

EPUAP2017

The 19th Annual Meeting of the
European Pressure Ulcer Advisory Panel

20 – 22 September 2017
Belfast, Northern Ireland

www.epuap2017.org



PROGRAMME AND ABSTRACT BOOK

**One Voice for Pressure Ulcer
Prevention and Treatment**
Challenges and Opportunities
for Practice, Research and Education

EPUAP 2017 organised by the European
Pressure Ulcer Advisory Panel in partnership
with the Tissue Viability Nurse Network
(Northern Ireland) and the Wound Management
Association of Ireland.



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Dear colleagues, Dear friends,

On behalf of all of us at the European Pressure Ulcer Advisory Panel (EPUAP) we wish you a warm welcome to our 19th Annual Meeting.

This year's conference is hosted by the Belfast Health & Social Care Trust, Belfast and it is organised in partnership with the Tissue Viability Nurse Network, Northern Ireland and the Wound Management Association of Ireland.

More than 500 experts from 30 countries in Europe, United States of America, Asia, Australia and the Middle East are attending the conference. Over 100 abstracts were submitted and more than 40 companies will be exhibiting in the next 3 days. The quality of the scientific programme has been acknowledged by the European Accreditation Council for Continuing Medical Education (EACCME) and 14 European CME Credits (ECMEC) assigned.

Like every year, the aim of the conference is to bring together clinical care practitioners, researchers and people from industry, to discuss the current status of the problem in Europe and the world and to discuss new developments in pressure ulcer prevention, treatment and care. The overall theme of this year's conference is **“One Voice for Pressure Ulcer Prevention and Treatment: Challenges and Opportunities for Practice, Research and Education”**. The main topics of the scientific programme will include:

- Debate about pressure ulcer terminology and classification
- Basic pressure ulcer research
- Update about the guideline implementation
- Patient involvement in pressure ulcer practice, research, guideline development
- Core outcome measures and measurement instruments for pressure ulcer research
- Pressure ulcer health economic research and guidelines to perform these studies
- Quality improvement projects
- Wound monitoring and documenting
- Crossing the Hospital-Community Interface
- Awards sessions

In addition to an interesting scientific programme, there are the two social events of the conference: the welcome reception hosted by the Belfast City Hall and the conference dinner held at the Titanic Museum.

Belfast is the capital and largest city of Northern Ireland. It was a centre of the Irish linen, tobacco-processing, rope-making and shipbuilding industries: in the early 20th century, Harland and Wolff, which built the RMS Titanic, was the world's biggest and most productive shipyard. Belfast played a key role in the Industrial Revolution, and was a global industrial centre until the latter half of the 20th century. It has sustained a major aerospace and missiles industry since the mid-1930s.

Today, Belfast remains a centre for industry, as well as the arts, higher education, business, and law, and is the economic engine of Northern Ireland. Over the last 20 years it has seen substantial economic and commercial growth, with considerable expansion and regeneration notably around Victoria Square, the Cathedral Quarter, Titanic and the Waterfront Hall.

The city is packed with history, culture, exciting events and great food... you might even spot a ship or two! You will also find some of the friendliest people you will ever meet.

Welcome to Belfast and we hope you enjoy the craic!

Kind regards,

Dr. Jeannie Donnelly; *Chair of EPUAP 2017*

Prof. Lisette Schoonhoven; *President of EPUAP*

Prof. Dimitri Beeckman; *Chair of the EPUAP Scientific Committee*

Prof. Jane Nixon; *President-Elect of EPUAP*



The European Pressure Ulcer Advisory Panel (EPUAP) was established in London in December 1996 to lead and support all European countries in the efforts to prevent and treat pressure ulcers.

A very important activity for the EPUAP is our annual conference. These meetings are aimed at bringing together clinical care practitioners, researchers and people from industry, to discuss the current status of the problem in Europe and the world and to discuss new developments in pressure ulcer prevention, treatment and care.

The mission

To provide the relief of persons suffering from or at risk of pressure ulcers through:

- research in prevention and treatment of pressure ulcers
- raising awareness on the importance of prevention and treatment of pressure ulcers
- influencing pressure ulcer policy in all European countries
- working towards an adequate patient centered and cost effective pressure ulcer care

www.epuap.org

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Niamh McLain, *Wound Management Association of Ireland (WMAI)*
Joan Rogan, *Belfast Health & Social Care Trust*

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About the Tissue Viability Nurse Network Northern Ireland (TVNN NI)



The TVNN NI was established in 1998. Membership is voluntary and consists of TVN specialists from all health care sectors including independent providers.

Over all aims:

- To provide a means of communication between members working in isolation.
- To support fellow clinicians in a safe environment.
- To promote innovation and evidence based wound care.
- To disseminate publications related to Tissue Viability and Wound Management.
- To promote and provide expertise in wound care through the provision of multi-professional education to all grades of staff.



About the Wound Management Association of Ireland (WMAI)



The Wound Management Association of Ireland was established in May 1996 by a multidisciplinary group of healthcare professionals interested in raising the profile of wound care within Ireland.

The Wound Management Association is a voluntary non profitable organization whose main objectives are:

- To promote a multi-professional approach to Wound Management
- To promote the highest standard of Wound Management through education
- To promote research into all aspects of Wound Management
- To disseminate reports and publications relating to the work of the association



See the programmes for the industry satellite symposia and workshops at pages 92 and 93.

Wednesday, 20 September 2017				
Time	Registration area			
08:00	Registration, badge and bag collection			
08:00 - 09:30	Morning coffee & tea (Riverside Foyer and exhibition area)			
Plenary session: Hall 2				
09:30 - 10:30	Opening Ceremony <i>Chairs: Jeannie Donnelly, Lisette Schoonhoven</i> <ul style="list-style-type: none"> Welcome by Dr Michael McBride, Chief Medical Officer for Northern Ireland Welcome by Mrs Charlotte McArdle, Chief Nursing Officer for Northern Ireland Opening by the EPUAP President and the EPUAP 2017 Chair 			
10:30 - 12:00	Key session 1: Pressure ulcer terminology and classification <i>Chairs: Jeannie Donnelly, Lisette Schoonhoven</i> <ul style="list-style-type: none"> Outcome and next steps in the international debate on pressure ulcer terminology and classification; <i>Jan Kottner</i> Device related pressure ulcers; <i>Joyce Black</i> A common language for pressure ulcers: The Outcomes for Pressure Ulcer Trials (OUTPUTS) project; <i>Katrin Balzer</i> A Cochrane review on incontinence-associated dermatitis (IAD) for making the case for Core Outcome Sets (COS) in clinical trials in wound care; <i>Dimitri Beekman</i> 			
12:00 - 13:15	Lunch break, exhibition and poster viewing (in the exhibition area)			
	Hall 2A	Hall 2B	Meeting room 1	Meeting room 3
13:15 - 14:45	Key session 2: Journal of Tissue Viability & Journal of Clinical Biomechanics Awards <i>Chairs: Dan Bader, Yohan Payan</i> <ul style="list-style-type: none"> Introduction to the Awards by the Co-Chair of the EPUAP Scientific Committee Surfaces for health: Early detection of skin damage using biomarkers; <i>Jibbe Soeters</i> Musculoskeletal finite element model of the foot: Loading and direct dynamic validation; <i>Antoine Perrier</i> Real world evidence of HAPU reduction using a novel early detection device measuring Sub-Epidermal Moisture (SEM); <i>Rachael Lester</i> Assessment and consideration of foot risk factors is essential to proactively prevent hospital acquired heel pressure injuries; <i>Jo Scheepers</i> 	Key session 3: Complexities of care (clinical session) <i>Chairs: Susanne Coleman, Jeannie Donnelly</i> <ul style="list-style-type: none"> Community pressure ulcer initiatives; <i>Fionnuala Gallagher</i> Pressure ulcer prevention: Focus on health care assistant education; <i>Lorna Semple</i> Pressure ulcer prevention in intensive care; <i>Steven Smet</i> Pressure ulcer prevention in paediatrics; <i>Guido Ciprandi</i> 	Industry workshop (13:15 - 14:15)	
14:45 - 15:15	Posters presentation (exhibition area)			
14:45 - 15:45	Coffee break and exhibition viewing			
15:45 - 16:45	Key session 4: Recognizing and managing risk factors <i>Chairs: Katrin Balzer, Niamh McLain</i> <ul style="list-style-type: none"> Nutrition and hydration; <i>Angela Small</i> 'Skin status', a risk factor for pressure ulcer development; <i>Jane Nixon</i> Risk assessment; <i>Zena Moore</i> Malnutrition as a precursor of pressure injuries; <i>Mary Litchford</i> 	Industry workshop	Key session 5: Seating (1) <i>Chairs: Shelley Crawford, Cees Oomens</i> <ul style="list-style-type: none"> Pressure ulcer prevention: What do healthcare professionals, patients and carers need to know?; <i>Declan Patton, Alison Porter-Armstrong</i> Repositioning for pressure ulcer prevention in the seated individual; <i>Menna Van Etten</i> "To sit or not to sit" sitting individuals with pressure ulcers; <i>Darren Hammond</i> 	Key session 6: EPUAP 2017 Quality Improvement Projects Awards <i>Chairs: Dimitri Beekman, Lisette Schoonhoven</i> <ul style="list-style-type: none"> Introduction to the Awards by the EPUAP President Tissue Viability Society guidelines for assessing seating and posture: Understanding the association between pressure ulcers and sitting in adults; <i>Carol Bartley, Melanie Stephens</i> Improving pressure damage detection in the community using continuous pressure monitoring of patients; <i>Nicci Aylward-Wotton</i> Zero Heroes: Working together to achieve no hospital acquired pressure ulcers; <i>Aoife McDonnell</i> Systematic effort reduces pressure ulcers with 50%; <i>Aase Fremmelevholm</i>
16:45 - 17:45	Free paper session 1: Pressure ulcers: Implementation science and education <i>Chairs: Christine Lindholm, Steven Smet</i> <ul style="list-style-type: none"> Attitude of nurses and nursing students towards the prevention of incontinence-associated dermatitis: A psychometric instrument validation study; <i>Nele Van Damme</i> A realist evaluation of pressure ulcer risk assessment instrument use in clinical practice; <i>Susanne Coleman</i> Sustainability of a multi-faceted intervention to implement evidence-based pressure ulcer prevention; <i>Eva Svigg</i> Wound management training programme for health care support workers; <i>Linda Fennel</i> 	Industry workshop (17:00 - 18:00)	Free paper session 2 : Basic science: Biomechanics and aetiology <i>Chairs: Cees Oomens, Yohan Payan</i> (16:45 - 18:00) <ul style="list-style-type: none"> Surfaces for health: In-vivo measurement of the effect of shear and pressure on skin viability; <i>Iris Hoogendoorn</i> Surfaces for health: On the relationship between surface texture and shear; <i>Michel Klaassen</i> Spatial effects of indentation induced deep tissue injury; <i>Willeke Traa</i> Incidence of skin pressure ulcers using cyclic pressure application in diet-induced model of skin adiposity in mice; <i>Dominique Sigaud-Roussel</i> Does posture influence biomechanics and physiological parameters on participants supported on an intelligent mattress; <i>Peter Worsley</i> 	Free paper session 3: Innovations in pressure ulcer prevention and treatment & Impact of pressure ulcers on patients, carers and society <i>Chairs: Maarit Ahtiala, Jan Kottner</i> <ul style="list-style-type: none"> National audit of pressure ulcers and incontinence-associated dermatitis: Cross-sectional survey in Wales; <i>Michael Clark</i> Extensive multifocal pressure ulcers in a young female patient bedridden due to multiple sclerosis: Case study; <i>Marcin Malka</i> Prevention of pressure ulcers with a static air support surface: A systematic review; <i>Brecht Serraes</i> The effects of bacterial fragments and antioxidants on cell resilience to mechanical stress; <i>Lisa Tucker-Kellogg</i>
19:00	Welcome reception at the Belfast City Hall			



See the programmes for the industry satellite symposia and workshops at pages 92 and 93.

Thursday, 21 September 2017				
Time	Registration area			
08:00	Registration, badge and bag collection			
	Hall 2A	Hall 2B	Meeting room 1	Meeting room 3
08:00 - 09:00	<p>Free paper session 4: Pressure ulcer prevention and management in specific patient groups (paediatrics, surgery, spinal cord, injury, ER, older persons, palliative care, etc.) (1) <i>Chairs: Oonagh Galway, Rolf Jelnes</i></p> <ul style="list-style-type: none"> The effects of cervical collar design and strap tension on tissue status reflected in biomechanics parameters and biomarker response; <i>Peter Worsley</i> Hospital acquired pressure ulcers increase the risk of adverse outcome in critically ill patients; <i>Maarit Ahtiala</i> Consistent practices in prevention of pressure ulcers; <i>Sirpa Mäki-Turja-Rostedt</i> Improving pressure ulcer prevention in nursing homes; <i>Michael Clark</i> 	<p>Industry satellite symposium</p>		<p>Free paper session 5: Pressure ulcer prevention and management in specific patient groups (paediatrics, surgery, spinal cord, injury, ER, older persons, palliative care, etc.) (2) <i>Chairs: Guido Ciprandi, Zena Moore</i></p> <ul style="list-style-type: none"> Using an informal educational approach to improve pressure ulcer diagnosis and grading; <i>Heather Hodgson</i> Pressure injury prevention interventions in adults and paediatrics; <i>Ann Marie Nie</i> The clinical effectiveness of silicone dressings to prevent PU in aged care; <i>Nick Santamaria</i> Making a difference in residential aged care: Reducing pressure injury rates through a multi-nodal approach; <i>Tabatha Rando</i>
09:00 - 10:00	<p>Key session 7: Emerging therapies <i>Chairs: Jane Nixon, Dominique Sigaud-Roussel</i></p> <ul style="list-style-type: none"> Prophylactic dressings; <i>Zena Moore</i> Early detection of pressure ulcers; <i>Cees Oomens</i> Smart materials; <i>Dan Bader</i> 	<p>Key session 8: Seating (2) <i>Chairs: Shelley Crawford, Alison Porter-Armstrong</i></p> <ul style="list-style-type: none"> Wheeled mobility for pressure ulcer prevention and improved function: Results of a RCT; <i>David Brienza</i> Pressure mapping of repositioning in wheelchair seated individuals - the ugly truth; <i>May Stinson</i> Development of the SPUPP: Pressure ulcer prevention programme; <i>Emer Shanley</i> 	<p>Industry workshop</p>	<p>TVNN NI session <i>Chairs: Gillian Carduff, Niamh McLain</i></p> <ul style="list-style-type: none"> PuClas4 workshop: Diagnosis and management of pressure ulcers and incontinence-associated dermatitis (IAD); <i>Dimitri Beekman, Denise McDonagh</i>
10:00 - 10:45	Coffee break and exhibition viewing			
10:45 - 11:45	<p>Key session 9: EPUAP Investigator Awards 2017 <i>Chairs: Dimitri Beekman, Lisette Schoonhoven</i></p> <ul style="list-style-type: none"> Introduction to the Awards by the Chair of the Scientific Committee Deformed cells as failing structures: The journey of a mechanical engineer in the labyrinth of biology to seek the reason for pressure ulcers; <i>Amit Gefen</i> Lately it occurs to me, what a long strange trip it's been; <i>Michael Clark</i> 	<p>Student free paper session 1: Clinical science <i>Chairs: Katrin Balzer, Carina Bääth</i></p> <ul style="list-style-type: none"> A review of design and analysis methods for pressure ulcer research; <i>Isabelle Smith</i> Effects of two different fabrics on skin barrier function under real pressure conditions; <i>Tsenka Tomova-Simitchieva</i> Real time feedback of pressure points: A tool to increase patient's participation?; <i>Lisa Hultin</i> Dry skin and pressure ulcer risk: A multi-center cross-sectional prevalence study in German hospitals and nursing homes; <i>Anna Lechner</i> 	<p>Free paper session 6: Pressure ulcers: Patient safety, quality of care and policy <i>Chairs: Jan Kottner, Zena Moore</i></p> <ul style="list-style-type: none"> The Ghent Global IAD Categorisation Tool (GLOBIAD) for incontinence-associated dermatitis: International development and reliability study; <i>Karen Van den Bussche</i> The development of a generic wound assessment minimum data set; <i>Susanne Coleman</i> Translating evidence-based device-related pressure injury prevention strategies to the intensive care environment: <i>The SUSTAIN study; Fiona Coyer</i> The possibility to monitor pressure ulcers prevalence and incidence on national level; <i>Andrea Pokorna</i> 	<p>WMAI session <i>Chairs: Gillian Carduff, Niamh McLain</i></p> <ul style="list-style-type: none"> The heel bone is connected to... - <i>Helen Strapp</i> - <i>Menno Van Etten</i> - <i>Pauline Wilson</i>
11:45 - 12:15	Posters presentation (exhibition area)			
11:45 - 13:15	Lunch break and exhibition viewing			
12:45 - 13:15	Annual General Assembly of the EPUAP			
13:15 - 14:30	<p>EPUAP - EWMA session: The Joint EPUAP-EWMA PU prevention & patient safety advocacy project <i>Chairs: Zena Moore, Lisette Schoonhoven</i></p> <ul style="list-style-type: none"> The concept of pressure ulcers as a key patient safety indicator; <i>Lisette Schoonhoven</i> Pressure ulcer prevention pathways; <i>Zena Moore</i> Barriers and enablers to pressure ulcer prevention in the Czech Republic; <i>Andrea Pokorna</i> Pressure ulcer, 20 years of prevalence monitoring and practical action in a Swiss university hospital; <i>Hubert Vuogant</i> What does the European data tell us.; <i>Laura Conaty</i> 	<p>Workshop 1: Core outcome sets in clinical research; <i>Chair: Katrin Balzer, Dimitri Beekman, Jan Kottner</i> (13:15 - 14:15)</p>	<p>Workshop 2: Seating biomechanics; <i>Chair: Dan Bader, Amit Gefen, Yohan Payan</i> (13:15 - 14:15)</p>	<p>Workshop 3: Dressing selection; <i>Chair: Jeannie Donnelly, Joan Rogan, Steven Smet</i> (13:15 - 14:15)</p>
14:30 - 15:45	<p>Key session 10: The complex foot <i>Chairs: Maarit Ahtiala, Jill Cundell</i></p> <ul style="list-style-type: none"> CPR for feet; <i>Duncan Stang</i> The research on the heel casts; <i>William Jeffcoate</i> Complexities of caring for patients with renal disease; <i>John Smyth</i> 	<p>Industry satellite symposium (14:15 - 15:45)</p>	<p>Student free paper session 2: Basic science <i>Chairs: Cees Oomens, Dominique Sigaud-Roussel</i> (14:15 - 15:15)</p> <ul style="list-style-type: none"> Modelling an adult human head on different positioners for pressure ulcer prevention; <i>Rana Greifman</i> Deep tissue loads in the seated buttocks on a foam off-loading wheelchair cushion versus an adjustable air-cell-based cushion: Finite element studies; <i>Lea Cohen</i> Dynamic computational simulations for evaluating protocols of tissue loads applied by a regulated negative pressure-assisted wound therapy (mpt) system for treating large wounds; <i>Rana Greifman</i> An interconnected-air-cells cushion technology is effective in protecting bony clients; <i>Lea Cohen</i> 	<p>Workshop 4: Dressing selection; <i>Chair: Jeannie Donnelly, Joan Rogan, Steven Smet</i> (14:15 - 15:15)</p>
15:45 - 16:15	Coffee break and exhibition viewing			
16:15 - 17:30	<p>Free paper session 7: Innovative approaches in clinical research (prevention and treatment) <i>Chairs: Dimitri Beekman, Jan Kottner</i></p> <ul style="list-style-type: none"> Independent risk factors for the development of skin erosion due to incontinence in nursing homes and the ICU; <i>Nele Van Damme</i> Pressure mapping to prevent pressure ulcers in a geriatric hospital ward: A pragmatic randomised controlled trial; <i>Lena Gunningberg</i> PROTECT - Trial: A multi-center prospective pragmatic RCT and health economic analysis about the effect of tailored repositioning to prevent pressure ulcers; <i>Dorien De Meyer</i> Outcomes of pressure ulcer treatment in specialist wound clinics; <i>Michael Clark</i> Measuring microclimate: An RCT to explore the influences of foam dressings on pressure prone areas; <i>William McGuinness</i> 	<p>Industry workshop (16:15 - 17:15)</p>	<p>Workshop 5: Repositioning; <i>Chairs: Jeannie Donnelly, Joan Rogan, Menno van Etten</i></p>	<p>Workshop 6: Debridement: Why - When - When not?; <i>Chair: Carolyn Wyndham-White</i> (16:15 - 17:15)</p>
19:30	Conference dinner at the Titanic Museum			

See the programmes for the industry satellite symposia and workshops at pages 92 and 93.

Friday, 22 September 2017				
Time	Registration area			
08:00	Registration, badge and bag collection			
	Hall 2A	Hall 2B	Meeting room 1	Meeting room 3
09:00 - 10:00	<p>Key session 11: Health economic evaluations of pressure ulcer interventions Chair: <i>David Meads</i></p> <ul style="list-style-type: none"> This session will be organised as a discussion forum, a first step to develop pressure ulcer specific guidelines for health economic research. 	<p>Free paper session 8: Pressure ulcers: Patient safety, quality of care and policy Chairs: <i>Guido Ciprandi, Denise McDonagh, Joyce Black</i></p> <ul style="list-style-type: none"> Varieties of Pressure Injury in the Terminally Ill; Clinical performance of a new PU risk tool: Shape Risk Scale with the Braden scale; <i>Esa Soppi</i> A scientific assessment of an automated disinfection system for the decontamination of hospital: Pressure-relieving mattresses; <i>Samantha Westgate</i> Ground-breaking clinical research revealing the effectiveness of therapeutic seating in reducing pressure injuries; <i>Martina Tierney</i> 	<p>Free paper session 9: Pressure ulcers and health economics & Interdisciplinary collaboration Chairs: <i>Dimitri Beeckman, Jeannie Donnelly</i></p> <ul style="list-style-type: none"> A multidisciplinary approach to pressure ulcer prevention: An exploration of healthcare professionals' involvement and perceptions of pressure ulcer prevention in a community setting; <i>Paul Clarkson</i> Outcomes of a specialist multi-disciplinary team in prevention of hospital acquired pressure injuries and malnutrition in an acute hospital setting: A pilot project; <i>Jessica Moon</i> Promoting cultural change impacts the bottom line: A case for measuring the economic impact of providing supportive environment; <i>Sarah Sage</i> The direct cost of pressure injury (PI) treatment in an Australian residential aged care setting; <i>Suzanne Kapp</i> 	<p>Workshop 7: Debridement: Why - When - When not?; Chair: <i>Carolyn Wyndham-White</i></p>
10:00 - 10:45	Coffee break and exhibition viewing			
10:45 - 12:15	<p>Interactive session: Pressure ulceration: Local wound management Chair: <i>Jeannie Donnelly</i></p> <ul style="list-style-type: none"> Several case studies will be presented and discussed during this session. <ul style="list-style-type: none"> - Joan Rogan & Oonagh Galway - Niamh McLain - Steven Smet - Maarit Ahtiala 			
12:15 - 12:45	<p>EPUAP 2018 Rome, Italy; <i>Guido Ciprandi</i> Focus Meeting 2018 Turku, Finland; <i>Maarit Ahtiala</i> Closing of the conference; <i>Chairs: Jane Nixon, Jeannie Donnelly</i></p>			





EPUAP2018

The 20th Annual Meeting of the
European Pressure Ulcer Advisory Panel

12 – 14 September 2018
Rome, Italy

www.epuap2018.org



INTERDISCIPLINARY TEAMWORK AND TECHNOLOGICAL INNOVATIONS:

A winning approach
to pressure ulcer
management

Conference venue

Angelicum University Congress
Center, Pontifical University
of Saint Thomas Aquinas

Abstract submission deadline:

2nd April 2018

Review notification deadline:

4th May 2018

Early registration deadline:

4th June 2018

EPUAP Business Office

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Organised by The European Pressure Ulcer Advisory Panel (EPUAP) in partnership with Bambino Gesù' Children's Hospital, Research Institute, Unit of Plastic and Maxillofacial Surgery, International Society for Pediatric Wound Care (ISPeW), Italian Association for Pressure Ulcers (AIUC) and Italian Nursing Society for Wound Care (AISLeC).



Key session 1: Pressure ulcer terminology and classification

Chairs: Jeannie Donnelly, Lisette Schoonhoven

- K1.1** Outcome and next steps in the international debate on pressure ulcer terminology and classification; *Jan Kottner*
- K1.2** Device related pressure ulcers; *Joyce Black*
- K1.3** A common language for pressure ulcers: The Outcomes for Pressure Ulcer Trials (OUTPUTs) project; *Katrin Balzer*
- K1.4** A Cochrane review on incontinence-associated dermatitis (IAD) for making the case for Core Outcome Sets (COS) in clinical trials in wound care; *Dimitri Beeckman*

Key session 2: Journal of Tissue Viability & Journal of Clinical Biomechanics Awards

Chairs: Dan Bader, Yohan Payan

- K2.1** Surfaces for health: Early detection of skin damage using biomarkers; *Jibbe Soetens*
- K2.2** Musculoskeletal finite element model of the foot: Loading and direct dynamic validation; *Antoine Perrier*
- K2.3** Real world evidence of HAPU reduction using a novel early detection device measuring Sub-Epidermal Moisture (SEM); *Rachael Lester*
- K2.4** Assessment and consideration of foot risk factors is essential to proactively prevent hospital acquired heel pressure injuries; *Jo Scheepers*

Key session 3: Complexities of care (clinical session)

Chairs: Susanne Coleman, Jeannie Donnelly

- K3.1** Community pressure ulcer initiatives; *Fionnuala Gallagher*
- K3.2** Pressure ulcer prevention: Focus on health care assistant education; *Lorna Semple*
- K3.3** Pressure ulcer prevention in intensive care; *Steven Smet*
- K3.4** Pressure ulcer prevention in paediatrics; *Guido Ciprandi*

Key session 4: Recognizing and managing risk factors

Chairs: Katrin Balzer, Niamh McLain

- K4.1** Nutrition and hydration; *Angela Small*
- K4.2** 'Skin status', a risk factor for pressure ulcer development; *Jane Nixon*
- K4.3** Risk assessment; *Zena Moore*
- K4.4** Malnutrition as a precursor of pressure injuries; *Mary Litchford*

Key session 5: Seating (I)

Chairs: Shelley Crawford, Cees Oomens

- K5.1** Pressure ulcer prevention: What do healthcare professionals, patients and carers need to know?; *Declan Patton, Alison Porter-Armstrong*
- K5.2** Repositioning for pressure ulcer prevention in the seated individual; *Menno Van Etten*
- K5.3** "To sit or not to sit" sitting individuals with pressure ulcers; *Darren Hammond*

Key session 6: EPUAP 2017 Quality Improvement Projects Awards

Chairs: Dimitri Beeckman, Lisette Schoonhoven

- K6.1** Tissue Viability Society guidelines for assessing seating and posture: Understanding the association between pressure ulcers and sitting in adults; *Carol Bartley, Melanie Stephens*
- K6.2** Improving pressure damage detection in the community using continuous pressure monitoring of patients; *Nicci Aylward-Wotton*
- K6.3** Zero Heroes: Working together to achieve no hospital acquired pressure ulcers; *Aoife McDonnell*
- K6.4** Systematic effort reduces pressure ulcers with 50%; *Aase Fremmelevholm*

Key session 7: Emerging therapies

Chairs: Jane Nixon, Dominique Sigaud-Roussel

- K7.1** Prophylactic dressings; *Zena Moore*
- K7.2** Early detection of pressure ulcers; *Cees Oomens*
- K7.3** Smart materials; *Dan Bader*

Key session 8: Seating (2)

Chairs: Shelley Crawford, Alison Porter-Armstrong

- K8.1** Wheeled mobility for pressure ulcer prevention and improved function: Results of a RCT; *David Brienza*
- K8.2** Pressure mapping of repositioning in wheelchair seated individuals - the ugly truth; *May Stinson*
- K8.3** Development of the SPUPP: Pressure ulcer prevention programme; *Emer Shanley*

Key session 9: EPUAP Investigator Awards 2017

Chairs: Dimitri Beeckman, Lisette Schoonhoven

- K9.1** Deformed cells as failing structures: The journey of a mechanical engineer in the labyrinth of biology to seek the reason for pressure ulcers; *Amit Gefen*
- K9.2** Lately it occurs to me, what a long strange trip it's been; *Michael Clark*

Key session 10: The complex foot

Chairs: Maarit Ahtiala, Jill Cundell

- K10.1** CPR for feet; *Duncan Stang*
- K10.2** The research on the heel casts; *William Jeffcoate*
- K10.3** Complexities of caring for patients with renal disease; *John Smyth*

Key session 11: Health economic evaluations of pressure ulcer interventions

Chair: David Meads

- K11.1** This session will be organised as a discussion forum, a first step to develop pressure ulcer specific guidelines for health economic research

[KS1/4] A COCHRANE REVIEW ON INCONTINENCE-ASSOCIATED DERMATITIS (IAD) FOR MAKING THE CASE FOR CORE OUTCOME SETS (COS) IN CLINICAL TRIALS IN WOUND CARE

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Introduction: Incontinence is a widespread disorder with an important impact on quality of life. One of the most common complications is incontinence-associated dermatitis (IAD), resulting from chemical and physical irritation of the skin barrier triggering inflammation and skin damage. Managing IAD is an important challenge for healthcare professionals.

Methods: There are few validated methods for assessing IAD improvement, possibly due to the multiplicity of outcomes collected. Selective outcome reporting bias, defined as results-based selection of outcomes for publication, is a problem in many clinical trials and affects the conclusions of a significant proportion of systematic reviews.

Results/discussions: Specific organizations have been formed to address outcome reporting bias. The Core Outcome Measures in Effectiveness Trials Initiative (COMET) brings together researchers interested in developing a standardized set of core outcomes in various health-related fields. A core outcome set (COS) is defined as an agreed minimum set of outcomes that is recommended to be measured and reported in all clinical trials of a given condition or disease. The implementation of a COS may reduce the risk of selective outcome reporting and allow for more important outcomes to be assessed.

Clinical relevance: The aim of this lecture is to present an international COS that is relevant to clinical trials of IAD (Van de Bussche et al. 2016) based on the systematic synthesis of peer-reviewed research evidence (Beeckman et al. 2016); preferences from relevant stakeholder groups, including patients, clinicians, regulators; and structured consensus processes involving all relevant perspectives.

References:

- [1] Van den Bussche K, De Meyer D, Van Damme N, Kottner J, Beeckman D. **CONSIDER** - Core Outcome Set in IAD Research: study protocol for establishing a core set of outcomes and measurements in incontinence-associated dermatitis research. *J Adv Nurs*. 2016 Sep 28; doi: 10.1111/jan.13165.
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[KS1/1] OUTCOME AND NEXT STEPS IN THE INTERNATIONAL DEBATE ON PRESSURE ULCER TERMINOLOGY AND CLASSIFICATION

Jan Kottner¹

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Prolonged tissue deformation may cause skin and/or underlying soft tissue breakdown eventually leading to chronic ulcers. This phenomenon was long known as 'bedsores', 'pressure sores', 'decubitus' or 'decubital ulcers'. Later 'pressure ulcer' was introduced and today the term 'pressure injury' is discussed to be even more appropriate. Due to advances in science or other requirements change of terminology is not unusual. One important criterion for justifying change is: Is the label an accurate presentation of the concept? Interestingly, an answer to this question is not easy. The term 'ulcer' as well as 'injury' has limitations and still the conceptual differences to 'decubitus' or other established names are not always clear. In addition to the scientific conceptual approach there is also a practical dimension: Does the name really matter? In many European languages there is no distinction made between the English words 'ulcer' and 'injury' making the current international debate irrelevant. Changing terminology has a number of additional effects. For instance, does the advantage of changing the name outweigh the huge education and implementation requirements? Is changing the papers and documentation worth the effort? Will this change improve practice? Similar discussions can be made regarding classification. Are continuous changes of pressure ulcer classification actually needed? The non-comparability of existing pressure ulcer classifications used worldwide is already a problem. This situation will not improve by proposing additional new systems. Because of the international debates about pressure ulcer terminology and classification the European Pressure Ulcer Advisory Panel conducted two surveys in 2013 (n = 20) and 2016 (n = 27) among the trustees. Overall the respondents were not convinced that the term 'pressure injury' is advantageous and should be replaced by 'ulcer'. The EPUAP recommends using the International Pressure Ulcer Classification System published in the 2014 International Guideline. The final publication of the ICD-11 in 2018 will have a major impact on pressure ulcer definition classification worldwide for the next years.

