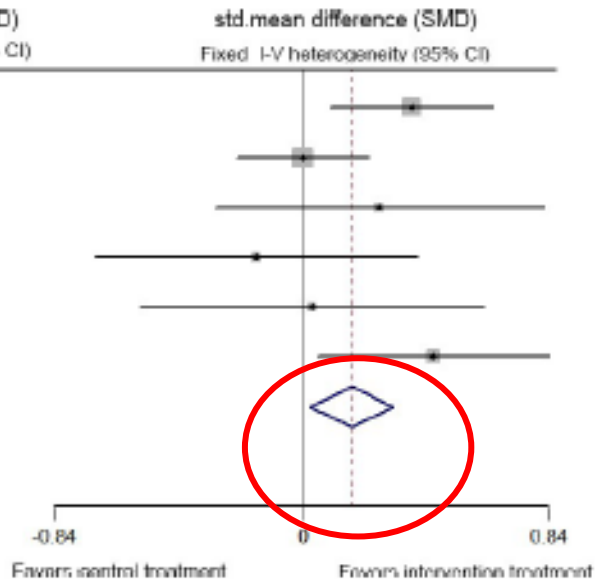
Zhang L, et al. PLOS ONE. 2019;14(10): e0223185.

Systematic Review of Early Rehabilitation in the ICU

Vent-free days:

Ventilator-free days	Intervention Mean	SD	Total	Control Mean	SD	Total	Weight %	std.mean difference (SMD) Fixed I-V heterogeneity (95% CI)
Schaller (2016)	23.00	1.17	104	22.50	1.50	96	28.88	0.37 (0.09, 0.65)
Morris (2016)	24.00	1.17	150	24.00	1.00	150	40.76	0.00 (-0.23, 0.23)
Hodgson (2016)	19.20	7.40	29	17.10	8.70	21	6.56	0.26 (-0.30, 0.83)
Kayambu (2015)	20.00	6.00	26	21.00	6.50	24	6.76	-0.16 (-0.72, 0.40)
Brummel (2014)	20.93	6.75	22	20.71	7.30	22	5.98	0.03 (-0.56, 0.62)
Schweickert (2009)	23.50	4.55	46	21.10	5.95	55	13.28	0.45 (0.05, 0.84)
Overall(95% CI)			377			368	100.00	0.17 (0.02, 0.31)

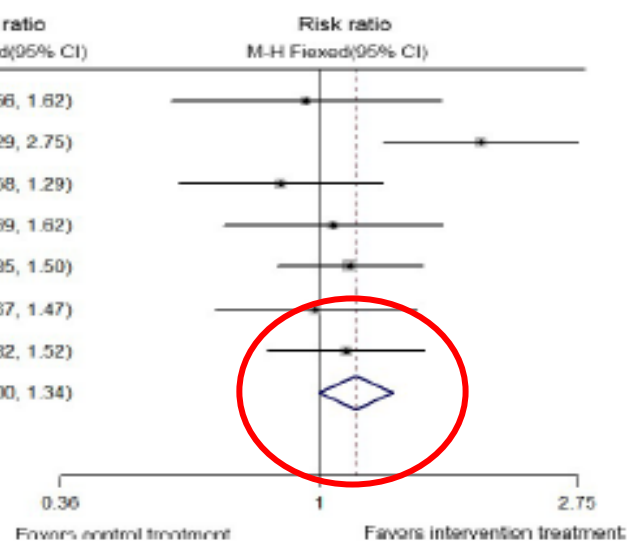
Heterogeneity: chi²=7.76; d.f.=5 (P=0.170); I²=35.5%
Test of overall effect: z=2.27; P=0.023.



Discharge to home:

Discharged-to-home	Intervention Events	Total	Control Events	Total	Weight %	Risk ratio M-H Fixed(95% CI)
Kho (2019)	16	36	14	30	8.72	0.95 (0.56, 1.62)
Schaller (2016)	53	104	26	96	15.43	1.88 (1.29, 2.75)
Moss (2016)	25	59	27	55	15.95	0.86 (0.58, 1.29)
Hodgson (2016)	19	29	13	21	8.61	1.06 (0.69, 1.62)
Denchy (2013)	44	74	40	76	22.53	1.13 (0.85, 1.50)
Schweickert (2009)	21	49	42	97	16.09	0.99 (0.67, 1.47)
Burtin (2009)	23	31	24	36	12.68	1.11 (0.82, 1.52)
Overall (95% CI)	201	382	186	411	100.00	1.16 (1.00, 1.34)

Heterogeneity: chi²=9.76; d.f.=6 (p=0.135); I²=38.5%
Test of overall effect: z=1.99; p=0.046



No difference in mortality or adverse events

Zhang L, et al. PLOS ONE. 2019;14(10): e0223185.

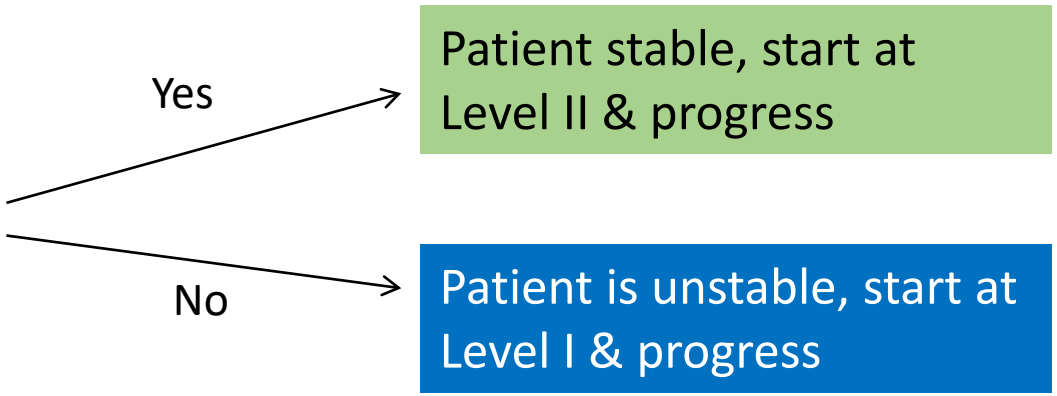
Systematic Review of Inpatient Mobilization

- Literature review of research studies that provides evidence to the consequences of mobilizing or not mobilizing hospitalized adult patients
- 36 studies were included, studies showed strong quality
- Finding in four theme areas:
  - △ Physical outcomes include pain relief, reduced deep vein thrombosis, less fatigue, less delirium, less pneumonia, improved physical function (no relationship to falls)
  - △ Psychological outcomes include less anxiety, ↓depressive mood, ↓ distress symptoms, ↑comfort and ↑satisfaction
  - △ Social outcomes include ↑quality of life and more independence
  - △ Organizational outcomes include ↓length of stay, ↓mortality and ↓cost

Kalish BJ, et al. Journal of Clinical Nursing, 2013;23:1486-1501

Determining Readiness

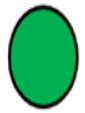
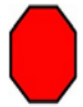
- Perform initial mobility screen w/in 8 hours of ICU admission & daily
  - PaO2/FiO2 ≥ 250
  - Peep <10
  - O2 Sat ≥ 90%
  - RR 10-30
  - No new onset cardiac arrhythmias or ischemia
  - HR >60 <120
  - MAP >55 <140
  - SBP >90 <180
  - No new or increasing vasopressor infusion
  - RASS ≥ -3



Bassett RD, et al.Intensive Crit Care Nurs (2012) 2012 Apr;28(2):88-97

Consensus on Safe Criteria for Active Mobilization

- Categories
  - Respiratory
  - Cardiovascular
  - Neurological
  - Other Considerations

	Low risk of an adverse event. Proceed as usual according to each ICU's protocols and procedures.
	Potential risk and consequences of an adverse event are higher than green, but may be outweighed by the potential benefits of mobilization. The precautions or contraindications should be clarified prior to any mobilization episode. If mobilized, consideration should be given to doing so gradually and cautiously.
	Significant potential risk or consequences of an adverse event. Active mobilization should not occur unless specifically authorized by the treating intensive care specialist in consultation with the senior physical therapist and senior nursing staff.

Consensus reach on all criteria. If no other contraindications; vasoactive infusions, endotracheal tube, FiO_2 < 60% with SaO_2 90% & RR < 30/min were considered safe criteria

Hodgson CL, et. al Critical Care, 2014;18:658

Progressive Mobility Continuum

START HERE

Includes complex, intubated, hemodynamically unstable and stable intubated patients; may include non-intubated

Includes intubated, non intubated hemodynamically stable/stabilizing, no contraindications

Perform Initial mobility screen w/in 8 hours of ICU admission
Reassess mobility level at least every 24 hours (Recommended at shift Δ)

Refer to the following criteria to assist in determining mobility level

- o PaO2/FiO2 ≥ 250
- o Peep <10
- o O2 Sat ≥ 90%
- o RR 10-30
- o No new onset cardiac arrythmias or ischemia
- o HR >60 <120
- o MAP >55 <140
- o SBP >90 <180
- o No new or increasing vasopressor infusion
- o RASS ≥ 3

NO → Start at level I*

YES → Start at level II and progress*

LEVEL I	LEVEL II	LEVEL III	LEVEL IV	LEVEL V
RASS -5 to - 3	RASS -3 & up	RASS -1 & up	RASS 0 & up	RASS 0 & up
Goal: clinical stability; passive ROM	**Goal**: upright sitting; increased strength and moves arm against gravity	**Goal**: Increased trunk strength, moves leg against gravity and readiness to weight bear	**Goal:** stands w/ min. to mod. assist, able to march in place, weight bear and transfer to chair	**Goal:** Increase distance in ambulation & ability to perform some ADLs
	PT consultation prn OT consultation prn	PT: Active Resistance Once a day, strength exercises OT consultation prn	PT x 2 daily OT consult for ADL's	PT x 2 daily & OT x1 daily
ACTIVITY: HOB ≥ 30º *Passive ROM 2X/d performed by RN, or UAP ——— CLRT/Pronation initiated if patient meets criteria based on institutional practice OR Q 2 hr turning	**ACTIVITY:** Q 2 hr turning *Passive /Active ROM 3x/d 1. HOB 45º X 15 min. 2. HOB 45º,Legs in dependant position X 15 min. 3. HOB 65º,Legs in dependant position X 15 min. 4. Step (3) & full chair mode X20 min. 3X/d Or Full assist into cardiac chair 2X/day	**ACTIVITY:** Self or assisted Q 2 hr turning 1.Sitting on edge of bed w/RN, PT, RT assist X 15 min. 2.Progressive bed sitting Position Min.20 min. 3X/d Or Pivot to chair position 2X/d	**ACTIVITY:** Self or assisted Q 2 hr turning 1.Bed sitting Position Min.20 min. 3X/d; 2.Sitting on edge of bed; stand w/ RN, PT, RT assist 3.Active Transfer to Chair (OOB) w/ RN/PT/RT assist Min. 3X/d	**ACTIVITY:** Self or assisted Q 2 hr turning 1.Chair (OOB) w/ RN/PT/RT assist Min. 3X/day 2.Meals consumed while dangling on edge of bed or in chair Ambulate progressively longer distances with less assistance x2 or x3/day with RN/PT/RT/UAP
Tolerates Level I Activities	Tolerates Level II Activities	Tolerates Level III Activities	Tolerates Level IV Activities	

For each position/activity change allow 5-10 minutes for equilibration before determining the patient is intolerant

*****If the patient is intolerant of current mobility level activities, reassess and place in appropriate mobility level*****

***Mobility is the responsibility of the RN, with the assistance from the RT's Unlicensed Assistive Personnel and PT/ OT. PT and OT may assist the team with placement to the appropriate mobility level of activity, *always prioritizing patient and provider safety*. Placement is based on clinical judgment.**

Bassett RD, et al.Intensive Crit Care Nurs (2012) 2012 Apr;28(2):88-97

- Safety Assessment
- Patient Mobility Assessment
- Suggestive use of equipment for mobility

Adult Bedside Mobility Assessment Tool (BMAT) for Nurses

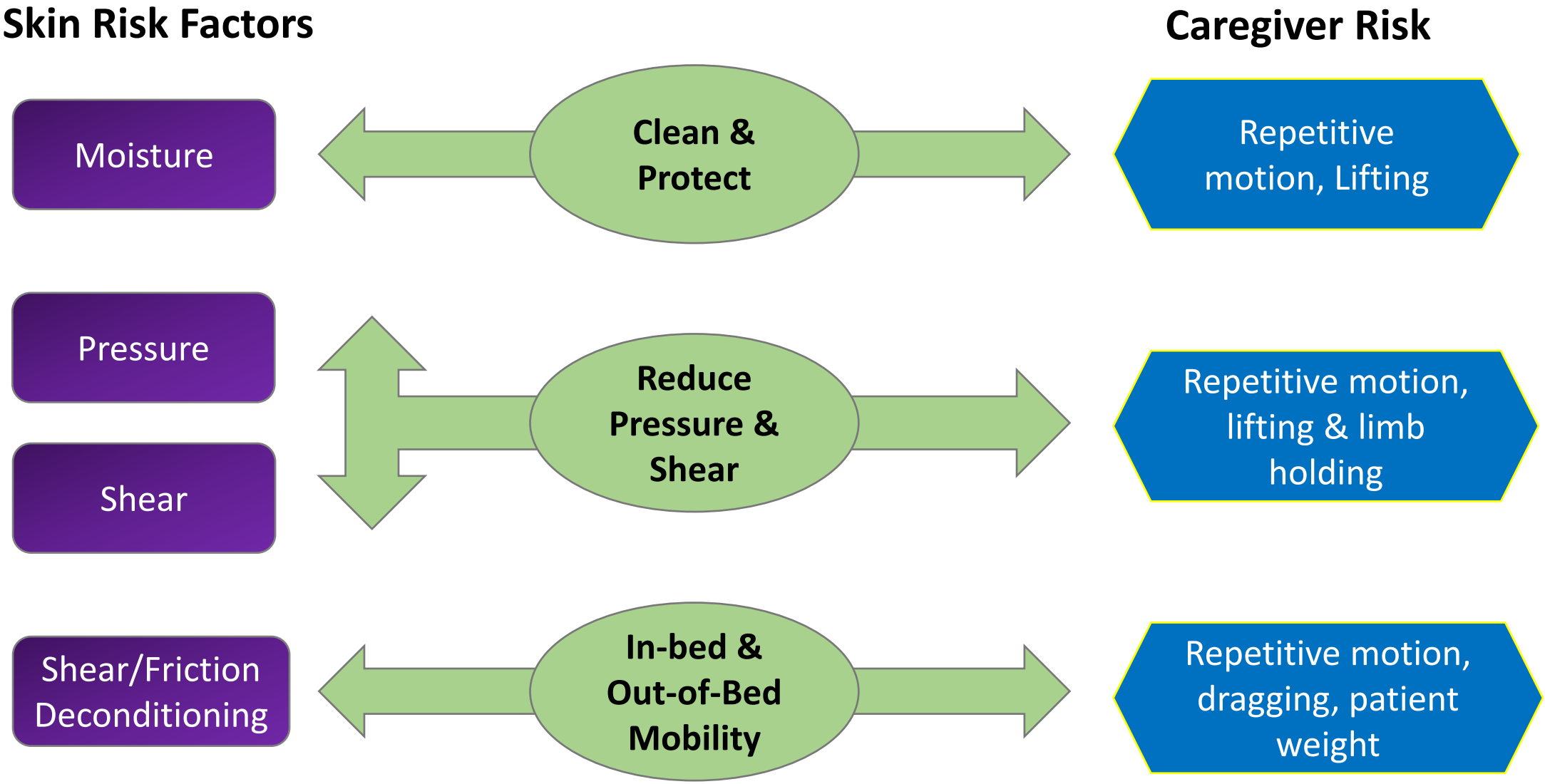
ASSESSMENT	TEST	INTERVENTIONS
Safety Screen Assessment: **M:** Myocardial **O:**Oxygenation **V:**Vasoactive **E:** Engaged **S:** Special Considerations	FAIL →	**Strict Bedrest** • Initiate falls bundle, if indicated • Use equipment for repositioning in bed • ROM exercises, minimum 5 repetitions
	PASS →	Continue with Sit and Shake Assessment
Sit and Shake Assessment (trunk strength and seated balance)  **Instructions:** (Obtain necessary assistive device, cane or walker.) 1. From a semi-reclined position, ask patient to sit at the side of the bed. May use bed rail. 2. Note patient's ability to sit for > 2 minutes without caregiver assistance. 3. Ask patient to reach out and grab your hand and shake making sure patient reaches across midline.	FAIL →	**Mobility Level 1 – Bedfast/Dependent** • Initiate falls bundle, if indicated • ICU: consider PT/OT consult for RASS score -2 to +2 • Use equipment for repositioning in bed • Use chair position in bed or sit in chair for meals and/or ADLs • Use equipment for transfers OOB • Initiate Level 1 ROM exercises*
	PASS →	Continue to Stretch and Point Assessment
Stretch and Point Assessment (lower extremity strength and stability)  **Instructions:** 1. With patient seated, have patient place both feet on floor with knees no higher than hips. 2. Ask patient to stretch one leg and straighten knee, then bend the ankle/flex and point toes. If appropriate, repeat with other leg. May test with only one leg (e.g. ankle cast, stroke).	FAIL →	**Mobility Level 2 - Chairfast** • Initiate falls bundle • Use equipment for repositioning in bed • Sit on edge of the bed or chair for meals and/or ADLs • Use equipment for transfers OOB • Initiate Level 2 ROM exercises*
	PASS →	Continue to Stand Assessment
Stand Assessment (lower extremity strength for standing)  **Instructions:** (Consider patient's cognitive ability, orientation, & presence of delirium.) 1. Ask patient to elevate off the bed or chair (seated to standing). May use assistive device (cane, bedrail). 2. Patient should be able to raise buttocks off bed and hold for count of 5. May repeat once. May test with only one leg (e.g. ankle cast, stroke).	FAIL →	**Mobility Level 3 – Stand** • Initiate falls bundle • Sit on the edge of bed or chair for meals and/or ADLs • Use equipment for transfers OOB and standing • Initiate Level 3 ROM exercises*
	PASS →	Continue to Walk Assessment
Walk Assessment (standing balance and gait)  **Instructions:** (Use assistive device if needed.) 1. Ask patient to march in place at bedside. 2. Then ask patient to advance step and return each foot. 3. Assess patient's balance, stability, and safety awareness.	FAIL →	**Mobility Level 3 – Stand** Implement Level 3 activities as above
	PASS →	**Mobility Level 4 – Walk** • Initiate falls bundle, if indicated • Walking in room and in hallway as able • Use assistive devices as needed • Encourage out of bed for meals and/or ADLs • Initiate Level 4 ROM exercises*

Always default to the safest patient handling equipment if there is any doubt in patient's ability to perform task.
*Consider notifying provider to place PT/OT consult for patient not at baseline or who demonstrates declining mobility/ADL.

https://lhatrustfunds.com/assets/uploads/documents/15-BMAT-Adult.pdf

Achieving In-Bed and Out-of-Bed Mobility While Protecting the Patient and Caregiver

Skin & Immobility Prevention Strategies



NIOSH (National Institute of Occupational Safety and Health) Recommendations for Safe Patient Handling

- Maximum recommended weight limit set for patient lifting
  - The weight being lifted can be estimated
  - When patient is cooperative
  - The lift is smooth and slow
- Maximum recommended limits set for patient push/pull activity
- Proper body mechanics alone will not prevent patient handling injury
- Safe work practice

National Institute for Occupational Safety and Health NIOSH

https://www.cdc.gov/niosh/topics/safepatient/

Evidence-Based Strategies for a Comprehensive Safe Patient Handling and Mobility (SPHM) Program

- Ergonomic Assessment Protocol
- Peer Leaders
- Patient Handling Assessment Criteria and Decision Algorithms
- State-of-the-Art Equipment
- After Action Reviews
- No Lift Policy

https://www.cdc.gov/niosh/topics/safepatient/

Pressure Injury Prevention

Purchased from Shutterstock

Notes on Hospitals: 1859

"It may seem a strange principle to enunciate as the very first requirement in a hospital that it should do the sick no harm."

- Florence Nightingale

Advocacy = Safety

Do the staff you work with see pressure injury harm the same way they view CAUTI/CLABSI harm?

Immediate Huddle Learn from a Defect

Learning from Defect: Pressure Injury Facility Acquired

Date:_____

Attendees:_____

sticker

Instructions:

When HAPI is identified, staff nurse to notify unit manager. Manager will notify team of super huddle time. Super huddle to include any staff nurses and PSTs available, wound care nurse, CNS, CL, and NEC if available, and respiratory if applicable. If this occurs on nights, huddle can be done at night with any staff available, and then info passed on to manager to follow up with wound care, CL, CNS, NEC.

Manager to complete the form AT the BEDSIDE with input from everyone present. Once Section I has been completed, clinical leader (or manager designee) will complete Section II. Return completed form to Quality Department. Manager to keep a copy and have available for review at Pressure Injury Task force.

*if manager is off, contact whomever is covering, i.e. other manager or clinical leader.

Section I:

Location of the Pressure Injury: Unit_____ Date of Pressure Injury:_____

What happened? (brief description from RN caring for patient)

1. Anatomical location of the HAPI:_____
2. LOS when discovered: _____
3. Stage when discovered: _____
4. Was the patient transferred prior to discovery? ☐ yes ☐ no
5. Was there an OR procedure within 72 hours of discovery? ☐ yes ☐ no
6. Time in ED from admit order to admission to floor > 8 hours? ☐ yes ☐ no

Why did it happen?

Wound Nurse Comments:

Risk:

7. What risks were identified? ☐ Immobility ☐ Shear ☐ Medical device ☐ HD patient ☐ Moisture/incontinence ☐ hemodynamic instability with turning ☐ nutrition risk

Skin Assessment:

8. Redness was recognized before the skin broke down. ☐ Yes ☐ no ☐ N/A

Pressure/Shear and Patient Movement: complete on how patient is currently positioned

9. If the patient is in bed, what position are they currently in? ☐ back ☐ Rt side lying ☐ Lt side lying ☐ prone ☐ N/A
10. Immobile patients are moved using lifting equipment to minimize sheer and caregiver injury? ☐ Yes ☐ no ☐ N/A -not immobile
11. Heels are floated with pillows if temporary (<8hrs)? ☐ Yes ☐ no ☐ N/A
12. Heel floated with a device if >8 hrs of immobility? ☐ Yes ☐ no ☐ N/A
13. Sacral foam dressing in place? ☐ Yes ☐ no
14. HOB greater than 30 degrees? ☐ Yes ☐ no

Incontinence/Moisture

15. Urine and fecal containment per policy if patient is incontinent? ☐ Yes ☐ no ☐ N/A
16. Was barrier cream in room if patient is incontinent? ☐ Yes ☐ no ☐ N/A

Support Surface:

17. At risk patient is on appropriate surface? ☐ Yes ☐ no ☐ N/A

Medical Devices (check all that apply) (If none check proceed to the questions in a box)

☐ Trach ☐ noninvasive mask ☐ oxygen N/C ☐ cervical collar ☐ arterial line
☐ Endotracheal tube ☐ Endo Tube Holder ☐ orthotics ☐ cooling blanket ☐ SCD/Stocking
☐ Immobilizer/splint/arm board

18. Were protective measures taken to prevent injury? (Foam padding, protective dressing, repositioning? ☐ Yes ☐ No ☐ N/A

What happened to cause the defect?	What prevented it from being worse?

What can we do to prevent this from happening to someone else?

Action Plan	Responsible person	Targeted date	Evaluation Plan: How will we know risk is reduced?

With whom shall we share our learning? (communication plan)

Who	When	How	Follow up

Section II:

Additional Data to be completed when able:

1. Was Braden risk identified? yes ☐ no ☐
2. 4 eyes head to toe assessment performed on admission? ☐ Yes ☐ no
3. 4 eyes head to toe assessment performed per shift (last 24hrs)? ☐ Yes ☐ no
4. 4 eyes assessment of skin underneath device done q 12 hrs by RT.? ☐ Yes ☐ no ☐ N/A
5. Patient pressures redistributed and documented q 2? ☐ Yes ☐ no
6. Was patient placed on a specialty surface in OR (>/4hrs ☐ Yes ☐ no ☐ N/A
7. Was patient placed on specialty surface in ER? (>/4hrs) ☐ Yes ☐ no ☐ N/A
8. Was a nutritional consult placed/completed in patients at high risk? ☐ Yes ☐ no ☐ N/A
9. Document significant co-morbidities: _____
10. Doctor notified of the pressure injury: ☐ yes ☐ No

Rev. 7.11.2019 LMC

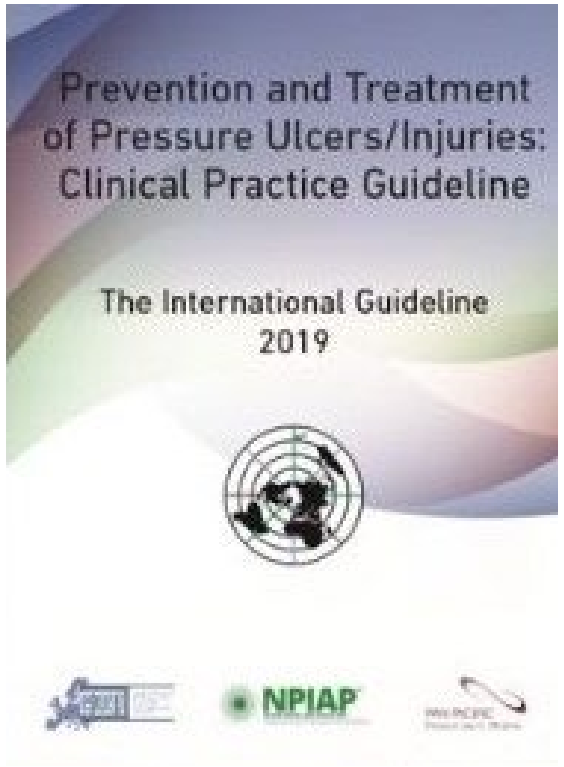
Pressure Injury Impact

- HAPI are the 4th most common preventable medical error in the United States[1]
- 2.5 million patients are treated for HAPI annually in acute care[1]
- Med-surg 1.87% and critical care 5.85% (2018-2019 IPUP Survey)[2]
- Most severe pressure injuries: sacrum (44.8%) or the heels (24.2%)[1,3]
- Cost Stage 1-2 $2,770.54, Stage 3-4 $71,000 to $127,000[4,5]
  - 17,000 lawsuits are related to pressure injuries annually
  - Targeted pressure injury prevention to patients with low Braden scores < 15 vs standard care does save money and results in better quality per life year (QALYs)
- 60,000 persons die from pressure injury complications each year in US/Pain & Suffering[1]
- National healthcare cost $26.8 billion per year in US[4]
- 2-fold ↑ in elder patients who develop a pressure injury[6]

1. http://www.ahrq.gov/professionals/systems/hospital/pressureulcertoolkit/putool1.html#11
2. VanGilder CA, et al. J Wound Ostomy Continence Nurs. 2021;48(6):492-503.
3. European Pressure Ulcer Advisory Panel/ National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention & treatment of pressure ulcers/injuries Clinical Practice Guideline. Emily Haesler (Ed).EPUAP/NPIAP/PPPIA. 2019
4. Padula WV, et al. *Int Wound J*. 2019;16(3):634-640.
5. Padula WV. Et al BMJ Qual Safety, 2019;28:132-41
6. Song YP, et. al. Int Wound J. 2019;16(6):1533-1544.

EBP Recommendations to Achieve Offloading & Reduce Pressure

- Turn & reposition every “(2)” hours (avoid positioning patients on a pressure ulcer
  - Repositioning should be undertaken to reduce the duration & magnitude of pressure over vulnerable areas[4]
  - Consider right surface with right frequency[1,4]
  - Cushioning devices to maintain alignment /30° side-lying & prevent pressure on bony prominences[2,3]
    - Between pillows and wedges, the wedge system was more effective in reducing pressure in the sacral area (healthy subjects)
    - Between pillows and wedges, wedges maintain lateral position better
  - Assess whether actual offloading has occurred[4]
  - Use lifting device or other aids to reposition & make it easy to achieve the turn[4]



1. McNichol L, et al. J Wound Ostomy Continence Nurse, 2015;42(1):19-37.
2. Bush T, et al. WOCN, 2015;42(4):338-345
3. Kapp S, et al. Int Wound J. 2019;1-7
4. European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention & treatment of pressure ulcers/injuries :Clinical Practice Guideline. Emily Haesler (Ed). EPUAP/NPIAP/PPPIA. 2019

Incidence of Pressure Injuries in Critical Care

- 22 studies, 10 reported cumulative incidence of PI
- Incidence: 10-25.9%
- Prevalence: 16.9-23.8%
- Excluding Stage 1 Incidence: 0.0 to 23.8%
- Location: 5 studies (406 patients)
  - Sacrum: 26.9-48%
  - Buttock: 4.1-46%
  - Heel: 18.5-38.9%
  - Hips: 10.9-15.7%
  - Ears: 4.3-19.7%
  - Shoulders: 0.0-40.2%

1 out of every 4-5 patients in the ICU will develop a PI

Chaboyer WP, et al. Crit Care Med, 2018 Nov;46(11):e1074-e1081

DecubICUs Study: International Prevalence, Risk & Outcomes

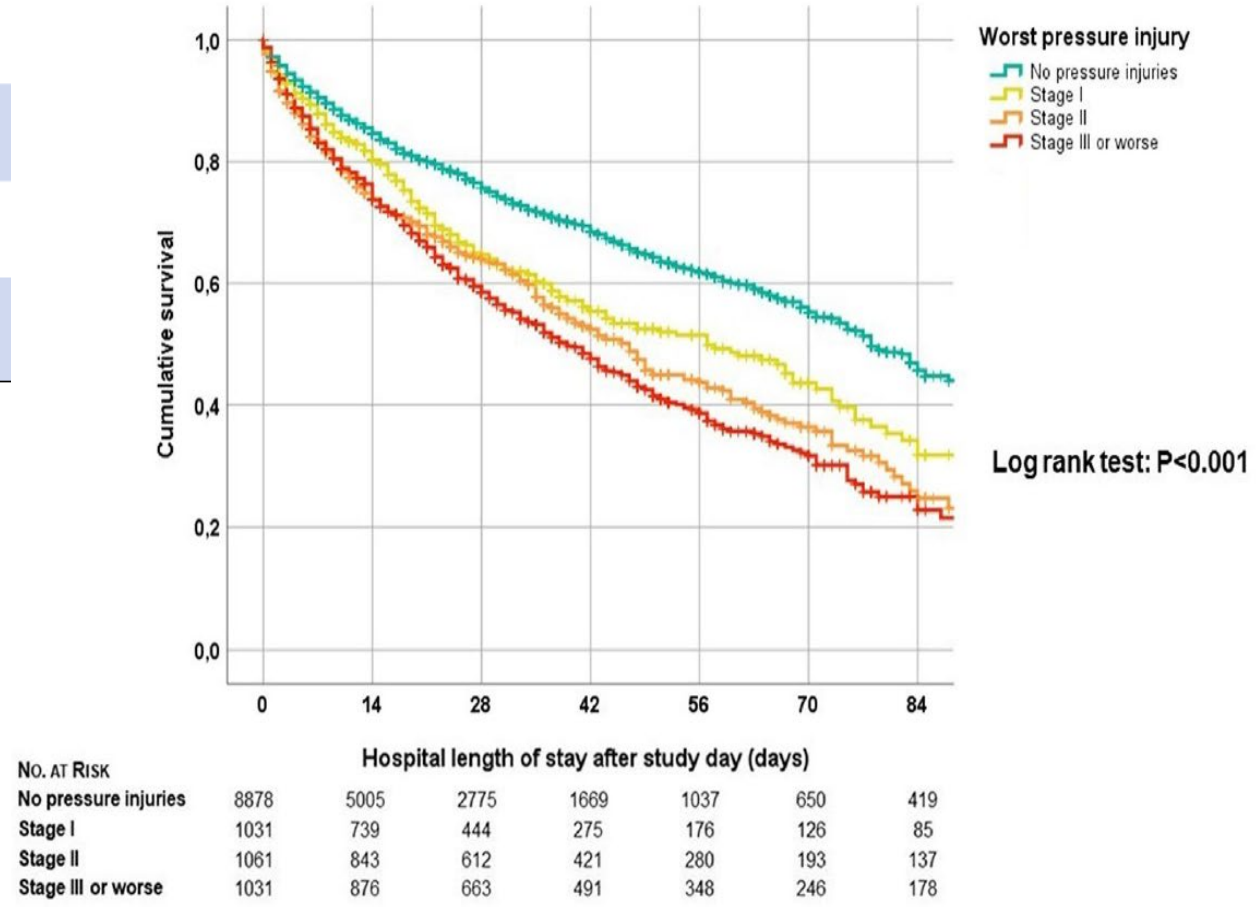
- Methodology
  - International 1-day prevalence
  - Follow up for outcome assessment until hospital d/c
  - Assess factors associated with ICU acquired pressure injuries
  - Hospital mortality

- Risk factors for ICU acquired PI
  - Older age
  - Male
  - Under weight
  - Emergency surgery
  - Higher APACHE score
  - Braden <19
  - ICU stay > 3days
  - Organ support (MV, CRRT)

Labeau SO, Afonso E, Benbenishty J, et al. *Intensive Care Med*. 2021;47(2):160-169.