[KS2/1] SURFACES FOR HEALTH: EARLY DETECTION OF SKIN DAMAGE USING BIOMARKERS

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Introduction: The use of non-invasive biomarkers is a promising method for the early detection of pressure ulcers. The aim of this study is to establish whether metabolic biomarkers in sweat are indicative of local tissue compromise by quantifying their temporal release from two sites of the sacrum subjected to two distinct loading regimens.

Methods: Eight healthy volunteers were subjected to the two different loading protocols in an environmental chamber set to 37 °C and 80% RH. After 20 minutes of baseline measurement, the sacrum was subjected to either continuous (left side) or intermittent (right side) loading at an equivalent pressure of 100 mmHg for a total period of 120 minutes. The lower back was used as an unloaded control site. Sweat was collected on filter paper pads every 20 minutes yielding six separate samples. Once extracted, concentrations of lactate and pyruvate metabolites, both representing anaerobic metabolites, were determined using an ultra-high performance supercritical fluid chromatography coupled with mass spectrometry (UHPSCF-MS).

Results: Overall results (Figure 1) indicate that continuous loading for 120 min. results in an increase in relative concentration for lactate and pyruvate of 27% and 47%, respectively. Both normalized concentrations were restored during the unloaded period. Intermittent loading also induced an increase in both lactate and pyruvate with loading, although these results were less consistent. Individual variability was observed between the different volunteers.

Discussions: Globally there is a clear correlation between sacral loading and the concentration of lactate and pyruvate in sweat. These results will be compared to other biomarkers, namely cytokine expression levels in sebum in order to provide a wider profile of metabolites in loaded tissues.

Clinical relevance: Knowledge of the expression of biomarkers at an early stage of mechanical induced damage can inform the development of techniques, involving biosensors and smart textiles which can be used in PU prevention.

References: [1] WatersAcquity

Acknowledgement: This research is supported by the Dutch Technology Foundation STW, which is part of the Netherlands Organization for Scientific Research (NWO), and which is partly funded by the Ministry of Economic Affairs (12673).

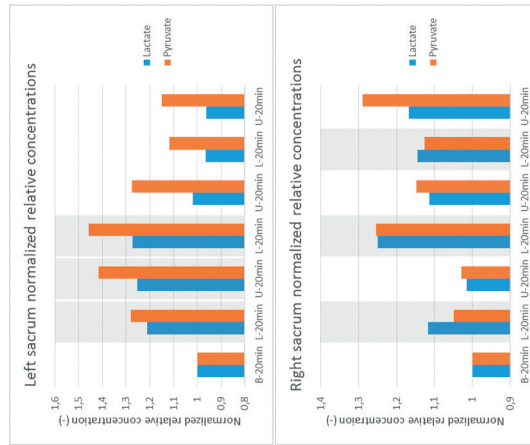


Figure 1. Normalized relative biomarker concentrations in sweat on sacrum

[KS2/2] MUSCULOSKELETAL FINITE ELEMENT MODEL OF THE FOOT: LOADING AND DIRECT DYNAMIC VALIDATION

Antoine Perrier¹, Vincent Luboz², Marek Bucki², Nicolas Vuillemer³, Yohan Payan¹

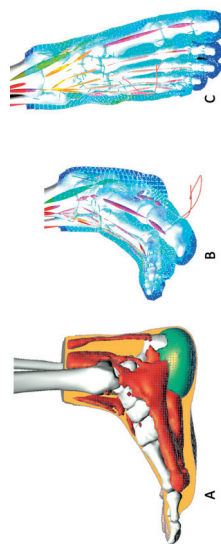
- 1 Timc-Imag Laboratory, Univ. Grenoble Alpes - Cnrs Umr 5525, La Tronche Cedex, France
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Introduction: The foot is one of the most complex structures of the human body with 28 bones, 33 joints and a hundred ligament structures. Foot plantar ulcer often appears when some deformities occur in a neuropathy context. Predicting foot adaptation of a structural, neurological or functional, and tissue modification is an important issue in estimating the risk lesion.

Methods: We designed a biomechanical model of the human foot. The anatomy was reconstructed from Ct Scan and MRI. The multi-articulated foot joint constraints were obtained by ligaments and bone contact. Muscles have been implemented to control the model in direct dynamic. Finally, the soft tissues such as muscle, fat and skin were meshed into finite elements. The validation was performed using foot plantar pressure and motion analysis coupled with EMG exploration.

Results: Adapting the foot on the ground in standing position was evaluated by comparing the actual loading pressure map of the subject to a simulated one. The mean pressure difference was 1.9 N/cm² and 1.6N/cm² for the peak pressure. The motor control of foot in opened chain by activation of the extrinsic muscles was assessed by comparing the kinematics of the biomechanical model piloted by electromyography to kinematics captured in the laboratory on a movement of abduction - adduction. The 3D range of motion difference was 3.9%.

Discussions: This model is validated and will allow through mesh-matching tool to obtain specific patient models. The fields of application will focus on assisted surgery and prevention of ulceration.



Clinical relevance: A realistic anatomical foot model can predict foot pressure at foot motion under muscle activation. It could be helpful for educational purpose and physio pathological understanding.

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[KS2/4] ASSESSMENT AND CONSIDERATION OF FOOT RISK FACTORS IS ESSENTIAL TO PROACTIVELY PREVENT HOSPITAL ACQUIRED HEEL PRESSURE INJURIES

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Introduction: Pressure Injury (PI) prevention is instigated by a low Braden score as per international guidelines; however, hospital acquired heel pressure injury prevalence continues to be unacceptably high. Outcomes for heel PIs on high risk feet (HRF) are often poor, we conducted research to see if HRF were adequately identified as at risk of heel ulceration by the Braden Score.

Methods: A random sample of 132 patients admitted under general, rehabilitation or geriatric medicine at a metropolitan hospital consented to participate. Each patient had foot risk stratified by a senior podiatrist and their admission PI risk level as indicated by Braden was compared. The collection protocol and both risk stratification scales used established, validated methods.

Results: The results were paired by individual, 36% were the same level of risk by both methods. This lack of agreement was demonstrated by a Kappa score of 0.0085 which is equal to chance. The Braden score inadequately identified the PI risk to feet for 52% of the study population, 14% of HRF did not have any PI prevention in place, plus another 17% the risk was underestimated significantly. 12 participants had foot PI, 92% of which were on HRF and the majority had been scored as low moderate risk.

Discussions: The sensitivity and specificity of the Braden score is low, validity has been questioned for many other sub-groups of patients. The risk factors for heel PIs are not the same as elsewhere on the body and Braden does not consider them.

Clinical relevance: Foot risk should be included as part of a holistic PI risk assessment, we need to move away from a reliance on the Braden score for the implementation of prevention. PI risk category should be automatically elevated to 'high' if foot risk factors are present and the use of heel PI prevention devices implemented proactively.

References: [1] Australian Wound Management Association. Pan Pacific Clinical Practice Guideline for the Prevention and Management of Pressure Injury, WA, 2012.

[KS2/3] REAL WORLD EVIDENCE OF HAPU REDUCTION USING A NOVEL EARLY DETECTION DEVICE MEASURING SUB-EPIDERMAL MOISTURE (SEM)

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Introduction: The purpose of the Pressure Ulcer Reduction Program (PURP) is to evaluate the clinical utility of an early-detection technology measuring local levels of sub-epidermal moisture (SEM), in reducing avoidable hospital-acquired pressure ulcers (HAPUs) and improving patient outcomes when incorporated into clinical workflow in real-world settings.

Methods: PURPs were conducted at hospitals in the UK, Spain, and Canada. PURPs were structured to evaluate impact on HAPU rate and ability to incorporate into clinical workflow over 1 to 6 month periods. Local nursing staff tailored PURP structured to be appropriate for their clinical setting. Nursing staff were trained to use a device for assessment of sub epidermal moisture (SEM)1, which has been shown to be an early indicator of pressure damage. Clinicians were provided with clinical interpretation; patients exhibiting SEM scores of ≥ 0.6 may have underlying pressure-induced damage. Patients were intervened upon using hospital standards for care for pressure ulcer prevention.

Results: Over 600 patients were scanned (heel, sacrum) across Emergency, Elderly Care, Orthopaedic Trauma, and ICU departments. HAPU incidence observed was 1% across all patients. In 5 of 9 participating hospitals, nurses observed zero HAPUs during the evaluation period. Participants provided baseline HAPU rates (from the same ward in previous time period) for comparison. 7 of these 9 hospitals observed reductions in HAPU rates of 88% or more.

Discussions: This represents an aggregation of real-world data from several hospital sites that provided their data with permission. Due to the limitations of real-world evidence, it cannot be concluded that reductions in PU incidence were due to the scanner alone. Nurses felt that objective data could detect or confirm nonvisible damage and serve as a trigger for intervention. Additionally, clinicians used SEM scores to determine if interventions were effective for patients.

Clinical relevance: Due to limitations of real-world evidence, it cannot be concluded that reductions in PU incidence were due to the scanner alone, however nurses feedback suggests that it enhances clinical assessment and decision making for PU prevention by providing unique, quantitative, real-time information about patients tissue health to facilitate earlier and targeted intervention.

Reference: [1] SEM Scanner

[KS3/1] COMMUNITY PRESSURE ULCER INITIATIVES

Fionnuala Gallagher

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Fionnuala Gallagher, Tissue Viability Nurse Lead and Quality Improvement Fellow, South Eastern Health and Social Care Trust is currently leading a piece of work on pressure ulcer prevention in primary care. This innovative project is part of the 'Advanced Improvement Practitioners' programme which she is undertaking. Prevention of pressure ulcers is one of the greatest health care challenges in terms of reducing patient harm. The literature reflects a focus on prevention in hospital settings but there appears to be little documented, specific to patients in their own homes, despite the unique and complex challenges that arise within this patient population. The aim of this work is to develop a pressure ulcer prevention strategy for primary care through collaboration with patients, carers and health & social care professionals. Fionnuala will discuss her approach to these unique and relatively unexplored issues in primary care using quality improvement methodology.

These issues include:

- Engaging and training private domiciliary carers who deliver fundamental care to patients in their own home yet have no mandatory requirement to access pressure ulcer prevention education;
- Developing a robust method for delivering consistent, evidence based pressure ulcer prevention training for private domiciliary carers that accounts for high staff turnover;
- Building partnerships between domiciliary carers who deliver the care, district nurses who prescribe the care, care managers that monitor the care and patients who depend on the care;
- Making the SSKIN Bundle work in primary care and standardising documentation of preventative interventions;
- Providing assurance of carer's consistency in delivering preventative interventions and timely reporting of skin deterioration;
- Introducing key performance indicators to provide assurance in district nursing assessment and prescription of preventative measures;
- And Engaging patients and families to address non-concordance.

[KS3/2] PRESSURE ULCER PREVENTION: FOCUS ON HEALTHCARE ASSISTANT EDUCATION

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- 3 *School of Health Science, Institute of Nursing and Health Research, Ulster University, Belfast Co Antrim, United Kingdom*
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Introduction: Healthcare assistants deliver the majority of hands-on nursing care in hospitals (Cavendish, 2013; Clark and Thompson, 2014) and are in a prime position to monitor patients' skin and implement pressure ulcer preventative care. It is important that they possess the knowledge and skills to effectively deliver this care. Attitude is also important (Ajzen, 2005) as this has been shown to be a reliable predictor of clinical practice (Beeckman et al., 2011).

Methods: Ninety-six healthcare assistants were recruited and randomised into four groups, two experimental groups and two control groups. The two experimental groups attended a three and a half hour training programme on pressure ulcer prevention. Knowledge, attitude and self report of clinical practice were assessed using questionnaires and a Solomon four group design.

Results: Results demonstrated an increase in knowledge ($p < 0.01$), attitude ($p < 0.01$) and self-report of clinical practice ($p < 0.01$) following attendance at the training intervention. Estimates of effect were pooled in an inverse variance weighted meta-analysis and the mean difference in effect between the intervention and control groups strongly favoured the intervention for all three outcome measures.

Discussions: This study suggests that the training intervention has been effective. As a result, this programme has been adapted as an integral part of the tissue viability educational strategy and will continue to be facilitated on an ongoing basis.

Clinical relevance: Healthcare assistants spend a great deal of time delivering bedside personal care and need to be furnished with the appropriate knowledge and skills to be able to competently deliver this care.

References:

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- [2] Beeckman et al., (2011) Knowledge and attitudes of nurses on pressure ulcer prevention: a cross-sectional multicentre study in Belgian hospitals. *World Views on Evidence-Based Nursing Third Quarter*; 8 (3): 166-176.
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[KS411] NUTRITION AND HYDRATION

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Introduction: It is accepted that malnutrition adversely affects wound healing, while tailored nutrition and hydration intervention can stimulate the healing process.

Methods: The South Eastern HSC Trust Specialist Tissue Viability (TV) Dietitian completes a comprehensive nutritional assessment for patients with wounds to enhance potential for wound healing and reduce risk of further tissue damage. The TV Dietitian has implemented the Process for Nutrition and Dietetic Practice to capture and demonstrate the outcomes that are achieved for patients through appropriate dietetic intervention.

Results: The nutrition and hydration assessment process and the clinical interventions implemented will be described. To date the testing of a tool for use in the Process for Nutrition and Dietetic Practice has demonstrated its application in this patient group. Examples of using the tool and the outcomes achieved in patients with wounds will be shared. Initial data for agreed outcomes indicates that 73% were achieved and 18% were partially achieved across 7 goals.

Discussions: The particular aspects of nutrition and hydration to assess and monitor will be highlighted in the session. The application of the Process for Nutrition and Dietetic Practice and the outcomes achieved from a professional and patient perspective will be described.

Clinical relevance: As health care professionals we should all consider the nutrition and hydration of our patients as an essential part of our assessment processes and where appropriate, onward referral to dietetic services should be completed. The comprehensive nutritional assessment and intervention undertaken by the Dietitian has been shown to assist in the prevention or treatment of wounds.

References: Provided at the session.

[KS313] PRESSURE ULCER PREVENTION IN INTENSIVE CARE

Steven Smet¹

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Introduction: Patients admitted to the intensive care units are at high risk of developing pressure ulcers. Prevalences and incidences of more than 40% are reported. Due to the multiple risk factors and the complexity of care, it is difficult to create a specific prevention protocol for these high risk patients.

The implementation of prevention care bundles based on a risk assessment tool is a possible solution to lower the high incidence and prevalence rates. But is it possible to implement the risk assessment tool in practice and if not, on which pressure ulcer risk factors do you focus? The Ghent University Hospital in Belgium developed during 2016 a new hospital wide prevention protocol with also a specific chapter that focuses on the ICU.

The new protocol tries to create a feasible risk assessment, focusing especially on the major risk factors mobility and skin status. Additional standard preventive measures need to be taken consistently. Evaluation of the cost-efficiency of the protocol is planned at the end of 2017.

Validation of this protocol in terms of a risk assessment that leads to an optimal prevention plan is still required.

References:

- [1] Tayyib N, Coyer F, Lewis PA. Implementing a pressure ulcer prevention bundle in an adult intensive care. *Intensive and critical care nursing*, 2016; 37: 27-36.
- [2] Nixon J, Nelson EA, Rutherford C, Coleman S, Muir D, Keen J, et al. Pressure UlcerR Programme Of reSEarch (PURPOSE): using mixed methods (systematic reviews, prospective cohort, case study, consensus and psychometrics) to identify patient and organisational risk, develop a risk assessment tool and patient-reported outcome Quality of Life and Health Utility measures. *Programme Grants Appl Res* 2015;3(6).

[KS4/4] MALNUTRITION AS A PRECURSOR OF PRESSURE INJURIES

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¹ Case Software & Books, Greensboro, United States

Introduction: Numerous studies have reported associations between declining nutrition status and risk for pressure injuries. Oral eating problems, weight loss, low body weight, undernutrition, and malnutrition are associated with increased risk for pressure injuries. Moreover, inadequate nutrient intake and low body weight are associated with slow and non-healing wounds.

Methods: The biologic significance of declining nutrition status and consistent methodologies to quantify malnutrition and diminished micronutrient stores as predictors of pressure injuries remains controversial. Academy of Nutrition & Dietetics (Academy) and American Society for Parenteral & Enteral Nutrition (ASPEN) Consensus Statements: Characteristics Recommended for the Identification and Documentation of Adult and Pediatric Malnutrition provide a standardized and measurable set of criterion to identify malnutrition.

Results: Etiology-based characteristics reflect the relationship between inflammation and the incidence, progression and resolution of malnutrition. Moreover, malnutrition syndromes are defined by patient settings.

Discussions: Utilizing validated screening tools and characteristics of malnutrition in the context of the Prevention and Treatment of Pressure Ulcers: CPG provide a template to identify malnutrition in populations at risk for pressure injuries. The characteristics of malnutrition advance the use of nutrition-focused physical assessment and assessment of functional status as predictors of malnutrition.

Clinical relevance: A standardized approach to diagnose malnutrition will facilitate improved correlation between best practice related to the prevention and healing of pressure injuries. Systems are needed to track co-morbid conditions associated with malnutrition.

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[KS5/1] PRESSURE ULCER PREVENTION: WHAT DO HEALTHCARE PROFESSIONALS, PATIENTS AND CARERS NEED TO KNOW?

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- ² RCSI, School of Nursing & Midwifery, Dublin, Ireland
- ³ Royal College of Surgeons in Ireland, School of Nursing & Midwifery, Dublin, Ireland
- ⁴ School of Nursing & Midwifery, Dublin, Ireland
- ⁵ Institute of Nursing and Health Research, Newtownabbey, United Kingdom

Introduction: To prevent pressure ulcers from developing in 'at risk' individuals, healthcare staff, patients and carers need to be well informed about how to prevent them. Providing education to all key stakeholders in pressure ulcer prevention is an integral component in the patient safety toolbox. The World Health Organization states that health education should foster "the motivation, skills and confidence necessary to improve health" (WHO 2012). Such health education is directed towards influencing behavioural change on the part of the recipient; whether that be changing knowledge, skills and clinical behaviours of professional staff to support a greater emphasis upon preventative practices, or, upon supporting the health literacy and condition self-management of the 'at risk' individual and their caregiver via an enhanced level of awareness of risk factors in pressure ulcer development and increasing the capacity to reduce that risk. It is important to understand what type of information these stakeholders need, how it might be best delivered, and whether these types of educational interventions can actually influence a reduction in pressure ulcer incidence.

Methods: This presentation will review the 'gold standard' research evidence available within the International databases to describe the 'state-of-the science' educational programmes delivered to these recipients.

Results: The authors will outline the content of these educational programmes, mode of delivery, recipient characteristics, and the author reported outcomes for healthcare professionals, patients and carers.

Discussion: It is anticipated that this presentation will stimulate debate about educational interventions; specifically to help delegates understand the range of methods and content used, the impact of such programmes on the prevention of pressure ulcers, and how to best integrate this research evidence into routine practice.

Clinical Relevance: Pressure ulcers not only impact upon an individual's health, quality of life and participation in everyday activities, but they also incur high treatment and healthcare costs. In order to drive down the incidence of pressure ulceration and minimize these negative aspects, it is important that key stakeholders are aware of the research evidence upon which to base healthcare practices in preventing pressure ulceration through education of healthcare staff, 'at risk' individuals and their caregivers.

[KS6/2] IMPROVING PRESSURE DAMAGE DETECTION IN THE COMMUNITY USING CONTINUOUS PRESSURE MONITORING OF PATIENTS

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Introduction: Half a million people in the UK will develop at least one pressure ulcer (PU) yearly, with research and technology focusing on the hospital setting. PUs affects people with: Underlying health conditions, Frailty and dependence on carers, Sleeping/spending large amounts of time in chairs unable to move.

Relieving the pressure is part of the healing process; some patients are reluctant to use pressure-relieving equipment as it can be uncomfortable, hot and noisy, labelling them as non-concordant.

Continuous pressure monitoring, with patient and carer education, has enabled patients to self-manage their PU risk. The Fore Site PT pressure monitor was used to aid healing and to determine if the technology could influence decision making by identifying 'hot-spots' of pressure.

Methods: The technology monitored patients in bed and in the chair for an agreed period. Results were discussed and amendments to care or equipment agreed. Further visits were arranged to review the changes and monitor outcomes.

Results: Forty-four patients were recruited; four patients died and were removed from the data analysis. Of the 40 remaining patients 32 (80%) healed/healing. The net annualised savings totaled £99,281 (DoH productivity calculator).

Discussion and further steps: Healing rates improved; pressure ulcers were prevented and user acceptability of the technology was good with a reduction in potential treatment costs. An individual approach to care is needed with no assumptions made regarding the suitability of pressure relieving mattresses or cushions, matching the equipment to the patient not the patient to the equipment.

Clinical relevance: The project challenged beliefs relating to PU prevention and patient non-concordance. It resulted in alternative equipment for patients sitting up in bed, identified the number of patients affected and that similarly high peak pressures are achieved to those in the chair all day. The evidence demonstrates the impact posture has on the development of PUs when sitting in the chair. Many cushions and mattresses are not fit for purpose for community use. It suggests that advising bed rest to alleviate the pressure, is not necessarily the best strategy.

[KS6/1] TISSUE VIABILITY SOCIETY GUIDELINES FOR ASSESSING SEATING AND POSTURE: UNDERSTANDING THE ASSOCIATION BETWEEN PRESSURE ULCERS AND SITTING IN ADULTS

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Introduction: Costs for the prevention and management of pressure ulcers have increased significantly and there is limited published advice from health and social care organizations on seating and preventing pressure ulcers. At the request of the UK Tissue Viability Society the aim of the publication was to develop a practical guide for people, carers and health and social care professionals on how the research and evidence base on pressure ulcer prevention and management can be applied to those who remain seated for extended periods of time.

Methods: The evidence base informing the guidelines was obtained by applying a triangulation of methods: a literature review, listening event and stakeholder group consultation. The purpose was to engage users and carers, academics, clinicians, inspectorate and charities, with an interest in seating, positioning and pressure management to: gather views, feedback, stories, and evidence of the current practices in the field to create a greater awareness of the issue. Collect opinions of the effectiveness of current commercially available seating products for service users who remain seated for extended periods of time, and share best practice to aid the development of the new TVS seating guidelines

Results/Discussion: The new guidelines are inclusive of all people with short and long-term mobility problems and will not be condition specific to avoid excluding certain population groups. The term seated for extended periods of time will be used instead of the long term seated individual as this includes people with short and long-term mobility issues. The document includes evidence on where pressure ulcers develop when seated, risk factors, best possible seated position and what seat adjustments are required, the ideal seating assessment, interventions, self-help suggestions and key seating outcomes.

Clinical relevance: These guidelines will be relevant to people who remain seated for extended periods of time and those involved in their care.

References:

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[KS6/3] ZERO HEROES: WORKING TOGETHER TO ACHIEVE NO HOSPITAL ACQUIRED PRESSURE ULCERS

Christine Gallagher¹

¹ St. Michael's Hospital, Dublin, Ireland

Introduction: In Ireland, the Pressure Ulcer to Zero Collaborative was launched by the Health Service Executive, in 2014. Our clinical setting became involved in the collaborative in September 2015, with the aim to initially reduce PUs by 50% within the first 6 months, and then by 100% in December 2016. Our unit has 18 beds, with 100% bed occupancy, patients' age ranges from 75 years – 100 years.

Methods: We employed the Plan Do Study Act (PDSA) 1 cycle

- "Plan": introduction of the SSKIN Bundle2 initially as "one nurse, one patient, one shift", followed by introduction to the whole ward
- "Do": collection of data for 10 patients, and gradually across the whole ward.
- "Study" data collection around use of the SSKIN Bundle2
- "Act" adaption of the SSKIN Bundle2, multidisciplinary team involvement. Outcomes measured using the "Safety Cross".

Over the first 2 months, zero PUs occurred, then on month 3, two ward acquired PUs were identified. The PDSA cycle was revisited and identified that as staff awareness rose, PUs were being identified earlier. A tissue viability guidance algorithm and a healthcare assistance check list were introduced into the prevention strategy.

Results: By June 2016, we achieved the first goal, PU prevalence was reduced by 50%. By December 2016 we reached zero hospital acquired PUs and are currently at 355 days PU free.

Discussion: Using a team approach to PU prevention guided by the IHI model for improvement yielded significant success for patients, staff and the wider healthcare service within our clinical setting.

Clinical relevance: Because we employed the PDSA cycles to review and understand our approach to PU prevention we were enabled to take a more objective view of our strategy and to implement relevant changes as necessary.

References:

- [1] Institute for Healthcare Improvement. The Breakthrough Series: IHI's Collaborative Model for Achieving Breakthrough Improvement. Diabetes Spectrum. 2004; 17(2):97-101.
- [2] Gibbons W, Shanks H, Kleinhalter P, Jones P. Eliminating facility-acquired pressure ulcers at Ascension Health. Journal of Quality and Patient Safety 2006; 32(9):488-96.

[KS6/4] SYSTEMATIC EFFORT REDUCES PRESSURE ULCERS WITH 50%

Aase Fremmelevholm¹

¹ Odense Universitetshospital, Afd. Z, Odense, Denmark

Introduction: Odense University Hospital (OUH) focused in 2012 on prevention of pressure ulcers. The background was prevalent studies which showed an occurrence of pressure ulcers in hospitalized patients in Denmark to 13-43% (1). The inspiration to this project was a pilot project "patient safe hospital" (2), which had several recommendations to patient safety in selected areas, including pressure ulcers. Nationally it has been decided to put prevention on the agenda with the goal of 50% reduction in patients developing pressure ulcers.

Methods:

- Establishing a network organization,
- Prevalent studies before start,
- Guidelines for preventing pressure ulcers,
- Introducing risk evaluation of patients at hospitalization start.

Results: The prevalent studies in the period 2012 to 2017 have shown a drop in the number of pressure ulcers from 10,3% to 5,2%. The pressure ulcer project has reduced category 4 pressure ulcer a great deal. The pressure ulcer project and the title as Pressure ulcer nurse has given a lot of attention to preventing. These are shown in these examples on different activities to prevent pressure ulcers.

- Focus on preventing pressure ulcers in operational wards,
- Testing new technology to preventing pressure ulcers,
- Preventing pressure ulcers at Patients with fractured hip with a parking disc and a pillow, with a reduction in 73% of pressure ulcers,
- Testing bandages to prevent pressure ulcers in patients cardiac intensive care unit with a 24% reduction in pressure ulcer,
- Annual theme-day to mark the international Stop-pressure ulcer day.

Discussions: The project ended in 2015, but the work in prevention pressure ulcers doesn't end. The function as a pressure ulcer nurse and the prevention of pressure ulcers is a permanent settlement. The task now is to maintain the effort and the responsibility to constantly follow up and put initiatives in motion to keep the pot boiling.

Clinical relevance: Prevention on pressure ulcers has been on the agenda since 2010 and it will keep on being the agenda.

References:

- [1] Bermark S et al. Prævalensundersøgelser for trykspor og tryksår på danske hospitaler, 2009.
- [2] <http://www.patientsikkerhedsgehus.dk>

[KS7/13] SMART MATERIALS**Dan Bader¹**¹ Faculty of Health Sciences, University of Southampton, Southampton, United Kingdom

Smart materials have become popular in a large number of engineering applications. It is therefore unsurprising that they have been proposed for use in both the prevention and treatment of soft tissue damage, typically in the management of pressure ulcers and diabetic foot ulcers. This presentation will highlight three exemplars. First, smart materials can be used either as a stand alone component or incorporated into support systems to control both the physical and mechanical characteristics and the microclimate at the loaded patient support interface. In addition, sensors which detect biochemical markers e.g. O₂, CO₂ and lactate, can be incorporated into materials, typically textiles, to monitor the status of skin tissues. Finally the use of smart materials loaded with pharmaceuticals, such as growth factors, has been developed to progress wound healing.

[KS7/12] EARLY DETECTION AND DIAGNOSIS OF PRESSURE ULCERS**Cees Oomens¹**¹ Eindhoven University of Technology, Eindhoven, Netherlands

Introduction: For the prevention of pressure ulcers it is necessary that they can be detected in a very early stage. Early detection of superficial ulcers may help to identify patients at risk and allow an adequate application of resources for the prevention. An early detection of pressure related deep tissue injury might help – using a rigorous unloading protocol – to prevent these from developing into category 3 or 4 pressure ulcers.

Methods: A short overview will be given of the latest findings on pressure ulcer aetiology and on recent developments in the use of biomarkers for early detection. For detection of superficial ulcers methodology is based on measurements of cytokines and metabolic waste products at the skin surface. Deep tissue injury is detected by means of biomarkers related to muscle damage in blood and urine.

Results: High resolution MRI including new modalities like MR Elastography, mechanical analysis with 3-D-models and follow up studies for longer times offer a more detailed view on the development of damage over time. It became clear that a model system using Sprague Dawley rats in muscle the effects of mechanical loading are not limited to the area with the highest stress/strain state and tissue repair appears to be slower than anticipated. Animal studies and studies with human volunteers have given a more clear view on the kinetics of combinations of biomarkers in blood, urine and the skin surface.

[KS9/12] LATELY IT OCCURS TO ME, WHAT A LONG STRANGE TRIP IT'S BEEN

Michael Clark'

Welsh Wound Innovation Centre, Ynysmaerdy, United Kingdom

Forty years ago, pressure ulcer research was barely out of its infancy. It has since greatly developed within a time-scale that can be covered by one person's professional career. This has given those fortunate enough to work for some time on pressure ulcers to see knowledge and skills bloom, albeit with errors along the way, until today where we are fortunate to have strong and growing foundations supporting pressure ulcer prevention and treatment.

This journey will be reflected in the highlights of one career covering work in bioengineering, economics, epidemiology, guideline development, industry, nursing, nutrition, physiology, registry development and veterinary medicine aptly illustrating how different disciplines and perspectives together help us gain understanding of pressure ulcer prevention and treatment

This presentation will not be rooted firmly in the past but also reflect on current and future steps through which our understanding of pressure ulcers in different care settings can be further increased.

[KS9/11] DEFORMED CELLS AS FAILING STRUCTURES: THE JOURNEY OF A MECHANICAL ENGINEER IN THE LABYRINTH OF BIOLOGY TO SEEK THE REASON FOR PRESSURE ULCERS

Amit Gefen'

Tel Aviv University, Ramat Aviv, Israel

Our research work, which spans over nearly two decades, has identified sustained tissue deformations as the primary cause of pressure ulcers- both at the skin and in deeper tissues. The sustained exposure to tissue deformations has multi-dimensional and multi-factorial influence on tissue status and cell viability and function, importantly including direct damage to cell structures, e.g. localized failures of the plasma membrane and cytoskeleton. From a mechanical engineering perspective, cells are structures that require energy to support loads and to repair themselves; hence, when loads are delivered for a period exceeding a critical threshold, or when the energy supply for cells is low (e.g. due to ischemia or hypoxia), cells gradually fail structurally, and lose homeostasis. In the evolution of our research work, we have developed a variety of living and in silico model systems, including cell cultures, animal models, tissue-engineered constructs, medical imaging of humans and finite element models of relevant body parts. All of these model systems indicated together that the fundamentals for achieving effective pressure ulcer prevention are to minimize exposure to sustained tissue deformations, and also, ensure that the minimization of tissue deformations applies to the entire layered structure of tissues, from superficial to deep. In other words, any device, consumable or equipment that claims pressure ulcer prevention, or a device that contacts the skin and may cause a pressure ulcer, should be designed to protect not only the skin but also, importantly, alleviate subcutaneous tissue distortion. In practical terms, there are different approaches for achieving minimization of exposure to tissue deformations (cutaneous and subcutaneous), such as to maximize immersion and envelopment of the body by a supporting surface (e.g. by molding or conforming to the body contours), as well as by matching stiffness properties of devices to contacting tissues and absorbance of deformation energy. Microclimate management couples with these considerations. The aforementioned approaches and relevant device concepts will be discussed in the aetiological context. Ultimately, devices aimed at alleviating tissue deformations should be combined with sensor technology to assess tissue status and early-diagnose deterioration in viability, as early as when the first cell deaths occur.