DecubICUs Study: International Prevalence, Risk & Outcomes

	All *n* = 13,254	Europe *n* = 5632	North America *n* = 1507
	Number of patients (percentage) *95% confidence interval*		
Overall prevalence	3526 (26.6) 25.9–27.3	1630 (28.9) 27.8–30.1	344 (22.8) 20.8–25
ICU-acquired prevalence	2145 (16.2) 15.6–16.8	1124 (20) 18.9–21	200 (13.3) 11.7–15.1
Proportion ICU-acquired prevalence (%)	60.8	69.0	58.1



Labeau SO, Afonso E, Benbenishty J, et al. *Intensive Care Med*. 2021;47(2):160-169.

Risk Factors-Descriptive Study

- Risks in Mix Medical Surgical ICU pop that developed a PI
- Were those risks congruent with unavoidable risk factors
  - 57 adult patients who developed PI between 2013-2016
  - >24hr ICU LOS, > 18 yrs, developed after admission
- PI
  - 1.5 PI per patient
  - 7.5 days average development
  - DTI 68%
  - Areas
    - 56% sacrum
    - 26% buttock

INTRINSIC/EXTRINSIC FACTORS

	n (%)[a]
Hemodynamic instability	25 (44)
Hypoxemia	2 (3.5)
Severe anemia (<7 g/dL)	10 (17.5)
Congestive heart failure	15 (26.3)
Cerebrovascular accident	5 (9)
Immobility	
Paralysis	12 (21)
Bedbound	45 (79)
Hypotension prior to PI, mean (SD), h	2 (7)
Shock states	
Septic shock	31 (54)
Cardiogenic	3 (5.3)
Hypovolemic	2 (3.5)
Mechanical ventilation >72 h	46 (81)
Head-of-bed elevation >30°	53 (93)
Sedation	50 (88)
Neuromuscular-blocking agent	5 (9)
Surgical procedure	
Neurosurgery	2 (3.5)
Gastrointestinal surgery	9 (16)
Thoracic	2 (3.5)
Vascular	4 (7)
Urologic	0
Gynecologic	0
Orthopedic	2 (3.5)
Other	1 (2)
Operating room hours, mean (SD)	3 (3.3)

65% vasopressors

30% Protein malnourished

Cox J, et al. Adv Skin Wound Care 2018;31:328-34

Vasopressors/Pressure Injury

Cox J, et al Am J Crit Care, 2015;24(8):501-510

- Retrospective correlation design
- 306 medical surgical and CV ICU patients who receive vasopressors
- Examine the type, dose and duration of vasopressor agents and PU development

Results

- 13% PI rate
- MV > 72 hours 23x more likely to develop a PI
- Receiving 2 vasopressor (Norepi & vasopressin) significant

Significant Predictors of PI Development

Variable	B	SE	Wald	*P*	Exp (B)	95% CI
Cardiac arrest	1.359	0.605	3.831	.05	3.894	0.998-15.188
Mechanical ventilation>72 hours	3.161	0.664	22.686	<.001	23.604	6.427-86.668
Hours of MAP<60 mm Hg while receiving vasopressors	0.092	0.037	6.199	.01	1.096	1.020-1.178
Use of vasopressin	1.572	0.542	8.423	.004	4.816	1.666-13.925
Cardiac diagnosis at ICU admission	-3.360	1.577	4.539	.03	0.035	0.002-0.764

Abbreviations: ICU, intensive care unit; MAP, mean arterial pressure.
[a] Nagelkerke R^2 = 0.571; Hosmer and Lemeshow test: χ^2 = 5. 3; *df* = 8; *P* = .73.

Addition of a second agent

Clarification of Definitions:

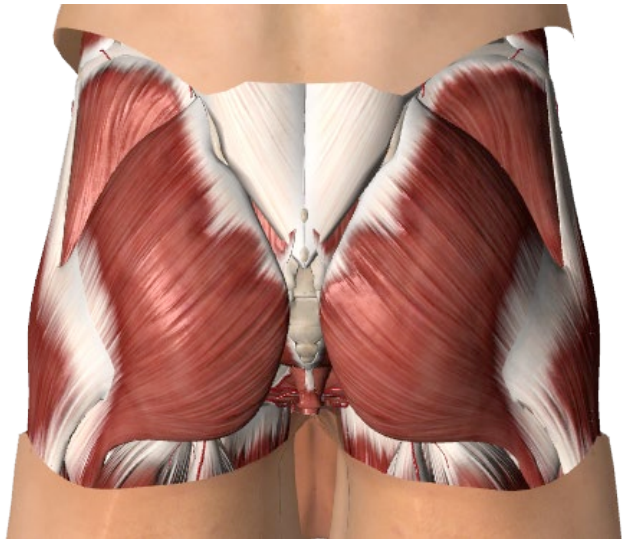
- Pressure Injury to replace Pressure Ulcer
- Accurately describes pressure injuries of both intact and ulcerated skin

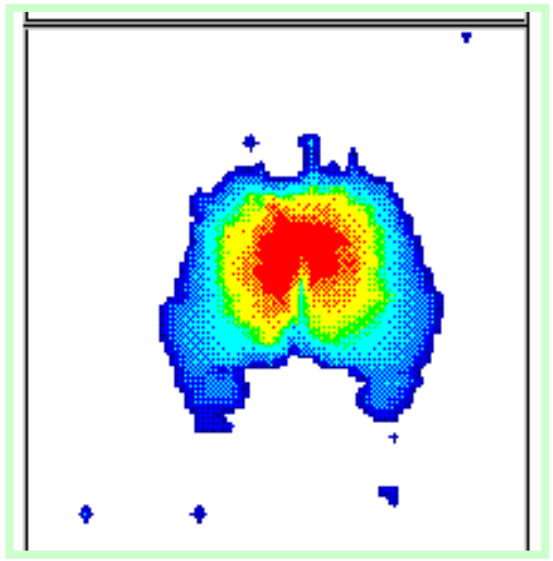
Stage I and Deep Tissue Injury (DTI) describe intact skin

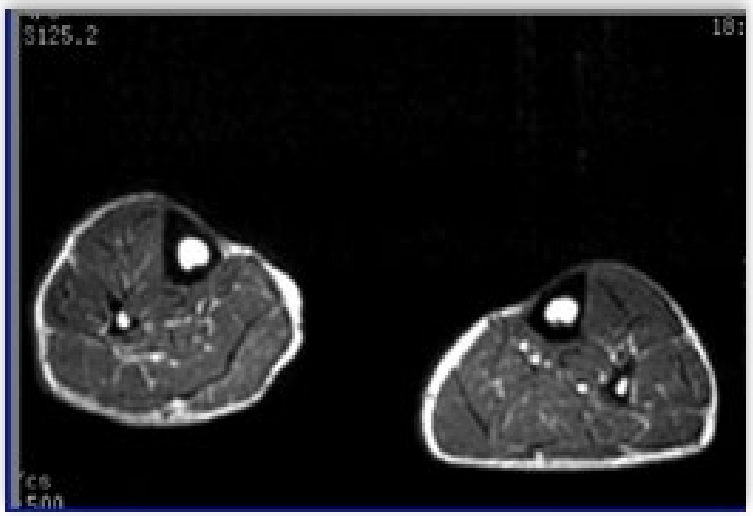
Stage II through IV describe open ulcers

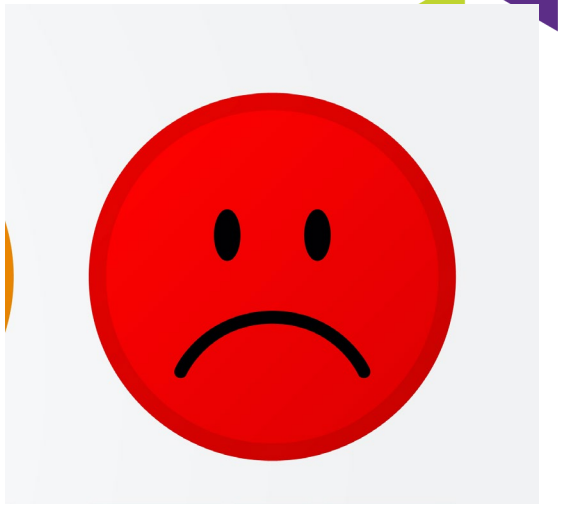
PRESSURE INJURY

Etiology of Pressure Injury









Bony Prominence → Sustained Pressure → Tissue Distortion → Cell Death → Pressure Injury

European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention & treatment of pressure ulcers/injuries :Clinical Practice Guideline. Emily Haesler (Ed).EPUAP/NPIAP/PPPIA. 2019

Top-Down vs Bottom-Up Tissue Damage

Top-Down

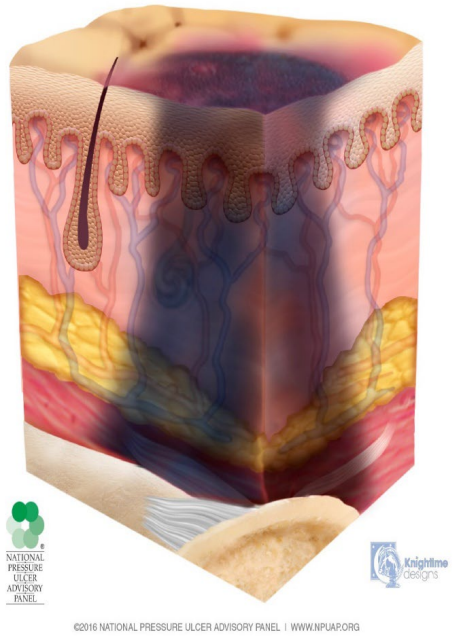
Stage 1, 2

Bottom-Up

- Stage 3, 4, Unstageable, DTI

Wound Ostomy and Continence Nurses Society. (2016) Bottom-Up (Pressure Shear) Injuries. In D. Doughty, and L. McNichol (Ed). *Core Curriculum Wound Management*. (pp. 313-332). Philadelphia, Wolters Kluwer.

Deep Tissue Pressure Injury



Persistent non-blanchable deep red, maroon or purple discoloration

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

Pressure Injury Rates in Darkly Pigmented Persons

5-year average rate of PI in US (2008-2012)

- 670,767 cases with reported Stage 3/4
  - Higher rates in men
  - Higher rates in African Americans
  - 2.4% higher when compared to all other races
- Mortality higher
  - 9.1% vs 1.8%
    - Odds ratio 5.08

Maybe missing the early stages

Phot from NDNQI

Bauer K, et al. Ostomy Wound Manage. 2016;62(11):30-38.

Darkly Pigmented Skin

- Thicker and more compact dermis
  - Thickness proportional to degree of pigmentation
- Less risk for skin cancers and photodamage
  - Black epidermis provides an SPF of 13.4
- Protected for accelerated aging induce by sun exposure
- Skin more vulnerable to inconsistent pigmentation- post inflammatory hypo and hyper pigmentation
- Melanocytes respond to inflammation

Vashi. J Clin Aesthet Dermatol. 2016 9(1): 31-38

Stage 1 & DTI Toughest to Stage in Darkly Pigmented Skin

Study of 96 African American patients with 274 pressure injuries:

- 88 (32.2%) were stage 1 and 186 (67.8%) were sDTI
- Stage 1 Pressure Injury had
  - Erythema or redness (75%)
  - Hyperpigmentation (14%)
  - Dark red discoloration (4.7%)
  - Persistent blanching (2.3%)
  - Dusky (1.5%)
- Normal color of skin (11.4%)
  - Boggy heels
  - Painful
  - Indurated
- Nonblanchable (75%)
  - The remainder had no documentation of blanching

Sullivan R. WOUNDS. 2014;26(12):351-359

DTI in Darkly Pigmented Skin

- Larger variation in presentation
  - 130 areas (70%) were purple
  - 26 areas (14%) were gray
  - 20 areas (10.8%) were black
  - 17 areas (9.1%) were brown
  - 11 areas (5.9% were blue
  - 10 areas (5.4%) were maroon

Sullivan R. WOUNDS. 2014;26(12):351-359

Challenges to Accurate Assessment

Photo courtesy of Joyce Black

Visual Assessment for Diverse Skin Tones

- Baseline skin tone should be established in an area not frequently exposed to ultraviolet radiation
- Use adequate lighting the best lighting includes ambient or natural sources
- Compare skin area to be assessed to surrounding unaffected area
- Compare moist skin to dry skin
- Implement A standardized valid and reliable skin tone classification system
- Accompany visual inspection with:
  - assessment of temperature, erythema and blanching via tactile inspection and palpitation
  - augmented visual technology when possible; consider standardizing throughout the entire healthcare setting

Black J, et al. *Adv Skin Wound Care*. 2023;36(9):470-480.

How to Find Erythema in Darkly Pigmented Skin

- Techniques for greater visibility
  - Moisten the skin aids in visualization-do not rub
  - Ask about pain in the area
  - Palpate for induration
  - Compare color to surrounding skin
  - Description of skin color

Photo courtesy of Joyce Black

Black J, e tal. *Adv Skin Wound Care*. 2023;36(9):470-480.

Moisture Injury:
Incontinence-Associated Dermatitis
ICD 10 Code: Irritant Contact Dermatitis r/t urine &/or stool

- Inflammatory response to the injury of the water-protein-lipid matrix of the skin[1]
  - Caused from prolonged exposure to urinary and fecal incontinence
  - Contributing factors of friction and secondary infection[2]
- Top-down injury[1,2]
- Physical signs on the perineum & buttocks[1]
  - Erythema, swelling, oozing, vesiculation, crusting, and scaling
- Skin breaks 4x more easily with excess moisture than dry skin[3]

1. Doughty D, et al. JWOCN. 2012;39(3):303-315
2. Beele H, et al. Drugs Aging 2018;35:1-10
3. Kottner J, et al. Clin Biomech, 2018;59:62-70

IAD: Multistate Epidemiology Study

- 5,342 patients in 189 acute care facilities in 36 states
- Prevalence study
  - To measure the prevalence of IAD, describe clinical characteristics of IAD, and analyze the relationship between IAD and prevalence of sacral/coccygeal pressure ulcers
- Results: 2,492 patients incontinent (46.6%)
  - 57% both FI and UI, 27% FI, 15% UI
  - 21.3% IAD rate overall/14% also had fungal rash
  - 45.7% in incontinent patients
    - 52.3% mild
    - 27.9% moderate
    - 9.2% severe
  - 73% was facility-acquired
  - ICU a 36% rate
  - IAD alone and in combination with immobility statistically associated with FAPI

Gray M. Giuliano K. JWOCN. 2018;45(1):63-67

GLOBIAD
The Ghent Global Categorization tool

Category 1: Persistent redness

1A - Persistent redness without clinical signs of infection

Critical criterion

- Persistent redness
  A variety of tones of redness may be present. Patients with darker skin tones, the skin may be paler or darker than normal, or purple in colour.

Additional criteria

- Marked areas or discolouration from a previous (healed) skin defect
- Shiny appearance of the skin
- Macerated skin
- Intact vesicles and/or bullae
- Skin may feel tense or swollen at palpation
- Burning, tingling, itching or pain

1A

1B - Persistent redness with clinical signs of infection

Critical criteria

- Persistent redness
  A variety of tones of redness may be present. Patients with darker skin tones, the skin may be paler or darker than normal, or purple in colour.
- Signs of infection
  Such as white scaling of the skin (suggesting a fungal infection) or satellite lesions (pustules surrounding the lesion, suggesting a Candida albicans fungal infection).

Additional criteria

- Marked areas or discolouration from a previous (healed) skin defect
- Shiny appearance of the skin
- Macerated skin
- Intact vesicles and/or bullae
- The skin may feel tense or swollen at palpation
- Burning, tingling, itching or pain

1B

Category 2: Skin loss

2A - Skin loss without clinical signs of infection

Critical criterion

- Skin loss
  Skin loss may present as skin erosion (may result from damaged/eroded vesicles or bullae), denudation or excoriation. The skin damage pattern may be diffuse.

Additional criteria

- Persistent redness
  A variety of tones of redness may be present. Patients with darker skin tones, the skin may be paler or darker than normal, or purple in colour
- Marked areas or discolouration from a previous (healed) skin defect
- Shiny appearance of the skin
- Macerated skin
- Intact vesicles and/or bullae
- Skin may feel tense or swollen at palpation
- Burning, tingling, itching or pain

2A

2B - Skin loss with clinical signs of infection

Critical criteria

- Skin loss
  Skin loss may present as skin erosion (may result from damaged/eroded vesicles or bullae), denudation or excoriation. The skin damage pattern may be diffuse.
- Signs of infection
  Such as white scaling of the skin (suggesting a fungal infection) or satellite lesions (pustules surrounding the lesion, suggesting a Candida albicans fungal infection), slough visible in the wound bed (yellow/brown/greyish), green appearance within the wound bed (suggesting a bacterial infection with Pseudomonas aeruginosa), excessive exudate levels, purulent exudate (pus) or a shiny appearance of the wound bed.

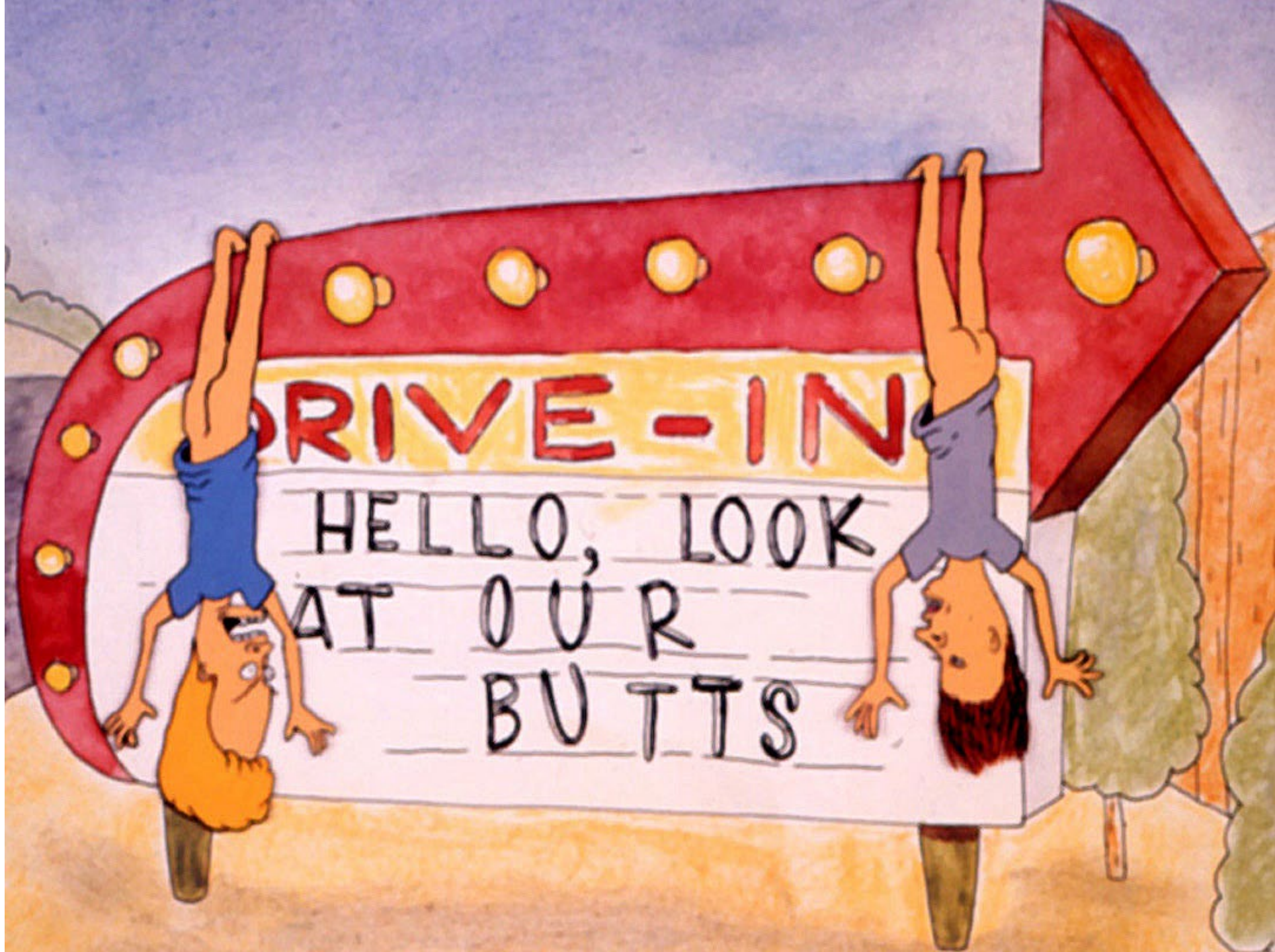
Additional criteria

- Persistent redness
  A variety of tones of redness may be present. Patients with darker skin tones, the skin may be paler or darker than normal, or purple in colour
- Marked areas or discolouration from a previous (healed) skin defect
- Shiny appearance of the skin
- Macerated skin
- Intact vesicles and/or bullae
- Skin may feel tense or swollen at palpation
- Burning, tingling, itching or pain

2B

Beeckman D. et al. The Ghent Global IAD Categorisation Tool (GLOBIAD). Skin Integrity Research Group - Ghent University 2017. Available to download from www.UCVVGent.be

Identify Patients at High Risk


RIVE-IN
HELLO, LOOK
AT OUR
BUTTS

Picking the Right Scale

Scales (cut-off)	Sensitivity Median (range)	Specificity Median (range)	Positive likelihood ratio	Negative likelihood ratio	AUROC Median (range)	Relative Risk (95% CI)
Braden (≤ 18)[118,135]	0.74[a] (0.33 to 1)	0.68[a] (0.34 to 0.86)	2.31[a]	0.38[a]	0.77[b] (0.55 to 0.88)	4.26[f] (3.27 to 5.55)
Norton (≤ 14)[118,135]	0.75[c] (0 to 0.89)	0.68[c] (0.59 to 0.95)	2.34[c]	0.37[c]	0.74[c] (0.56 to 0.75)	3.69[g] (2.64 to 5.16)
Waterlow (≥ 10)[118,135]	1.00, 0.88[d]	0.13, 0.29[d]	1.15, 1. 24[d]	0.0, 0.41[d]	0.61[e] (0.54 to 0.66)	2.66[h] (1.76 to 4.01)
Cubbin-Jackson (≤ 24)[135,145]	0.72[j]	0.68[j]	—	—	0.763[j]	8.63[k] (3.02 to 24.66)
SCIPUS (≥ 8)[130]	0.85[m]	0.38[m]	1.4[m]	—	0.64[m] (0.59 to 0.70)	—
Braden Q (≤ 13)[152]	0.86[p] (0.76 to 0.96)	0.59[p] (0.55 to 0.63)	2.09[p] (0.95 to4.58)	—	0.72[p] (0.76 to 0.78)	—

[a]16 studies, n=5,462 [b]7 studies, n=4,811 [c]5 studies, n=2,809
[d]2 studies, n=419 [e]4 studies, n=2,559 [f]31 studies, n=7,137
[g]15 studies, n=4,935 [h]12 studies, n=2,408 [j] 1 study, n=829
[k] 2 studies, n=151 [m] 1 study (n=759) [p] 1 study, n=625

European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention & treatment of pressure ulcers/injuries :Clinical Practice Guideline. Emily Haesler (Ed).EPUAP/NPIAP/PPPIA. 2019

It's About the Sub-Scales

- Retrospective cohort analysis of 12,566 adult patients in progressive & ICU settings for yr. 2007
- Identifying patients with HAPI Stage 2-4
- Data extracted: Demographic, Braden score, Braden subscales on admission, LOS, ICU LOS, presence of Acute respiratory and renal failure
- Calculated time to event, # of HAPU's
- Results:
  - 3.3% developed a HAPI
  - Total Braden score predictive (C=.71)
  - Subscales predictive (C=.83)

Tescher AN, et al. J WOCN. 2012;39(3):282-291

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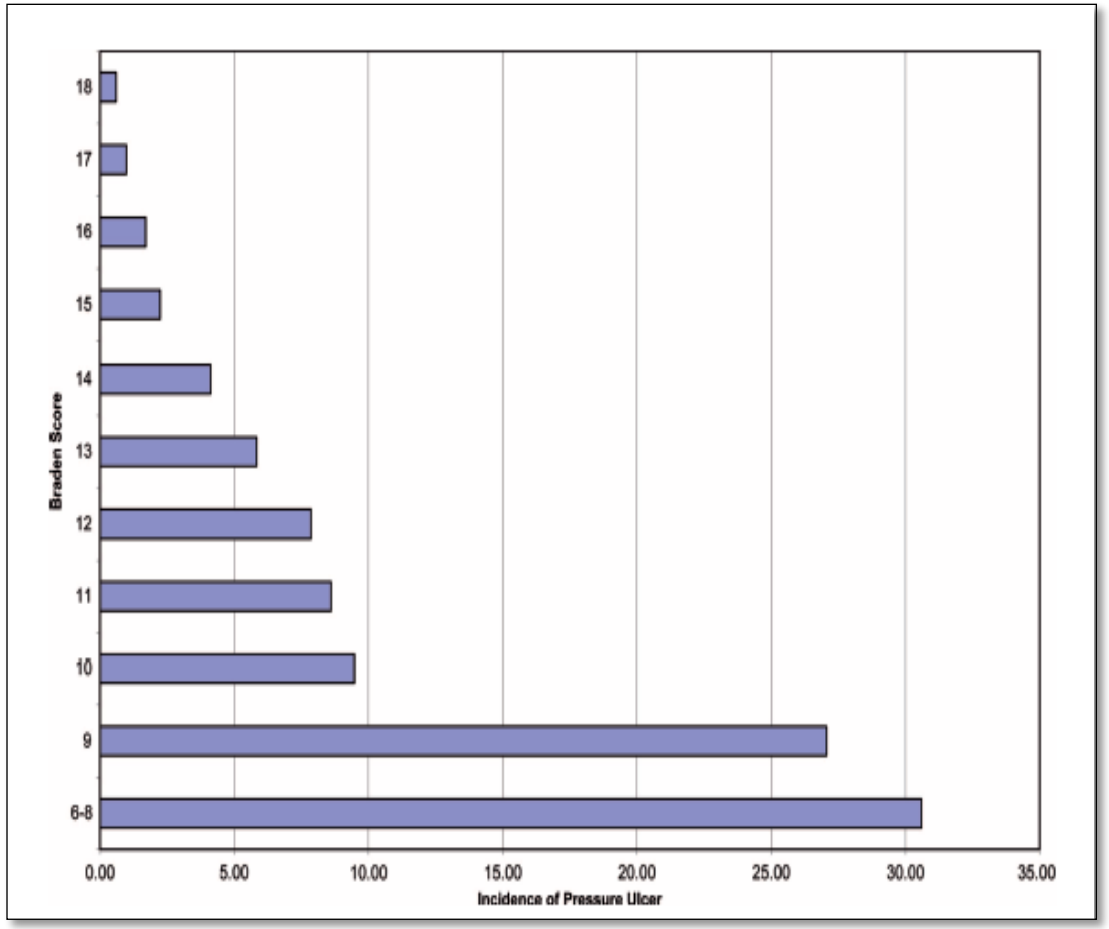
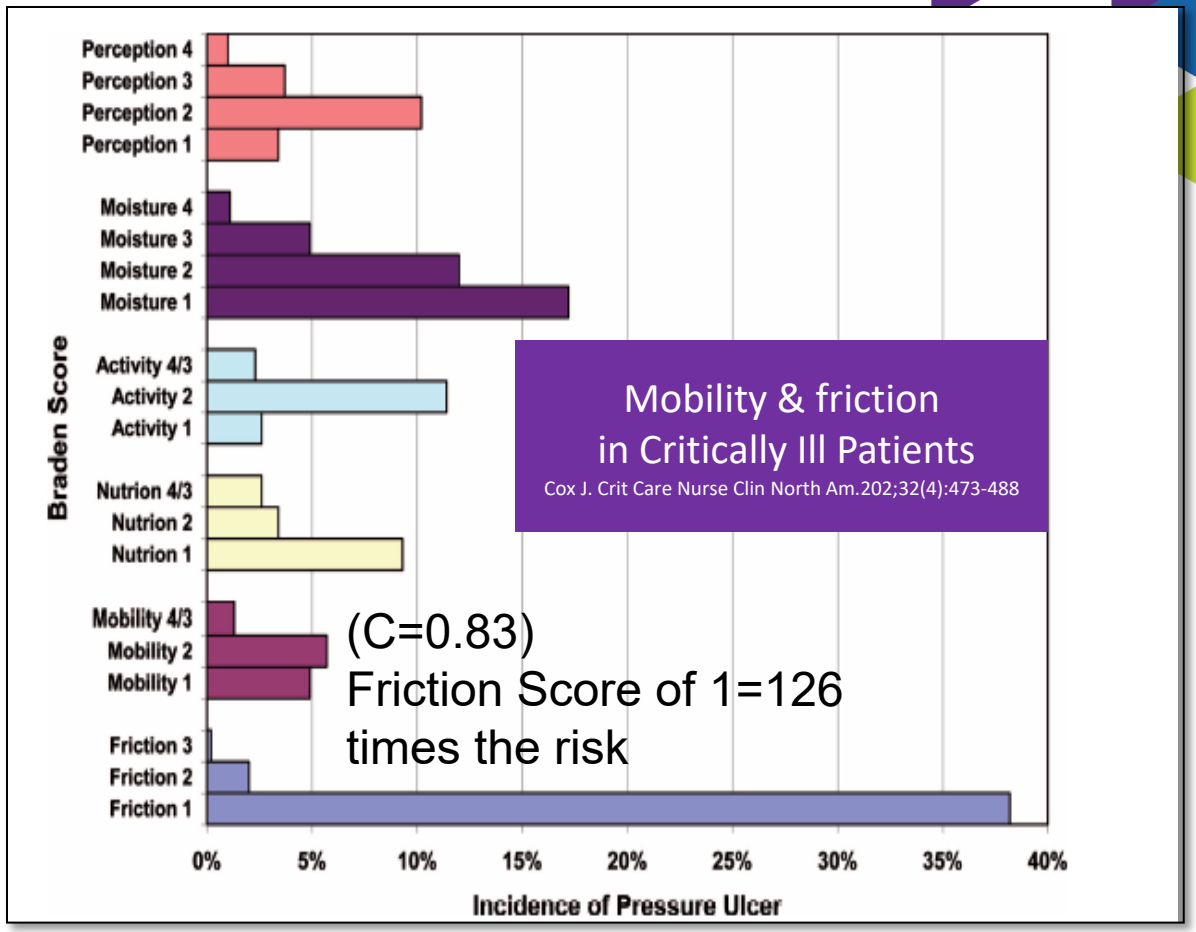
Braden Score



Braden Sub-Scales



Multivariate model included 5 Braden subscales, surgery and acute respiratory failure
C=0.91 (Mobility, Activity and sensory perception more predictive when combined with moisture or shear and friction)

Tescher AN, et al. J WOCN. 2012;39(3):282-291

Additional Risk Assessment (International Guideline)

Assess risk factors for pressure injury to guide risk-based prevention
Significant current or anticipated mobility problems
Use a structured risk assessment approach (e.g., Braden or other validated risk tool) on admission
Reassess risk q shift and with significant change in condition
Patient/family informed of PI risk and prevention plan
Additional risk factors considered: Previous PI__, Localized pain__, Diabetes__, Poor perfusion__, Vasopressors__, Oxygenation deficits__, Increased Temp__, Advanced Age__, Spinal cord injury__, Neuropathy__, Surgery/procedure duration > 2 hrs.__, Critical illness__, Organ Failure__, Sepsis__, Mechanical vent , Medical devices , Sedation , Dark skin tone