[KS10/I] CPR FOR FEET

Duncan Stang'

1 Hairmyres Hospital, East Kilbride, United Kingdom

Introduction: Avoidable Hospital acquired foot ulceration/pressure damage is unnecessary, can lead to litigation and is easily avoidable. A new inpatient initiative called CPR for Feet has been developed by the Scottish Diabetes Foot Action Group with the aim of eradication this problem.

Methods:

- All patients on admission to hospital have their feet Checked.
- All patients who are discovered to be 'at risk' of developing an avoidable foot ulcer/pressure damage to their foot during their stay in hospital have their feet Protected.
- All patients who are discovered to have existing foot ulcer/pressure damage are Referred appropriately according to local guidelines.

An online training package has been developed for all ward based staff to raise awareness of this issue. This training module is to teach staff how to Check feet for any existing problems, for neuropathy and other risk factors that the patient may have of developing an avoidable foot ulcer/pressure damage, to teach staff how to fit the appropriate pressure relief to Protect patients according to their individual needs and how to Refer the patient appropriately when an existing problem is discovered.

This is a very simple initiative which is presently being 'rolled out' throughout Scotland.

Results: An inpatient audit was carried out of 1,048 patients with diabetes which discovered that 2.4% of these patients had developed a new area of ulceration/pressure damage during their stay in hospital:

- 57% had not had their feet checked since admission
- 60% of those discovered to be at risk had no protection in place

Discussions: This initiative has been formulated by the Scottish Diabetes Foot Action Group with the support of the Scottish Diabetes Group and the Scottish Government with the aim of avoiding avoidable pressure damage/ulceration, especially in the heel area, to improve patient's Quality of Life, save valuable bed days and already stretched budgets.

Clinical relevance: The avoidance of avoidable pressure damage

References:

- [1] Scottish Diabetes Foot Action Group. CPR for Diabetic Feet - national initiative. 2016 [cited 2016 August 12]; Available from: <http://diabetesinscotland>

[KS11] HEALTH ECONOMIC EVALUATIONS OF PRESSURE ULCER INTERVENTIONS

David Meads'

1 University of Leeds, Leeds, United Kingdom

Health economic evaluations of healthcare interventions are a key component of health technology assessment (HTA) and represent critical evidence for decision makers and commissioners. In addition, funding bodies often require the inclusion of economic evaluations in clinical trials. This session will introduce key concepts in cost-effectiveness analyses (CEA) covering: when to conduct a CEA; different approaches to CEA; cost-utility analyses and quality-adjusted life years; evaluations alongside clinical trials vs. decision modelling studies; best practice in CEA; CEA results and interpretation; CEA and policy makers such as the National Institute for Health and Care Excellence (NICE). I will then move on to CEA within pressure ulcer prevention and treatment studies covering: case study examples; issues in measuring costs and benefits - particularly, health-related quality of life - and overcoming these. I will cover in more detail the Pressure Ulcer Quality of Life Utility Index (PUQoL-UI) including its development and use. As well as making recommendations on study design I will highlight areas for future research. This session will be non-technical and assumes no prior knowledge of the concepts to be discussed. There will be an opportunity to discuss the material presented and perceived barriers to implementing CEA in pressure ulcer studies and decision making.

[WMAI KS] THE HEEL BONE IS CONNECTED TO...

Helen Strapp¹, Menno van Etten², Pauline Wilson³

- 1 Tallaght Hospital, Dublin, Ireland
- 2 Menno van Etten Fysioterapeut, Oslo, Norway
- 3 St James' Hospital, Department of Endocrinology, Dublin, Ireland

This workshop will focus on a practical approach to the identification and management of heel pressure ulcers. 5 clinical scenarios will be presented covering all care settings. These scenarios will focus on common reasons for the development of heel pressure ulcer in the authors experience and supported by relevant literature. The challenges of prevention and management of these cases will be discussed and will be presented by members of the multidisciplinary team. The 5 scenarios will be presented in a workshop style session and audience participation is encouraged. Delegates will be reminded that heels are connected and should be considered as part of the holistic care of the patient. Causation of heel pressure ulcers are not always directly related to the intrinsic structures of the foot. Delegates will also be encouraged to complete CPR for heels in the prevention of this debilitating form of pressure ulcer.

[EPUAP-EWMA KS] PRESSURE ULCER PREVALENCE: WHAT DO THE EUROPEAN DATA TELL US?

Laura Conaty¹, Zena Moore²

- 1 Ireland
- 2 Royal College of Surgeons in Ireland, School of Nursing & Midwifery, Dublin, Ireland

Introduction: Pressure ulcers (PUs) remain a concern for individuals, their families and health service globally. A recent OECD report outlines that PUs are the most burdensome adverse event in health care, accounting for 13,780 healthy life years lost annually across England. Understanding the precise scope of the problem of PU is important in order to effectively plan prevention strategies.

Methods: A systematic review of the literature was undertaken in February 2017, to identify the prevalence of PU in Europe. Inclusion criteria were literature within Europe, exploring prevalence /epidemiology of PU and written in the English language. The primary outcome was PU prevalence and secondary outcomes included stages of PU; anatomical location. Quality appraisal was undertaken using the EBL Critical Appraisal Checklist (Glynn 2006) and data analysis included descriptive statistics.

Results: The search yielded 3,032 hits and on application of the inclusion criteria and duplicate removal, 70 articles remained. Seventeen countries were represented, with most data emerging from the UK and from acute and long stay settings. Overall, mean prevalence was 13.69% (SD 10.3%; Min 0.11%; Max 36%), with highest prevalence noted in a study from Spain (36 %) and lowest in a community study from the UK (0.11%). The majority of PUs were Grade 1 (41%), or Grade2 (32%), with the heel and sacrum the most common anatomical sites affected. The mean quality appraisal score was 67% (SD: 19%; min 20%, max 100%), with 57% of studies scoring > 75%, indicating confidence in the study design.

Discussions: PUs remain a common problem, however, from the studies reviewed, data collection methods were not consistent, meaning that, it is difficult to draw comparisons across the studies. Standardisation of data collection in this field is fundamental to achieving meaningful data

Clinical relevance: EWMA and EPUAP are striving for a collective European approach to PU monitoring, both prevalence and use of prevention strategies, in order that targets in PU reduction can be achieved consistently.

References:

- [1] Glynn, L. (2006). A critical appraisal tool for library and information research. Library Hi Tech, 24(3), 387

ws1 Core outcome sets in clinical research

Speakers: *Katrin Balzer, Dimitri Beeckman, Jan Kottner*

Date: 21st September, 13:15 - 14:15

MR: Hall 2B

Description: The quality and impact of clinical trials depend on a number of methodological criteria (e.g. randomization, concealed allocation etc.), but also on the choice of outcomes. Outcomes must be relevant to both patients and caregivers. Above all, outcomes must be comparable between trials to allow comparisons of treatment effects. This workshop introduces the concept of core outcomes and explains why core outcomes gain increasing attention in research. Two recent initiatives developing core outcome sets for pressure ulcer prevention and incontinence-associated dermatitis research will be discussed.

ws2 Seating biomechanics

Speakers: *Dan Bader, Amit Gefen, Yohan Payan*

Date: 21st September, 13:15 - 14:15

MR: Meeting room 1

Description: The workshop will explore the performances of available and future cushion technologies while estimating internal tissue deformations with three-dimensional computational modelling. Using a range of non-invasive biomechanical and biophysical parameters, the workshop will also question the ability to maintain the tissue integrity in the loaded sitting position, in conjunction with the postural and functional demands of the individual.

ws3 AND ws4 Dressing selection

Speaker: *Jeannie Donnelly, Joan Rogan, Steven Smet*

Date: 21st September, 13:15 - 14:15 and 14:15 - 15:15

MR: Meeting room 3

Description: There is hardly scientific evidence that supports health care givers in their decisions regarding wound treatment of pressure ulcers. Practical cases will be presented and we'll try to achieve consensus by discussions in one or more groups. Thereafter an evaluation will take place with an overview of the available evidence.

There is a limited number of seats for this workshop, therefore the pre-registration is required.

ws5 Repositioning

Speaker: *Menno Van Etten, Jeannie Donnelly, Joan Rogan*

Date: 21st September, 16:15 - 17:30

MR: Meeting room 1

Description: To prevent pressure ulcers EPUAP's guidelines suggest to positioning the patient in a 30 degrees side lying position, in other words moving the body load from the sacral- and trochanter area's to the gluteal area. In general position of patients is about giving patient stability, comfort and the feeling of security. But you may ask the question if classical repositioning techniques and the materials used to position the patient really give the stability and comfort needed? Also may shear forces be increased on the pressure ulcer hotspots. Adding the 30 degrees posture to the list of lying positions gives extra challenges to the caretakers. Positioning the upper body without rotations and positioning the legs preventing discomfort for the patient and without creating new PU hotspots. What role do positioning cushions play in off-loading and stabilizing the patient?

There is a limited number of seats for this workshop, therefore the pre-registration is required.

ws6 AND ws7 Debridement: Why-When-When not?

Speaker: *Carolyn Wyndham-White*

Date: 21st September, 16:15 - 17:15 and 22nd September, 09:00 - 10:00

MR: Meeting room 3

Description: This workshop will allow participants to become familiar with debridement, including surgical/sharp, enzymatic, autolytic, chemical, biosurgical, and mechanical techniques. Participants will gain knowledge about wound evaluation, the goals of debridement (when and why), limits, dangers, and related measures. Attendees will be able to practice sharp debridement and learn the necessary practical skills to integrate this essential practice in their wound care management tool kit.

There is a limited number of seats for this workshop, therefore the pre-registration is required.

[WS1] CORE OUTCOME SETS IN CLINICAL RESEARCH

Jan Kottner¹, Dimitri Beeckman², Katrin Balzer³

- 1 Charité-Universitätsmedizin Berlin, Clinical Research Center for Hair and Skin Science, Department of Dermatology and Allergy, Berlin, Germany
- 2 Ghent University, Department of Public Health, University Centre for Nursing and Midwifery, Ghent, Belgium
- 3 Institute for Social Medicine and Epidemiology, Lübeck, Germany

The quality and impact of clinical trials depend on a number of methodological criteria (e.g. randomization, concealed allocation etc.) but also on the choice of outcomes. Outcomes must be relevant to both patients and caregivers, they must be valid and reliable. Above all, outcomes must be comparable between trials to allow comparisons of treatment effects. Even if identical constructs are measured (e.g. pain), this can be done in many different ways. A core outcome set (COS) is an agreed standardized set of outcomes that should be measured and reported as a minimum in all clinical trials in a specific disease or trial population. COS consist of outcome domains and measurement instruments. Domains indicate what to measure and corresponding instruments indicate how to measure. COS development is a complex process consisting of a number of interrelated steps. There are a number of methodological frameworks providing guidance for the COS development process. Within the Core Outcome Set Initiative (COUSIN) of the Cochrane Skin Group (CSG) two projects with relevance to pressure ulcer care are being conducted at the moment: the Outcome for Pressure Ulcer Trials (OUTPUTs) and the Core Outcome Set in IAD Research (CONSIDER).

[WS2] SUBJECT-SPECIFIC MODELING FOR REAL-TIME PRESSURE ULCER PREVENTION IN SITTING POSTURE

Vincent Luboz¹, Matthieu Baillet², Christelle Boichon Grivot³, Michel Rochette³, Bruno Diot⁴, Marek Bucki¹, Yohan Payan⁵

- 1 Texisense, Montceau-Les-Mines, France
- 2 Timci-Imag, La Tronche, France
- 3 Ansys, Villeurbanne, France
- 4 Ids, Montceau-Les-Mines, France
- 5 Univ. Grenoble Alpes, Cnrs, La Tronche, France

Introduction: Ischial pressure ulcer is an important risk for every paraplegic person and a major public health issue. Pressure ulcers appear following excessive compression of buttock's soft tissues by bony structures, and particularly in ischial and sacral bones. Current prevention techniques are mainly based on daily skin inspection to spot red patches or injuries. Nevertheless, most pressure ulcers occur internally and are difficult to detect early.

Methods: Estimating internal strains within soft tissues could help to evaluate the risk of pressure ulcer. A subject-specific biomechanical model could be used to assess internal strains from measured skin surface pressures. However, a realistic 3D non-linear Finite Element buttock model, with different layers of tissue materials for skin, fat and muscles, requires somewhere between minutes and hours to compute, therefore forbidding its use in a real-time daily prevention context. In this work, we propose to optimize these computations by using a reduced order modeling technique (ROM) based on proper orthogonal decompositions of the pressure and strain fields coupled with a machine learning method.

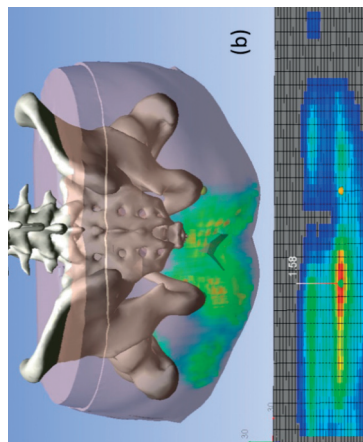
Results: ROM allows strains to be evaluated inside the model interactively (i.e. in less than a second) for any pressure field measured below the buttocks. In our case, with only 19 modes of variation of pressure patterns, an error divergence of one percent is observed compared to the full scale simulation for evaluating the strain field.

Discussions: This reduced model could be the first step towards interactive pressure ulcer prevention. The all on-line computations could be ported to a micro-controller embedded within a pressure mat placed on a wheelchair, thus providing a daily pressure ulcer prevention set up.

Clinical relevance: Coupled with the textile pressure sensor that continuously measures pressure frames under the sitting subject, the real-time ROM strain estimation inside the gluteal soft tissues should help to provide an interactive pressure ulcer risk assessment.

References:

- [1] TexiMat
- [2] Luboz V., Baillet M., Boichon Grivot C., Rochette M., Diot B., Bucki M. & Payan Y. (to appear). Personalized modeling for real-time pressure ulcer prevention in sitting posture. *Journal of Tissue Viability*.



Wednesday, 20 September 2017

- 16:45 - 17:45 **Free paper session 1**
Pressure ulcers: Implementation science and education
Hall 2A
- 16:45 - 17:45 **Free paper session 2**
Basic science: Biomechanics and aetiology
Meeting room 1
- 16:45 - 17:45 **Free paper session 3**
Innovations in pressure ulcer prevention and treatment & Impact of pressure ulcers on patients, carers and society
Meeting room 3

Thursday, 21 September 2017

- 08:00 - 09:00 **Free paper session 4**
Pressure ulcer prevention and management in specific patient groups (paediatrics, surgery, spinal cord, injury, ER, older persons, palliative care, etc.) (1)
Hall 2A
- 08:00 - 09:00 **Free paper session 5**
Pressure ulcer prevention and management in specific patient groups (paediatrics, surgery, spinal cord, injury, ER, older persons, palliative care, etc.) (2)
Meeting room 3
- 10:45 - 11:45 **Student free paper session 1**
Clinical science
Hall 2B
- 10:45 - 11:45 **Free paper session 6**
Pressure ulcers: Patient safety, quality of care and policy
Meeting room 1
- 14:30 - 15:45 **Student free paper session 2**
Basic science
Meeting room 1
- 16:15 - 17:30 **Free paper session 7**
Innovative approaches in clinical research (prevention and treatment)
Hall 2A

Friday, 22 September 2017

- 09:00 - 10:00 **Free paper session 8**
Pressure ulcers: Patient safety, quality of care and policy
Hall 2B
- 09:00 - 10:00 **Free paper session 9**
Pressure ulcers and health economics & Interdisciplinary collaboration
Meeting room 1

Free paper presentation

- 1 **Attitude of nurses and nursing students towards the prevention of incontinence-associated dermatitis: A psychometric instrument validation study**
Van Damme, Nele
- 2 **A realist evaluation of pressure ulcer risk assessment instrument use in clinical practice**
Coleman, Susanne
- 3 **Sustainability of a multi-faceted intervention to implement evidence-based pressure ulcer prevention**
Sving, Eva
- 4 **Wound management training programme for health care support workers**
Fennel, Linda
- 5 **Surfaces for health: In-vivo measurement of the effect of shear and pressure on skin viability**
Hoogendoorn, Iris
- 6 **Surfaces for health: On the relationship between surface texture and shear**
Klaassen, Michel
- 7 **Spatial effects of indentation induced deep tissue injury**
Traa, Willeke
- 8 **Incidence of skin pressure ulcers using cyclic pressure application in diet-induced model of skin adiposity in mice**
Sigaudou-Roussel, Dominique
- 9 **Does posture influence biomechanics and physiological parameters on participants supported on an intelligent mattress**
Worsley, Peter
- 10 **National audit of pressure ulcers and incontinence associated dermatitis: Cross-sectional survey in Wales**
Clark, Michael
- 11 **Extensive multifocal pressure ulcers in a young female patient bedridden due to multiple sclerosis: Case study**
Malka, Marcin
- 12 **Prevention of pressure ulcers with a static air support surface: A systematic review**
Serraes, Brecht
- 13 **The effects of bacterial fragments and antioxidants on cell resilience to mechanical stress**
Tucker-Kellogg, Lisa
- 14 **The effects of cervical collar design and strap tension on tissue status reflected in biomechanics parameters and biomarker response**
Worsley, Peter
- 15 **Hospital acquired pressure ulcers increase the risk of adverse outcome in critically ill patients**
Ahtiala, Maarit
- 16 **Consistent practices in prevention of pressure ulcers**
Mäki-Turja-Rostedt, Sirpa
- 17 **Improving pressure ulcer prevention in nursing homes**
Clark, Michael
- 18 **Using an informal educational approach to improve pressure ulcer diagnosis and grading**
Hodgson, Heather
- 19 **Pressure injury prevention interventions in adults and pediatrics**
Nie, Ann Marie
- 20 **The clinical effectiveness of silicone dressings to prevent PU in aged care**
Santamaria, Nick
- 21 **Making a difference in residential aged care: Reducing pressure injury rates through a multi-nodal approach**
Rando, Tabatha
- 22 **The Ghent Global IAD Categorisation Tool (GLOBIAD) for incontinence-associated dermatitis: International development and reliability study**
Van den Bussche, Karen
- 23 **The development of a generic wound assessment minimum data set**
Coleman, Susanne
- 24 **Translating evidence-based device-related pressure injury prevention strategies to the intensive care environment: The SUSTAIN study.**
Coyer, Fiona

- 25** The possibility to monitor pressure ulcers prevalence and incidence on national level
Pokorna, Andrea
- 26** Independent risk factors for the development of skin erosion due to incontinence in nursing homes and the ICU
Van Damme, Nele
- 27** Pressure mapping to prevent pressure ulcers in a geriatric hospital ward: A pragmatic randomised controlled trial
Gunningberg, Lena
- 28** PROTECT - Trial: A multicenter prospective pragmatic RCT and health economic analysis about the effect of tailored repositioning to prevent pressure ulcers
De Meyer, Dorien
- 29** Outcomes of pressure ulcer treatment in specialist wound clinics
Clark, Michael
- 30** Measuring microclimate: An RCT to explore the influences of foam dressings on pressure prone areas
McGuinness, William
- 31** Varieties of Pressure Injury in the Terminally Ill
Black, Joyce
- 32** Clinical performance of a new PU risk tool: Shape Risk Scale with the Braden scale
Soppi, Esa
- 33** A scientific assessment of an automated disinfection system for the decontamination of hospital: Pressure-relieving mattresses
Westgate, Samantha
- 34** Groundbreaking clinical research revealing the effectiveness of therapeutic seating in reducing pressure injuries
Tierney, Martina
- 35** A multidisciplinary approach to pressure ulcer prevention: An exploration of healthcare professionals' involvement and perceptions of pressure ulcer prevention in a community setting
Clarkson, Paul
- 36** Outcomes of a specialist multi-disciplinary team in prevention of hospital acquired pressure injuries and malnutrition in an acute hospital setting: A pilot project
Moon, Jessica
- 37** Promoting cultural change impacts the bottom line: A case for measuring the economic impact of providing supportive environment
Sage, Sarah
- 38** The direct cost of pressure injury (PI) treatment in an Australian residential aged care setting
Kapp, Suzanne

Student free paper presentation

- 39** A review of design and analysis methods for pressure ulcer research
Smith, Isabelle
- 40** Effects of two different fabrics on skin barrier function under real pressure conditions
Tomova-Simitchieva, Tsenka
- 41** Real time feedback of pressure points: A tool to increase patient's participation?
Hultin, Lisa
- 42** Dry skin and pressure ulcer risk: A multi-center cross-sectional prevalence study in German hospitals and nursing homes
Lechner, Anna
- 43** Modelling an adult human head on different positioners for pressure ulcer prevention
Greifman, Rona
- 44** Deep tissue loads in the seated buttocks on a foam off-loading wheelchair cushion versus an adjustable air-cell-based cushion: Finite element studies
Cohen, Lea
- 45** Dynamic computational simulations for evaluating protocols of tissue loads applied by a regulated negative pressure-assisted wound therapy (rnp) system for treating large wounds
Greifman, Rona
- 46** An interconnected-air-cells cushion technology is effective in protecting bony clients
Cohen, Lea

[1] ATTITUDE OF NURSES AND NURSING STUDENTS TOWARDS THE PREVENTION OF INCONTINENCE-ASSOCIATED DERMATITIS: A PSYCHOMETRIC INSTRUMENT VALIDATION STUDY

Nele Van Damme¹, Annelies Himpens¹, Ann Van Hecke¹, Sofie Verhaeghe¹, Dimitri Beekman²

- 1 University Centre for Nursing and Midwifery, Ghent University, Ghent, Belgium
- 2 Ghent University, Department of Public Health, University Centre for Nursing and Midwifery, Ghent, Belgium

Introduction: One of the main complications of incontinence is inflammation of the skin in the genital and anal region, also known as incontinence-associated dermatitis (IAD). IAD is a known risk factor for pressure ulcers development. Prevalence figures of IAD vary between 5.6% and 50.0%. Nevertheless, a wide range of products and procedures for the prevention of IAD are available (1). In order to promote effective and timely IAD prevention, improving nurses' knowledge is widely used strategy. However, preventive behavior is also influenced by nurses' attitude. The aim of this study was to develop and psychometrically validate an instrument measuring nurses' and nursing students' attitude towards the prevention of IAD.

Methods: A prospective psychometric instrument validation study was performed. In a first phase, the instrument was designed based on a literature review, three focus group interviews with nurses and nursing students, clinical experience, and deductive reasoning by the developers. In a second phase, the instrument was psychometrically evaluated in a sample of 150 nurses and 150 students. Construct validity (factor analysis, discriminating power and internal consistency) as well as stability reliability testing of the instrument were evaluated.

Results: The preliminary version of the instrument consisted of 26 items, divided into four themes: priority, responsibility, impact, and belief in the effectiveness of prevention. The psychometric evaluation is currently ongoing. Results are expected before July 2017.

Discussions: To our knowledge, the Attitude towards the Prevention of IAD tool is the first tool which is able to provide insight into the attitude of nurses and nursing students towards the prevention of IAD.

Clinical relevance: Results from the application of the tool can be used in quality improvement strategies aimed at reducing IAD incidence.

References:

- [1] Beekman D, Van Damme N, Schoonhoven L, Van Lancker A, Kottner J, Beele H, et al. Interventions for preventing and treating incontinence-associated dermatitis in adults: The Cochrane database of systematic reviews. 2016;11:CD011627.

Text

[2] A REALIST EVALUATION OF PRESSURE ULCER RISK ASSESSMENT INSTRUMENT USE IN CLINICAL PRACTICE

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Introduction: Pressure Ulcer Risk Primary Or Secondary Evaluation Tool - PURPOSE-T was developed as part of an NIHR Programme Grant (PURPOSE: RP-PG-0407-10056) following concerns about the development methods and content validity of standard Risk Assessment Instruments (RAIs) commonly used in practice. PURPOSE-T has been implemented in acute and community trusts in the UK and further evaluation of its usefulness in practice is needed.

A review of evaluation methods used for RAIs found studies predominantly consider predictive validity with only 2 inconclusive clinical effectiveness trials [1]. These have methodological weaknesses and fail to consider RAIs as complex interventions. Given the large sample size required to undertake an RCT of RAIs [2], it would be prudent to increase our understanding of causal mechanisms and contextual factors associated with effective RAI use in practice [3].

Methods: A realist evaluation will be undertaken to understand how different contexts elicit particular nursing team responses and give rise to different outcomes when using PURPOSE-T and standard RAIs. Evaluation comprises theory elicitation, prioritisation and testing and methods include a scoping review, semi-structured interviews (staff/patients), structured consensus methods, record review and observation.

Results: The study will facilitate user guidance development to better target RAI use in different care contexts and the possibility of improved patient outcomes.

Discussions: The study will increase our understanding of how RAIs are used in practice to establish whether there is sufficient confidence that PURPOSE-T can 'reasonably be expected to have a worthwhile effect' over standard RAIs, informing ongoing evaluation.

Clinical relevance: Improving the identification and management of PU risk remains an important challenge in practice.

References:

- [1] NICE, PU prevention CG179, 2014.
- [2] Balzer et al, Designing trials for PU risk assessment research: Methodological challenges. JNS 2013.
- [3] Moore et al, Process evaluation of complex interventions: MR guidance. BMJ, 2015.

Acknowledgement: This report is independent research arising from a Post-Doctoral Research Fellowship (PDF-2016-09-054) supported by the National Institute for Health Research. The views expressed in this publication are those of the author(s) and not necessarily those of the NHS, the National Institute for Health Research, Health Education England or the Department of Health.

Text

[3] SUSTAINABILITY OF A MULTI-FACETED INTERVENTION TO IMPLEMENT EVIDENCE-BASED PRESSURE ULCER PREVENTION

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- 3 Faculty of Health and Occupational Studies, Department of Health and Caring Sciences, University of Gävle, Gävle, Sweden
- 4 Department of Medical Sciences, Uppsala Universitet, Uppsala, Sweden
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Introduction: More knowledge is needed about implementation of evidence-based pressure ulcer prevention [1] and how to get sustainability [2]. A multi-faceted intervention aimed to implement evidence based pressure ulcer prevention was performed in a hospital setting. The result showed significant improvement in prevention care [3]. The aim of this study was to evaluate the long time effects of the intervention.

Methods: A quasi-experimental, clustered pre- and post-test (6-8 month, and 36-42 month) design was applied. Five hospital units were included. The intervention consisted of a multi professional team, training and repeated quality measurement.

Results: Included were 763 patients, out of them 153 risk patients (MN ≤20). More risk patients had prevention at long time follow up (58%) compared with base line (29%, p≤0.001)) and more prevention to each risk patient was given (p≤0.001). Comparing the 6-8 month follow up with the long time follow up there were no improvement regarding how many risk patients that got prevention (50%, p=0.202) but each patient at risk was given more prevention (p=0.045).

Discussions: This study showed that the improvement reached after 6-8 month was sustainable over a longer time period. However, additional improvement is still needed that all patients at risk get prevention. A qualitative study in the same setting after 6-8 month [4] showed changed understanding among nurses and fist-line managers – from treating pressure ulcers to preventing them.

Clinical relevance: It is important to evaluate long time effects to decide which implementation strategies that are successful in clinical settings.

References:

- [1] Balzer (2015) *International Journal of Nursing Studies*, 52, 1655–1658
- [2] Wiltsey Stirman (2012) *Implementation Science*, 7: 17
- [3] Sving et al. (2016) *International Wound Journal*, 13:645–654
- [4] Sving et al. (2017) *International Journal of Clinical Nursing*, doi:10.1111/ijocn.13668

[4] WOUND MANAGEMENT TRAINING PROGRAMME FOR HEALTH CARE SUPPORT WORKERS

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Introduction: In response to a scoping exercise of wards/community teams and unregistered Health care support workers (HCSWs) in the Belfast Trust a need was identified for a wound care course.

This training:

- Provided HCSW's with theory and supervised practice in the care of uncomplicated wounds and the management and prevention of pressure ulcers.
- Included strict protocols for HCSW's in relation to delegation, reporting and recording documentation.

Methods: In 2014 we commissioned training support from the Clinical Education Centre. In collaboration with Nurse Development Leads, Community Nurse Leads, Tissue Viability Nurses, Infection Prevention Control Nurses and a Senior Consultant from the CEC, the following was created:

- A Trust Policy (outlining roles and responsibilities of registered nurses and HCSW's in relation to wound care and pressure ulcers)
- A theoretical component and skills based programme.
- A mentorship and competency assessment tool.

The pilot commenced in April 2015 with 20 HCSW's (representing hospital and community teams)

Participants attended 4 days of interactive teaching and workstations.

HCSW's were assessed through classroom based skills tests and practice observations. They also completed a portfolio which included questionnaires and personal reflections relating to wound care.

Results: This course has been positively evaluated and enjoyed with participants reporting knowledge and skills applied appropriately in practice.

Discussions: Positive testimonials recorded by patients and staff.

Clinical relevance: Benefits for Patients /HCSW's

- HCSW's recognize signs of wound deterioration.
- Prompt escalation of concerns to registered nurses.
- HCSW's able to promote health eating, pressure relief and good patient skin care.
- Increased confidence, knowledge and skills in relation to wound care and detection of pressure damage.
- Enhanced sense of job satisfaction and autonomy.

60 participants have completed the programme. The third cohort successfully completed in April 2017.

In summary this project has developed the skills of HCSW's to care for patients with simple wounds. By investing in our HCSW's we have improved their feeling of value and improved the efficacy of right person, right skills in care delivery.

References:

- [1] Delegation of Simple wound care (Adults) to Band 3 HCSW's (2015)

[5] SURFACES FOR HEALTH: IN-VIVO MEASUREMENT OF THE EFFECT OF SHEAR AND PRESSURE ON SKIN VIABILITY

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Introduction: In general, two pathways of tissue damage are distinguished: ischemia-induced damage and deformation-induced damage. To increase understanding of the effect of shear in tissue damage, both pathways should be investigated. We aim at developing techniques to measure, analyze and quantify the effect of shear on tissue viability in-vivo.

Methods: An experimental measurement set-up was built to apply pressure and shear on human skin (figure 1). The set-up was either fitted with two sensors of the 'Oxygen to See' measuring skin blood flow (SBF) parameters, or it was fitted with an ultrasound transducer to visualize tissue deformation and post-processed with a digital image correlation analysis estimating internal strain. Both set-ups were tested in measurements using multiple shear (max 7.4N) and pressure (55 or 110 mmHg) levels.



Figure 1. Overview measurement set-up with O2C sensors (left) and ultrasound transducer (right).

Results: Microcirculation: The effect of shear, in addition to pressure, is small. With low pressure, shear results in a small negative effect on SBF, while with large pressure, shear results in a stronger decrease in SBF (figure 2). Furthermore, it seems that men and women react differently to loading: women show a stronger decrease in SBF during load and a reduced post-reactive hyperemic peak after loading. Deformation: Preliminary results show that the technique is feasible to measure deformation in-vivo but further analysis is needed (figure 2).

Figure 2. Example showing effect of load on SBF (left) and tissue deformation (right).

Discussions: The effect of multiple shear levels on microcirculation is smaller as expected from literature, where usually one level of shear is compared to a condition without shear. The difference in response between men and women is remarkable but the underlying cause cannot be determined from this research.

Clinical relevance: Knowledge on the effect of interface shear on skin viability could help in the development of new textiles or surfaces to prevent pressure ulcer development.

References: None

Acknowledgement: This research is supported by the Dutch Technology Foundation STW, which is part of the Netherlands Organization for Scientific Research (NWO), and which is partly funded by the Ministry of Economic Affairs (12673).

[6] SURFACES FOR HEALTH: ON THE RELATIONSHIP BETWEEN SURFACE TEXTURE AND SHEAR

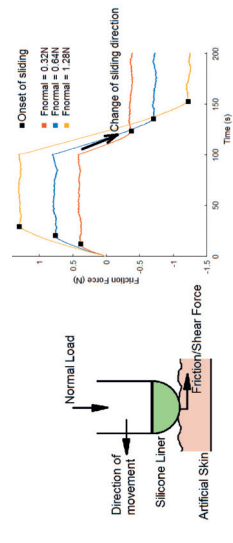
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Introduction: Shear forces are a major concern for both bedridden patients and prosthetic limb users. The shear forces that exist between the, often silicone, prosthetic liner can lead to elevated temperatures (rubbing), or high shear stresses (sticking), thereby damaging the skin. The goal of this work to develop design rules for optimizing the friction between the skin and prosthetic liner such that skin problems (such as pressure ulcers) can be reduced.