Standardized Pressure Injury Prevention Protocol Checklist (Adult 2.0). www.npiap.com

Assessing Skin

Assess Skin/Tissue for signs of skin damage and pressure injury		
Assess skin (comprehensive, visual, palpation) upon admission and q shift for erythema, discoloration, edema, and temperature		Location(s):
Assess skin under medical devices q shift		Device(s):
Inspect heels q shift		
In people of color: Ensure adequate lighting and moisten/moisturize skin to augment visual inspection		
Consider enhanced skin assessment methods- thermography, SEM, skin color chart		

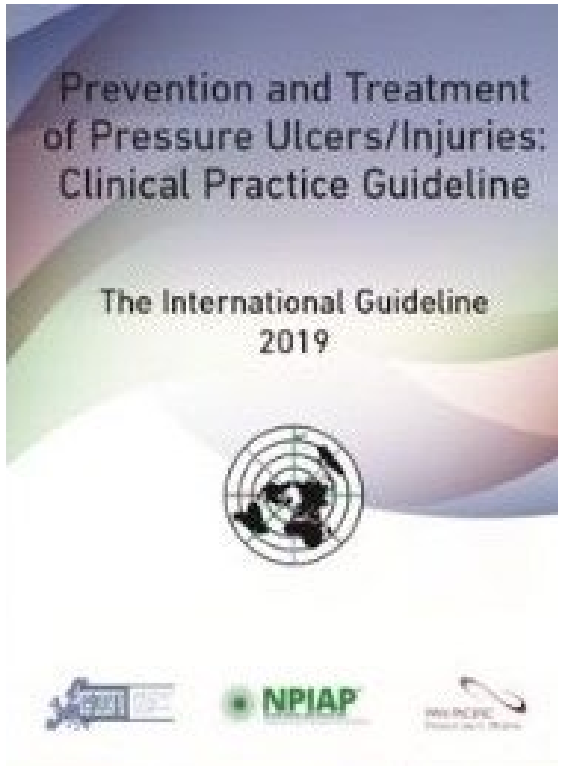
Methods to Prevent Pressure Injuries in High Risk Patient

- Understanding current fundamental nursing care practice
- Unit Culture-seeing PI as harm
- Success of applying current evidence-based practice-Care Bundle
  - Staff education
  - Risk assessment
  - Mobilization
  - Repositioning
  - Skin care protocols
  - Appropriate surfaces
  - Monitoring practice
- Overcome the challenge of hemodynamic instability

Chaboyer WP, et al. Crit Care Med, 2018 Nov;46(11):e1074-e1081
Tayyib N, et al. J Nurse Scholarsh. 2015;47:237-247
European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention & treatment of pressure ulcers/injuries :Clinical Practice Guideline. Emily Haesler (Ed).EPUAP/NPIAP/PPPIA. 2019

EBP Recommendations to Achieve Offloading & Reduce Pressure

- Turn & reposition every “(2)” hours (avoid positioning patients on a pressure ulcer
  - Repositioning should be undertaken to reduce the duration & magnitude of pressure over vulnerable areas[4]
  - Consider right surface with right frequency[1,4]
  - Cushioning devices to maintain alignment /30° side-lying & prevent pressure on bony prominences[2,3]
    - Between pillows and wedges, the wedge system was more effective in reducing pressure in the sacral area (healthy subjects)
    - Between pillows and wedges, wedges maintain lateral position better
  - Assess whether actual offloading has occurred[4]
  - Use lifting device or other aids to reposition & make it easy to achieve the turn[4]



1. McNichol L, et al. J Wound Ostomy Continence Nurse, 2015;42(1):19-37.
2. Bush T, et al. WOCN, 2015;42(4):338-345
3. Kapp S, et al. Int Wound J. 2019;1-7
4. European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention & treatment of pressure ulcers/injuries :Clinical Practice Guideline. Emily Haesler (Ed). EPUAP/NPIAP/PPPIA. 2019

Effect of Varying Positioning Frequencies on PI

- Largest study to date acute care or nursing home
- Pragmatic cluster randomized trial
- 992 Residents (avg 78yrs, 63% women)
- Randomly assigned 1 of 3 positioning intervals-2,3 or 4hrs
- 12-month baseline data, 4-week intervention
- All had 7-inch-high density foam
- Wireless patient monitoring system used
- Measured: PI & staff repositioning compliance

- PI baseline: 5.24%
- PI intervention: 0%
- Higher clinical risk during intervention time period
- Repositioning compliance
  - 4-hour: 95%
  - 3-hour: 90%
  - 2-hour: 80%

Yap TL, et al. *Adv Skin Wound Care*. 2022;35(6):315-325.

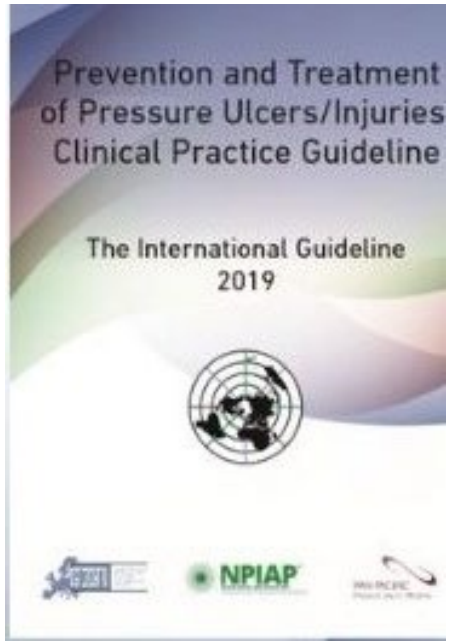
The Correct Way to Position

Fig 2. **The 30-degree tilt**

Shared with permission from Black J 2023

EBP Recommendations to Reduce Shear & Friction

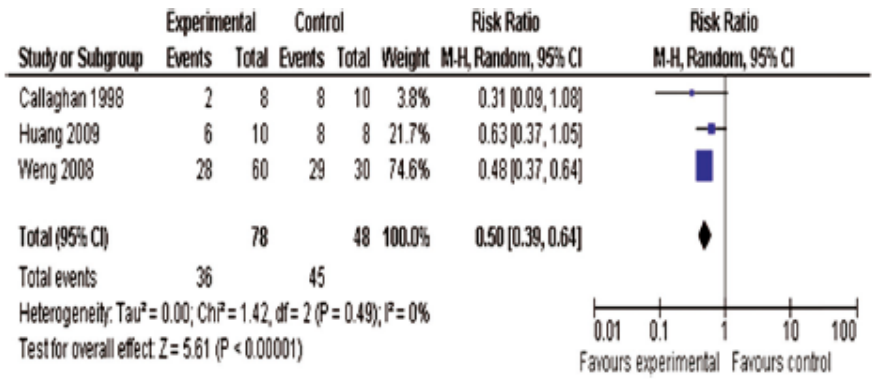
- Loose covers & increased immersion in the support medium increase contact area
- Prophylactic dressings



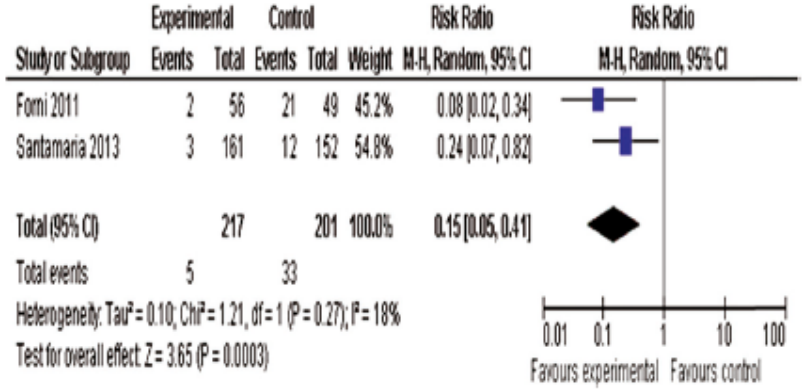
European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention & treatment of pressure ulcers/injuries :Clinical Practice Guideline. Emily Haesler (Ed). EPUAP/NPIAP/PPPIA. 2019

Systematic Review: Use of Prophylactic Dressing in Pressure Injury Prevention

- 21 studies met the criteria for review
- 2 RCTs, 9 had a comparator arm, 5 cohort studies, 1 within-subject design where prophylactic dressings were applied to one trochanter with the other trochanter dressing free



Evaluated nasal bridge device injury prevention

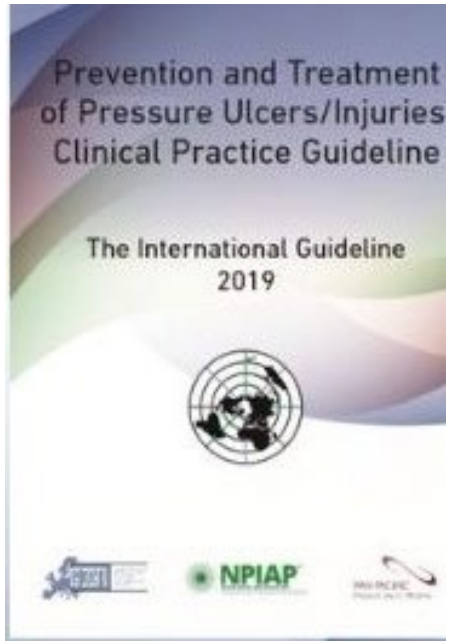


Evaluated sacral pressure injury prevention

Clark M, Black J, et al. Int Wound J 2014; 11:460–471

EBP Recommendations to Reduce Shear & Friction

- Loose covers & increased immersion in the support medium increase contact area
- Prophylactic dressings: emerging science
- Use lifting/transfer devices & other aids to reduce shear & friction.
  - Mechanical lifts
  - Transfer sheets
  - 2-4 person lifts
  - Turn & assist features on beds
- Do not leave moving and handling equip underneath the patient, unless it is specifically designed for this purpose



European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention & treatment of pressure ulcers/injuries :Clinical Practice Guideline. Emily Haesler (Ed). EPUAP/NPIAP/PPPIA. 2019

Facilitators of In Bed Mobility: Cues, Position Systems, Turn Teams

- Reminders helpful/turn clocks, wearable sensors
- Rounding increased repositioning by 30%
- Nursing education
- Position systems
- Wearable sensors and pressure mapping help to assess effective offloading
- Turn teams (internal or external)
  - △ PI 11% vs. 20% with usual care OR .49 (95% CI: 0.27-0.86, p=0.01)

Everett Day S, et al. *Adv Skin Wound Care*. 2022;35(6):344-351.
Avsar P, et al. *J Wound Care*. 2020;29(9):496-508

Specialty Bed

Disposable Glide /Slide Sheets

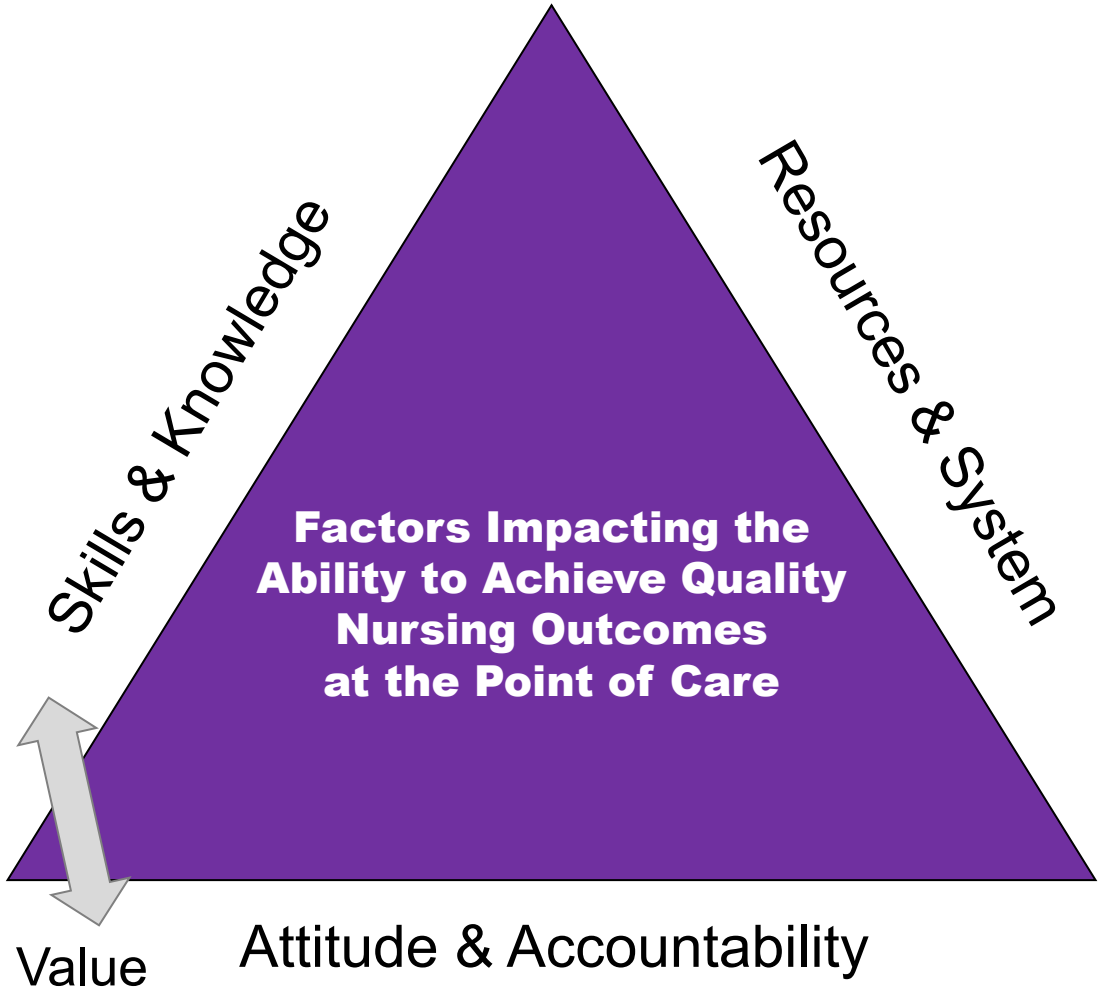
Breathable Shear Reduction Glide Sheet

Current Practice: Turn & Reposition

Draw Sheet/Pillows/Layers of Linen

Lift Device

Achieving the Use of the Evidence for Pressure Injury Reduction



- Resource & System
  - Breathable glide sheet/stays
  - Foam wedges
  - Microclimate control
  - Reduce layers of linen
  - Wick away moisture body pad
  - Protects the caregiver

Vollman KM. Intensive Care Nurse.2013;29(5):250-5

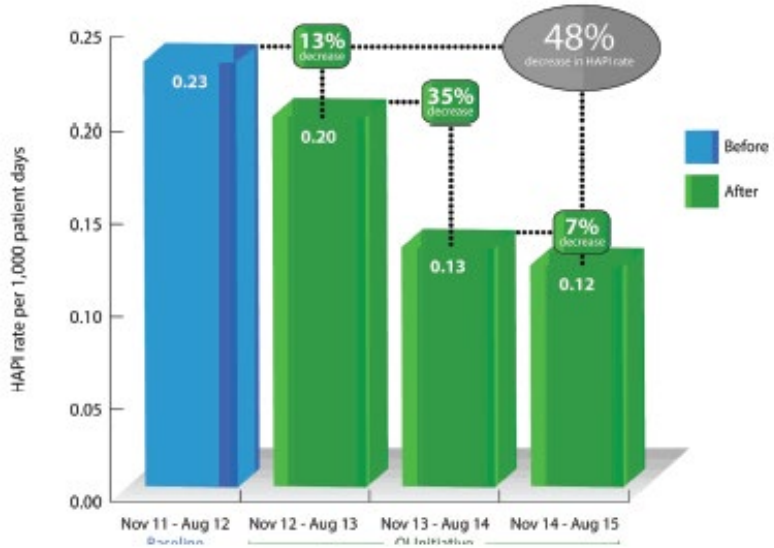
Impact of a Turn & Position Device on PI & Staff Time

- Prospective, QI study (1 SICU & 1 MICU)
- 2 phases
  - SOC: pillows, under pads, standard low air loss bed and additional staff if required
  - Interventional: turn and position system, a large wicking pad (part of the product)
- △ Inclusion criteria: newly admitted, non-ambulatory, required 2 or more to assist with turning/ repositioning
- △ Turning procedures were timed/admitting till ICU discharge
- **Results**
  - No difference in sociodemographic and clinical data between the groups
  - Phase 1: 14 patients (28%) Stage II sacral PI
  - Phase 2: zero sacral PI (p<.0001)
  - Timing:
    - Phase 1: 16.34 mins (range 4-60min) SD= 10.08
    - Phase 2: 3.58 mins (range 1.12-8.48) SD = 2.31 (p=0.0006)

Hall KD, et al. Ostomy Wound Management, Nov 2016:40-44

Reducing HAPI & Patient Handling Injuries

- Compared pre-implementation turning practice: pillows/draw sheet vs turn and position system (breathable glide sheet/foam wedges/wick away pad)
- Baseline: November 2011-August 2012
- Implementation period: November 2012 to August 2015
- 3660 patients
- Compared HAPI rates, patent handling injuries, and cost



PATIENT HANDLING INJURY AND COSTS — 74% reduction

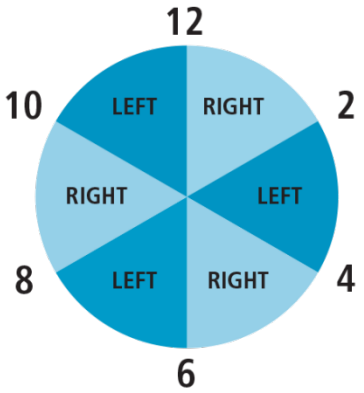
	January 2012 to October 2012 (Before)	November 2012 to August 2013 (After)	November 2013 to August 2014 (After)	November 2014 to August 2015 (After)
Injuries/Cost	19/$427,500	8/$180,000	2/$45,000	5*/$112,500

Average cost calculated by estimating $22,500 per injury.[17]

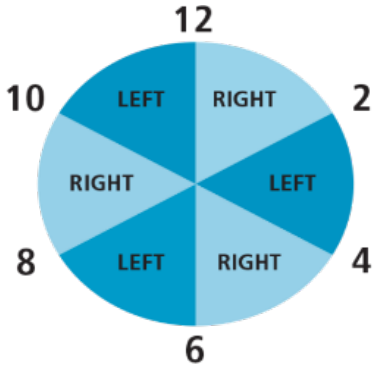
*1 PCI in critical care, 4 PCIs in medical. We were unable to determine if the patients were eligible for the repositioning system.

Way H, Am JSPHM, 2016;6(4):160-165

In-Bed Technology



Transition: In-Bed to Out-of-Bed & Back



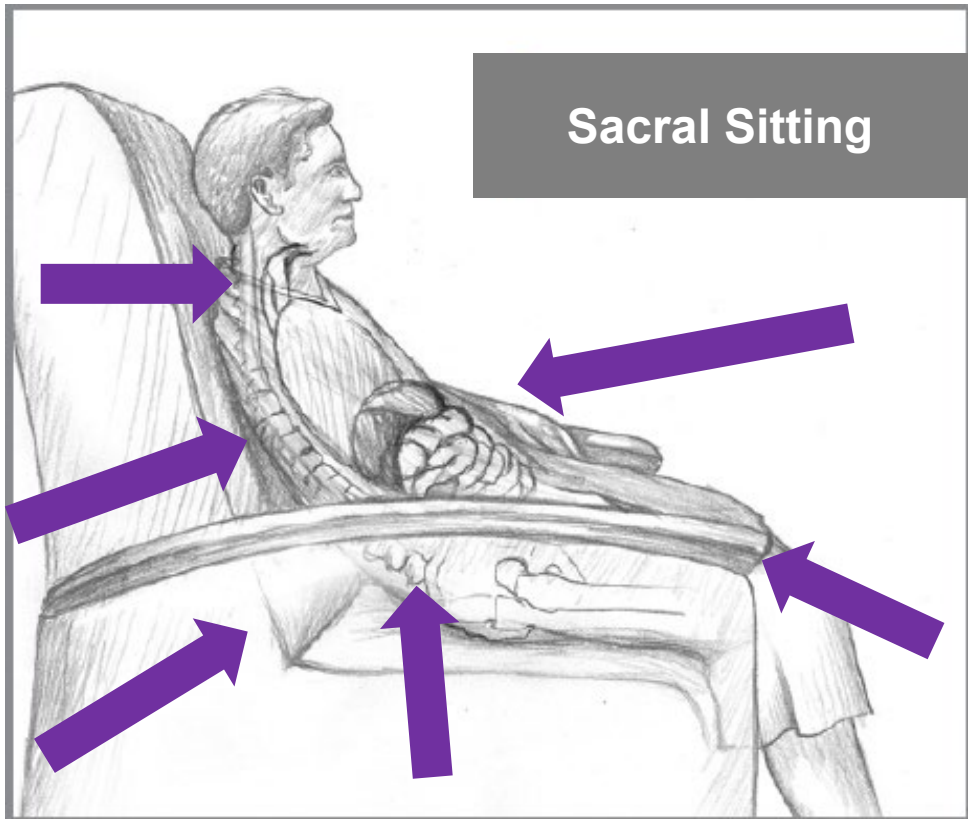
Out-of-Bed Technology

Current seating positioning challenges

Airway & epiglottis compressed

Body alignment

Shear/Friction



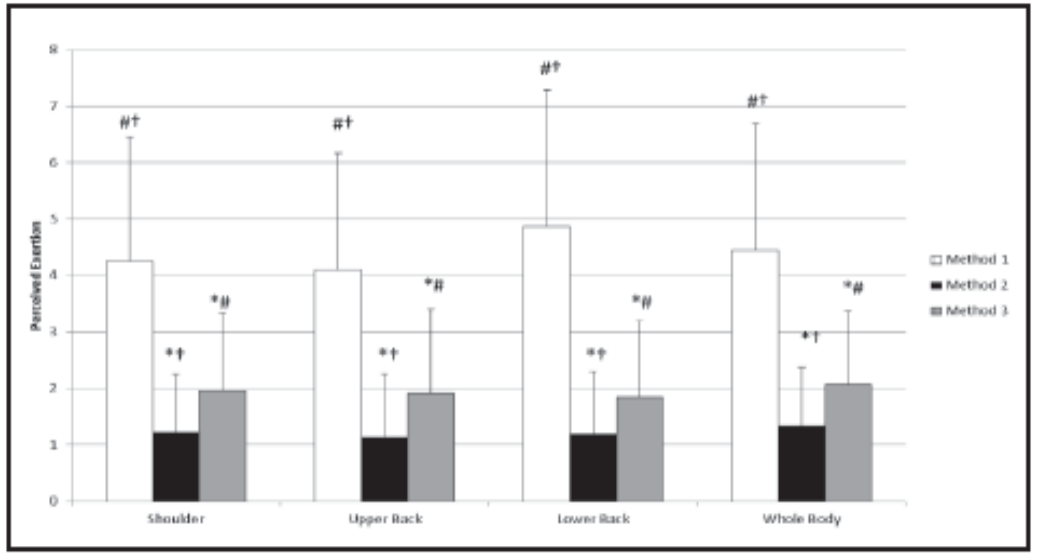
Frequent repositioning & potential caregiver injury

Potential risk of sliding from chair

Sacral pressure

Repositioning patients in chairs:
an improved method (chair positioning device)

- Study the exertion required for 3 methods of repositioning patients in chairs
- 31 caregiver volunteers
- Each one trial of all 3 reposition methods
- Reported perceived exertion using the Borg tool, a validated scale



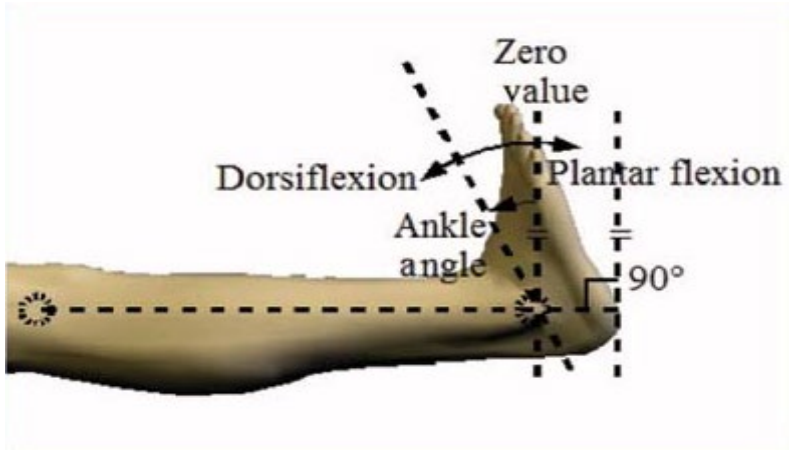
Method 1: 2 caregivers using old method of repositioning
246% greater exertion than chair positioning device
Method 2: 2 caregivers with chair positioning device
Method 3: 1 caregiver with chair positioning device
52% greater exertion than method 2

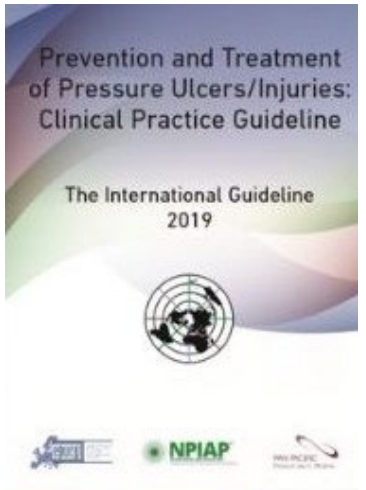
Fragala G, et al. Workplace Health & Safety;61:141-144

Ambulation Assist Devices

EBP Recommendations to Achieve Offloading & Reduce Pressure

- Ensure the heels are free of the bed surface
  - Heel protection devices should elevate the heel completely (off-load) in such a way as to distribute weight along the calf
  - The knee should be in slight flexion
  - Remove device periodically to assess the skin





European Pressure Ulcer Advisory Panel/ National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention & treatment of pressure ulcers/injuries :Clinical Practice Guideline. Emily Haesler (Ed).EPUAP/NPIAP/PPPIA. 2019

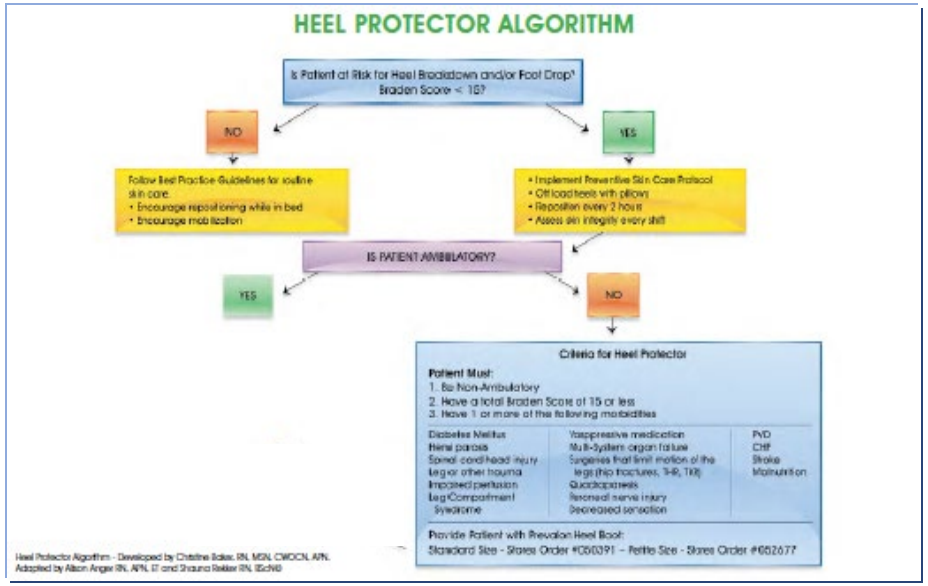
RCT: Prevention of Heel Injuries and Plantar Flexion Contractures

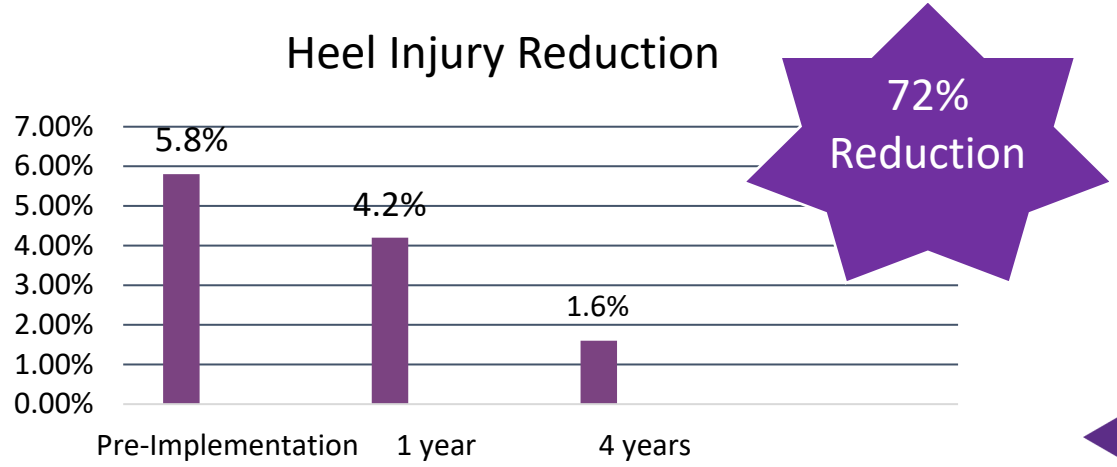
- Surgical intensive care unit, medical intensive care unit, and neurotrauma intensive care unit.
- Inclusion criteria; 5 days of sedation related to care for a critical illness, immobility for 6 to 8 hours before study initiation. Braden $\leq$ 18, mobility subscale $\leq$ 2 & pre-existing PI
- 54 subjects: 37 intervention 19 control
- Measured pressure injury and goniometric scores
- Intervention: Heel protector Control: Pillows
- Results:
  - PI: 0% versus 41% developed by day 2
  - Goniometric scores: Significant day 3 lower goniometric score as well as last study day.
    - 10 patients had improved PFC in intervention group
    - 1 patient had improved PFC in control group

Meyers T, WOCN, 2017;44(5):429-433

Sustainability of Heel Injury Reduction: QI Project

- 490 bed facility
- Evidence-based quality improvement initiative
- 4 tier process
  - Partnership
  - Comprehensive product review
  - Education & engagement
  - Support structures & processes

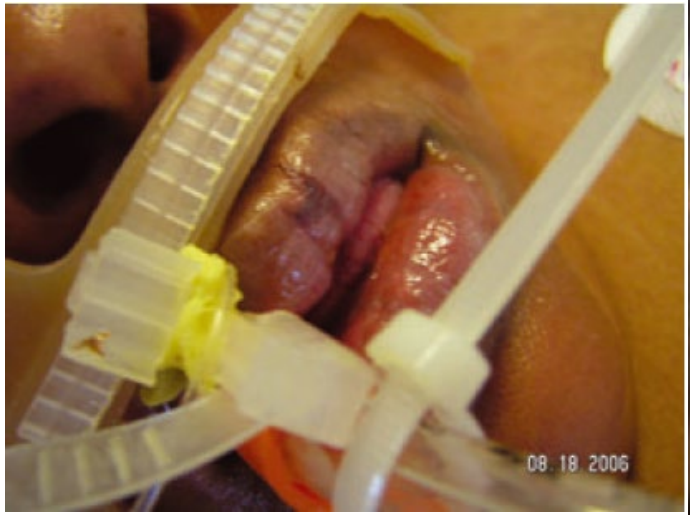




Hanna-Bull D. WOCN, 2016;43(2):129-132

Redistribute Pressure

Redistribute Pressure		
Turn/reposition q 2-3 hours persons who do not have independent bed mobility and as required by individual needs and risk, unless contraindicated (Braden Activity/Mobility score ≤2)		
Use high specification reactive foam or reactive air mattress/overlay for immobile persons (Braden Activity/Mobility score ≤2)		
Use positioning aids that minimize friction/shear (pillows, wedges). Use turn/lift equipment if available. Proper side-lying position with upper leg over/in front of lower leg		
Keep head of bed as flat as possible		
Place silicone multilayer foam dressings on areas of high-risk (i.e., sacrum, lower buttocks, or heels) (Braden Activity/Mobility scores ≤2)		
Elevate heels off bed with pillows, heel devices or boots (Braden Sensory Perception score ≤3)		
Provide adequate repositioning (30 degree) when side lying. Position upper leg forward and support with pillow.		
Use slow, gradual, frequent, small, body shifts when unstable		
Use pressure redistributing seat cushion for persons who cannot adequately reposition independently		
Reposition seated persons q 1 hour		
Consult Physical Therapy for mobilization program when appropriate (Braden Activity/Mobility scores ≤2)		
Consider reminder systems, pressure mapping, motion sensors		
Implement early mobilization program		