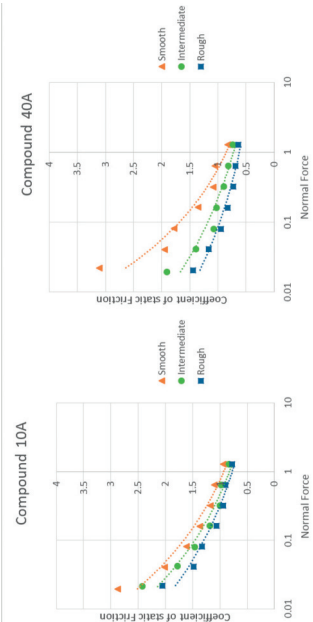
Methods: Friction measurements are performed using an artificial skin against two silicone compounds with varying (clinically relevant) Shore A hardness. Samples are produced with a surface roughness ranging from 0.5 to 10µm.

Figure 1. Contact between artificial skin and silicone liner material, and typical results for three normal loads



A typical measurement result is shown in Figure 1. At the onset of sliding the friction force does not further increase. The ratio between this point and the normal load gives the coefficient of friction

Results: Figure 2 shows the coefficient of friction for different values of surface roughness. The figure shows that Compound 10A (Softer) is less sensitive to roughness change than compound 40A (Harder). The results show that the harder compound is more sensitive to change in roughness than the softer compound. At larger normal forces the effects of roughness reduce, but are still present.



Discussions: The surface roughness of the liner material has a large influence on the frictional behavior. This allows for prosthetic liners in which the shear force distribution is optimized in order to relieve the skin tissue. By increasing the friction coefficient less heat will be generated, and by reducing it, (possibly damaging) shear forces can be prevented.

Clinical relevance: In this work we focused on developing design criteria for prosthetic liners, in order to apply these criteria for developing surfaces that reduce pressure ulcer prevalence.

Acknowledgements: This research is supported by the Dutch Technology Foundation STW, which is part of the Netherlands Organization for Scientific Research (NWO), and which is partly funded by the Ministry of Economic Affairs.

[8] INCIDENCE OF SKIN PRESSURE ULCERS USING CYCLIC PRESSURE APPLICATION IN DIET-INDUCED MODEL OF SKIN ADIPOSITY IN MICE

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Introduction: Dermal white adipose tissue was shown to increase during obesity at the expense of surrounding tissues and could participate to cutaneous fragility. Extremely obese patients are subjected to higher risk for pressure ulcers than normal weight or overweight patients. The aim of the present study was to study the incidence and mechanisms of pressure ulcer depending on the adiposity in a diet-induced model of adiposity in mice.

Methods: C57Bl6 male mice were randomly assigned to a high-caloric diet for 4 or 12 weeks (HCD4 or HCD12). Skin pressure injury was induced using two magnets applied twice. We studied the time for skin lesion and healing process. Skin functionality was evaluated before and after injury using laser Doppler flowmetry in response to a local pressure application or vasoactive drugs.

Results: Before skin lesion sequence of vascular adaptive cellular events dependent on the endothelial stimulation (Ach and PIV) were observed from nitric oxide (HCD4) to COX-2 pro-inflammatory factors (HCD12). HCD12 mice presented a bigger necrotic surface of the skin compared to HCD4 mice. The skin healing process is delayed in HCD12 compared to HCD4 mice.

Skin functionality appears to be altered after skin closure in both HCD groups. The skin blood flow was decreased in HCD4 and HCD12 mice after skin closure compared to the non-wounded skin.

Discussions: In this study we show that cyclic pressure application is deleterious for the skin and suggests that the increase of dermal white adipose tissue during obesity contributes to skin fragility. The severity of the skin lesion and the time to heal was dependent to the increase in adiposity but not dependent to dermal adipose tissue insulin resistance.

Clinical relevance: Cutaneous vascular adaptation related to fat changes could be beneficial to the skin tissue subjected to acute pressure application (Nguyen-tu 2013) but not for repetitive and chronic pressure application. The involvement of distinct adaptive vasodilatory signals may provide useful diagnostics to assess pressure ulcer risk in overweight and obese subjects.

References:

- [1] Nguyen-Tu MS et al. Microvascular Research. 2013; 90:138–143 UMR 5305 CNRS, 69367 Lyon cedex 07, France; University of Lyon 1

[7] SPATIAL EFFECTS OF INDENTATION INDUCED DEEP TISSUE INJURY

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- 4 Faculty of Health Sciences, University of Southampton, Southampton, United Kingdom

Introduction: A previous study has indicated that elevated internal tissue strains can directly cause soft tissue damage; hence minimizing these strains should result in effective pressure ulcer prevention strategies. However, the strain thresholds are based on a local analysis of muscle indentation and do not include the response of the tissue at an organ level. To determine the effect of mechanical loading on muscle tissue as an organ, a model of deep tissue injury is combined with finite element analysis. The objective of this study is to determine the spatial effects at a distance from the area of indentation.

Methods: The tibialis anterior muscle of Sprague-Dawley rats (n=35) was indented for 2 hours inside an MRI system. Displacement-driven dedicated 3D-finite element models were created from T1-weighted scans. Increased T2-values indicate oedema formation and structural damage, which is taken as a measure of muscle damage. For the regional analysis the leg was divided into three 4mm regions distal, beneath and proximal to the indenter.

Results: Highly structured damage was observed by MRI in most cases after load removal. Maximal muscle damage occurred in the region underneath the indenter. Where high damage is evident at the site of indentation (>20%), the proportion of further damage was consistently higher in proximal compared to the distal region. Damage was shown to persist for 5 days. The highest strain energies were estimated to localize in the region of indentation. The relationship between muscle damage and strain energy in the 3D-analysis is more diffuse than has been previously reported.

Discussions: Muscle tissue reacts to mechanical loading on an organ level, showing elevated T2-values outwith the region of indentation. The persistent increase in T2-values highlights the long term nature of the structural damage. Histological analysis will provide more insight into the mechanisms of regeneration. A regional analysis of the finite element results is currently in progress to elucidate the relationship between mechanical loading and wound development at an organ level.

Clinical relevance: The progression of tissue damage outwith the region of indentation should be taken into account in the overall treatment of pressure ulcers.

References:

- [1] doi.org/10.1007/s10439-010-0002-x

[9] DOES POSTURE INFLUENCE BIOMECHANICS AND PHYSIOLOGICAL PARAMETERS ON PARTICIPANTS SUPPORTED ON AN INTELLIGENT MATTRESS

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Introduction: Individuals with reduced mobility are at risk of developing pressure ulcers (PUs). To reduce this risk, clinical guidelines advocate regular repositioning and the use of intelligent mattress systems to redistribute pressure across the body. This study examines the biomechanical and physiological responses to lying postures, using one such mattress.

Methods: The study was conducted with healthy participants who were asked to adopt three postures in a random order: supine, lateral tilt, cardiac high-sitting. A series of biomechanical and physiological parameters were estimated, including: 1) Interface pressures, 2) Transcutaneous gas levels (TcPO₂ and TcPCO₂) at the sacrum, 3) Comfort scores, 4) Microclimate. Measures were collated for each posture, with transcutaneous gas levels categorised according to established criteria [1].

Results: Fifteen participants (9 males) across the age spectrum (18-82 years old) were tested. The majority of participants 13/15 exhibited transcutaneous levels that did not indicate compromised tissue viability and were comfortable throughout testing (Fig 1). By contrast, two participants exhibited reduced TcPO₂ and elevated TcPCO₂, during the high sitting posture [1]. The microclimate at the participant-support surface interface increased, reaching values of 35-36°C and 46-48% RH, respectively. Close examination of the data revealed that lateral tilt provided some relief in the form of tissue reperfusion and reduced microclimate. Interface pressure measures revealed relatively consistent values, with median pressures of 42-63mmHg across all test conditions.

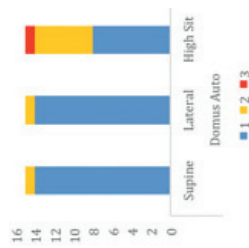


Figure 1: Category responses from the 15 participants.

Discussions: The findings were comparable to other similar studies [2&3]. Indeed, when the head of bed was raised to 45°, a small number of participants demonstrated a compromised tissue viability.

Clinical relevance: The support surface provided pressure redistribution and high levels of comfort, whilst in a standard setting mode. In selected individuals, high sitting caused an ischemic response in sacral tissues. The lateral tilt provided some recovery, but represents a compromised functional posture for individuals.

References:

- [1] ProCare Auto, Apex Medical Corp, Taiwan
- [2] Chai, C. Y. & Bader, D. L. 2013. JMBBM. 28:427-35
- [3] Woodhouse, M. et al. 2015. Clin Biomech, 30, 166-174.
- [4] Worsley, P.R., et al. 2016. Clin Biomech 40:27-32

[10] NATIONAL AUDIT OF PRESSURE ULCERS AND INCONTINENCE ASSOCIATED DERMATITIS: CROSS-SECTIONAL SURVEY IN WALES

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- 3 Welsh Wound Innovation Centre, Wales, United Kingdom

Introduction: The Chief Nurse National Health Service Wales initiated a national survey of acute and community hospital patients in Wales to identify the prevalence of pressure ulcers and incontinence associated dermatitis.

Methods: Following the EPUAP methods for recording pressure ulcer prevalence teams of two Tissue Viability or research nurses independently assessed the skin of each in-patient who consented to having their skin observed. Pressure ulcers were classified using the system reported by the NPUAP/EPUAP/PPPIA (2014) and incontinence associated dermatitis defined following the guidelines of the All Wales Tissue Viability Nurses Forum and All-Wales Continence Nurses (2014). Both classification systems are used across Wales and familiar to the data collectors

Results: The audit was undertaken during the period 28th September 2015 to October 2nd 2015 with data collected upon 8365 patients located across 66 hospitals. Seven hundred and forty-eight patients (748/8365; 8.9%, 95% CI 8.29% to 9.51%) had pressure ulcers with these wounds being either reported by ward staff and/or observed during the audit. Not all patients had their skin inspected with all mental health patients exempt from this part of the audit along with others who did not consent or were too ill. Of the patients with pressure ulcers 593 (79.3%) had their skin inspected with 158 new pressure ulcers encountered that were not known to ward staff while 152 pressure ulcers were incorrectly categorised by the ward teams.

There were 362 patients with incontinence associated dermatitis (4.3%; 95% CI 3.91% – 4.79%).

Discussions: This was the first national survey of pressure ulcers and incontinence associated dermatitis in the devolved nations of the United Kingdom.

Clinical relevance: Although logistically complex it is feasible to undertake national surveys of pressure ulcers and incontinence associated dermatitis.

References:

- [1] All Wales Tissue Viability Nurse Forum and All Wales Continence Forum. All Wales Best Practice Statement on the Prevention and Management of Moisture Lesions. 2014. Accessed at http://www.welshwoundnetwork.org/files/5514/0326/4395/All_Wales-Moisture_Lesions_final_final.pdf on November 24th 2016.
- [2] National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers: Quick Reference Guide. Emily Haesler (Ed.). Cambridge Media: Osborne Park, Australia; 2014.

[12] PREVENTION OF PRESSURE ULCERS WITH A STATIC AIR SUPPORT SURFACE: A SYSTEMATIC REVIEW

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- 1 (General Hospital) Az Nikolaas, Nursing and Paramedical Department, Sint-Niklaas, Belgium
- 2 Martin's Geriatric and Wound Consultancy, Rotterdam, The Netherlands, Caphri, School of Public Health and Primary Care, Department of Family Medicine AND Department of Health Services Research, Maastricht, Netherlands
- 3 Caphri, School of Public Health and Primary Care, Department of Family Medicine AND Department of Health Services Research, Maastricht, Netherlands
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Introduction: Pressure ulcers (PUs) have a major impact on patients, caregivers and society. Prevention is essential to reduce this impact. The aim of this review was to identify, assess and summarize available evidence to prevent the development of PUs on a static air mattress overlay. The primary outcome was the incidence of PUs. Secondary outcomes included costs and comfort.

Methods: A two-step search strategy was applied. Firstly, six databases were consulted. The terms and synonyms for pressure ulcers, static air mattress overlay(s) and prevention were combined. Secondly, a hand search was performed through reviews, conference proceedings. Studies were included if the following criteria were met: (1) reporting an original study, (2) outcome was the incidence of PUs Cat. I-IV when using a static air mattress overlay, (3) published in English, French and Dutch. No limitation was set on study setting, design and date of publication. The methodological quality assessment was evaluated by two independent authors based on the Critical Appraisal Skills Program.

Results: The searches included 13 studies: randomized controlled trials (n=11) and cohort studies (n = 2). The mean PU incidence figures found in the different settings was respectively: 7,8% PUs Cat. II-IV in nursing homes, 9,06% PUs Cat. I-IV in intensive care settings, 12% PUs Cat. I-IV in orthopaedic wards. Seven comparative studies reported a lower incidence in the groups of patients on a static air mattress overlay. Three studies reported a statistical (significance level of <0.1) lower PUs incidence compared to a standard hospital mattress (10cm thick, density 35kg / m³), a foam mattress (15cm thick) and a viscoelastic foam mattress (15cm thick). No significant difference in costs and comfort was found compared to dynamic air mattresses.

Discussions: Interpretation of the evidence should be done with caution due the wide variety of methodological and/or reporting quality of the included studies.

Clinical relevance: This review focused on the effectiveness of static air mattress overlays to prevent PUs. There are indications that these mattress overlays are more effective compared to the use of a standard mattress or a pressure-reducing foam mattress in nursing homes, intensive care settings.

Reference: None

[11] EXTENSIVE MULTIFOCAL PRESSURE ULCERS IN A YOUNG FEMALE PATIENT BEDRIDDEN DUE TO MULTIPLE SCLEROSIS: CASE STUDY

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- 2 Podos Wound Care Clinic, Warszawa, Poland

Introduction: Multiple sclerosis (MS) is a chronic inflammation-driven demyelinating disease with multifocal damage to the nervous tissue. MS is common cause of disability among young people.

Methods: A 29-year-old female patient, suffering from MS since 2003, came to our clinic due to expanding pressure ulcers (PU) located in the sacral-ischial area. Body of the right ischium was present in the wound cavity. She also had PU of the left calf and left knee joint with leakage of synovial fluid and PU of the right elbow joint and right foot. Main causes for the development and exacerbation of the PU were identified as: lack of appropriate prophylaxis, patient malnutrition, and inadequate removal of the necrotic tissue from the wound cavity. The following multidisciplinary care was initiated. The family was educated on the most appropriate preventative care. Patient's diet was modified. Necrotic tissue was removed from the ulcers located on the buttocks and autolytic dressings were applied to the wounds. The same procedure was followed during subsequent visits until the necrotic tissue was entirely eliminated from the wound cavities. Further treatment of this area involved the introduction of negative-pressure wound therapy in order to connect the multifocal ulcers of the buttocks into one system. This part of the treatment was considered successful when granulation tissue developed in the wounds. Next, treatment with foam dressings was introduced. The use of this dressing was performed until closing the wounds. The foam dressings were used until the wounds were completely closed.

Results: All the wounds in this patient were completely closed within six months

Discussions: Consistent use of causal and local therapy in the treatment of PU in a young patient with MS allowed gradual healing of extensive wounds

Clinical relevance: Appropriate multidisciplinary care allows successful treatment of extensive PU

References:

- [1] Prevention and Treatment of Pressure Ulcers. Clinical Practice Guideline 2014

[13] THE EFFECTS OF BACTERIAL FRAGMENTS AND ANTIOXIDANTS ON CELL RESILIENCE TO MECHANICAL STRESS

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- 1 Duke-Nus Medical School, Singapore, Singapore, Singapore
- 2 Duke-Nus Medical School, Centre for Computational Biology, Singapore, Singapore

Introduction: Non-healing ulcers in humans are known to have high levels of oxidative stress [1-2], and oxidative stress may contribute to the pathology of pressure injuries. Lipopolysaccharides (LPS) from Gram-negative bacteria may contribute to oxidative stress through numerous mechanisms, such as enhancing the pseudo-peroxidase activity of haemoglobin [3]. The chief goal of this work was to determine whether antioxidant treatments can improve cell resilience to mechanical injury, alone or in the presence of bacterial LPS.

Methods: We studied mouse muscle cells cultured on elastic surfaces, inside a previously-characterized device to inflict mechanical injury. The cultures were exposed to bacterial LPS, with or without antioxidant compounds Catalase, Trolox, or Acetylcysteine (NAC), at different doses. Cells were subjected to mechanical injury or unstrained control treatment, and were measured for oxidative stress and cell death (cytotoxicity).

Results: The addition of 100µg/ml LPS did not enhance the killing of muscle cells by mechanical strain. The antioxidant enzyme catalase lowered strain-induced oxidative stress to the level of unstrained cells, and it reduced strain-induced cytotoxicity by 21%. Trolox improved strain-induced oxidative stress but failed to deliver any benefit toward cytotoxicity. NAC was the most effective antioxidant as it completely ameliorated strain-induced oxidative stress and strain-induced cytotoxicity.

Discussions: We conclude that Acetylcysteine (NAC) warrants further investigation as it completely protected muscle cells from strain-induced cell death, according to our *in vitro* model of mechanical injury.

Clinical relevance: Acetylcysteine is an antioxidant drug that is widely taken by mouth to loosen mucous. Our mouse cell experiments suggest that this same drug might also have benefits for helping muscle cells to survive mechanical deformation. Acetylcysteine should undergo further testing in human skin and muscle.

References:

- [1] Wlaschek & Scharfetter-Kochanek (2005). Oxidative stress in chronic venous leg ulcers. *Wound Repair Regen*, 13:452.
- [2] Yeoh-Ellerton & Stacey (2003). Iron and 8-isoprostane levels in acute and chronic wounds. *J Invest Dermatol*, 121:918.
- [3] Bahi, Du, Winarsih, Ho, Tucker-Kellogg, Tidor & Ding. (2011). Delineation of lipopolysaccharide (LPS)-binding sites on hemoglobin: from *in silico* predictions to biophysical characterization. *J Biol Chem*, 286: 37793.

[14] THE EFFECTS OF CERVICAL COLLAR DESIGN AND STRAP TENSION ON TISSUE STATUS REFLECTED IN BIOMECHANICS PARAMETERS AND BIOMARKER RESPONSE

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Introduction: Research has shown that medical device related pressure ulcers could represent up to 33% of pressure ulcers (PUs) acquired in hospitals [1]. Cervical collars (C-collars) have been implicated in causing PUs, resulting from high contact pressures with the skin [2,3]. The present study aimed to assess the biomechanical, biochemical and microclimate responses to C-collar application.

Methods: A cohort of 15 healthy volunteers was fitted with two different C-collars according to the manufacturer guidelines. Two further collar tensions were also defined as loose and tight for each collar. Each collar condition was applied for 15 minutes, with a 10 minute refractory period. Measurements at the device-skin interface included interface pressures, inflammatory biomarkers (Sebutape), microclimate, range of cervical motion and comfort scores (Fig 1).

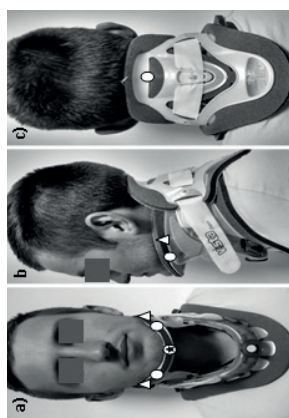


Figure 1. Measure sites for interface pressure, microclimate and Sebutape.

Results: The interface pressures at each tissue site increased monotonically with collar tension ($p < 0.01$). Fig 2). Biomarker analysis revealed that inflammatory cytokines (IL-1a) were elevated during collar application, with the highest increase during the tight fit condition, representing a 4-fold increase from unloaded conditions. Regardless of collar tension or type, there was an increase in temperature $1.5 \pm 0.8^\circ\text{C}$ and humidity $6.1 \pm 3.6\%$ compared to baseline values. Range of motion significantly decreased with greater strap tension, with an associated increase in discomfort.

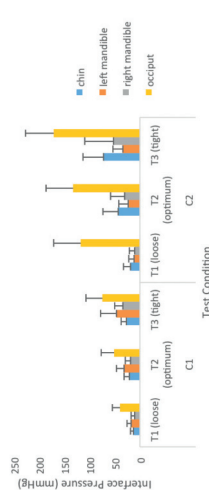


Figure 2. Interface pressures from the two collars, applied at three tensions.

Discussions: The present findings revealed that increasing C-collar tensions caused enhanced contact pressures at the device-skin interface, with a corresponding inflammatory response at the skin. These peak contact pressures at the occiput correspond with reported PU locations [3]. The elevated microclimate could also increase the susceptibility to PUs [4].

Clinical relevance: C-collars have been implicated in PU development, in part, due to a lack of guidance for application. Devices should be designed to uniformly distribute pressures and appropriate guidance is needed for their application.

References:

- [1] Black J, et al, IWJ, 2010. 7(5):358-65
- [2] Davis, J.W., et al., *J Trauma Acute Care Surg*, 1995, 39(3): p. 435-438.
- [3] Ham, H.W., et al., *JTN*, 2014, 21(3): p. 94-102
- [4] Clark, M., et al, *WI*, 2010. p. 19-25.

[16] CONSISTENT PRACTICES IN PREVENTION OF PRESSURE ULCERS

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Introduction: Pressure ulcers (PU) are a big challenge for the organizations because clinical practices in the treatment of pressure ulcers vary widely. The aim of the study was to explore the consistent practices for PU prevention in elderly care facilities.

Methods: The intervention study was conducted in nursing homes for the elderly. The study involved registered and practical nurses (n=141) of the thirteen nursing home units. Nurses were randomly allocated either to the intervention group or to the comparison group. The intervention based on evidence-based international guidelines for PU prevention as well as on the policy and environment of these elderly care facilities. Intervention included six elements: risk assessment, skin assessment and care, nutrition, repositioning, support surfaces and documentation.

The data was collected in January 2016 – January 2017 using a structured questionnaire, PUPP- instrument (Pressure Ulcer Prevention Practices-Instrument) that included 56 questions on practices for preventing PUs. The scale based on realization of the practices (never – always) and on agreement on the practices in the unit (no –yes). Data was analyzed with SPSS23 Statistics. The tools that were used to compare the eight variables of realization of practices and as well as the agreement on the practices were the independent-samples t-test and the Mann-Whitney test.

Results: The intervention group showed statistically significant change (p=0.000) in the three realization of the practices for preventing PUs. Also seven out of the eight variables of the agreement on the practices showed significant change. The comparison group showed statistically significant change (p=0.009) in one realization of the practices but none in the agreement on the practices.

Discussions: The results can be utilized in the development of the evidence-based consistent practices for prevention and early detection of pressure ulcers in elderly care facilities, in health care degree programs, and in continuing education.

Clinical relevance: When conducting an intervention it is important to take into account the evidence-based guidelines as well as the environment of care.

References: National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers: Quick Reference Guide. 2014.

[15] HOSPITAL ACQUIRED PRESSURE ULCERS INCREASE THE RISK OF ADVERSE OUTCOME IN CRITICALLY ILL PATIENTS

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Introduction: High SOFA scores at admission predict adverse outcome in patients in the intensive care units. The SOFA scores may also predict the development of pressure ulcers. Pressure ulcers do not only prolong the hospital stay, but they also seem to increase the mortality. The prevalence of PUs in ICUs has decreased during the last 20 years from about 30 % to 10 %. At the same time the hospital mortality for patients admitted to ICUs has decreased significantly despite an increase in the severity of patients treated.

Methods: The patients in 2010-2013 (Average N=1630/yr) were included in the retrospective database study. Modified Jackson/Cubbin (m)/C) pressure ulcer risk scale is used to assess patients' PU risk. The roles of length of stay (LOS), Apache II, SOFA and m)/C scores among others in prediction of critical care acquired PU development were studied. The adverse intensive care outcome (dead and no response to treatment) of 6582 critically ill patients were studied.

Results: The m)/C score predicts the development of PUs. Patients with the low score (high risk) have 3.7 times higher risk for PU development than those with the high scores (low risk). These ICU patients behave similarly as other ICU materials i.e. high SOFA scores predict adverse ICU outcome. PU development seems to be an independent risk factor for adverse outcome in critical care.

Discussions: The PU development seems to be an independent risk factor for adverse ICU outcome. However, it remains undetermined which indicators behind the PU development are the real factors predicting the outcome.

Clinical relevance: PUs decrease the quality of life of the patients and are costly. PUs also affect adversely the life expectancy of the patients. Thus the PU prevention is highly important

References:

- [1] Minne et al 2008, Manzano et al 2010, Allman et al 1999, Anthony et al 2004, Berlowitz et al 1997, Redelings et al 2005, Jaul & Calderon-Margalit. 2015, Ahtiala et al 2014, Zimmerman et al 2013.

[18] USING AN INFORMAL EDUCATIONAL APPROACH TO IMPROVE PRESSURE ULCER DIAGNOSIS AND GRADING

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Introduction: For over a decade it has been internationally recognised that pressure ulcer diagnosis and grading is challenging. Misdiagnosis and incorrect grading happens in the majority of cases (Buckley et al, 2005, Briggs, 2006)

Methods: A pre and post intervention study of pressure ulcer diagnosis and grading accuracy.

Groups of care home staff comprising of registered nurses and support workers were asked to diagnose and grade pressure damage from a series of photographs. These photographs were images contained in the pressure ulcer grading and moisture lesion tools currently used by all staff.

The nurses then participated in an informal training session focusing on pressure ulcer diagnosis and grading. Pre and post education accuracy of participants was compared.

Results:

Cohort 1

Pass rate Pre education was 33%; Pass rate post education was 94%; Pre education scores ranged from 22% - 61%, median 44%; Post education scores ranged from 39% - 100% median 83%

Cohort 2*

Pass rate Pre education was 9%; Pass rate post education was 45%; Pre education scores ranged from 20% - 70%, median 25%; Post education scores ranged from 30% - 80% median 50%

Cohort 3*

Pass rate Pre education was 37.5 %

Pass rate post education was 100%

Pre education scores ranged from 10% - 90%, median 35%

Post education scores ranged from 50% - 100% median 85%

Cohort 4*

Pass rate Pre education was 30 %; Pass rate post education was 70%; Pre education scores ranged from 15% - 85%, median 35%; Post education scores ranged from 35% - 100% median 75%

*Care home liaison nurse participant

Discussions:

100% of participants demonstrated an improvement in knowledge.

100% positive feedback from participants about education format and delivery.

Clinical relevance: All clinical staff involved in the prevention and management of pressure damage must be competent in diagnosis and grading.

References:

[1] Briggs SL (2006) How accurate are RGNs in grading Pressure Ulcers? Br J Nurs 15 p 1230 – 1234

[2] Buckley KM, Tran BQ, Adelson LK, Agazio JG, Halstead L The use of digital images in evaluating homecare nurses' knowledge of wound assessment (2005) J Wound Ostomy Continence Nursing 32 p307-31

[17] IMPROVING PRESSURE ULCER PREVENTION IN NURSING HOMES

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Introduction: This project reported the demographics, vulnerability to pressure ulcers and number of residents with established pressure ulcers across four care homes in South Wales. Changes in pressure ulcer occurrence were followed post implementation of education and replacement of mattresses that failed visual inspection

Methods: Where consent was provided research nurses inspected residents' skin to identify pressure ulcers with classification based on the NPUAP/EPUAP/PPPIA (2014) guidelines. Mattresses were inspected visually for failed covers/staining and manually tested for their ability to provide support to residents.

Results: Nine of 117 (7.7%; 95% Confidence Interval 4.10 – 13.97) residents had pressure ulcers upon skin inspection with the mean age of residents ranging from 83.0 to 89.8 years. Only three residents were not at risk of pressure damage based on Waterlow scores. Across the four homes 40 mattresses failed inspection. Three-months after education and replacement of mattresses residents remained elderly (mean age per home 82.9 to 89.5 years) and vulnerable to pressure damage (only 2/134 not at risk). 15.6% (21/134; 95% Confidence Interval 10.48 – 22.77) had pressure ulcers and a further 15 mattresses failed inspection. There were changes in the resident population with 29 lost to follow-up from the pre-intervention audit and 53 new residents post-intervention audit.

Discussions: The four homes cared for very elderly, frail residents with a pressure ulcer prevalence pre-intervention of 7.7%. The increase in prevalence post-intervention was primarily due to an increase in the number of residents with pressure ulcers in one nursing home that changed ownership during the study with a 50% staff turnover rate being a contributing factor.

Clinical relevance: Nursing homes care for very frail residents and greater attention should focus upon this care sector when investigating pressure ulcer prevention and treatment

References:

[1] National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers: Quick Reference Guide. Emily Haesler (Ed.). Cambridge Media: Osborne Park, Australia; 2014

[19] PRESSURE INJURY PREVENTION INTERVENTIONS IN ADULTS AND PEDIATRICS

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Introduction: Pressure injury (PI) prevention is a topic published in every wound journal and multiple international organizations have prevention strategies focusing on prevention of PIs in the adult population. There is limited information regarding PI prevention in pediatrics despite the fact that this health issue can lead to high morbidity in children. One challenge is that pediatrics encompasses patients from birth to 18 or 21 years of age. Depending on the age, the prevention interventions will vary. An additional challenge is that new product innovations are usually developed for adults. They may or may not have indications for pediatric use and testing of these interventions can be challenging.

Methods: The author has worked at two large pediatric hospitals and two large adult healthcare systems and has witnessed varying PI prevention "bundles". A literature search was performed in March and April, 2017 looking for specific PI interventions going back 10 years.

Results: Multiple articles were found with categories on PI prevention, but minimal information on how the categories are fulfilled. The categories consist of positioning, moisture, surface, nutrition, PI risk assessment, skin assessment, device assessment and family and staff engagement. While there are articles on specific interventions that address one or a few of the categories, this author was unable to identify one publication that addresses all prevention interventions.

Discussions: For ease of use, all PI prevention interventions should be readily available to facility personnel. These include interventions for acute care facilities, adults and pediatrics, long term acute care, nursing homes and home care settings.

Clinical relevance: General categories of PI prevention are necessary, but the ability to carry out the categories is most important. It is the interventions that directly affect the patient and prevent facility acquired PIs.

References:

- [1] AHRQ; Preventing Pressure Ulcers in Hospitals, Agency for Healthcare Research and Quality
- [2] Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline; published 2014; EPUAP, NPUAP and Pan Pacific Pressure Injury Alliance
- [3] Wound Ostomy and Continence Nurses Society (2016). Pressure Ulcer Evaluation: Clinical Resource Guide. Mt. Laurel: NJ; Author.

[20] THE CLINICAL EFFECTIVENESS OF SILICONE DRESSINGS TO PREVENT PU IN AGED CARE

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⁴ University of Melbourne, Melbourne, Australia

Introduction: The use of multi-layer silicone foam dressings to prevent hospital acquired pressure ulcers (PU) has been shown to be effective in the ICU and acute care settings. There have been no trials conducted using this form of prophylaxis in the aged care environment. This paper describes a randomised controlled trial of the effectiveness of these dressings to prevent the development of PU in nursing home residents in Australia.

Methods: A randomised controlled trial was conducted with 260 nursing home residents. All participants were at high risk for PU (Braden scale) and were randomised to either standard care (n=130) or standard care plus the application of a multi-layer silicone foam dressing to the sacrum and both heels (n=130). The intervention dressings were changed every three days and maintained for a period of four weeks.

Results: The mean age of the participants in the trial was 80 for controls and 84 for intervention group participants. Residents in the control group had a median of 3 comorbidities whereas intervention group residents had a median of 4 comorbidities and the majority of participants were incontinent of urine (92%). A total of 11 residents in the control group developed 11 pressure ulcers (7 stage I, 2 stage II, and 2 stage IV). One resident in the intervention group developed a pressure ulcer (1 stage I) during the one month intervention period (p<0.01). The incidence rates for pressure ulcers were; controls 8.4% and intervention 0.7% (p <0.01)

Discussions: The use of multi-layer silicone foam dressings to prevent the development of PU in high risk nursing homes residents appears to be a clinically effective intervention. The reductions in PU incidence are similar to those reported in the acute settings despite higher rates of comorbidity and incontinence in this population. Future research is required to determine the most effective type of multi-layer silicone foam dressings to prevent PU.