10% incidence in a recent metanalysis

- 26% nasal oxygen tubing
- 9% airway pressure masks
- 7.7% sequential compression devices
- 5.6% nasal oxygen prongs
- 5.5percent tracheostomy tubes under flange
- 5% nasogastric tube
- 2.4% cervical collar under the rim

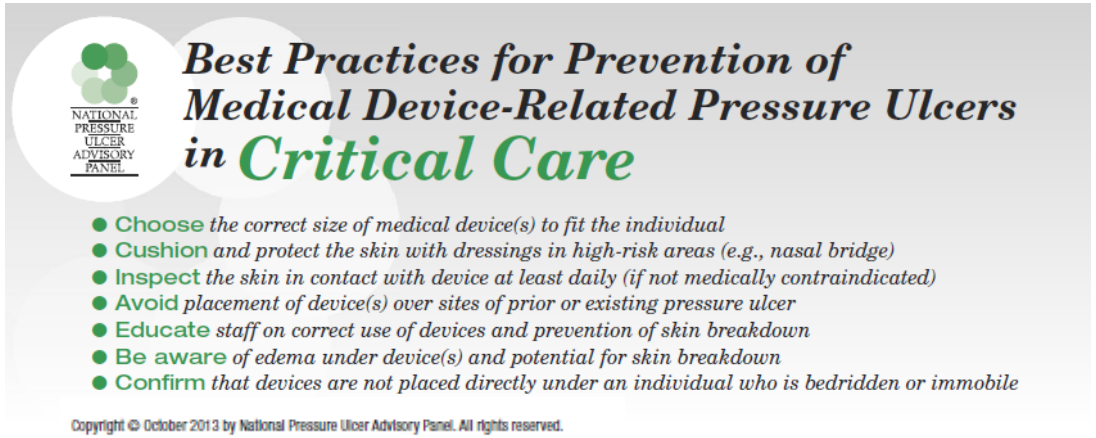
Jackson D, et al. International J of Nursing Studies. 2019;92:109-120

Having a medical device you are 2.4 x more likely to develop a HAPU of any kind (p=0.0008)

Black JM., et al. International Wound J, 2010;7(5)358-365

Prevention of MDR's-HAPI

- Selected based on their ability to cause the least degree of damage from pressure or shear forces
  - use devices made of softer material
- Sized correctly to avoid excessive pressure
  - tension on securement device should be checked regularly and adjusted
- Securement devices that splint the tubes (for NG's) allowing them to float
- Remove as soon as clinical possible
- Skin under device assessed minimum q 12 (more freq if fluid shifts or localized edema seen)
- Devices lifted at frequent intervals or rotated
- Use dressings to cushion medical devices



1. Cooper KD, et al. Amer J of Crit Care. 2020;29(2):150-154

Prevention Strategies for IAD

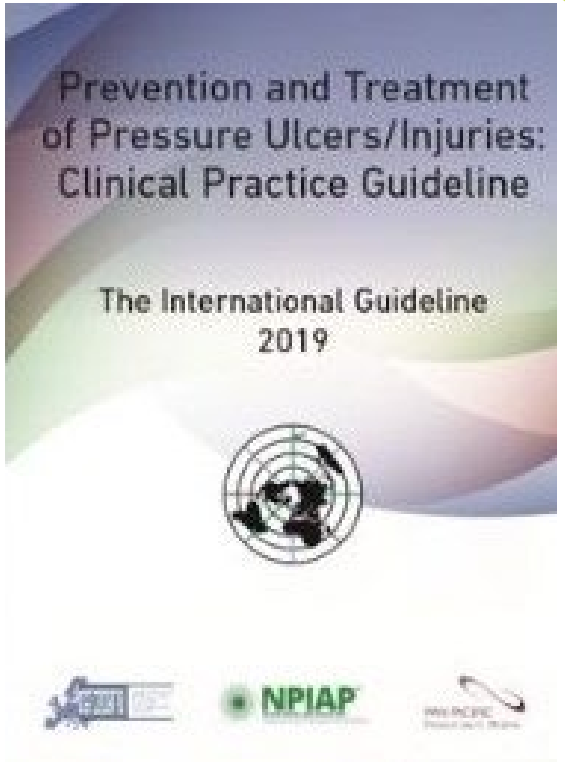
Evidence-Based Components of an IAD Prevention Program

- Skin care products used for prevention or treatment of IAD should be selected based on consideration of individual ingredients in addition to consideration of broad product categories such as cleanser, moisturizer, or skin protectant. (Grade C)
  - A skin protectant or disposable cloth that combines a pH balanced no rinse cleanser, emollient-based moisturizer, and skin protectant is recommended for prevention of IAD in persons with urinary or fecal incontinence and for treatment of IAD, especially when the skin is denuded. (Grade B)
  - Commercially available skin protectants vary in their ability to protect the skin from irritants, prevent maceration, and maintain skin health. More research is needed. (Grade B)

Doughty D, etal. J WOCN. 2012;39(3):303-315

EBP Recommendations to Reduce Injury From Incontinence & Other Forms of Moisture

- Clean the skin as soon as it becomes soiled[2,4]
- Use an incontinence pad and/or briefs that wick away moisture[1,2,4]
- Use a protective cream or ointment[1,2,4]
  - Disposable barrier cloth recommended by IHI & IAD consensus group
- Ensure an appropriate microclimate & breathability[4]
- < 4 layers of linen[3]
- Barrier & wick away material under adipose and breast tissue[2,4]
- Pouching device or a bowel management system[2,4]



1. https://www.ihi.org/Topics/PressureUlcers/Pages/default.aspx
2. Doughty D, et al. JWOCN. 2012;39(3):303-315
3. Williamson R, et al. Ostomy Wound Manage. 2013;59(8):32-41.
4. Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention & treatment of pressure ulcers/injuries :Clinical Practice Guideline. Emily Haesler (Ed). EPUAP/NPIAP/PPPIA. 2019

IAD/HAPU Reduction Study

- Prospective, descriptive study
- 2 Neuro units
- Phase 1: prevalence of incontinence & incidence of IAD & HAPU
- Phase 2: Intervention
  - Use of a 1 step cleanser/barrier product
  - Education on IAD/HAPU
- Results:
  - Phase 1: incontinent 42.5%, IAD 29.4%, HAPU 29.4%, LOS 7.3 (2-14 days), Braden 14.4
  - Phase 2: incontinent 54.3%, IAD & HAPU 0, LOS 7.4 (2-14), Braden 12.74

Hall K, et al. Ostomy Wound Management, 2015;61(7):26-30

IAD Prevention Practices: Implementation Science Approach

- Identified evidence gaps in previous study (4 hospitals-250 patients
- Using implementation science approach to introduce evidence based IAD practices
- IAD committee: education about correct pad sizing, washable and disposable pads and plastic sheets removed from the wards. All in one barrier cloth that cleans, protects and moisturizes was introduced
- Nurses from wards ask to participate in 1 of 6 focus groups post implementation

Barakat-Johnson M, et al. Ostomy Wound Management. 2018;64(12):16-28

IAD Prevention Practices: Results

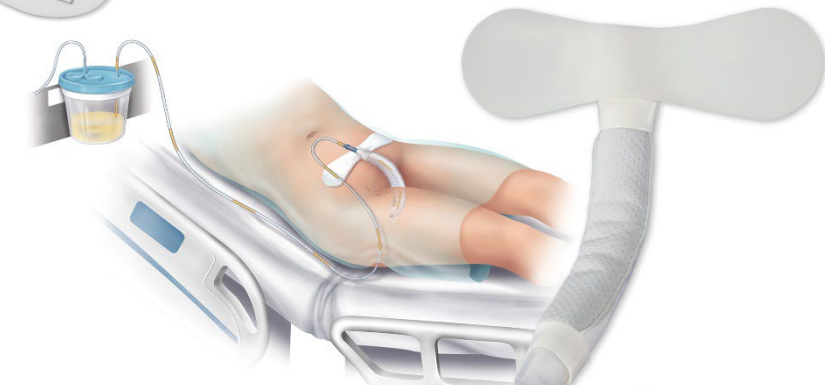
Variable	Pre-Implementation N=250	Post Implementation N=259	P value
IAD	23 (9.2%)	6 (2.3%)	.015
HAPI	9 (3.6%)	2 (0.8%)	.034
Bed protection use	154 (64.7%)	6 (2.3%)	<.01
Continent patients with incontinent products	73 (29.2%)	28 (10.8%)	<.01

Nurse Focus Groups: 31 nurses, 4 themes

- Benefit to patient: improved skin condition, patient comfort
- Usability: fewer steps
- Problems encountered: not seeing barrier in place
- Related factors: confusion between IAD and pressure injury

Barakat-Johnson M, et al. Ostomy Wound Management. 2018;64(12):16-28

Urine and Fecal Containment Device



Preventive Skin Care & Managing Moisture

Preventative Skin Care- Manage moisture/Incontinence
Cleanse and apply appropriate moisture barriers promptly after each incontinent episode
Avoid use of alkaline soaps/cleansers
Consider urinary/fecal management systems for high-risk persons
Single layer, breathable, high absorbency pads for incontinence
Consider using low friction textiles
Apply wicking material to skin folds when appropriate

Standardized Pressure Injury Prevention Protocol Checklist (Adult 2.0). www.npiap.com

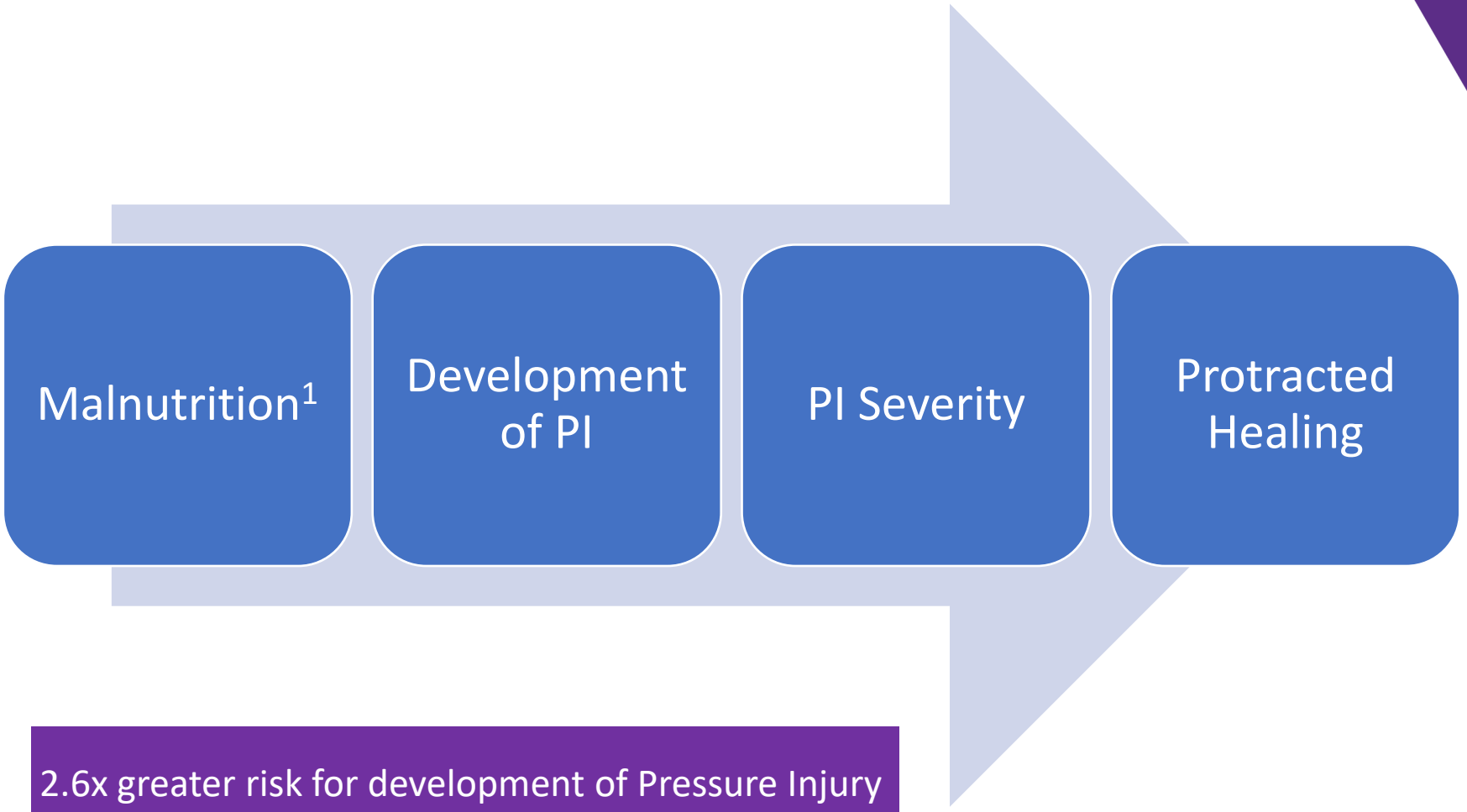
Nutrition: Critical To Prevention & Healing

Malnutrition

- A condition in which a nutritional deficiency or an excess or imbalance of energy protein and other new nutrients cause measurable adverse effects on tissues, body structure, body function and clinical outcomes
- Adult malnutrition is defined as the presence of two or more of the following characteristics
  - insufficient energy intake
  - unintended weight loss
  - loss of subcutaneous fat
  - localized or generalized fluid accumulation
  - decrease functional status

European Pressure Ulcer Advisory Panel/ National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention & treatment of pressure ulcers/injuries :Clinical Practice Guideline. Emily Haesler (Ed).EPUAP/NPIAP/PPPIA. 2019

Malnutrition Consequences



2.6x greater risk for development of Pressure Injury being Malnourished[2]

1. European Pressure Ulcer Advisory Panel/ National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention & treatment of pressure ulcers/injuries :Clinical Practice Guideline. Emily Haesler (Ed).EPUAP/NPIAP/PPPIA. 2019
2. Banks M et al. Nut Clin Pract, 2010;26(9):896-901

Nutrition

Nutrition		
Screen for malnutrition using a validated tool on admission		
Consult dietitian for persons with or at risk of malnutrition, decreased nutrient intake, NPO > 48 hours or presence of stage 2 or greater PI (Braden Nutrition Score ≤2)		
Provide additional calories, protein, fluids, and additional nutrients (i.e. multi-vitamin, arginine, glutamine, HMB) per nutrition plan of care or as appropriate		
Continue to regularly assess goals and consult dietitian as needed		

Validated Nutritional Risk Screening Tool

Other validated tool recommended is the MUST

Mini Nutritional Assessment

MNA®

Nestlé Nutrition Institute

Last name: First name:

Sex: Age: Weight, kg: Height, cm: Date:

Complete the screen by filling in the boxes with the appropriate numbers. Total the numbers for the final screening score.

Screening

A Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?
0 = severe decrease in food intake
1 = moderate decrease in food intake
2 = no decrease in food intake ☐

B Weight loss during the last 3 months
0 = weight loss greater than 3 kg (6.6 lbs)
1 = does not know
2 = weight loss between 1 and 3 kg (2.2 and 6.6 lbs)
3 = no weight loss ☐

C Mobility
0 = bed or chair bound
1 = able to get out of bed / chair but does not go out
2 = goes out ☐

D Has suffered psychological stress or acute disease in the past 3 months?
0 = yes 2 = no ☐

E Neuropsychological problems
0 = severe dementia or depression
1 = mild dementia
2 = no psychological problems ☐

F1 Body Mass Index (BMI) (weight in kg) / (height in m)^2 ☐
0 = BMI less than 19
1 = BMI 19 to less than 21
2 = BMI 21 to less than 23
3 = BMI 23 or greater ☐

IF BMI IS NOT AVAILABLE, REPLACE QUESTION F1 WITH QUESTION F2.
DO NOT ANSWER QUESTION F2 IF QUESTION F1 IS ALREADY COMPLETED.