Clinical relevance: The specific type of dressing used in this trial should be considered as part of the PU prevention strategy for individuals with a high risk of developing PU in nursing homes.

References: None

[21] MAKING A DIFFERENCE IN RESIDENTIAL AGED CARE: REDUCING PRESSURE INJURY RATES THROUGH A MULTI-MODAL APPROACH

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Aim: To implement and evaluate a staff and resident pressure injury prevention multi-modal approach as part of a larger healing and wound prevention initiative measuring proportion of wounds before and after implementation.

Methods: A cohort of 66 registered and enrolled nurses, 98 care workers and 261 residents with a large aged care approved provider in South Australia contributed to this intervention. Pre (phase 1) and post-implementation (phase 3) wound prevalence surveys were conducted along with written staff knowledge assessments to measure the effect of education, mentoring and practice change on staff knowledge and wound prevalence within 2 residential aged care facilities (N=296 residents). Phase 2 consisted of formal and informal education sessions with staff and bedside clinical coaching and mentoring. Residents reviewed pressure injury education literature and received face to face prevention training at resident meetings.

Results: There was a significant decrease in pressure injury prevalence between phase 1 and 3 across the two facilities (64% decrease). Overall registered nurses and enrolled nurses showed significant increase in wound management and pressure injury prevention mean knowledge scores (74% increase p<0.001, 71% increase p<0.001 respectively). There was a reorganisation of time spent on various wound care and prevention strategies that better represented education levels and knowledge.

Discussions: Pressure Injury prevention education alone is not enough. This study used a multi-modal approach through an educational intervention in conjunction with practice change, namely mentorship, site skin integrity champions and product choice suggestions. This was backed by senior management involvement, resident education and a pressure redistribution equipment review which demonstrated improvement across the two sites.

Clinical relevance: A successful multi-modal intervention to prevent pressure injuries in residential aged care facilities is most effective when combined with a protocol intervention, facility management process change and resident involvement.

References: None

[22] THE GHENT GLOBAL IAD CATEGORISATION TOOL (GLOBIAD) FOR INCONTINENCE-ASSOCIATED DERMATITIS: INTERNATIONAL DEVELOPMENT AND RELIABILITY STUDY

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- 2 Ghent University, Ghent, Belgium
- 3 Charité-Universitätsmedizin Berlin, Clinical Research Center for Hair and Skin Science, Department of Dermatology and Allergy, Berlin, Germany

Introduction: Incontinence-associated dermatitis (IAD) is a common problem in all care settings. Moreover, IAD is associated with pressure ulcer development. To enhance correct classification of IAD, an easy to use, valid and reliable IAD classification instrument should be used. This study aimed to develop a new Ghent Global IAD Categorisation tool (GLOBIAD) and to examine the reliability.

Methods: The study consisted of three phases. First, the content validity was evaluated in a three-round Delphi procedure by an international expert panel with extensive experience in IAD clinical practice or research. Second, the inter-rater reliability was evaluated by an international convenience sample of caregivers. 34 photographs were presented in an online survey which was translated into 14 languages. The participants were asked to classify the IAD lesions according to the GLOBIAD. Third, an intra-rater reliability study was conducted with an interval of one week. The same 34 photographs were presented in a different random order to the respondents.

Results: 25 international experts were involved in at least one of the three rounds in which the categories emerged and descriptors were developed. GLOBIAD consists of two main categories: (1) persistent redness and (2) skin loss. Each category is subdivided into IAD (A) without and (B) with clinical signs of infection. Currently, 823 participants (84.6% female; 39.7% nurse) from 30 countries completed the second phase, of which 433 completed the third phase.

Discussions: The categorization of IAD through skin inspection is vital. The strength of this study is the sound development of the content, based on structured input and feedback of international experts. The international sample of caregivers allows generalizability across professions and countries. Further in-depth analysis will explore the inter- and intra-rater reliability, to be presented at the conference.

Clinical relevance: The development of GLOBIAD is a major step towards a better systematic assessment of IAD in clinical practice and research worldwide. The use of a valid and reliable IAD categorization tool improves clinical decision making and research in IAD care.

References:

- [1] Beeckman et al. Proceedings of the Global IAD Expert Panel. Incontinence-associated dermatitis: moving prevention forward. Wounds International 2015

[23] THE DEVELOPMENT OF A GENERIC WOUND ASSESSMENT MINIMUM DATA SET

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Introduction: Wound care represents a significant burden to the NHS in the UK and an important part of nursing practice [1]. At present there is no established national minimum data set (MDS) for generic wound assessment (including pressure ulcers) in England. This has led to variable assessment criteria being used across the country, hampering the quality and monitoring of wound healing progress and treatment. Work to establish an MDS for generic wound assessment was taken forward as part of NHS England's Improving Wound Care Project.

Methods: The project comprised 1) a scoping review to provide an overview of wound assessment best practice and identify potential candidates for inclusion in the MDS and 2) a structured consensus study using an adapted RAND/UCLA Appropriateness method [2] with experts in the wound care field to agree the assessment criteria to be included in the MDS.

Results: The scoping review identified 24 papers that were considered relevant to generic wound assessment. From these papers 68 potential assessment items were identified and the expert group agreed that 37 (relating to general health information, baseline information, assessment parameters, symptoms and specialists) should be included in the MDS.

Discussions: Using a robust approach we have developed a generic wound assessment MDS to underpin wound assessment documentation and practice.

Clinical relevance: It is anticipated that the MDS will facilitate a more consistent approach to generic wound assessment practice and support providers and commissioners of care to develop and re focus services that promote improvements in wound care.

References:

- [1] Guest et al., Health economic burden that wounds impose on the NHS in the UK. BMJ Open, 2015.
- [2] Fitch et al., The RAND/UCLA Appropriateness Method User's Manual, 2001.

Acknowledgement: To the Improving Wound Care Project Board, as part of NHS England's Leading Change Adding Value Framework and the Generic wound assessment MDS expert group

[24] TRANSLATING EVIDENCE-BASED DEVICE-RELATED PRESSURE INJURY PREVENTION STRATEGIES TO THE INTENSIVE CARE ENVIRONMENT: THE SUSTAIN STUDY.

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Introduction: Intensive care units (ICUs) have the highest rates of hospital-acquired pressure injuries (PIs). Medical device-related PIs (MDRPI) contribute significantly to this problem. To address this issue, this multi-phased knowledge translation study aimed to implement targeted evidence-based strategies in an ICU and to monitor the uptake of the strategies. This presentation reports findings from this study related to MDRPIs.

Methods: In this study, conducted in a 36 bed ICU of an Australian tertiary teaching hospital, multiple PI prevention strategies were implemented including weekly audit feedback and patient rounds. Over 52 weeks, weekly skin integrity audits were conducted by trained research nurses on ICU patients who met all of the inclusion, and none of the exclusion criteria. Data collected included patient demographic characteristics, prevalence, severity, location and aetiology of MDRPIs, and RN adherence to the ICU processes of care.

Results: A total of 928 patients were audited; 55% were male, mean age was 55.5 years, and mean ICU length of stay of 8 days. Of these, 73 patients had 96 MDRPIs with mucosal injuries (39, 40.6%) and Stage 2 injuries (31, 32.3%) the most common classifications found. The majority of MDRPIs were found on the nose (32; 33%), the lip/mouth (18, 18.8%) and the ear (12, 12.5%). Injuries were attributed to nasogastric tubes (25%), facemasks (24.9%) and endotracheal tubes (20.7%). Prevalence of MDRPIs trended from 11% at the commencement of the audits to 7% at completion.

Discussions: This study demonstrates a successful and sustained approach in the translation of evidence-based strategies to prevent MDRPIs. Raising awareness of evidence-based best practice in PI prevention was shown to be a positive vehicle for education and professional development, enhancing a collaborative multidisciplinary team approach to patient care.

Clinical relevance: Regular assessment of high risk locations for MDRPIs and the early implementation of strategies to minimise skin and mucous membrane damage in critically ill patients is essential.

References:

- [1] Tayyib N, Coyer F, Lewis P. Pressure ulcers in the adult intensive care unit: a literature review of patient risk factors and risk assessment scales. JNEP. 2013;3(1):28-42.

[26] INDEPENDENT RISK FACTORS FOR THE DEVELOPMENT OF SKIN EROSION DUE TO INCONTINENCE IN NURSING HOMES AND THE ICU

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Introduction: One of the main complications of incontinence is incontinence-associated dermatitis (IAD). IAD is a known risk factor for pressure ulcer development. Prevalence figures of IAD vary between 5.6% and 50.0%. A wide range of products and procedures for the prevention are available (1). In order to promote (cost)effective IAD prevention, interventions should be started timely in patients at risk. This study aimed to identify risk factors associated with the development of skin erosion (IAD category 2) in nursing home residents and patients at the intensive care unit (ICU).

Methods: The first study was a prospective study, including 381 residents, from 11 Belgian nursing homes. Data on a wide range of demographical, physical, functional and psychological characteristics were collected at baseline and during a follow-up period of 30 days. The second study was a matched case-control study, including 200 critically ill patients from 19 Belgian hospitals. In this study, data on 19 risk factors, related to illness and skin care, were collected at one point in time. Binary logistic regression analyses were performed to identify characteristics independently associated with IAD category 2 development.

Results: In nursing home residents, the presence of friction and shear problems (OR 0.39; 95% CI 0.16-0.98), severe restricted mobility (OR 0.37; 95% CI 0.14-0.94), and erythema due to incontinence (OR 3.02; 95% CI 1.04-8.73) were independently associated with developing IAD category 2. Data collection at the ICU is currently ongoing. Results are expected before September 2017.

Discussions: Our studies provide necessary knowledge to guide interventions for preventing IAD in high risk patients. Large-scale studies are needed to identify other existing risk factors.

Clinical relevance: Care providers should give full attention to risk factors to both detect patients at risk for IAD development and to start timely prevention.

References:

- [1] Beeckman D, Van Damme N, Schoonhoven L, Van Lancker A, Kottner J, Beele H, et al. Interventions for preventing and treating incontinence-associated dermatitis in adults. The Cochrane Database of Systematic Reviews. 2016; 11:CD011627.

[25] THE POSSIBILITY TO MONITOR PRESSURE ULCERS PREVALENCE AND INCIDENCE ON NATIONAL LEVEL

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Introduction: Hospital-acquired PUs (HAPUs) significantly increase healthcare costs. Development of a PUs independently increases the length of a patient's hospital stay and incidence of other complications. There is need for an accurate monitoring of PUs under the uniform guidance with appropriate methodological support.

Methods: The aim of presented study was to analyze different sources for PUs monitoring and to compare their usability on national level. The three data sources were compared: National register of hospitalized patients (NRHOSP), Central system of adverse event reporting (CSAER) and data from pilot study testing the new data set for PUs special register.

Results: From the nationwide analyses of NRHOSP the prevalence of PUs were identified as 0.3% of all analyzed hospitalization cases in 2007 – 2014. The highest number of reported ICD code L89 was at long term care units. PUs are the most often reported adverse event in CSAER and their prevalence differ according the type of hospital and type of unit. The highest number of PUs were in the long term hospitals (71.83/1000 patients) and lowest in specialized centers (e.g. oncological) 5.82/1000 patients. From the pilot study of new data set prepared as part of future national register for PUs monitoring is clear that nurses are unable always to monitor important clinical symptoms and use objective scales for patients in risk.

Discussions: Despite the fact that we have several sources for PU prevalence monitoring in the Czech Republic there is still need to have special monitoring system. The data from actually available sources differ significantly.

Clinical relevance: CSAER would be possible platform to collect data about PUs prevalence. However there is still need to work on local policy monitoring systems on local level in involved hospitals. We would like to highlight that not all PUs should be treated as adverse events rather as results of the clinical condition of the patient.

Acknowledgement: This study was supported by the Ministry of Health of the Czech Republic, grant no. 15-29111A with title – "The register of decubitus ulcers – Integration strategy for monitoring and preventive interventions on the national level". All rights reserved.

[27] PRESSURE MAPPING TO PREVENT PRESSURE ULCERS IN A GERIATRIC HOSPITAL WARD: A PRAGMATIC RANDOMISED CONTROLLED TRIAL

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Introduction: Reduction of pressure and shear is the single most important intervention to prevent pressure ulcers.¹ The continuous bedside pressure mapping (CBPM)-system displays the patient's pressure points as real-time, colour imagery and depict how pressure is distributed at the body-mat interface.² The system could increase nurses' commitment to preventive interventions. The aim was to evaluate the effect of the CBPM-system on pressure ulcer prevalence and incidence in a hospital setting.

Methods: A randomised controlled trial including 190 geriatric patients over a period of 9 months (2015). The CBPM-system was used from admittance to discharge from the ward. Both intervention and control groups received standard pressure ulcer prevention care.

Results: No significant difference in the prevalence and incidence of pressure ulcers was shown. The prevalence of pressure ulcers in the intervention group was 24.2% on day 1 and 28.2% on day 14. In the control group the corresponding numbers were 18.2 % and 23.8 %. Seven of 69 patients (10.1%) in the intervention group and seven of 81 patients (8.6%) in the control group who had no pressure ulcers on admission developed category 1 and category 2 ulcers during their hospital stay.

Discussions: This study failed to demonstrate a beneficial effect of the CBPM-system on pressure ulcer prevalence and incidence. However, the study could have increased staff awareness and focus on pressure ulcer prevention in both study groups, as annual prevalence studies showed a decrease from 38.6% (2015) to 15.4% (2016) in the study ward.

Clinical relevance: It is important to investigate the experience of the nurses regarding their use of the pressure mapping system, as well as strengths and weaknesses of the system.

References:

- [1] NPUAP, EUAP, PPIA. Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline. Emily Haesler (Ed.), Perth, Australia: Cambridge Media; 2014.
- [2] Gunningsberg L, Carl C. Reduced pressure for fewer pressure ulcers: can real-time feedback of interface pressure optimise repositioning in bed? *Int Wound J.* 2016, 13, 774-9.

[28] PROTECT - TRIAL: A MULTICENTER PROSPECTIVE PRAGMATIC RCT AND HEALTH ECONOMIC ANALYSIS ABOUT THE EFFECT OF TAILORED REPOSITIONING TO PREVENT PRESSURE ULCERS

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Introduction: Prevention of pressure ulcers (PU) focuses on systematic patient repositioning, support surfaces and skin care. Interventions should be patient tailored and based on a thorough assessment of both patient and context related risk factors. Limited compliance exists towards PU preventive interventions. There is a lack of rigorously performed research addressing the effectiveness of devices for supporting repositioning. Additionally, it is unclear how to manage repositioning at the individual patient level.

Methods: The aims of this trial are: (1) to compare the effectiveness of the turn and repositioning I system and an algorithm for tailored repositioning versus usual care to improve reposition frequency in patients at risk; (2) to study the effectiveness of standard incontinence care to improve the incidence of PU and incontinence-associated dermatitis (IAD); (3) to perform a health economic evaluation. A multicentre prospective pragmatic RCT and cost-effectiveness analysis was performed in a random sample of 226 patients at risk of developing PU (power 80%). Patients are recruited on three types of wards: ICU (n= 6), geriatrics (n= 6) and rehabilitation (n= 7). They should be free of PU category II-IV and IAD category 2 at baseline.

Results: Data collection is ongoing. Following outcomes will be analysed: turn and position compliance, (time to) development of PU and IAD, costs and health effects. Results will be available to be presented at the conference.

Discussions: Despite the fact that several evidence based guidelines for pressure ulcer prevention exist, prevalence and incidence rates remain high. This study will provide insight in the (cost) effectiveness of a turn and positioning system, a tailored prevention plan for repositioning and standard incontinence care.

Clinical relevance: The PU prevention algorithm, tailored to individual risk factors and developed for this study may be of value to guideline developers and thus clinical practice.

References:

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- [2] DE MEYER D., VAN DAMME N., VAN DEN BUSSCHE K., VAN HECKE A., VERHAEGHE S., BEECKMAN D. (2017) PROTECT – trial: a multicentre prospective pragmatic RCT and health economic analysis of the effect of tailored repositioning to prevent pressure ulcers – study protocol, *Journal of Advanced Nursing* 73(2), 495–503. doi: 10.1111/jan.13166

[30] MEASURING MICROCLIMATE: AN RCT TO EXPLORE THE INFLUENCES OF FOAM DRESSINGS ON PRESSURE PRONE AREAS

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Introduction: Despite varied interventions aimed at preventing pressure ulcers the prevalence of this condition and the associated personal and institutional cost remains. Recent attention has turned to the influence of skin temperature and skin moisture on the breakdown of skin. Commonly referred to 'microclimate' this concept describes how a high skin temperature and/or a high level of skin hydration contribute to maceration of the skin and eventual breakdown. Some studies have examined the effect of controlling the microclimate of pressure prone areas with products such as foam dressing. All of these studies however, have only measured the prevalence of pressure ulcer development not the actual microclimate itself.

Methods: A non-invasive readily available device was used to measure the temperature, erythema and moisture of skin over pressure prone areas of patients in an ICU population who had been randomly assigned to a foam dressing cover².

Results: In 2016, 218 patients were recruited from a large metropolitan intensive care unit in Australia. 107 were assigned to the intervention group (foam dressing) and 111 to the control. Whilst temperature recordings remained stable for both groups, the moisture level was significantly different in the intervention group. The sacrum becomes drier (36 units day one to 31 units day two) and the heel increasing in hydration (6 units day one to 18 units day two).

Discussions: These findings are consistent with the presentation of pressure ulcers in these regions with sacral pressure ulcers often being a moist lesion with heels being a dry lesion. The findings suggest that the foam dressing may be 'normalising' the moisture level of the skin assisting resilience and preventing breakdown.

Clinical relevance: This paper provides insights into the changes of microclimate over pressure prone areas over time. It further examines the influence foam dressings have on the microclimate and provides a validated method for measuring microclimate in the clinical setting.

References:

- [1] SD202[®]
- [2] Allevyn Life[®]

[29] OUTCOMES OF PRESSURE ULCER TREATMENT IN SPECIALIST WOUND CLINICS

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Introduction: To report outcomes of pressure ulcer treatment delivered in specialist out-patient wound clinics.

Methods: A 110-item questionnaire is completed electronically at each patient visit to specialist out-patient wound clinics. This questionnaire collects data upon the processes and outcomes of pressure ulcer treatment.

Results: Between the 26th April 2012 and the 24th February 2016 1782 patients entered the electronic database (950 female and 832 male). Of these 89 (4.99%; 95% Confidence Interval 4.07 – 6.10) had pressure ulcers. Patients with pressure ulcers tended to be male (n=52, 58.4%) and relatively young (mean age 60.03 years, standard deviation 19.77), range 7 to 96 years. Superficial pressure ulcers were relatively rare (Category I n=1, Category II n=9) with 26 Category III and 49 category IV pressure ulcers. One was a suspected Deep Tissue Injury while 3 were unstageable. At the first clinic visit 41 pressure ulcers had been present for at least a year with 10 present for less than 3 months.

Superficial pressure ulcers ranged in area from 0.09 – 16 cm² and patients attended the clinics predominantly once or twice only (n=8) with one patient making 12 visits. Patients with Category III pressure ulcers made 6.27 +/- 7.44 visits to clinic (range 1 to 35) while those with category IV wounds made 5.48 +/- 6.28 (range 1 to 29) clinic visits.

59 had complete records of changes in wound dimensions over the course of treatment with 24 having healed wounds at their final assessment (volume less than 0.5cm³ used to mark healing), a healing rate of 40.7%. Seven superficial pressure ulcers healed while 34%, 9/32 category IV and 8/18 category III pressure ulcers also healed where measurements were available at the start and end of clinic visits.

Discussions: If wound healing is to advance, detailed records of both the processes and outcomes must be captured to allow exploration of the effects of the wound care provided in real-world environments.

Clinical relevance: This first report of the outcomes achieved within a group of specialist out-patient wound clinics provides data against which other centres can benchmark.

References: None

[31] VARIETIES OF PRESSURE INJURY IN THE TERMINALLY ILL

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Introduction: Nearing death, blood flow is shunted away from the skin to preserve vital organs leading to pressure injury to the skin in 17% of the dying. However, the appearance of the wounds may be confusing to the practitioner...are they pressure injury? Ischemic wounds? Extruding tumor? The purpose of this presentation is to display the usual presentations of wounds in the terminally ill.

Methods: Literature review combined with clinical examples of the various wounds.

Results: Five terms were found associated with pressure injury in the terminally ill patient: decubitus omissus; Kennedy Terminal Ulcer; skin failure; Skin Changes at Life's End; and the Trombley-Brennan Terminal Tissue Injury. These skin conditions preceded death from a few hours to 6 weeks.

Discussions: The 5 names to various skin changes have similarities to pressure injury from ischemia and deep tissue pressure injury. These may be unavoidable due to the terminal condition of the patient, however, before such a determination can be made, the facts preceding the change in skin condition must be examined.

Clinical relevance: When the wound developed in terminally ill patients within hours of death, clinical settings should be not held responsible for pressure injury developing in terminally ill patients. Developing metrics to determine if the cause of the ulcer was preventable will be crucial to developing a reasonable approach to understanding the cause of the problem.

References:

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[32] CLINICAL PERFORMANCE OF A NEW PU RISK TOOL: SHAPE RISK SCALE WITH THE BRADEN SCALE

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Introduction: Applicability of pressure ulcer (PU) risk scales varies and their inherent capability of assessing various risk indicators differs. Braden scale performs best among the assessment scales [1], but its use needs experience and is compromised by subjective interpretation. Shape Risk Scale (SRS) was developed based on practical experience as well as to exclude some subjective assessments in Braden. SRS includes the following assessments: 1) Body shape, 2) BMI, 3) Physical activity and mobility, 4) Consciousness and sensory perception and 5) Body temperature.

Methods: Trained wound specialists evaluated patients (N=548) in acute (N=280) and long-term care (N=188) facilities and in home care (N=80), and carried out risk assessment by both Braden and SRS.

Results: The prevalence of PUs in the material was 15.5% (85/548). In high risk group patients (Braden score < 14; SRS score > 13) the prevalence of PUs was 28.7/24.3%. In medium/low risk groups the corresponding prevalences were 16.3/14.0%. Low risk group with SRS was significantly smaller (10.9%) than with the Braden-scale (46.1%). Furthermore, the low risk patients with SRS had less PUs than corresponding patients identified by Braden-scale, 3.4 vs 6.8%, respectively.

Discussions: The Braden-scale performed as described in the literature. As a whole SRS performed at least equally well as Braden-scale; the direct concordance was 46%. Simultaneous use of the both scales seemed to identify patients in extremely high risk (PU prevalence 80%) but the patient numbers were small. SRS reclassifies a considerable population among the low risk patients correctly into medium risk. The reformed low risk group had much less PUs than the low risk group of Braden scale. Together these features of SRS are important capabilities of PU risk scale in clinical use.

Clinical relevance: SRS reclassifies a considerable population among the low risk patients correctly into medium risk. The SRS includes fewer assessments that require subjective interpretation and it easy to use in every day clinical work.

References:

- [1] Pancorbo-Hidalgo PL, et al. Risk assessment scales for pressure ulcer prevention: a systematic review. *J Adv Nursing* 54: 94-110, 2006.

[34] GROUND BREAKING CLINICAL RESEARCH REVEALING THE EFFECTIVENESS OF THERAPEUTIC SEATING IN REDUCING PRESSURE INJURIES

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Introduction: While guidance is available on most aspects of pressure injury prevention and management, there has been little information on addressing these issues in seated patients. The role of specialised seating can be overlooked. This research investigates the effectiveness of a specialised seating programme and its impact on pressure injury incidence in long term care.

Methods: A mixed methods design was ethically approved and employed. Participants were recruited from three long term care settings before random allocation. The control group continued to use their existing seating while the intervention group was provided with seating tailored to their individual needs following a complex assessment. Participants were observed for pressure care, posture, function, saturated oxygen levels and comfort.

Results: The intervention participants who had red skin areas at the beginning of the trial no longer presented with these at the end of the 12 week trial period. None of the intervention participants developed skin redness. 5% of the control group developed a pressure injury in their existing seating and those with redness noted at the beginning of the trial remained following the trial period. The findings revealed: an 88.3% reduction in pressure injury incidence; 80% reduction in the use of high cost cushions; 49.2% reduction in postural correction; 85% of patients had 11% average increase in blood oxygen levels; 10% reduction in pain/discomfort levels.

Discussions: Prescribed seating contributes to a reduction in pressure injury incidence. It highlights that each patient is different, requiring individualised evaluation of seating needs before making recommendations for an appropriate seating system. This research provides evidence based pressure management through therapeutic seating.

Clinical relevance: The findings from the research are replicated by clinicians worldwide who continue to improve patient care through utilising therapeutic seating to reduce pressure injuries, encourage early mobilisation and reduce caregiver manual handling. Having conducted this ethically approved clinical research in real life care settings, it makes it manageable for the outcomes to be replicated to improve clinical practice.

References:

[1] Daly, O., Casey, J., Martin, S., Tierney, M., McVey, O. 2013. The effectiveness of specialist seating provision for nursing home residents. Ulster University; Northern Ireland.

[33] A SCIENTIFIC ASSESSMENT OF AN AUTOMATED DISINFECTION SYSTEM FOR THE DECONTAMINATION OF HOSPITAL: PRESSURE-RELIEVING MATTRESSES

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Introduction: Pressure-relieving mattresses can become contaminated with pathogens. Pathogens can be transferred from the mattress to patients and healthcare practitioners. Disinfection can break the epidemiological chain of infection [1]. Traditionally mattress disinfection involves manual cleaning following pre-determined wipe protocols whilst mattress covers are decontaminated according to widely-publicised washing machine protocols. Manual methods are open to human error. Automated decontamination procedures remove opportunities for human error and decrease the risk of cross-contamination.

Methods: Three 'dirty' pressure-relieving mattresses were randomly selected. Prior to cleaning, 10 contact plate samples were taken per mattress representing the head, torso and feet. Mattresses were decontaminated using the automated disinfection system. Following decontamination contact plates were again used to sample for microorganisms. Microbiological samples were enumerated according to standard methodologies. Mattress covers were also sampled pre- and post-cleaning. Covers were washed following industry standard washing and drying procedures.

Results: Following decontamination there was a significant reduction in the number of microorganisms recovered from each mattress. Prior to disinfection, extremely high levels of microorganisms were recovered from one mattress in particular. Post disinfection, these levels had dropped significantly at each sampling site. Prior to cleaning, microorganisms were recovered from all contact plates used to sample the mattress covers. Post cleaning all but one sample resulted in the recovery of less than 10 colonies per plate.

Discussions: The automated system reduced the quantity of microorganisms recovered from the mattresses, and standard cleaning methods reduced the bacterial load on the mattress covers. Utilising an automated system decreases variability in the disinfection process and thus provides an assurance of quality relating to the disinfection process. A direct comparison of manual and automated methods would be an ideal next step to this study.

Clinical relevance: Hospital beds can pose a potential infection risk for the patient if not adequately disinfected. A number of outbreaks have been quoted in the literature involving antibiotic-resistant microorganisms and hospital bed components. It is essential that these items are adequately decontaminated to minimise the risk of cross-infection [2].

References:

[1] Weinstein, Hora. 2004. Contamination, Disinfection and Cross-Contamination. Creamer, Humphreys. 2008. Contribution of beds to healthcare-associated infection



[35] A MULTIDISCIPLINARY APPROACH TO PRESSURE ULCER PREVENTION: AN EXPLORATION OF HEALTHCARE PROFESSIONALS' INVOLVEMENT AND PERCEPTIONS OF PRESSURE ULCER PREVENTION IN A COMMUNITY SETTING

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Introduction: Pressure ulcers (PUs) present a burden to both individuals (Spilsbury et al 2007) and healthcare providers (Demarre et al 2015). While declines in acute sector prevalence have been reported (Goldberg et al 2012), healthcare delivery is increasingly focused on the community setting (Edwards 2014). Historically, prevention has been deemed a nursing issue, although recently a multidisciplinary team (MDT) approach has been advocated (NICE 2014). However, little is known about the role of the MDT in the community.

Methods: A multiphase mixed-methods design was adopted, using pre-designed questionnaires, focus groups and interviews to explore knowledge, attitudes and perceptions of healthcare staff in the community setting. 160 participants completed an attitudes questionnaire, while 119 completed a knowledge questionnaire. Four focus groups were conducted, involving individual professional groups and a multidisciplinary group. Three interviews were undertaken with tissue viability nurses.

Results: Knowledge questionnaire categories relating to treatment scored higher (60-66.7%) than prevention categories (50%). Some nurses, perceived as the most accountable profession, considered that they had the required knowledge to prevent PUs without the involvement of the MDT.

Participants considered that community sector patients were increasingly complex. Some nurses considered this to be frustrating in their efforts to prevent PUs. By contrast, some therapists considered this to be an opportunity for greater MDT involvement.

Participants described a lack of awareness of what different professionals could offer for PU prevention. An array of current practices was therefore identified, ranging from disciplines working in isolation, to MDT and interdisciplinary approaches.

Discussions: Considerable variability in practice was observed with some staff open to collaboration and others either working in isolation. Clinicians' professional identity was identified as an important factor in collaborative PU practice.

Clinical relevance: The design of a structured intervention should take account factors related to knowledge, attitudes and awareness to improve collaborative practice in the community.

References:

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- [2] Edwards N,(2014) The King's Fund
- [3] Goldberg M, et al.(2012) National Pressure Ulcer Advisory Panel
- [4] NICE,(2014) National Institute for Health and Care Excellence
- [5] Spilsbury K, et al.(2007) Journal of Advanced Nursing

[36] OUTCOMES OF A SPECIALIST MULTI-DISCIPLINARY TEAM IN PREVENTION OF HOSPITAL ACQUIRED PRESSURE INJURIES AND MALNUTRITION IN AN ACUTE HOSPITAL SETTING: A PILOT PROJECT

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Introduction: In 2013 in Australia, financial penalties were introduced for stage 3 (\$30,000) and stage 4 (\$50,000) hospital acquired pressure injuries in government-funded hospitals and services due to the impact on the health care system by extending length of stay (Department of Health, 2013). In 2016, financial penalties were also introduced for unstageable pressure injuries (\$30,000).

There are very few published research articles regarding the effectiveness of a specialist wound care team in managing and preventing hospital acquired pressure injuries (Cochrane, 2015).

This pilot project investigates the effectiveness of a specialist multi-disciplinary team (a wound nurse, dietitian and occupational therapist) in preventing hospital acquired pressure injuries and improving patient care.

Methods: Our project team used the following methods to reduce the number of hospital acquired pressure injuries and manage malnutrition: (1) engaging consumers in pressure injury management, (2) regular nursing staff education sessions about pressure injury management, (3) development of handover processes and tools for use on hospital discharge, (4) comprehensive multi-disciplinary intervention for malnutrition and pressure injury management, and (4) regular team meetings to identify patients with pressure injuries.

Data on rates of pressure injuries and malnutrition was gathered prior to and during project implementation through patient interview, staff survey and review of hospital documentation.

Results: The project achieved a reduction in hospital acquired pressure injuries from 2.8% to 1.1%, resulting in a reduction in financial penalties from \$120,000 to \$0 compared between 2015 and 2016.

Discussions: This pilot project has demonstrated that a specialist multi-disciplinary pressure injury and malnutrition management team is a cost-effective method in reducing hospital acquired pressure injuries, identifying and managing malnutrition, and improving patient care.

Clinical relevance: We believe that this project model has the potential to achieve positive patient outcomes at other inpatient facilities.

References:

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- [2] Moore, Z. E., Webster, J. & Samuriwo, R. (2015). Wound-care teams for preventing and treating pressure ulcers (bed sores). Cochrane. Retrieved from: http://www.cochrane.org/CD011011/WOUNDS_wound-care-teams-preventing-and-treating-pressure-ulcers-bed-sores



[38] THE DIRECT COST OF PRESSURE INJURY (PI) TREATMENT IN AN AUSTRALIAN RESIDENTIAL AGED CARE SETTING

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Introduction: The economic cost of providing PI treatment in the Residential Aged Care (RAC) setting is typically reported by extrapolation or estimation. This study sought to develop and pilot a costing tool applicable to the RAC setting and to quantify the direct costs associated with PI treatment to PI Stages 1-4, Unstageable (US) and Deep Tissue Injuries (DTI).

Methods: An observational study was undertaken in a RAC setting in Victoria, Australia. A non probability, purposive sample was sought. Prospective primary data was collected through observation of staff attending PI treatment activities. Retrospective secondary data was collected from electronic resident health history audits.

Results: A sample of 23 PIs were observed from 16 females and 4 males with a mean age of 83 years. The direct cost of PI treatment was AU \$98,489.22 (EUR 70,391.35). The direct cost of PI treatment disaggregated by PI stage was a mean daily cost of AU \$26.42 (Stage 1), AU \$37.17 (Stage 2), AU \$30.01 (Stage 3) and AU \$10.22 (US).

Discussions: The healthcare providers substantial economic waste due to PI treatment in this study accounted for 23 PIs, with 19 of these indefinitely contributing to economic waste. An Evidence Based Practice (EBP) approach to PI treatment was calculated at AU \$99,693.15 for the same sample, until healing, highlighting the economic savings. In 2012, the annual cost-of-illness of PIs in the Australian RAC setting was estimated at AU \$13.6 million (Graves & Zheng, 2014). The methodological heterogeneity in study length, resource cost inclusions, healthcare setting and economic analysis makes comparative cost studies difficult. Developing a standardised costing tool applicable to the RAC setting allowed more accurate collection of resource costs that could potentially improve the cost certainty of future PI economic research.

Clinical relevance: Improved articulation of the main cost drivers of PI treatment in the RAC setting has the potential to guide limited health care budgets towards strategies that prevent initial pressure damage and halt the progression of PI severity.

References:

Graves, N., & Zheng, H. (2014). Modelling the direct health care costs of chronic wounds in Australia. *Wound Practice and Research*, 22(1), 20-33.

[37] PROMOTING CULTURAL CHANGE IMPACTS THE BOTTOM LINE: A CASE FOR MEASURING THE ECONOMIC IMPACT OF PROVIDING SUPPORTIVE ENVIRONMENT

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Introduction: Hospital Acquired Pressure Injuries (HAPIs) are a concern for health services in Australia. Approaches to reduce harm and the language used such as: 'failure of nursing care', are perceived as punitive and lead to staff disengagement. We need to explore if providing a supportive, continuous learning culture which allows for clinician autonomy is at odds with the need to provide a high standard of safe reliable care.

Methods: The RMH piloted a program in the ICU where a culture of 'continuous learning' was evaluated for its impact on HAPI development and hospital costs. This pilot includes regular leadership rounds which consist of the ward leadership and Clinical Nurse Consultant-Wound. The key features of PI rounds are: celebrating success, honesty looking at the data and valuing how the ward perceives their progress and priorities.

PI components:

- Celebrating success-e.g. high reporting of stage 1 pressure injuries, near misses and achievements
- Advocating the ward needs to executive staff
- Role modelling and informal education for the ward leadership around equipment review, problem solving and escalation/negotiation
- Understanding the challenges to implantation of guidelines and managing competing risks
- Encouraging wards to personalise guidelines to meet local needs

Results: The HAPIs reduced in the ICU by 45% saving the organisation an estimated to: \$37 400 over the 6 month pilot

Discussions: While this pilot is of a highly specialised area, it demonstrates that investing in a positive culture improves patient outcomes and financial viability of a health service.

Clinical relevance: Promotion of positive learning and reporting cultures has the potential to improve patient outcomes and costs associated with patient care.

References:

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- [2] Wang, W., Liu, K., You, L., Xiang, J., Hu, H., Zhang, L. and Zhu, X. (2013). The relationship between patient safety culture and adverse event: questionnaire survey. *International Journal of Nursing Studies*, Vol. 51 pp 1114-1122.

[39] A REVIEW OF DESIGN AND ANALYSIS METHODS FOR PRESSURE ULCER RESEARCH

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Introduction: During pressure ulcer (PU) research, patients are assessed at multiple time points and have their skin assessed using a semi-ordered scale. For analysis, these data are often aggregated to a single endpoint of whether the patient develops a PU or not and therefore information provided by patients during PU research is inefficiently used.

Methods: We have conducted a review of methods used in PU trials and observational cohort studies including how data are collected and analysed in PU research. Key manuscripts were identified through systematic reviews of published PU research. From these a pearl-growing strategy was adopted to identify other trials and large cohort studies. Finally experts in the field were approached to ensure major studies were not overlooked. Data extraction was pre-specified to include study design, frequency of assessments, assessor characteristics, PU definition, primary outcome including derivation, analysis methods including relevant assumptions and accommodation of complications such as censoring or missing data.

Results: In this presentation we will describe common issues identified including uncertainty about PU endpoint definitions, analysis of multiple skin sites per patient and missing skin assessments. A further issue relates to the subjectivity inherent in PU assessment which may lead to misclassification and is often identified as an issue through incorporation of an inter-rater reliability study. We will summarise how these issues are currently handled in published PU research and some future research plans to address inefficiencies in research design and analysis.

Discussions: Current methods for design and analysis of PU trials are inefficient and ignore many complexities that introduce variation into the results, such as multiple skin sites per patient. More efficient designs and analysis methods may reduce the numbers of patients required and be less subject to bias.

Clinical relevance: This review has informed our future research which will focus on making better use of data collected in PU research. This will mean that patients will benefit from improved care through deeper understanding of the natural history of PUs and how treatments affect it.

References:

- [1] NPUAP/EPUAP/PPPIA, Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline. 2014, Cambridge Media: Osborne Park, Western Australia

[40] EFFECTS OF TWO DIFFERENT FABRICS ON SKIN BARRIER FUNCTION UNDER REAL PRESSURE CONDITIONS

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Introduction: The aetiology of pressure ulcers is multifactorial. Besides deformation of soft tissues sustained loading also causes microclimate changes which may be related to skin integrity. The purpose of this study was to evaluate the impact of two different fabrics on skin function under pressure conditions in a sitting position.

Methods: Six healthy females (median age 65.0 (61.0-67.8) years) were requested to sit comfortably for 45 min on a chair with a hard wooden surface covered by a 3D spacer fabric or by 2D cotton fabric. Skin-physiological parameters such as skin surface temperature, stratum corneum hydration (SCH), transepidermal water loss (TEWL), erythema, skin stiffness and elasticity were measured at the gluteal areas before and after the loading period.

Results: Erythema indices and skin temperature increased in both fabric groups after sitting. TEWL increase in the 3D fabric group was twice as high compared to the cotton group. There was a slight increase of the SCH in the 3D fabric and a decrease in the cotton fabric group.

Discussions: Our findings indicate fabric dependent changes SCH and TEWL during sitting. A possible reason for the SCH decrease in the cotton group may be the higher water sorption and holding capacity of cotton fiber compared to the 3D fabric made of polyester. Erythema occurrence seems to be independent from the fabric indicating a similar degree of deformation of dermal (and subdermal) soft tissues.

Clinical relevance: Fabrics close to the skin surface influence the microclimate which is relevant for possible damage thresholds in soft tissues.

References:

- [1] Schario M, et al., Effects of two different fabrics on skin barrier function under real pressure conditions, Journal of Tissue Viability (2016)

[41] REAL TIME FEEDBACK OF PRESSURE POINTS: A TOOL TO INCREASE PATIENTS PARTICIPATION?

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Introduction: Pressure ulcers (PU) are adverse events causing suffering and pain for patients and elderly patients are specially exposed. Prevalence rate in age care setting vary from 4,1 % to 32,2 % (1). Patients should be invited to participate in their own PU prevention (2). The purpose was to evaluate patients experiences of using a pressure mapping (CBPM) system with real time feedback of pressure points in a geriatric ward, with specific focus on patient participation.

Methods: A sample of 30 patients with risk for PU and intact cognitive function participated. Data collection; Nov 2016-Feb 2017. The intervention consisted of short oral information of PU and the use of the CBPM system. After using the CBPM system for two days, the patients were interviewed.

Results: There were three ways of using the feedback from the CBPM system; table.

	Used the feedback n=15	Partly used the feedback n=8	Did not use the feedback n=7
	Citation: "viewed the screen and change position after the colors"	Citation: "No I have not used it...only viewed sometimes and moved when there have been red spots"	Citation: "I don't understand this thing"
Easy to understand CBPM	15	8	4
Would use CBPM again	14	5	3
Would recommend CBPM to other patients	15	6	5

Discussions: Content analysis of the interviews is ongoing to understand how the patient used the feedback and to identify for whom the CBPM system would benefit.

Clinical relevance: The system could be a pedagogical tool to enhance patient participation in a geriatric ward.

References:

- [1] National Pressure Ulcer Advisory Panel, and Pan Pacific Pressure Injury Alliance; Haesler E, ed. Prevention and treatment of Pressure Ulcers: Clinical Practice Guideline. Perth, Australia: Cambridge Media; 2014.
- [2] Latimer et al. Patient participation in pressure injury prevention: giving patient's a voice. Scand J Caring Sci. 2014; 28(4):648-56

[42] DRY SKIN AND PRESSURE ULCER RISK: A MULTI-CENTER CROSS-SECTIONAL PREVALENCE STUDY IN GERMAN HOSPITALS AND NURSING HOMES

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Introduction: Results of previous studies suggest that dry skin is a risk factor for pressure ulcer development, but precise definitions and operationalizations of dry skin were lacking. Dry skin is a local phenomenon that may be present at certain skin areas. Therefore, the aim of our study was to investigate the association between dry skin and pressure ulcers paying particular attention to the two most important pressure ulcer predilection areas sacrum/trochanter and heel/ankle.

Methods: The data used in this study is based on two multicentre descriptive cross-sectional prevalence studies of the years 2014 and 2015, which are performed annually by the Department of Nursing Science at the Charité - Universitätsmedizin Berlin (Lahmann et al., 2005) since 2001. Group comparisons and multilevel logistic regressions predicting pressure ulcers at sacrum/trochanter and ankle/heel were conducted.

Results: The prevalence of skin dryness at the trunk was significantly higher for subjects with pressure ulcers category 2+ at the sacral area compared to without (39,0% vs. 24,4%, p = 0,010). Adjusted to demographic variables, mobility and type of institution, dry skin at the trunk was no longer associated with pressure ulceration (OR 1,11 (95% CI 0,62 to 2,00)). 71,9% of patients with heel/ankle pressure ulcers category 2+ were affected by dry skin at legs or feet, compared to 42,8% of subjects without pressure ulcers (p < 0,001). In the adjusted analysis the OR was 1,85 (95% CI 0,83 - 4,14).

Discussions: Dry skin at the heels was strongly associated with heel pressure ulcers, whereas dry sacral skin may be less relevant. The variable skin status should be better defined in future studies and in pressure ulcer risk models.

Clinical relevance: Study results indicate that dry skin at the feet may be considered as a risk factor for heel pressure ulcers development.

References:

- [1] Lahmann, N. A., Halfens, R.J.G., Dassen, T., 2005. Prevalence of pressure ulcers in Germany. J Clin Nurs 14(2): 165-172.

[44] DEEP TISSUE LOADS IN THE SEATED BUTTOCKS ON A FOAM OFF-LOADING WHEELCHAIR CUSHION VERSUS AN ADJUSTABLE AIR-CELL-BASED CUSHION: FINITE ELEMENT STUDIES

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Introduction: For wheelchair users, a common injury is a sitting-acquired pressure ulcer (PU) which typically onsets near the interface between the ischial tuberosity (IT) and the overlying soft tissues. The risk of developing PUs can be reduced using a soft but thick enough cushion on the wheelchair that acts to protect against PUs by minimizing interface mechanical loads between the body and cushion and exposure to internal soft tissue loads. In this work, we studied the biomechanical performances of a foam-based, off loading (OL) cushion in comparison to an adjustable air-cell-based (ACB) cushion.

Methods: These different cushion design approaches were methodologically and quantitatively analysed and compared here using a finite element (FE) modelling framework that has been developed in our group for evaluation of cushions. We determined the internal mechanical deformations, strains and stresses in soft tissues under ITs during symmetric sitting, in a specific anatomy of a person with a spinal cord injury that was acquired during sitting in an Open MRI configuration.

Results: Strain and stress concentrations appeared in soft tissues near the IT for both the ACB and OL cushion simulations, but the ACB cushion provided greater contact surface for the bodyweight load transfer. Thus, peak strain and stress values in all tissues were 4 orders of magnitude lower for the ACB cushion, with respect to the OL cushion.

Discussions: The OL cushion design has taken the approach of protecting at-risk sites of the buttocks by transferring local internal tissue loads away from the ITs and towards the greater trochanters, at the price of increasing exposure to internal tissue loads at sites other than the ITs. The ACB cushion design however, has utilized effective adjustability to provide immersion and envelopment of the entire buttocks structure, which is useful for minimizing the exposure to internal tissue loads throughout the whole buttocks.

Clinical relevance: Quantifying performances of wheelchair cushions using FE provides insights into deep tissue loads, which is essential for informed decision-making in developing sitting solutions for individuals at risk as well as patient groups.

References: None

Acknowledgements: Ms. Kara Kopplin at Permobil Group, (Belleville, IL, USA) for supporting this work

[43] MODELLING AN ADULT HUMAN HEAD ON DIFFERENT POSITIONERS FOR PRESSURE ULCER PREVENTION

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Introduction: Patients who are stationary (e.g. as a result of partial or complete immobility due to critical illness, paralysis or anaesthesia) endure prolonged pressures and shear stresses at contact areas between their body and the support surface, and sustained deformations in their weight-bearing soft tissues. Over time, this leads to the onset of pressure ulcers which requires that nursing staff frequently move patients in order to minimize that risk. The question is how often these repositioning manoeuvres need to be done on a certain support surface, particularly given that during surgery it is difficult, dangerous and sometimes impossible to reposition. Some new products for patient positioning in such scenarios are made of viscoelastic materials with shape-memory properties¹, but their effectiveness in alleviating tissue loads has not been quantified.

Methods: To examine differences in tissue biomechanical responses to positioning the head, two comparable finite element (FE) model configurations were created using the FEBio FE solver. Both configurations included an (identical) adult head with scalp tissues and their relevant mechanical properties. One model variant was supported by a flat foam positioner and the other by the positioner¹ with a socket to support the sides of the head, which simulates the shaping done in preparation for use.

Results: The positioner¹ resulted in over 40% greater reduction in scalp stresses with respect to the foam positioner. For the respective tissue strains, over 45% greater reduction was demonstrated with the positioner¹ compared to the foam positioner.

Discussions: The technology¹ has been designed to increase immersion and envelopment of the head by the positioner, which provides additional time for the scalp tissues to remain viable when subjected to the sustained deformations of weight-bearing. This is an important advantage in prolonged surgeries where repositioning is challenging and sometimes impossible.

Clinical relevance: By providing adequate immersion and envelopment to the head, the positioner¹ alleviates scalp tissue loads, which lowers the risk of developing pressure ulcers at the back of the head during prolonged surgeries.

References:

[1] Molnlycke Z-Flow™ Fluidized positioner

[46] AN INTERCONNECTED-AIR-CELLS CUSHION TECHNOLOGY IS EFFECTIVE IN PROTECTING BONY CLIENTS

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Introduction: Sitting-acquired pressure injuries (PIs) are a common complication of wheelchair users after suffering a spinal cord injury (SCI). Wheelchair cushions are commonly prescribed, however, little is known about their efficacy in preventing tissue damage for individuals with different anatomy.

Methods: In this preliminary work, we used seated MRI scans of a healthy male subject, while seated on seven commercially available wheelchair cushions, to evaluate their mechanical performance in protecting the soft tissues of the buttocks from PIs. First, we used a 3D image segmentation and processing software to generate a three-dimensional model of the buttocks in order to segment and mesh the pelvic bones, muscles, fat and skin tissues from an unloaded (suspended) MRI dataset, and to segment the geometry of the weight bearing cushions from the seated MRI datasets. Then, we employed the finite element method, with specialized software, and used the geometric models of the cushions as stiff molds to compress the undeformed buttocks, so that the final geometry was equivalent to that of the seated buttocks on the corresponding cushion in the MRI. We compared maximal and average strain energy densities (SED), effective strains and stresses in soft tissues, across cushions.

Results: The peak SED values were found in muscle and fat tissues immediately below the ischial tuberosities. Peak effective stresses were found in skin tissues, for all the modeled cushions. Donut and independent-air-cell (IAC) cushions resulted in the worst mechanical states in skin tissues. Contoured plastic honeycomb and IAC cushions resulted in the worst mechanical states in muscles and an interconnected-air-cells cushion offered the best protection for fat tissue for the examined subject.

Discussions: Overall, the results of the simulations fitted nicely with soft tissue thickness measurements taken directly from the seated MRI datasets. Maximal preservation of tissue thicknesses is considered effective tissue protection against PIs.

Clinical relevance: Knowledge of which type of wheelchair cushion performs best for a certain body habitus will allow caregivers to perform a more informed decision when fitting a new cushion to a person.

References:

- [1] ScanIP module of Simpleware®
- [2] FEBio software suite

[45] DYNAMIC COMPUTATIONAL SIMULATIONS FOR EVALUATING PROTOCOLS OF TISSUE LOADS APPLIED BY A REGULATED NEGATIVE PRESSURE-ASSISTED WOUND THERAPY (RNPT) SYSTEM FOR TREATING LARGE WOUNDS

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Introduction: Regulated negative pressure-assisted wound therapy (RNPT) is one of the most important wound treatment technologies developed and applied over the last two decades. To-date RNPT has been proven as clinically effective in treating chronic wounds, however, the effects of different specific pressure delivery protocols on the progress and quality of tissue repair are not adequately understood yet. Here, we suggest a viscoelastic, 3D finite element model of a wound covered with foam dressing, with some realistic features, for studying the biomechanics of RNPT.

Methods: The effects of the RNPT system on the wound/dressing complex were simulated by applying time-varying pressure boundary conditions. Three commonly-used modes of operation were simulated: continuous, non-continuous intermittent and dynamic, each mode was applied at four different moderate or extreme pressure levels. Loading the tissues at each simulated operation mode continued until all tissues reached steady response to the delivered excitation.

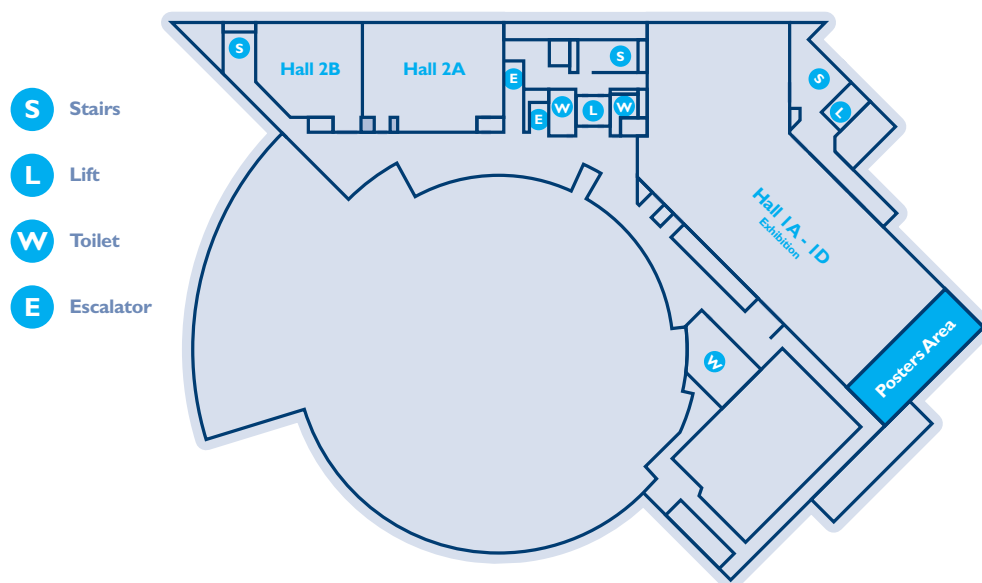
Results: Outcome measures of strain and stress magnitudes and distributions were acquired from the dermis and subcutaneous fat. For both tissues, the continuous operation mode induced initial peak values of all outcome measures, which then stabilized on approximately constant, lower values. In contrast, the outcome measures for the non-continuous operation modes fluctuated at all simulated times. Fluctuations of the outcome measures for the intermittent operation mode were more substantial compared to those of the dynamic.

Discussions: Comparison across tissue types comprises two important factors: location relative to the wound geometry and the mechanical and structural properties of the specific tissue. The skin plane stresses fluctuations, which correlate to dynamic stretches, are known to stimulate blood flow to the wound bed and to enhance cell migration and proliferation in normally perfused tissues, which influence wound repair. Our most important conclusion is that tissue loads that actually apply in and around the wound can differ substantially from the pressure levels that are set by RNPT systems.

Clinical relevance: Our present modeling contributes to the understanding of the mechanobiological effects of RNPT and how these systems could be better applied, particularly in extreme situations of low tissue perfusion in terms of controlling tissue deformation levels.

References: None

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[P1] A STUDY ON THE KNOWLEDGE, ATTITUDE AND PERFORMANCE OF PRESSURE ULCER PREVENTING AMONG NURSES IN LONG-TERM CARE HOSPITAL IN KOREA

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Introduction: In Korea, pressure ulcer patients are rising in proportion to increasing aged patients. As a result, more and more people began to be aware that PU prevention is very important because it is directly related to patient safety. Nurses' adequate and accurate knowledge and practice is the key to successfully preventing PU. This is a descriptive study designed to develop PU guidelines and education program for nurses in long-term care hospital by analysing preventive knowledge, attitude and performance of nurses who work in long term hospital.

Methods: The data had been collected from June 2 to September 9, 2015. The participants for this study were 282 registered nurses who were working in long term hospitals in Korea. Knowledge and attitude of PU prevention were measured using a Korean version tool which was modified from the tool developed by Beekman et al (2010). Performance of PU prevention was measured using the tool developed by Moore & Price (2004).

Results: The level of attitude toward PU prevention was high (3.05±.30), but the mean percentage of correct answers about PU prevention knowledge was low level, 60.6%, and the level of performance for PU prevention was high in risk assessment (82.3%). On the other hands, many nurses did not regularly evaluate nursing plan about preventing PU.

Discussions: The study found that the nurses somewhat lacked the knowledge and preventive practice related to PU prevention. However, their attitude toward PU prevention was found to be positive. Since knowledge and nursing practice are very important for PU prevention, this result can trigger quality deterioration in the nursing performance of PU prevention.

Clinical relevance: This study suggested that a systematic and comprehensive educational program and guideline for Korean long term hospital nurses needs to be developed and implemented in Korean hospitals' settings.

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- [2] Moore, Z. & Price, P. (2004). Nurses' attitudes, behavior and perceived behavior towards pressure ulcer prevention. *Journal of Clinical Nursing*, 13, 942-951.

[P2] PRESSURE INJURY PREVALENCE SURVEYS: ARE WE GETTING THE RIGHT ANSWERS

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Introduction: In the United States, pressure injury (PI) prevalence studies are increasingly seen as the standard of care to capture the prevalence of PI's in a healthcare facility. The prevalence survey measures the total number of patients with a PI in a facility on the day of the PI survey divided by the population. If every facility is not performing these studies using the same process, then likely the data collected will differ from facility to facility. Several wound societies exist worldwide, but none give direction on how to perform a PI prevalence survey.

Methods: A literature search was performed in February-March, 2017 of several international journals, including articles from 2006-2016. In addition, a website search of NPUAP, WOCN, NDNQI, EPUAP, Tissue Viability Society and EPUAP's sites.

Results: The NDNQI has information on how to perform a prevalence survey imbedded in their Pressure Injury modules. The author was unable to find any other references on how to perform a PI survey.

Discussions: It is concerning that an international consensus does not exist as to how to accurately capture PI prevalence. Variables that can affect the accuracy of PI data include:

1. Experience of the team leader;
2. Inclusion and exclusion criteria (patients and physical location (unit) where the PI occurred),
3. How the skin assessment is performed,
4. When the survey is performed,
5. Training of staff,
6. Who stages the PI and their ability to accurately stage,
7. What is considered PI prevention,
8. How the data is collected and reported, and
9. How facility administration reacts to PI detected.

Given these factors we should be asking: Is the wound care community able to say that the data reported in the literature is accurate?

Clinical relevance: If we in the wound care community cannot say that our PI prevalence data is accurate, how can we say that our prevention techniques are preventing PI's? Global guidelines on how to perform PI prevalence surveys need to be established, agreed upon and implemented.

References:

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- [2] <http://www.wocn.org>
- [3] <http://epuap.org/>
- [4] <http://woundheal.org/>
- [5] <https://tvs.org.uk/clinical-guidelines/>

[P3] DO SUPPORT SERVICES CAUSE MEDICAL DEVICE RELATED PRESSURE ULCERS IN THE COMMUNITY

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Introduction: Frail individuals residing in their own homes often spend prolonged periods in chairs, unable to move, increasing risk of pressure ulcers. Technologies have been developed to monitor patient posture and mobility in the community which have the potential to identify medical device related pressure ulcers.

Methods: Forty-four people were recruited between January and December 2016. Following routine assessment, the Fore Site PT pressure monitor was placed between the individual and support surface. This technology consists of a chair-sized pressure map, with sensors having a spatial resolution of 1cm, connected to a monitor recording real-time data at 0.5Hz. Continuous pressure monitoring identifies 'hot-spots' of pressure, generated when the patient sits in one position for long periods. Following education about the system, the monitor was left in situ for an average of 24 hours. Results were discussed with the patient and carers and amendments to care or equipment agreed as required. Subsequent visits monitored healing times, patient and carer acceptability.

Results: Participants aged 18-94 years (S.D 16.8years), living in care homes (n =8); own homes (n = 36), predominantly bedbound, chair bound or wheelchair bound (79%), unable to move independently and a Frailty index of 7(1). Pressure ulcer grades ranged from 0-4. Healing rates are: Static/RIP 2, Static 5, Healing 12, Healed 20, Deteriorating 1.

Patient feedback was positive and, particularly useful for patients with reduced levels of sensation.

Discussions: Repositioning is not always possible in the community; this technology enables support surfaces to be patient centered by selecting equipment which takes into account patients' needs and therefore having the potential to reduce medical device related pressure ulcers and unavoidable pressure ulcers

Clinical relevance: Technology has the ability to:

- Achieve good clinical outcomes 80% healing/healed pressure ulcers
- Visualise in real time the effects of pressure relieving equipment helping carers feel more confident in identifying high risk positions
- Reduce the number of unavoidable pressure injuries by reducing the number of non-concordant patients related to medical device pressure ulcers

References:

- [1] K. Rockwood et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-495.

[P4] SURGICAL PROCEDURE PROTOCOL IN THE SEPTIC CHEST CAVITY COMPLICATIONS

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Introduction: The pyogenesis of the thoracic cavity has localized, a thick wall pus-sack has developed. In this clinical status, result cannot be achieved with minimal surgical methods.

Methods: Due to the psychic status of the patient the commenced thoracic tubing and the antiseptic lavages were unsuccessful. We performed the partial removal of the 8th and 9th rib at the deepest point of the chest and the abscess cavity, we sutured together the pleura and the skin, and we developed a window on the wall of the chest. We closed up the thoracic cavity following antiseptic lavages, with the help of the sponge technique that was placed in through the working channel, and with negative pressure wound therapy device (NPWT) 1.

Results: With the open-chest management, and with the appliance of negative pressure wound therapy (NPWT) the lungs are able to perform full capacity dilation, residual fluid reservoirs and air inclusions are not formed, thus the septic focus can be directed towards the window on the wall of the chest. By eliminating the free cavity and with targeted antibiotic therapy, the septic procedure can be completely healed.

Discussions: The negative pressure therapy performed in the thoracic cavity is a therapy that can be used safely. The sponge placed in the thoracic cavity needs to be changed on regular bases. With the combined use of the window of the chest wall we change the sponge every 3rd day. Following the primary surgical intervention we performed revision and the change of the decreasing size of the sponge; the free chest cavity has disappeared. We closed up the window of the chest wall with a muscle lobe and with the skin, following we have achieved a sterile status.

Clinical relevance: The negative pressure wound therapy can be successfully used in the pyogenous processes of the thoracic cavity, even in cases that were therapy resistant at the beginning. The well developed therapeutic protocol and the targeted antibiotic therapy may provide a proposable duration for the therapy, which provides pecuniary assistance of the method.

References:

- [1] VIVANO

[P5] A STRUCTURAL EQUATION MODEL OF PRESSURE ULCER PREVENTION ACTION IN CLINICAL NURSES

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Introduction: The purpose of this study was to construct and test a structural equation model for pressure ulcer prevention action by clinical nurses. The Health Belief Model and the Theory of Planned Behavior were used as the basis for the study.

Methods: A structured questionnaire was completed by 251 clinical nurses to analyze the relationships between concepts of perceived benefits, perceived barriers, attitude, subjective norm, perceived control, intention to perform action and behavior. SPSS 22.0 and AMOS 22.0 programs were used to analyze the efficiency of the hypothesized model and calculate the direct and indirect effects of factors affecting pressure ulcer prevention action among clinical nurses.

Results: The model fitness statistics of the hypothetical model fitted to the recommended levels. Attitude, subjective norm and perceived control on pressure ulcer prevention action explained 64.2% for intention to perform prevention action.

Discussions: The major findings of this study indicate that it is essential to recognize improvement in positive attitude for pressure ulcer prevention action and a need for systematic education programs to increase perceived control for prevention action.

Reference: None

[P6] HOW A SCOTTISH HEALTH BOARD HAS REDUCED HOSPITAL ACQUIRED PRESSURE DAMAGE AND SEVERITY BY REPLACING WATERLOW WITH PUDRA (PRESSURE ULCER DAILY RISK ASSESSMENT)

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Introduction: NHSGCG Pressure Ulcer Prevention and Management Policy (2014) stated that all hospital acquired pressure damage should be referred to the Tissue Viability Service where a review would be undertaken to determine whether the pressure damage was avoidable and lessons to be learned.

There was a need for a more user friendly document to replace the Waterlow which would be:

- Easy and quick to complete
- Understandable
- Met policy and current standards
- Provided guidance
- Allowed clinical judgement

PUDRA was created – Pressure Ulcer Daily Risk Assessment It underwent eight tests of change before the final document which was gradually rolled out.

Methods: A pre and post intervention study was carried out to determine if the number of hospital acquired pressure ulcers reduced and if severity of damage was reduced.

Results:

- A drop in hospital acquired avoidable pressure ulcers
- An overall drop of 42% (in one hospital a drop from 95% to 0%)
- P value of < 0.001
- 0% grade 4 pressure damage
- Reduction from 7% to 2% grade 3 damage

Discussions: Avoidable pressure damage is recognised harm. Clinicians have a duty of care to ensure that patients are correctly assessed for the risk of pressure damage and preventative measures are put in place to ensure that the risk of developing pressure damage is reduced.

NHSGCG utilised data and learning from clinical incident reviews to develop a tool which combines risk assessment, care guidance and a patient centred plan of care. This document underwent eight tests of change using Plan Do Study Act (PDSA) improvement methodology to create the Pressure Ulcer Daily Risk Assessment (PUDRA) which is currently being used.

Clinical relevance: PUDRA demonstrated that when correctly used it lead to a reduction in hospital acquired avoidable pressure damage and severity of pressure damage. It is easy to use and can be used in many care settings.

Team were winners of JWC Pressure Care Award 2017

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- [1] Downie F, Guy H, Gilroy P, Royall D, Davies S Are 95% of hospital acquired pressure ulcers avoidable? Wounds UK (2013) Vol 9 N

[P7] THE PREVENTION OF PRESSURE ULCERS IN PATIENTS WITH SPINAL CORD INJURIES USING A SPECIAL BED

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Introduction: The case study is focused on prevention of pressure ulcer in patient with spinal cord injury with the usage of special bed. It presents detailed description and monitoring of adverse factors.

Methods: Case study, 52 years old patient, hospitalized for 16 days at Anesthesiology and intensive care unit for respiratory insufficiency with a transversal spine lesion in segment C 5/6 and bilateral bronchopneumonia.