F2 Calf circumference (CC) in cm
0 = CC less than 31
3 = CC 31 or greater ☐

Screening score ☐☐
(max. 14 points)

12-14 points: ☐ Normal nutritional status
8-11 points: ☐ At risk of malnutrition
0-7 points: ☐ Malnourished

Save Print Reset

Ref. Vellas B, Villars H, Abellan G, et al. *Overview of the MNA® - Its History and Challenges.* J Nutr Health Aging 2006;10:456-465.
Rubenstein LZ, Harker JO, Salva A, Guigoz Y, Vellas B. *Screening for Undernutrition in Geriatric Practice: Developing the Short-Form Mini Nutritional Assessment (MNA-SF).* J. Geront 2001;56A: M366-377.
Guigoz Y. *The Mini-Nutritional Assessment (MNA®) Review of the Literature - What does it tell us?* J Nutr Health Aging 2006; 10:466-487.
Kaiser MJ, Bauer JM, Ramsch C, et al. *Validation of the Mini Nutritional Assessment Short-Form (MNA®-SF): A practical tool for identification of nutritional status.* J Nutr Health Aging 2009; 13:782-788.

Energy and Protein Intake for Individuals at Risk for Pressure Injuries-It is Good Clinical Practice to Increase

Aspen Guidelines 2017	Target Population	Energy Recommendation
	Critically ill adults	Use indirect telemetry to estimate energy needs, if unavailable use appropriate predictive equation or weight-based formula 25 to 30 kcalories/kg/day
	Critically Ill individuals with obesity	BMI > 30 to 50: 11 to 14 kcalories/ kg actual body weight/ day BMI > 50: 22-25 OK calories/kg/ ideal body weight/ day
Aspen Guidelines 2017	Target Population	Protein Recommendation
	Critically ill adults	1.2 grams/ kilogram body weight/ day
	Critically ill individuals with obesity	BMI > 30 to 40: 2.0 grams/kg ideal body weight/day BMI >40: 2.5 grams/ kg ideal body weight/ day
ESPEN Guidelines 2018	Target Population	Energy & Protein Recommendation
	Older adults	30 Kcalories/ kg body weight/ day, individually adjusted based on nutritional assessment 1.2 g/kg/body weight/day

European Pressure Ulcer Advisory Panel/ National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance. Prevention & treatment of pressure ulcers/injuries :Clinical Practice Guideline. Emily Haesler (Ed).EPUAP/NPIAP/PPPIA. 2019

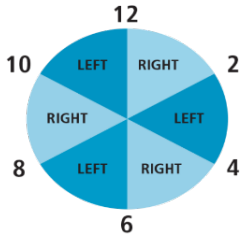
Nutrition

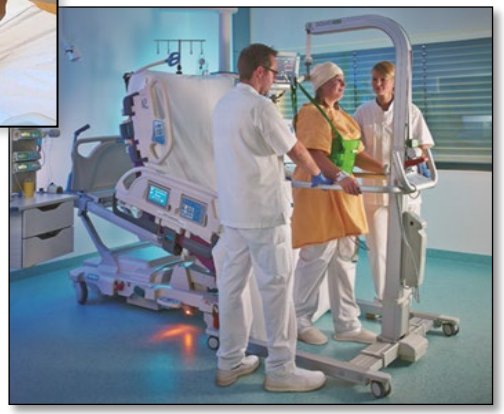
Nutrition		
Screen for malnutrition using a validated tool on admission		
Consult dietitian for persons with or at risk of malnutrition, decreased nutrient intake, NPO > 48 hours or presence of stage 2 or greater PI (Braden Nutrition Score ≤2)		
Provide additional calories, protein, fluids, and additional nutrients (i.e. multi-vitamin, arginine, glutamine, HMB) per nutrition plan of care or as appropriate		
Continue to regularly assess goals and consult dietitian as needed		

Unit ____	Standardized Pressure Injury Prevention Protocol Checklist (SPIPP- Adult) 2.0	Date_____
ITEM	**Completed Yes/No**	**COMMENT**
Assess risk factors for pressure injury to guide risk-based prevention		
Significant current or anticipated mobility problems		
Use a structured risk assessment approach (e.g., Braden or other validated risk tool) on admission		
Reassess risk q shift and with significant change in condition		
Patient/family informed of PI risk and prevention plan		
Additional risk factors considered: Previous PI__, Localized pain__, Diabetes__, Poor perfusion__, Vasopressors__, Oxygenation deficits__, Increased Temp__, Advanced Age__, Spinal cord injury__, Neuropathy__, Surgery/procedure duration > 2 hrs.__, Critical illness__, Organ Failure__, Sepsis__, Mechanical vent__, Medical devices__, Sedation__, Dark skin tone		
Assess Skin/Tissue for signs of skin damage and pressure injury		
Assess skin (comprehensive, visual, palpation) upon admission and q shift for erythema, discoloration, edema, and temperature		Location(s):
Assess skin under medical devices q shift		Device(s):
Inspect heels q shift		
In people of color: Ensure adequate lighting and moisten/moisturize skin to augment visual inspection		
Consider enhanced skin assessment methods- thermography, SEM, skin color chart		
Preventative Skin Care- Manage moisture/Incontinence		
Cleanse and apply appropriate moisture barriers promptly after each incontinent episode		
Avoid use of alkaline soaps/cleansers		
Consider urinary/fecal management systems for high-risk persons		
Single layer, breathable, high absorbency pads for incontinence		
Consider using low friction textiles		
Apply wicking material to skin folds when appropriate		
Redistribute Pressure		
Turn/reposition q 2-3 hours persons who do not have independent bed mobility and as required by individual needs and risk, unless contraindicated (Braden Activity/Mobility score ≤2)		
Use high specification reactive foam or reactive air mattress/overlay for immobile persons (Braden Activity/Mobility score ≤2)		
Use positioning aids that minimize friction/shear (pillows, wedges). Use turn/lift equipment if available. Proper side-lying position with upper leg over/in front of lower leg		
Keep head of bed as flat as possible		
Place silicone multilayer foam dressings on areas of high-risk (i.e., sacrum, lower buttocks, or heels) (Braden Activity/Mobility scores ≤2)		
Elevate heels off bed with pillows, heel devices or boots (Braden Sensory Perception score ≤3)		
Provide adequate repositioning (30 degree) when side lying. Position upper leg forward and support with pillow.		
Use slow, gradual, frequent, small, body shifts when unstable		
Use pressure redistributing seat cushion for persons who cannot adequately reposition independently		
Reposition seated persons q 1 hour		
Consult Physical Therapy for mobilization program when appropriate (Braden Activity/Mobility scores ≤2)		
Consider reminder systems, pressure mapping, motion sensors		
Implement early mobilization program		
Nutrition		
Screen for malnutrition using a validated tool on admission		
Consult dietitian for persons with or at risk of malnutrition, decreased nutrient intake, NPO > 48 hours or presence of stage 2 or greater PI (Braden Nutrition Score ≤2)		
Provide additional calories, protein, fluids, and additional nutrients (i.e. multi-vitamin, arginine, glutamine, HMB) per nutrition plan of care or as appropriate		
Continue to regularly assess goals and consult dietitian as needed		


"Even if you are on the right track, you will get run over if you just sit there."
Will Rogers

Progressive Mobility + Caregiver Safety + Skin Safety





Challenges to Mobilizing Patients

- Potentially Modifiable Barriers
  - Patient – related barriers (50%)
    - Hemodynamic instability, ICU devices, physical & neuropsych
  - Structural (18%)
    - Human or technological Resources
  - ICU culture (18%)
    - Knowledge/ Priority/ Habits
  - Process related (14%)
    - Service delivery/ lack of coordination
    - Clinician function

Dubb R, et a;l. Ann Am Thorac Soc. 2016;13(5):724-730.

Decision-Making Tree for Patients Who Are Hemodynamically Unstable With Movement

Screen for mobility readiness within 8 hrs of admission to ICU & daily initiate in-bed mobility strategies as soon as possible

Is the patient hemodynamically unstable with manual turning?
- O_2 saturation $\leq$ 90%
- New onset cardiac arrhythmias or ischemia
- HR < 60 <120
- MAP < 55 >140
- SPB < 90 >180
- New or increasing vasopressor infusion

Yes →

Is the patient still hemodynamically unstable after allowing 5-10 minutes' adaption post-position change before determining tolerance?

Yes →

Screen for mobility readiness within 8 hours of admission to ICU & daily initiate in-bed mobility strategies as soon as possible

Yes →

Has the manual position turn or HOB elevation been performed slowly?

Yes →

Initiate continuous lateral rotation therapy via a protocol to train the patient to tolerate turning

No →

Begin in-bed mobility techniques and progress out-of-bed mobility as the patient tolerates

No →

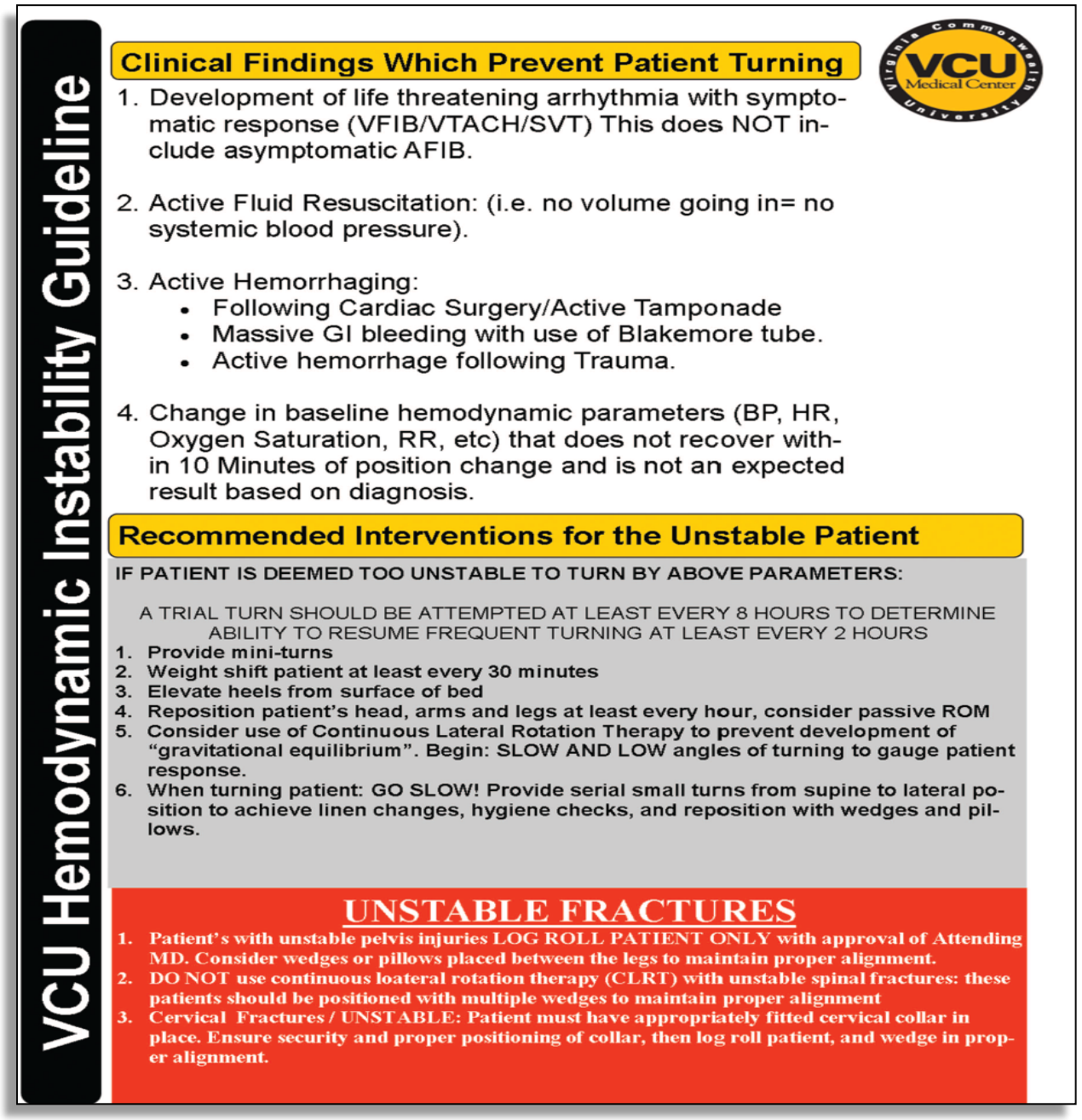
Allow the patient a minimum of 10 minutes of rest between activities, then try again to determine tolerance

No →

Try the position turn or HOB maneuver slowly to allow adaption of cardiovascular response to the inner ear position change

HOB = Head of Bed
HR = Heart Rate
MAP = Mean Arterial Pressure
SPB = Systolic Blood Pressure

Vollman KM. Crit Care Nurs Q. 2013;36:17-27.

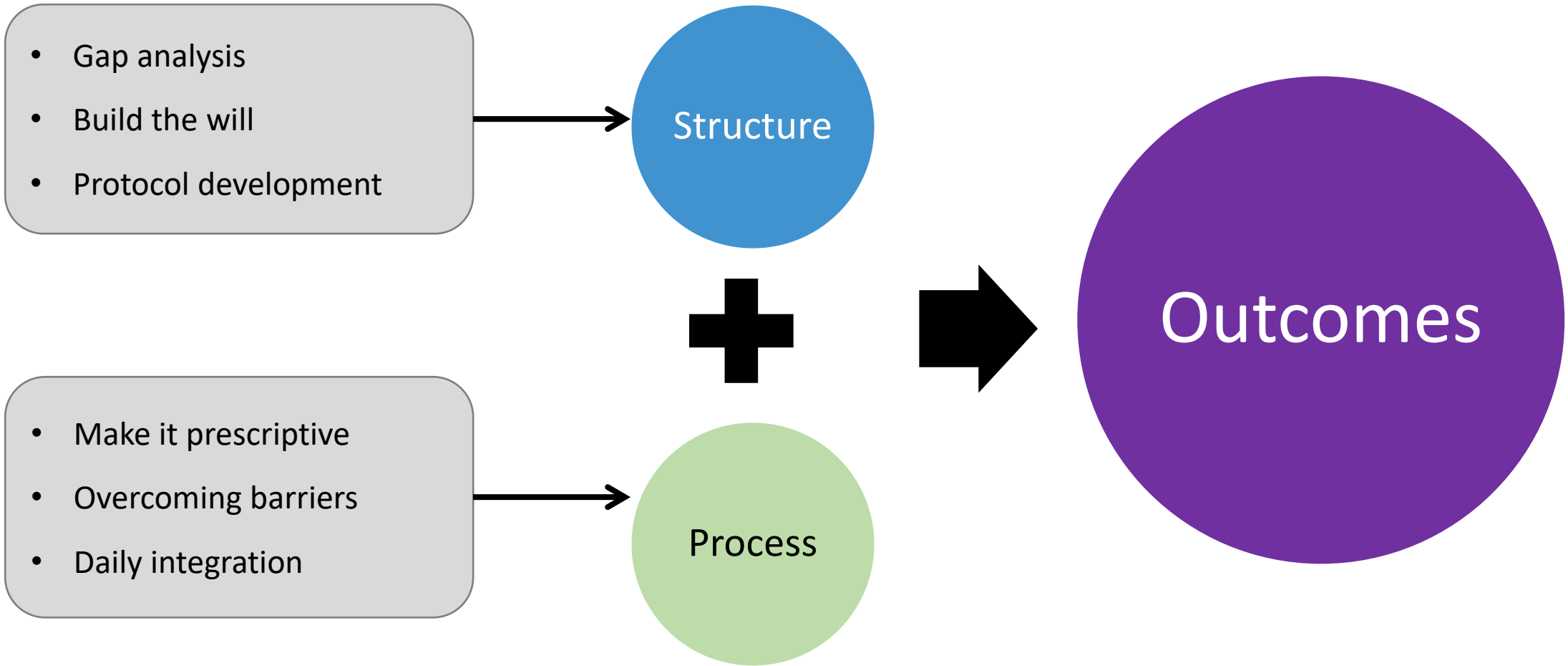


Example Guideline

Brindle TC, et al. WOCN, 2013;40(3):254-267

How Do We Make it Happen?

Driving Change



The Goal: Patient & Caregiver Safety

Black J, et al. Crit Care Nurs Q. 2018;41(3):226-239.

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ADVANCING NURSING THROUGH KNOWLEDGE & INNOVATION

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