Results: Admission patient had already undergone a surgical intervention on the spine and his neck was fixed with neck collar. Patient was in risk of pressure ulcers development, Norton scale = 19 points, Braden scale = 12 points. Patient repositioning was ensured by turning multifunction bed 1 on its axis with using stabilization cushions, which are part of the bed and allow the torso to be maintained on the axis and still permit lateral tilt. Patient was repositioned using automatic lateral therapy in + / - 10° each hour (day 1-7). The tilt passes of right side, back and left side and lateral tilt was + / - 5° every hour (day 8-16). A special active mattress with Microclimate management was activated immediately and throughout.

Discussions: Despite the severity of the patient's condition (spinal injury, infectious complication, fever and diarrhoea), no skin defects appeared. The multifunction bed 1 is highly beneficial both for patients and also for nursing staff, it can be used to help prevent pressure ulcers, ankyloses, pneumonia, pulmonary atelectasis, contractures and other pathological health conditions.

Clinical relevance: The main goal of the case study is not only to present the positive effect of the special bed 1 and mattress but also to highlight the need for appropriate assessment and use of objective and validated scales when planning individual care plan.

This study was supported by the Ministry of Health of the Czech Republic, grant no. 15 291 11A with the title "The register of decubitus ulcers – integration strategy for monitoring and preventive interventions on the national level". All rights reserved.

References:

- [1] Multicare bed
- [2] KOUTNÁ, M., ULRYCH, O. Manual on Wound Healing in Intensive Care, Galén, 2015, Prevention and Treatment of Pressure Ulcers: Clinical Practice guidelines, EPUAP, 2014

[P8] LET'S PUT PRESSURE ON PREVENTION

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Introduction: The Emergency Department (ED) and Medical Admission Unit (MAU) recognised a need to ignite a focus on pressure ulcer prevention strategies. Their aim was to reduce the incidence of facility acquired pressure ulcers by delivering timely, facility appropriate and consistent preventative measures ensuring the safety of patients in their care.

Methods: An ED specific skin bundle was developed and implemented which highlighted risk factors in this patient population and acted as a trigger to introduce patient specific preventative measures, eg provision of pressure relieving mattresses, hospital beds and skin checks. This presented a challenge as not all patients were in a cubicle to facilitate this.

Results: Positive outcomes on patient care were:

- 1. Significant increase in the number of 'at risk' patients with an individualised preventative care plan implemented and documented in ED.
- 2. 66% increase in the number of 'at risk' patients nursed on pressure relieving mattresses at the onset of treatment in ED.
- 3. Implementation of a food trolley in ED ensuring patients access to nutrition after 18:00.
- 4. 50% reduction in pressure ulcer incidence in MAU.

Discussions: The nature of these departments, in terms of priority of care and volume of through put, presents challenges in providing consistently high standards of pressure ulcer prevention.

ED struggled with an inconsistency in recognising those 'at risk' and therefore subsequent preventative measures and documentation was ad hoc. This is an issue that all EDs must overcome as there is currently no validated pressure ulcer risk assessment tool that accurately reflects risk in this patient population.

Specific issues had been highlighted in MAU in relation to timely skin assessment and application of pressure relieving mattresses.

Clinical relevance: Ensuring common goals for their patients, these two departments worked together with the Tissue Viability Team to develop a strategy for providing a high standard of care in the ED that perpetuated throughout their stay in MAU.

References: This piece of work was undertaken as part of an Safety, Quality and Experience project through the South Eastern Trust, all this was done as a series of PDSA (plan, do, study, act) cycles.

[P10] IMPLEMENTATION OF SUCCESSFUL EQUIPMENT ALGORITHM 2017

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Introduction: Pressure redistributing equipment algorithms are often used to guide clinicians. Appropriate selection of pressure-redistributing mattresses to achieve positive clinical and financial outcomes is a challenge for organisations and staff. Evaluations were undertaken across Worcester Health and Care Trust and Medway Maritime Hospital to assess pressure redistributing equipment prescription patterns.

Methods: 7 week on line prescriber survey was undertaken within WHCT to explore the use of the specialized mattress I to include: rationale for selection, patient diagnosis, mobility, waterflow, grade and location of pressure ulcer (PU) comfort, ease of use and training requirements.

22 completed surveys – 73% selected for prevention of a PU, whereby algorithm guidance was high specification foam. Prompted 12-month retrospective audit.

Retrospective audit conducted within Medway Hospital. Prompted one-month review of rental Low Air Loss systems and 52 questionnaires completed by staff rationalizing equipment choice.

Prescriber surveys were conducted in both Trusts to review awareness of algorithm, guidelines, confidence and competence, training needs and rationale for choice of equipment.

Results: 411 patients in WHCT had used the SPA in 12-month period. Effective healing was documented for grade 3 and 4 PUs which resulted in a change to the equipment algorithm.

Healing of severe PUs were recorded within Medway Hospital, confirming the algorithm choice.

65% of patients had intact skin, 89% had superficial PUs, suggesting an over-prescription of 95%.

23 Prescriber surveys within both Trusts revealed similarities for rationale and highlighted differing training needs.

Discussions: Analysis revealed a 73% over-prescription for WHCT, amounting to an estimated 41k saving per annum and a 76% over-prescription for Medway, amounting to an estimated 91k saving per annum if this were rectified.

Clinical relevance: Over prescription of pressure redistributing equipment can have an effect both clinically and financial and it is important to rationalize appropriate selection to ensure effective outcomes.

References:

- [1] Sofform Premier-Active (SPA)
- [2] Adams N (2014) Gearing Up For Change. Poster presented at Wounds UK. Available at: <http://bit.ly/1lfx2mx> (accessed 26.01.17)
- [3] National Institute for Health and Care Excellence (2014) Pressure Ulcers: Prevention and Management [CG179]. Available at: <https://www.nice.org.uk/guidance/cg179> (accessed 26.01.17)

[P9] PAEDIATRIC PRESSURE ULCER PREVENTION MADE EASY

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Introduction: To help paediatric nurses recognise children at risk of pressure damage and to provide preventative care in an individualised and efficient way.

Methods: Utilising 'small cycles of change', evidence based practice and the concept of local ownership we:

- introduced the Glamorgan Paediatric Risk Assessment Tool [1]
- developed and introduced a tailored Paediatric SKIN™ [2] Bundle
- developed a document for recording skin checks around devices
- created a process for reviewing paediatric pressure ulcer incidents, sharing learning as appropriate.
- provided pressure ulcer education.

Results: In January 2016, audits showed that care was not always recorded consistently or legibly. A key reason related to workload and photocopying quality - staff had to photocopy the charts for everyday use. This was time consuming and printing quality could not be assured. Arrangements were made to have the Bundle professionally designed, printed and available to order as a stock item. Re-audit of the documentation in January 2017 was positive.

Children were noted to:

- Be risk assessed within 6 hours of admission.
- Have a pressure ulcer prevention plan in place.
- Have the impact of the interventions evaluated, and plan changed as required.

Discussions: Within paediatric nursing, pressure ulcer documentation is viewed as important. However, due to competing interests it is not always completed as accurately as one would like. To improve record keeping nurses must be provided with well-designed documents. These act as an aide memoire, prompting the delivery and accurate recording of pressure ulcer preventative care.

Clinical relevance: Pressure injuries do occur in children. The goal of any quality improvement initiative should be a reduction in avoidable incidents. A standardised, efficient way of recording the evidence based pressure prevention care required and provided in the paediatric hospital is therefore essential.

References:

- [1] Willock, J. et al., (2007) A risk assessment scale for pressure ulcers in children. *nursingtimes.net*
- [2] Gibbons et al., (2006) Eliminating facility-acquired pressure ulcers at Ascension Health. *Journal of Quality and Patient Safety*, 32 (9):488-496.

[P11] HOSPITAL-ACQUIRED PRESSURE INJURIES: DETERMINING THE SIGNIFICANT RISK FACTORS FROM THE KNOWN RISK FACTORS AMONG SURGICAL ADULT PATIENTS IN AN ACUTE CARE HOSPITAL IN SINGAPORE

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Introduction: Patients who went for surgery are at high-risk of developing pressure injuries due to extended period of immobility while under anesthesia. Previous studies have identified several known-risk factors that are prevalent during pre-, intra and post-operation period 2-5. However, these known-risk factors were derived from varying context thus there is a lack of knowledge of these known-risk factors that would contribute the most (significantly) to the development of hospital-acquired pressure injuries (HAPI) among surgical patients in Singapore. Therefore the purpose of this study was to determine the significant risk factors among the known-risk factors in the development of HAPI among surgical patients in Singapore.

Methods: This retrospective case-control study was conducted in an acute care hospital in Singapore. Cases were patients who underwent surgery and developed HAPI between January 2013 to December 2015. Cases were identified via the hospital's electronic-risk management system. Controls were surgical patients (without HAPI). Cases were matched to controls in a ratio of 1:4 and according to gender, discipline and admission period. Cases and Control were compared on the known risk factors. Data extraction was done by a trained nurse. Data that were unavailable electronically were retrieved via hardcopy.

Results: 122 surgical patients who developed PI during the study period were matched with 486 controls. Cases were older in age and statistically significant compared to control (Mean difference=10.5, p<0.002). Smoking status and BMI were not statistically significantly different between (p=>0.05) cases and control. However, Braden score upon admission (M= 19.38, SD=2.81, t(598)=10.38, p<0.01) was statistically significantly lower among cases as compared to control. Patients with higher ASA score (3 or 4) were more likely to develop HAPI (X² (1, N = 261) = 45.25, p = <0.001).

Discussions: Older age, lower Braden score and higher ASA score were significantly associated with the development of HAPI among our surgical adult patients. However this analysis has yet to include the known-risk factors related to surgery.

Clinical relevance: These significant risk factors that are associated with development of HAPI will be incorporated into our nursing care assessment during pre-, intra and post-operation.

References: None

[P12] INCIDENCE OF HOSPITAL-ACQUIRED HEEL PRESSURE INJURIES AMONG PATIENTS IN INTENSIVE CARE UNITS: EXPERIENCE OF A TERTIARY HOSPITAL IN SINGAPORE

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Introduction: Pressure injuries (PI) are a significant cause of morbidity and lead to lower quality of life for patients. The heel is a common area for PI. Critically ill patients are at high risk of PI, given that they are already physiologically compromised.

This study aimed to describe the incidence of heel PI among patients admitted to intensive care units (ICUs) of a tertiary hospital in Singapore.

Methods: A prospective, observational study was conducted. Patients admitted to the ICUs within the six months study period were recruited. Data was censored upon patients discharged from hospital, commenced ambulation, death or development of PI during admission.

Results: Of the 198 patients recruited, 4.5% (n=9) dropped out of the study as additional preventive measures (i.e. did not receive standard care) were given. Patients' mean age was 60.7 (SD = ±17.0) years and 57.1% (n=108) were males. More than two-third (78.8%) were non-elective admissions. The mean observed days was 5.9 (SD = ± 9.1) and mean APACHE_II score was 21.5 (SD = ±7.7).

Twenty-one (11.1%) patients developed heel PI. Eight patients developed PI at one heel while 13 (6.9%) patients acquired PI at both heels. Only one patient developed a stage 2 injury, one had a deep tissue injury, and 19 patients (10.1%) had stage 1 heel PI. The incidence rate of hospital-acquired heel PI was 16.7 per 1000 observed days.

Discussions: Despite the current standard care (i.e. use of air-mattress and off-loading of heels) in our ICUs, development of heel PI is still a common complication. An additional measure is needed to prevent hospital-acquired heel PI.

Clinical relevance: This study generated new knowledge on the incidence of heel PI in the local setting. Results was used to inform the next phase of the study where we compared PI incidence after applying prophylactic dressings to the heels.

References:

- [1] Langemo D, Thompson P, Hunter S, Hanson D, Anderson J. Heel pressure ulcers: stand guard. *Advances in skin & wound care.* Jun2008;21(6):282-292; quiz293-284.
- [2] Levy A, Frank MB, Gefen A. The biomechanical efficacy of dressings in preventing heel ulcers. *Journal of tissue viability.* Feb2015;24(1):1-11.

[P14] PRESSURE ULCER RISK ASSESSMENT: RISK FACTORS AND RISK SCREENING IN OLDER PERSONS - A PILOT STUDY

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Introduction: Using novel movement sensor technology, in addition to sub epidermal moisture measurement, the present study aims to determine the contribution of mobility, activity, nutritional status and incontinence on the development of PUs.

Methods: A quantitative, prospective, non-experimental among the elderly population cared for in a long stay setting. The 48 patients recruited as part of this pilot study were followed up for 20 days.

Results: Most participants (85.4%, N=41) were incontinent. Mean weekly Braden scores did not change over the follow up period. The mean MUST score was: 1.52 and remained unchanged. The mean number of movements/hours was 182.25. Five patients developed a PU (incidence 10.4%) and had at least 3 days of abnormal SEM reading, preceding the PU becoming evident visually. There was a statistically significant difference in the time to PU detection using SEM compared to the visual skin assessment (p=0.0001). SEM detects PU on average 7.5 days earlier than visual skin assessment.

Discussions: Braden score/activity, incontinence and nutrition among the participants remained static during the study follow up. On the other hand, SEM readings and movement score vary reflecting changes in the patients' actual movements and responses to pressure/shear forces. Interestingly, 2 PUs developed in individuals with very little movements and 3 PUs developed in individuals with a lot of movement. Those agitated patients are consistently rubbing their skin off the bed, giving rise to the superficial PUs. Conversely, those with little movements are at risk of developing deeper PUs.

Clinical relevance: The preventative strategies required for these 2 cohorts of patients might be different as one group may benefit from dressings to protect the areas exposed to shear/friction and the other group almost certainly require enhanced repositioning strategies

References:

- [1] Moore, Z., Patton, D., Rhodes, S. L. & O'Connor, T. Subepidermal moisture (SEM) and bioimpedance: a literature review of a novel method for early detection of pressure-induced tissue damage (pressure ulcers). *Int Wound J*, doi:10.1111/iwj.12604 (2016).
- [2] Oomens, C. W. J., Bader, D. L., Loerakker, S. & Baijens, F. Pressure Induced Deep Tissue Injury Explained. *Annals of Biomedical Engineering* 43, 297-305, doi:10.1007/s10439-014-1202-6 (2015).

[P13] EVALUATING THE EFFECTIVENESS OF A HIGH SPECIFICATION FOAM INTERFACE HYBRID MATTRESS IN A NEURO-REHABILITATION UNIT

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Introduction: Central England Rehabilitation Unit (CERU) is the largest level 1 accredited facility available which offers patient focused neuro rehabilitation.

On admission to the unit, an alternating air mattress was prescribed, unless contraindicated.

There were occasions when patients were compromised and an alternative support surface was required, which would address comfort and transfer issues, prevented pressure damage and be prescribed as part of a holistic approach to pressure ulcer treatment.

Evaluation of the hybrid mattress with high specification interface was undertaken.

Methods: 41 bedded unit was supplied with SPA mattresses to evaluate effectiveness for patients with neurological conditions.

Three case studies: A 68-year-old gentleman, who developed Guillain Barre syndrome. He felt frightened on the alternating system due to the movement on the cells causing instability.

A 23-year-old gentleman fell down a ventilation shaft and suffered multiple injuries. He found the alternating air mattress uncomfortable

A 16-year-old boy, with axonal diffuse brain injury after falling off his bicycle. He was considered to be at high risk of falls and the cell interface proved to be a means of egress for him.

Testimonial from the Clinical Lead Nurse of the benefits of switching to an alternative system.

Results: The SPA mattress was a successful alternative for patients within the unit, proving to be clinically and financially cost effective.

The unit was free from hospital acquired pressure ulcers for a period of 4 years following the change to the SPA mattress.

Discussions: Evaluation identified the SPA mattress to be a suitable alternative to an alternating air mattress for neuro-rehabilitation patients.

Clinical relevance: As changes evolve for support surface technology, the relevance and importance of reviewing alternative clinically proven technology is paramount in achieving effective clinical and financial outcomes.

References:

- [1] Soffform Premier Active
- [2] Stephen-Haynes J, Callaghan J, Allsopp A (2015) A retrospective analysis of the use of the Soffform® Premier Active 2 in an NHS Trust. *Wounds UK* 11 (4):82-8
- [3] National Institute for Health and Care Excellence (2014) *Pressure Ulcers: Prevention and Management* [CG179]. Available at: <https://www.nice.org.uk/guidance/cg179>

[P15] PRESSURE ULCER QUALITY IMPROVEMENT INITIATIVE IN TWO COMMUNITY HOSPITALS

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Introduction: Pressure ulcers are painful and debilitating and, if left untreated, can lead to serious harm and death. The Southern Health and Social Care Trust, NI recognized there was a need to raise awareness of and enhance the prevention and management of Pressure Ulcers on our wards. There was evidence of under and inappropriate reporting of incidents of Pressure ulcers. The nursing documentation needed to be enhanced to reflect the new Regional SKIN bundle. This poster will demonstrate how effective this quality improvement initiative has been on 5 wards in two trust Community Hospitals.

Methods: The following was implemented:

- Staff Training in pressure ulcer prevention and management
- The safety cross to capture details of admitted with and ward acquired pressure ulcers
- Development and introduction of new documentation based on the SKIN bundle
- Monthly real time auditing of SKIN bundle
- Patient information leaflet 2
- Monthly team meetings
- Route cause analysis carried out on ward acquired pressure ulcers stage III and IV (to determine the number of avoidable pressure ulcers)

Results: Ward acquired pressure ulcers reduced by 56% in 2016/2017 compared to 2015/2016 (see attached run chart) Compliance with SKIN bundle documentation increased over the same period. Staff increased their knowledge and skills in relation to pressure ulcer classification and the prevention and management of pressure ulcers.

Discussions: There were some challenges with the introduction of the new documentation and difficulties with staff turnover. Despite this due to the engagement and commitment of staff we were able to achieve enhanced outcomes for patients.

Clinical relevance: Quality improvement initiatives can improve patient care and reduce costs and burden to the NHS.

The effective introduction of the SKIN bundle led to a reduction in ward acquired pressure ulcers.

References:

- [1] National Patient Safety Agency (2010) NHS to Adopt Zero Tolerance approach to pressure ulcers. London: NPSA
- [2] Health and Social Care (2012) Pressure Ulcer prevention – Information for patients and carers. Public Health Agency, Belfast

[P16] EFFECTIVENESS OF USING A NEW POLYURETHANE FOAM MULTI-LAYER DRESSING IN THE SACRAL AREA TO PREVENT THE ONSET OF PRESSURE SORE IN THE ELDERLY WITH HIP FRACTURE: RANDOMIZED CONTROLLED TRIAL

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Introduction: Hip fractures in the elderly are a serious problem for the health service due to the high rate of mortality and complications that they produce. One of these complications is pressure sores (PS) that, according to the literature, occur in 8.8% to 55% of patients and mainly arise in the sacral area. The present study tests whether applying a new hydrocellular polyurethane foam multi-layer dressing, tailored for the sacral area (Allewyn Life[®]), reduces the onset of PS in the sacral area.

Methods: Monocentric open randomized controlled trial. From March to December 2016, 359 fragility hip fracture patients aged ≥ 65 were randomly divided into two groups: 182 in the control group (standard care) and 177 in the experimental group. In the experimental group the Allewyn life dressing was applied to the sacrum within 24 hours of admission to hospital and kept in place for 8 days.

Results: PS occurred overall in 36 patients (10%); 8 patients (4.5%) in the experimental group compared to 28 (15.4%) in the control group: P=0.001. RRR 71% with NNT of 9 (6-21). In the experimental group the lesions occurred on the 6th day compared to the 4th day of the control group. PS > grade I were also significantly reduced in the experimental group (2.3% vs 8.2%). The mean number of dressings used in the experimental group to cover the 8 days was 1.8 per patient. The dressing produced a mild skin rash in two patients of the experimental group.

Discussions: Using polyurethane foam is effective at reducing the rate of PS in the sacrum in elderly patients with hip fracture. The excellent adhesiveness of this device also enables costs to be kept down.

[P18] USING NEW TECHNOLOGY TO ENABLE PREVENTING PRESSURE ULCERS AND FALLS IN A UNIVERSITY HOSPITAL IN SWITZERLAND: A CLINICAL PROJECT

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Introduction: The prevalence of pressure ulcers (PU) in the Department of Medicine was 12.2% and the incidence of falls 7.9% (n=123). We evaluated a new technology I designed to help nurses assess the mobility of patients and provide an alarm both when a pre-set level of immobility has been exceeded and also if the patient gets out of bed. The clinical project assessed:

- Can MoMo help improve the risk assessment of PUs and falls?
- How can we use this system in clinical practice?
- Can this system help to decrease the incidence of PUs and falls during hospitalisation?

Methods: The project had two phases: a blind test during three weeks to record the mobilization of random patients without alerts activated. Risk assessment, preventive measures and PUs and falls were recorded 2-3. In the second phase inclusion criteria were fixed; immobility alerts were set and mobilization monitoring was displayed on a screen on the nurses' desk. Data of PU/falls and preventive measures were recorded as in first phase.

Results: During phase one 56 patients were included. Five PU categories 1-2 were acquired. 75% of patients with moderate risk of PU had more than three-hour mobility. Three patients who left their bed frequently had falls. During the second phase 57 patients were included, PU category 1 was acquired and resolved during the test and no falls occurred. The general preventive measures for PUs were increased by 50%.

Discussions: This evaluation showed how MoMo helps staff to have a better assessment of PU risk and to plan preventive measures and implement them in a more targeted fashion. The alerts help prevent falls for patients with cognitive impairment. The implementation of this technology needs to be led by clinical nurses and coached by nursing management to develop reflective practice.

Clinical relevance: MoMo is a tool to have objective measures of mobilization in bed. The system of alerts helps nurses move the patient in time and prevent falls.

References:

- [1] Mobility Monitor
- [2] NPUAP-EPUAP. Prévention des Escarres. Guide de référence abrégé, 2009.
- [3] NICE. Falls in older people: assessment after a fall and preventing further falls, 2015.

[P17] USE OF PRESSURE ULCER (PU) DATA BY TISSUE VIABILITY NURSES (TVNS) TO DIRECT EDUCATION AND IMPROVE PATIENT OUTCOMES

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Introduction: A plethora of local PU data is available. However, if data is not monitored and analysed there are lost opportunities to provide targeted education to improve quality of care and patient outcomes.

Methods: PU data is collected online. TVNs verify all hospital acquired PU (hapu) from grade (G) 2 to G4, ungradable and suspected deep tissue injury.

Collaborative working between the TVNs and Risk Management generates monthly PU data. Data is verified and cleansed of misclassification and duplication by a TVN. A pivot table is generated; data is analysed and developing themes investigated and acted upon.

Increased avoidable sacral/buttock G2 hapus was observed, from 7% to 56% over two months. Stockton et al. (2009) suggest prolonged sitting is a significant factor in PU development. Data analysis revealed seating to be a key factor.

A collaborative education approach, involving therapies and industry was devised, targeting areas identified as having increased incidence. Education delivered was short and key message driven. All staff involved in clinical care were targeted including nurses, medics and therapists. A pressure mapper provided visual confirmation of pressure associated with sitting, demonstrating small changes in positioning significantly alters pressure distribution. In total 182 staff were educated.

Results: The following three months of data showed a decrease in avoidable G2 sacral/buttock hapus to 37.5%.

Discussions: A positive culture of PU reporting creates large amounts of data. However due to difficulties in educating a large and ever changing workforce accuracy of data can be lacking. TVNs play a vital role in ensuring data is verified and analysed to quickly identify educational needs both within the organisation as a whole and in individual areas. However pressures within the NHS result in difficulties in allowing staff time to attend formal education. Therefore different approaches are required. Key message driven, multidisciplinary ward walking in collaboration with industry provides a method that yields positive results.

Clinical relevance: Timely, targeted education and resource in response to a robust data improves PU prevention and outcomes for patients.

References:

- [1] Stockton, L. et al. 2009. Seating and pressure ulcers: clinical practice guideline. Journal of Tissue Viability, 18(4), pp. 98-108.

	A	B	Total
1. Division	(All)	(All)	31966
2. Category	(All)	(All)	
3. Is the User LHE required?	(All)	(All)	
4. Waterlow score	(All)	(All)	
5. Risk score	(All)	(All)	
6. Cushion being used?	(All)	(All)	
7. Device	(All)	(All)	
8. Site of ulcer?	(All)	(All)	
9. PU type	(All)	(All)	
10. Avoidable/Unavoidable	(All)	(All)	
11. Grade	(All)	(All)	
12. Incident date	(All)	(All)	
13. Location	(All)	(All)	
14. Location	(All)	(All)	
15. Count of Ref	(All)	(All)	
16. Total			31966

[P19] THE BENEFITS OF USING THE BUTTERFLY SCHEME AND DISTRACTION THERAPY FOR A DEMENTIA PATIENT IN THE MANAGEMENT OF A STAGE I I PRESSURE ULCER

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Introduction: Dementia is and should be a key priority for all health care staff. Mr. B was an 82 year old man with a diagnosis of Dementia. He was admitted to Lurgan Hospital for rehabilitation following a fall at home. On admission he presented with a stage I I I pressure ulcer to his sacrum which had been present for two weeks. Mr. B had urinary and faecal incontinence and poor mobility. Mr. B's wife explained that her husband had become very irritable, agitated and aggressive when trying to provide care at home. This pattern of behaviour continued in hospital and Mr. B was aggressive and violent towards staff when providing care and during wound dressing change.

Methods: This poster will present how using some of the following techniques prevented wound deterioration and resulted in improved wound care

- Using the Butterfly scheme REACH response to reduce anxiety and improve communication.
- This is me document - Completed by Mr. B's wife. Mr. B was a postman.
- Distraction therapy - the nurse made a post box and letters addressed to Mr. B's relatives. These were given to him to sort and post when wound care was carried out. He also enjoyed singing and staff sang with the patient

Results: The use of the Butterfly scheme and distraction techniques enabled staff to carry out dressing changes which resulted in improved patient safety and wellbeing. The wound improved throughout Mr. B's five week stay. The wound was almost healed on discharge.

Discussions: When we know the beliefs, values and preferences of the individual we are caring for we can distract and engage them with something that they may enjoy thus reducing stress and anxiety.

Clinical relevance: The use of established dementia care therapies to aid in wound management to facilitate healing.

References:

- [1] Health and Social Services Board (2016) The Dementia Learning and Development framework. HSCboard: Belfast
- [2] Butterflyscheme.org.uk. (2017). The Butterfly Scheme/ Reaching out to people with dementia and to anyone needing memory support. [online] Available at: <http://butterflyscheme.org.uk/> [Accessed 11 Apr. 2017].

[P20] THE IMPACT OF AN EDUCATIONAL INTERVENTION ON HOME SUPPORT WORKERS' ABILITY TO DETECT EARLY PRESSURE ULCER DAMAGE

Mairead Clarke¹

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Introduction: Skin assessment is an essential component in pressure ulcer prevention, however, there is evidence to suggest that patients may not always receive the correct level of care to maintain their skin integrity. Home Support Workers (HSWs) are directly involved in patient care, and they have a pivotal role to play in skin assessment. All health care workers require education to fulfil this role.

Methods: A repeated measure design was employed to quantify the effectiveness of an educational intervention, consisting of one pre-test and two post-tests. This was followed by a workshop, tasked with reflecting on the educational intervention.

Results: At the baseline (pre-education), 58% of the photographs were classified correctly. The post-test 1 results were lower, with 55% of the photographs being classified correctly. In post-test 2 findings, results increased to 58%, achieving the original baseline scores. There was a moderate negative relationship between pre-training and post-test 2 scores ($r=-.44$; $n=27$; $p=0.02$).

Discussions: The educational intervention has been shown not to have a statistically significant positive effect on HSWs' ability to detect early pressure ulcer damage. The moderate negative relationship can be principally explained by low health literacy among the participants. The workshop group findings exposed educational issues relating to participant ability to understand theoretical health concepts.

Clinical relevance: This study has shown that, at present, HSW ability to complete skin assessment is inadequate. As professionals, nurses are accountable for the delegation of care delivery to HSWs.

References:

- [1] Samuriwo, R. (2010). The impact of nurses' values on the prevention of pressure ulcers. *British Journal Of Nursing*, 19, 15, pp. S4-S14 [p.
- [2] Athlin, E, Idvall, E, Jernfält, M, & Johansson, I (2010). Factors of importance to the development of pressure ulcers in the care trajectory: perceptions of hospital and community care nurses. *Journal Of Clinical Nursing*, 19, 15/16, pp. 2252-2258 7p.

[P21] AN ALGORITHM FOR SUPPORT SURFACE SELECTION: CROSSING THE HOSPITAL-COMMUNITY INTERFACE

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Introduction: The pressure on community nursing in Ireland has increased due to the conclusive link between the risk of developing pressure ulcers and age progression¹. Additionally challenging nurses to find innovative ways of working and embracing new methods of service delivery for pressure ulcer prevention². The SSKIN bundle is an innovative model of care adopted in Ireland to help prevent pressure ulcer damage³. Surface is the second element included in the evidence-based improvement bundle for pressure ulcer prevention. Integrated bed systems to redistribute pressure have become an integral component of pressure ulcer prevention and treatment for nursing staff⁴. There is insufficient evidence to guide nurses to make a clinical decision on selecting a support system to match individual needs in a safe home environment.

Methods:

1. Baseline Audit;
2. Algorithm Design: 'Positive Eight'⁵ and 'Fundamental Five' (SSKIN);
3. Staff Education;
4. Re-Audit;

Results: Data Collection to commence April 30th

Discussions: In Ireland, minimal research has been carried out to guide nurses in clinical decision making for the selection of support surfaces incorporating a safe working environment to meet individuals needs in the community.

Clinical relevance: An algorithm will be designed in an effort to guide nursing staff in the community to select appropriate support surface, with consideration given to a safe working environment.

References:

- [1] Moore, Z, & Cowman, S 2012, 'Pressure ulcer prevalence and prevention practices in care of the older person in the Republic of Ireland', *Journal Of Clinical Nursing*, 21, 3/4, pp. 362-371 10p.
- [2] Department of Health (2017) 'Developing a Community Nursing and Midwifery Response to an Integrated Model of Care' Consultation Document, Dublin, Stationary Office.
- [3] Health Service Executive (2014) Annual Report and Financial Statements 2014, Health Service Executive, Dublin.
- [4] McNichol, L, Watts, C, Mackey, D, Beitz, J, & Gray, M 2015, 'Identifying the Right Surface for the Right Patient at the Right Time: Generation and Content Validation of an Algorithm for Support Surface Selection', *Journal Of Wound, Ostomy & Continence Nursing*, 42, 1, pp. 19-3.
- [5] ArjoHunteigh Guidebook for Architects and Planners

[P22] THE INTRODUCTION OF A MULTI-FUNCTIONAL PRESSURE ULCER GRADING TOOL TO ASSIST NURSES RECOGNIZE AND GRADE PRESSURE ULCERS

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Introduction: SET V Service have highlighted through facility acquired PU incident reports and mandatory PU education, that nurses struggle to accurately stage pressure damage. This has significant implications for patient care in relation to the implementation of pressure ulcer prevention strategies.

I addressed these issues using a quality improvement approach. To facilitate me in undertaking this work, I undertook the Trust Safety Quality & Experience programme. My aim was to develop a multi-functioning tool that could be adopted into daily practice to give nurses the confidence to accurately stage and report pressure damage. I needed to develop an innovative way to build nurses knowledge and confidence in daily practice.

I designed disposable paper rulers that provided a descriptive and visual aid at the patient's bedside to ensure accurate measurement of PUs, to establish a baseline from which nurses could measure the effectiveness of an individual management regime and wound healing outcomes; provide descriptions and images of the stages of pressure damage to reinforce this important decision; and a description of the process for reporting facility acquired damage to ensure accurate incidence data.

Methods: An electronic survey was designed to establish baseline data. A trust wide email was disseminated encouraging nursing staff to respond. The PU staging tool was introduced and promoted on World Stop Pressure Ulcer day following which, a second Survey was introduced to establish outcomes from using the tool in daily practice.

Results: A marked increase in staff identifying steps for reporting facility acquired PUs as well as a clear rise in the number of staff accurately identifying stages 1, 2 and Deep tissue injury when using the grading ruler. Furthermore, a significant rise in staff confidence in this decision making process was evident.

Discussions: The introduction of this tool in conjunction with ongoing mandatory training has had significant impact on PU recognition, prevention strategies and reporting within SET.

Clinical relevance: This tool has been an invaluable asset in the Trust PU prevention strategy. It is innovative, functional, practical and ensures best practice every time. Currently six wards within SEHSCT have achieved 1000 plus PU free days.



[P23] DEVELOPING A PRESSURE REDISTRIBUTING EQUIPMENT FORMULARY

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Introduction: Appropriate selection and use of pressure-redistributing mattresses to achieve positive clinical and financial outcomes is a challenge for organisations and staff alike. Dissemination of information within a Community Trust on appropriate selection and use can often be a challenge.

Methods: Worcester Health and Care Trust Viability team compiled a Pressure Redistributing Equipment Formulary, based upon the local the Wounds Management Formulary.

Information and guidance on clinically proven equipment available from the community equipment service for community patients and for the community hospitals for in patients' use was included.

Results: The pressure- redistributing formulary was created to provide information to hand for prescribers for mattresses and cushions to include: product details, indication for use, order codes, specification, application, contraindication for use, service and cleaning instructions, supplier information and practical tips.

The booklet is available for pressure- redistribution prescribers and has been promoted and discussed at local Link nurse meeting, conferences and educational events.

Discussions: Believed to be the first of its kind, the concept of the pressure- redistributing formulary has since been explored by other Trusts in order to make information on available support surfaces readily available and ensure resources are used effectively and safely with regular review.

Clinical relevance: A Pressure Redistributing Equipment Formulary can promote evidence based practice by providing a framework within which it is safe to practice. The formulary supports the practical application of pressure- redistributing prescribing, promotes continuity of care, cost effectiveness and encourages safe, effective and appropriate use of pressure- redistributing equipment and promotes rational prescribing.

References:

- [1] National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance (NPUAP, EUAP, PPIA) (2014) Prevention and Treatment of Pressure Ulcers: Quick Reference Guide. Emily Haesler (ed), Cambridge Media: Osborne Park, Western Australia
- [2] National Institute for Health and Care Excellence (2014) Pressure Ulcers: Prevention and Management [CG179]. Available at: <https://www.nice.org.uk/guidance/cg179> (accessed 26.01.17)
- [3] Stephen-Haynes J, Allsopp A, Jones H (2017) Evaluating the effectiveness of pressure- redistributing equipment for the best clinical and financial outcomes Wounds UK 13 (1): 70-73

[P24] INCLUDING ALLIED HEALTH PROFESSIONALS IN PRESSURE ULCER PREVENTION TRAINING AND PLANNING

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Introduction: Housebound patients often have multiple services visiting, including Allied Health Professionals (AHPs). They are a vital service in ensuring the patient may remain at home as independently as possible. In pressure ulcers prevention care planning, the risk assessment and prevention care plan is instigated and monitored by community nursing staff.

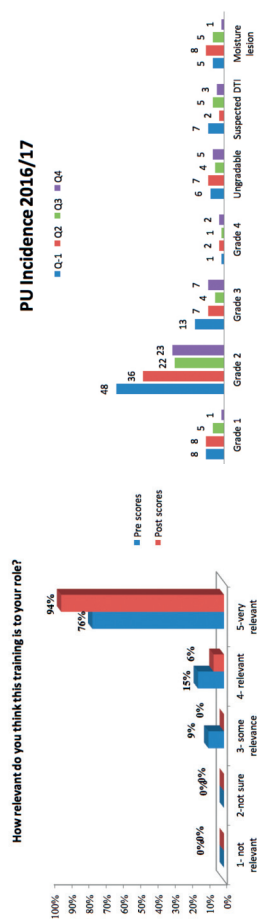
The research highlights the poor inter/intra rater reliability in grading pressure ulcers Defloor & Schoonhoven (2004). AHPs need to be well equipped on how to identify early stage pressure damage and what actions to take to prevent deterioration. At HRCH this is now mandatory in induction training for AHPs. It is encouraged through multi-disciplinary planning that prevention planning is joint between AHPs, nursing, patient and carers. A long term individualised prevention plan is then held by the patient and their carer.

Methods: In HRCH prevention of pressure ulcers was included on induction training in 2016 for AHPs.

A perception audit was collated to assess the feedback from this group pre and post training session.

AHPs are invited to a multidisciplinary pressure ulcer working group to identify emerging themes and set potential solutions to the pressure ulcer project work streams.

Results: Results following induction training perception survey with occupational therapists, physiotherapist, dieticians, social workers, podiatrists. AHPs are now reporting pressure ulcers as first point of contact and are more confidentially able to give immediate advice. See below Reduction figures since training commenced:



Discussions: The results show an increase in the value AHPs felt that the training was relevant to their role. Making this mandatory in induction and equipping our AHPs with knowledge and management of at risk individuals has potentially contributed to the decline in our Grade 2 pressure ulcers.

Clinical relevance: With an increasing aging population with people remaining within their home longer, with increased immobility and long term conditions increasing the risk of this group developing pressure ulcers, we must develop an interdisciplinary approach to prevention planning.

References:

- [1] Defloor, T., Schoonhoven, L. (2004) 'Inter-rater reliability of the EUAP pressure ulcer classification system using photographs', Journal of clinical Nursing, 13, pp. 952-959.

[P26] COMMUNICATION PATHWAY BETWEEN ORGANISATIONS FOR PATIENTS WITH PRESSURE ULCERS

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¹ Hounslow and Richmond Community Healthcare, Teddington Hospital, Middlesex, United Kingdom

Introduction: A large part of a person at risk of developing a pressure ulcer is by maintaining their independence and remaining in their own home, through moving and handling aids and care. In relation to pressure ulcer prevention planning a multi-disciplinary approach is required. Certain patient groups with complex needs may cross over services from their home to hospital to care homes in one demographic area. The increasing current pressures on the NHS health and social services, along with staffing shortages means that communication between organisations may not be as robust as required to facilitate joint hospital/community approach to prevention planning. There lacks a patient centered pathway for those at risk. Hounslow and Richmond healthcare along with North West London Clinical commissioning group are preparing to look at potential solutions to this.

Methods: Designing a proposed standard operating procedure using a PDSA model, a pilot will be launched using a healthcare informatics 'skype' system to cross the hospital-community divide.

It is proposed that for patients admitted/discharged with initially a grade 3/4 pressure ulcer, an online meeting will be coordinated to discuss the patient. Online care plans and photographs may be shared securely with all attendees to view and comment on.

Results: The web conferencing tool has been trailed with success in house for meetings across a large demographic area, allowing participants to take part without leaving the work stations. This has increased participation and has allowed us to extend invites to general practitioners and where appropriate involve the patient and/or the carers without needed to leave their home. We will identify outcome measure in quarter 2 17/18 after a stakeholder discussion.

Discussions: The need for an effective patient pathway has been identified across clinical and directorial networks, the issue with a patient held passport historically is that the patient has not had it with them or has been lost.

Clinical relevance: With an increasing aging population with people remaining within their home longer, with increased immobility and long term conditions increasing the risk of this group developing pressure ulcers, we must develop an interdisciplinary approach to prevention planning.

References:
[1] Omnijoin

[P25] A NURSING TOOL TO PREVENT PRESSURE ULCERS

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Introduction: In 2015, the EHC Hospital, in Switzerland, launched an institutional project for the prevention of pressure ulcers. Until then, the institutional approach had focused on curative rather than preventive aspects. The decision was taken to refocus actions on screening and preventing pressure ulcers. A nursing tool for the prevention of pressure ulcers was developed. The intention was to create a working tool to simplify the decision-making process. A paper document was developed, which would be used during the nursing consultation to centralise all the information related to pressure ulcers prevention.

Methods: The tool, based on the NPUAP (2014) recommendations, was developed by a work group and tested for 9 months in two voluntary surgery wards (50 beds). It was then set up and tested in 4 other services (= 125 beds). Monthly audits were made to evaluate the use of the tool (about 500 charts reviewed in 10 months). The caregivers had to systematically use the tool and were coached by the work group. Then, the work group joined a regional Breakthrough Collaborative. This allowed it to improve the tool and to spread it to 3 new services (200 beds in total).

Results: The mandatory use of the tool allowed to improve the compliance with and the traceability of risk detection. This was measured through the monthly audit: 63% to 95% in 10 months in using the Braden Scale.

Discussions: The first version of the form led to variable quality in prevention strategies. We therefore revised the document and included prescriptive criteria based on the literature.

Clinical relevance: Nurses now have a tool that stimulates reflection. They can choose and customise prevention measures based on the clinical context. This provides documentation of their assessment, whilst enhancing and valuing their role.

References:
[1] National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers: Quick Reference Guide. Emily Haesler (Ed.). Cambridge Media: Perth, Australia: 2014

[P27] POSITIVE OUTCOMES FOR PATIENTS, STAFF AND A SCOTTISH HEALTH BOARD WHEN BEDS ARE PRE-EQUIPPED WITH A PRESSURE RELIEVING SURFACE

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Introduction: Organisations rent pressure relieving surfaces as an integral part in preventing pressure damage. Over the past decade pressure relieving surfaces have become sophisticated, less complicated and individual costs reduced. Non-powered hybrid support surfaces are a more recent technology which is becoming increasingly accepted as an alternative prevention and management option, it could be argued that it would be more beneficial to patients, staff and the organisation if beds were pre-equipped with a pressure relieving surface.

Methods: A 27 bed medical ward was pre-equipped with a non-powered pressure redistributing mattress. Pressure ulcer incidence was recorded pre and during a 12 week trial and verbal feedback from staff and 50 patients

Results: 0% of patients developed pressure damage whilst on mattress

96% of patients and 100% staff rated mattress positively

Mattress rental significantly reduced (previously up to 50% of patients would have been nursed on a powered pressure relieving surface)

Discussions: The trialing of equipping all beds with a pressure relieving mattress has proved beneficial in a very short space of time and the benefits in terms of cost effectiveness will increase as time increases. With time pressure on nurses becoming more evident, this simple approach appears to have huge positive impacts in terms of efficient and effective use of resources and patient safety. Already staff has verbalized that they would not wish to return to the previous rental system.

Clinical relevance: In a very short period of time, the utilization of a high specification mattress on all in-patient beds has proved beneficial for patients, staff and the organization:

- Reduction of pressure damage
- Time saving
- Instant pressure relief – less skin marking
- Patient comfort
- Rental costs drastically reduced
- Reduced moving and handling
- Reduced carbon foot print

References: None

[P28] EFFECTIVENESS OF A TECHNOLOGICAL ANTISEPTIC CREAM IN THE TREATMENT OF SLOUGHY INFECTIOUS PRESSURE ULCERS

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Introduction: The most of debriding dressings are not effective against infections; most of antiseptic dressings cannot be used in case of necrotic wounds. That's why we need to use antibiotic systemic therapy when we must debride a sloughy infected wound. Especially in bedsores it's frequent to have to treat an infectious necrotic wound, but our local therapy has only one target: debridement or antiseptic action. The aim of this study is to demonstrate that there's a dressing that can achieve both targets.

Methods: 10 sloughy infectious pressure ulcers (Cutting & Harding criteria – WBP scores of C) have been enrolled in this study; we treated them with a cream containing silicon dioxide, ionic silver and chlorhexidine (SiO₂-Ag+Chlorex) every 48 hours for 3 weeks. We evaluated the removal of clinical signs of infection and the debridement, until reaching a satisfying granulating tissue (WBP score of B or A).

Results: All wounds improved within the period of observation with complete disappearance of clinical signs of infection and the removal of sloughy tissue, showing a good and viable granulating tissue (7 B and 3 A). The main feature of this dressing is the effectiveness against infection: all clinical signs completely disappeared within the first week of treatment. The complete debridement has been reached in 3 out of 10 cases; the other wounds had a partial debridement (from a WBP score of C to B).

Discussions: This work demonstrated that SiO₂-Ag+Chlorex is effective not only as antimicrobial dressing, but, in a creamy formulation, as a debrider too. Our suggestion is that a hydrogel with SiO₂-Ag+Chlorex could be the new approach of all necrotic infectious wounds.

Clinical relevance: The clinical relevance of this study is that this new technological silver dressing can be used with very good results in patients with sloughy infectious pressure sores avoiding a systemic antibiotic therapy, often badly tolerated, especially by elderly people.

References:

[1] R.Cassino et. al. Molecular technology for antiseptis and tissue repair. EWMA (European Wound Management Association) 24th European Conference on Advances in Wound Management, 2014. Madrid (Spain)

[P30] THE ROLE OF IONIC SILVER IN THE HEALING OF DEEP NARROW BEDSORES

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Introduction: The main problem in the management of deep narrow wounds is the growing of granulating tissue from the bottom of the lesion; very often we have a lot of exudate inside the lesion, very difficult to drain outside, that doesn't allow the growing of granulating tissue. Usually we use a dry antiseptic gauze in a rope shape to drain the exudate but the growing of new viable tissue and the healing are very slow and difficult. The aim of this study is to demonstrate that a new technological ionic silver can help to achieve this target.

Methods: The study is still on going. We enrolled 15 non healing medium/heavy exuding deep narrow pressure ulcers on stand by for at least 6 weeks, dressed with an antiseptic dry gauze; we are treating them with a spray powder containing silicon dioxide, ionic silver and chlorhexidine (SiO₂-Ag+Chlorex) before filling the cavity/fistula with dry antiseptic gauze. Dressing change every 48 hours. We are evaluating the filling/healing time.

Results: All wounds improved within the first two weeks of treatment. At the moment 7 lesions have been completely healed: 3 within 4 weeks and 4 within 8 weeks; the other 8 wounds, still in treatment, are improving; there's a significant reduction of depth (about 40% within the first two weeks) and the exudate is better controlled. No new signs of infection, or malodour, or pain.

Discussions: This work demonstrated that SiO₂-Ag+Chlorex spray powder is very effective to promote the growing of granulating tissue in this kind of wounds; it's also a good system to prevent bacterial colonization. Maybe this result is due to the effectiveness against bacterial strain that can damage viable tissues.

Clinical relevance: The clinical relevance of this study is that this new technological ionic silver dressing can be effective not only against infections, but also to promote granulation and healing, especially in these particular bedsores in which bacterial growing can stop the healing process.

References:

- [1] R. Cassino et al. Molecular technology for antiseptis and tissue repair. EWMA (European Wound Management Association) 24th European Conference on Advances in Wound Management, 2014. Madrid (Spain)

[P29] A COMPARISON BETWEEN TWO DIFFERENT SILVER SPRAY POWDERS IN THE MANAGEMENT OF INFECTIOUS BEDSORES

Roberto Cassino¹

- 1 "Città Studi" Clinical Institute, Milan, Italy

Introduction: According with the Wounds International Consensus of 2012, in case of infectious wound, it's recommended to use a silver antimicrobial dressing, avoiding SilverSulfaDiazine and preferring new medications containing ionic silver. The aim of this work is to demonstrate that new SCX technology (SiO₂-Ag+Chlorex) is more effective than SSD (SilverSulfaDiazine) in the management of infectious wounds.

Methods: 10 infectious pressure ulcers (Cutting & Harding criteria) have been enrolled in this study; we first treated them with a spray powder of SSD, every 48 hours for 14 days; if still infectious after this period, we should have to change the treatment, using a spray powder containing silicon dioxide, ionic silver and chlorhexidine (SiO₂-Ag+Chlorex) every 48 hours for 14 days. We evaluated the number of clinical signs of infection and the disappearance or not of the wound edge erythema.

Results: All wounds treated with SSD were still infectious after the treatment period; the signs of infection increased and the wound edge erythema didn't disappear. So we treated all wounds with SCX and they all improved within the period of observation with complete disappearance of clinical signs of infection and of the wound edge erythema.

Discussions: This work demonstrated that SiO₂-Ag+Chlorex is really more effective than SSD, especially in terms of long lasting antimicrobial action.

Clinical relevance: The clinical relevance of this study is that this new technology can improve the quality of life of patients with pressure sores; usually they have no pain, if the wound is clean, but when infected, the involvement of soft tissues surrounding the wound causes much pain and, very often, they need hospitalization.

References:

- [1] International Consensus. Appropriate use of silver dressings in wounds. Wounds International, 2012
- [2] R. Cassino et al. Molecular technology for antiseptis and tissue repair. EWMA (European Wound Management Association) 24th European Conference on Advances in Wound Management, 2014. Madrid (Spain)

[P32] THE 'MITCHELL FOOTSTOOL', AN INNOVATIVE DESIGN TO REDUCE HEEL PRESSURES

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- 2 Liberton Hospital, NHS Lothian, Edinburgh, United Kingdom
- 3 NHS Lothian, St John's Hospital, Livingston, United Kingdom

Introduction: The second most common pressure ulcer is to the heel (Whittington, Briones 2004). Complications of ulceration include slower rehabilitation, cellulitis and osteomyelitis (Dealey et al, 2012). Footstools are used widely with little understanding of the forces they exert on patient's heels or pressure redistribution. The 'Mitchell Pressure Reducing Footstool' was developed by a Tissue Viability Nurse Specialist in NHS Lothian in partnership with industry and supported by Academia. It aimed to tackle the challenge of pressure redistribution for heels and related healthcare costs.

Features include:

- Pressure reducing foam
- Angled heel-down position
- Two-way stretch waterproof cover
- Enclosed zip
- Self-adjusting for height



Image 1

A study was planned to compare the Mitchell footstool with the standard non-adjustable footstool.

Methods: Pressure mapping on standard and Mitchell footstool with eleven healthy individuals. Patient and staff experience questionnaires comparing footstools.

Results: Pressure mapping identified lower average pressures in comparison to standard footstool. Key measure of interest is the mean decrease in pressure of 145.0 mmHg.

Early results of questionnaires show:

- Staff experience - good to excellent
- Patient experience - positive feedback on comfort and use.

Discussions: A grant was obtained from Edinburgh and Lothian Health Foundation with the aim to complete a randomised comparative study of the Mitchell stool with a standard foot stool. Input from Bioengineers, researchers and statisticians led to a full study design. Pressure Mapping and data analysis of initial results identified the sample size for this study was unmanageable. This led to a change to collect patient/staff experience in practice.

Clinical relevance: Difference in pressure of 145.0 mmHg would suggest that the Mitchell Footstool has the potential to create less pressure on the heel than current practice. The team will review suggested modifications for adjustable height and bariatric version. Future study designs should consider workable solutions.

References:

- [1] Dealey, C; Posnett J; Walker, A. (2012). The cost of pressure ulcers in the United Kingdom. *Journal of Wound Care*. 21 (6), p264-266.
- [2] Whittington KT, Briones R (2004) National prevalence and incidence study: 6-year sequential acute care data. *Adv Skin Wound Care* 17(9):490-4

[P31] EVALUATE THE EFFECT OF ACIDIC ELECTROLYZED OXIDIZING WATER USED IN INCONTINENCE-ASSOCIATED DERMATITIS PATIENTS

Jing Chu'

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Introduction: Evaluate the effect of acidic electrolyzed oxidizing water used in incontinence-associated dermatitis patients

Methods: Improve the traditional care methods of incontinence-associated dermatitis, apply the acidic electrolyzed oxidizing water to the patient after cleaning the skin and assessment and compare before and after improvement method.

Results: Patients in the experimental group had significantly lower incontinence-associated dermatitis incidence than the subjects in the control group (X² =8.362 P=0.039) and the occurred time were extended from 1-4d to 5-13d.

Discussions: The acidic electrolyzed oxidizing water can effectively reduce the incidence of incontinence-associated dermatitis and extend the occurred time for prevention and treatment.

Clinical relevance: The prevalence rate of incontinent dermatitis in hospital patients with fecal incontinence was 20%, and the prevalence rate can be as high as 50% in ICU.

References:

- [1] Gray M, Bliss DZ, Ermer Sulten J, et al. Incontinence associated dermatitis: A consensus [J]. *J Wound Ostomy Continence Nurs*, 2007, 34(1):45-54.
- [2] Driver D S. Perineal Dermatitis in Critical Care Patients [J]. *Crit Care Nurs*, 2007, 27(4):42-46.
- [3] Bliss D Z, Savik K, Thorson MAL, et al. Incontinence-Associated Dermatitis in Critically Ill Adults: Time to Development, Severity, And Risk Factors [J]. *J Wound Ostomy Continence Nurs*, 2011, 38(4):433-445.
- [4] Junkin J, Selekof J L. Prevalence of Incontinence and Associated Skin Injury in the Acute Care Inpatient [J]. *J Wound Ostomy Continence Nurs*, 2007, 34(3):260-269.
- [5] Zhao Y, Liao LX, Chen GQ, et al. Clinical application of electrolyzed oxidized water in treatment of superficial II burn wounds [J]. *Academic Journal of Second Military Medical University*, 2005, 26(11): 1319-1320.
- [6] Cao JG, He XF, Cui X, et al. The application of acidic electrolyzed oxidizing water in the MRSA infection control [J]. *Chinese Nursing Management*, 2009, 9(4): 9-11.
- [7] Beeckman D, Verhaeghe S, Defloor T, et al. A 3-in-1 perineal care washcloth impregnated with dimethicone 3% versus water and pH neutral soap to prevent and treat incontinence-associated dermatitis: a randomized, controlled clinical trial [J]. *J Wound Ostomy Continence Nurs*, 2011, 38 (6) : 627-634.
- [8] Wang HQ, Chen HF. The crissum skin care of fecal incontinence in critically ill patients [J]. *Today Nurse*, 2010(1): 85-86.

[P33] THE SKIN IQ MICROCLIMATE MANAGER DOES NOT ALTER IMMERSION IN 9 THERAPEUTIC SURFACES: THE RESULTS OF AN INDEPENDENT LABORATORY RESNA SS-1 PILOT STUDY

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Introduction: Hospitalized patients are at high risk for the development of pressure injury (PI), which results in substantial morbidity and consequent care. Key risk factors such as pressure, heat, and moisture, have led to the advancement of therapeutic support surfaces. Often, therapeutic support surfaces are used in conjunction with a microclimate coverlet to mitigate PI. However, there is concern that a coverlet might interfere with the characteristics of the underlying therapeutic surface potentially resulting in hammocking and focused contact pressure.

Methods: An independent materials testing laboratory (Element; St. Paul, MN), was commissioned to perform a multi-point, pre/post immersion study following the RESNA / NPUAP / Support Surface Standards Initiative (SS1) issued SS-1 standard, to determine if the underlying therapeutic surface would be substantially altered in terms of immersion. Multiple point immersion tests were measured for 9 different pressure redistribution surfaces using SS-1 standards, before and after the addition of the Skin IQ[®] Microclimate Manager. Immersion levels were measured on the therapeutic surface without and with the addition of the Skin IQ[®] Microclimate Manager. Measurements were reported as differences in depth in inches.

Results: In this pilot validation study; there was no substantial alteration of the underlying surface function in terms of immersion with the addition of the Skin IQ[®] Microclimate Manager. Minimum difference 0.04 inches (0.10 cm) Atmos Air; mean difference all surfaces 0.26 inches (0.57 cm); maximum difference 0.30 inches (0.76 cm) Integrated Patient Care System I.

Discussions: The Skin IQ[®] Microclimate Manager can be used with a variety of therapeutic surfaces without negatively affecting immersion while providing an augmented microclimate feature. To our knowledge, this is the first study of its kind whereby a manufacturer has publicly reported independent laboratory testing and validation using the SS-1 standard.

Clinical relevance: Creating a favorable skin microclimate in conjunction with therapeutic surface theoretically should create a synergistic condition that mitigates or eliminates the potential for skin injury. However, the coverlet must not appreciable interfere with the underlying surface to realize optimal benefit.

References:

- [1] CitadelTM

[P34] WHEELCHAIR FOOT PLATES ARE SURFACES THAT NEED ASSESSMENT TO MINIMIZE DEVELOPMENT OF PRESSURE DAMAGE

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Introduction: Wheelchairs provide mobility and independence to people with spinal injuries and other chronic conditions. However if properly assessed or reassessed in a timely manner problems can occur resulting in pressure damage to at risk areas e.g. sacral/ ischial tuberosity's and plantar surfaces of feet. Wheelchairs are not equipped with an inherent mechanism of redistributing pressure on foot plate and thus is a under addressed factor in development of pressure damage.

Methods: This case study highlights the problems encountered by a person who was wheelchair bound due to deteriorating health and thus used a standard wheelchair.

Results: Patient required intensive podiatry input to aid reduction in pressure under hyperkeratotic callous, wound care due to lack of adaptive absorbent material on the foot plates, adaptations to wheelchair leg rest with addition of a thick silicone Kerrapro[™] layer.

Discussions: Wheelchairs are often borrowed whilst awaiting provision from a specialist occupational therapy or re-enablement services.

Footplate surfaces should be assessed to minimize or reduce plantar pressures.

Reduced sensation and mobility needs to be highlighted as trigger factors of potential pressure breakdown and access to specialized services is essential to minimize this problem.

Clinical relevance: The demographic changes occurring within Northern Ireland alone indicates rise in elderly population which can compound the emergence or progression of chronic conditions of old age and potential use of a wheelchair as a mobility aid. Standard wheelchairs on the whole do not have any pressure distribution or absorbent materials on the foot plates and this requires further attention from manufacturing and specialized services in order to minimize long term risk of pressure damage in those with sensory impairment, diabetes, chronic oedema with leg dependency and would be a welcome development for Tissue Viability Professionals.

References:

- [1] Kerrapro: www.crawfordhealthcare.com/woundcare/kerrapro

[P35] PRESSURE ULCERS TO ZERO COLLABORATIVE IN THE REPUBLIC OF IRELAND: PHASE 3

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Introduction: The HSE QID in the Republic of Ireland is leading and is responsible for the design and delivery of Phase 3 of the Pressure Ulcers to Zero (PUTZ) collaborative (PUTZ 3). Phase 3 focuses on the acute sector only and is being delivered in the South, South West (and Dublin Mid Leinster hospital groups with a total of 15 hospitals, 23 teams).

PUTZ3 aim is to reduce the number of ward acquired pressure ulcers across participating teams by 50% within six months and to be sustained by 12 months (28th February 2018)

Methods: The PUTZ collaborative is based on the IHI (2003) Breakthrough Series Collaborative Model. PUTZ3 runs for 12 months with four learning sessions and three action periods. Unlimited access to PUTZ3 facilitators is offered throughout the collaborative and includes site visits. Site coordinators were offered an opportunity to participate on a coaching conversations course before the first learning session and a sustainability Masterclass in January 2018 before the collaborative concludes.

The SSKIN bundle is a specific five step process that when performed can collectively and reliably improve pressure ulcer prevention. The Model for Improvement is used to structure improvement efforts and to guide implementation of the SSKIN bundle. Three thinking questions support teams to develop specific measurable aims, measures for improvement and to identify key changes that will result in improvement. This is followed by the doing component which involves iterative testing of changes called Plan, Do, Study, Act (PDSA) cycles.

Results: All teams return a monthly safety cross which records and displays the number of ward acquired pressure ulcers for each of the 12 months of the collaborative. The March 2017 baseline of newly acquired pressure ulcers for PUTZ3 n =38.

Clinical relevance:

- Patients and Families
- avoid unnecessary pain for patients, unnecessary admissions to hospital and prolonged lengths of stay
- release valuable resources for other aspects of patient care
- gaining practical and simple Quality Improvement skills and experience

Hospital

- reduce costs of managing pressure ulcers

References:

- [1] IHI (2003) Breakthrough Collaborative Series. Available at: <http://www.ihio.org/resources/Pages/IHWWhitePapers/TheBreakthroughSeriesIHIsCollaborativeModelforAchievingBreakthroughImprovement.aspx>

[P36] 'SAFER TOGETHER': COLLABORATIVE WORKING IN PRESSURE ULCER PREVENTION

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Introduction: Barking, Havering & Redbridge University Hospitals is an Acute Trust and the North East London Foundation Trust is a Community Trust. Both Trusts serve a demographically diverse population of approximately 747,900 people from a range of social and ethnic groups.

There is a relationship between pressure ulcer development, Dementia and nutrition (Alzheimers Disease International, 2014) additionally falls also put people at risk of developing pressure damage. The Trusts are working together to raise awareness of this problem.

Methods: A conference aimed to reach community carers was organised.

Presentations from speakers, topics included: Pressure ulcer prevention and management; Falls awareness; Frailty and Dementia awareness; Nutrition; Interaction via SLIDO.COM where delegates could ask questions anonymously and in a safe environment.

Breakout sessions for each of the 4 areas covered included: Role play; Games; Quizes; Experiential learning

Results: Using SLIDO delegates were asked to give words that showed their learning, these included: Patient centered; Holistic; Pressure; Falls; Importance; Awareness; Impact; Communication; Dementia; Nutrition

Feedback generated from the delegates suggests the aim of the conference was met.

Discussions: The conference was our starting point and has helped identify where to focus our interventions going forward. Following on from the conference it is envisaged that patient/carers forums will be set up regarding pressure ulcer prevention and management within the acute and community settings, leading to adopting a national campaign called 'React to Red' (React to Red 2014), with the aim to educate patients and carers on pressure ulcer prevention and management.

Clinical relevance: Reducing pressure damage means: Patients/clients are keep free from this harm; Less resources required; Decrease in the cost to the NHS (said to be £1.4 – £2.1 billion (4% of the NHS expenditure).

References:

- [1] Nutrition and dementia, Alzheimer's Disease International (ADI), London. February 2014, Reprinted October 2014
- [2] React to Red, 2014, www.reacttoreddskin.co.uk
- [3] Bennett, G , et al 2004, The cost of pressure ulcers in the UK, Age and Ageing 2004; 33: 230–235

[P38] COMPLIANCE WITH NATIONAL GUIDELINES ON PRESSURE ULCER PREVENTION/MANAGEMENT IN A COMMUNITY HOSPITAL IN IRELAND

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Introduction: A clinical audit was undertaken in one community hospital (100 beds) in the North West of Ireland where pressure ulcers were reported between January and December 2015. The objectives of the audit were to establish compliance with National Guidelines for Wound Management (HSE, 2009) pertaining to pressure ulcer prevention/management.

Methods: Audit management team: A Tissue Viability Audit Group was established to oversee the audit. Auditors: Nursing and/or clinical audit staff with experience and/or knowledge of wound management.

Audit Tool: Based on criteria set out in the HSE National Evidence Base Guidelines for Wound Management (2009)

Pre audit preparation and education: Auditors briefed on audit tools, processes, reports and best practise guidelines.

Evidence during audits was gathered by: Reviewing documentation on site and meeting with relevant personnel.

Areas audited: One community hospital.

Results: Frequency of pressure ulcers: Grade 1 - 14.3%; Grade 2 - 28.6%; Grade 3 - 21.4%; Grade 4 - 0%; Unstageable - 21.4%; Suspected Deep tissue injury - 14.3%

TVN Referrals: Compliance 78.6%; non-compliance 21.4%

Compliance against policy standards which included Risk / Skin Assessment, Repositioning, Redistribution surfaces provision and staff training ranged from 42.9% to 100% with an overall compliance of 81.1%

Discussions: While there was an overall 81.1% compliance with PU prevention and management in line with national guidelines within the hospital, there was however some gaps identified. Most notably was the absence of a local wound management policy. A local wound policy would support consistency of treatment and contribute to improved patient outcomes. Pain assessment secondary to pressure damage was not always (42.9% compliant) carried out. There was 83.3% compliance with elevating the patient's heels off the mattress. However considering that the heels are the second most common anatomical location for pressure ulcers, this area of practice warrants attention to ensure 100% compliance

Clinical relevance: The clinical audit established compliance with the National Guidelines for Wound Management pertaining to pressure ulcer prevention/management and areas for improvement were identified

References: National best practice and evidence based guidelines for wound management HSE, 2009.

[P37] HEEL PRESSURE ULCERATION IN DIABETICS WITH UNILATERAL AMPUTATIONS: THE FATE OF THE REMAINING LIMB

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Introduction: It is estimated that by 2030, more than 4.6 million people in the UK will have diabetes (1). Diabetes is the leading cause of limb loss in the UK (1). When diabetic patients lose a limb, the risk of pressure ulceration in the remaining extremity is increased due to a combination of factors including relative immobility and pre-existing neuropathy and peripheral arterial disease. Here we report a series of six diabetic patients post below-knee amputation (BKA) who developed ulceration in the remaining limb.

Methods: Data on consecutive diabetic patients who developed pressure ulceration were gathered retrospectively.

Results: Data were gathered for six patients. All patients were male and the mean age was 74.3 years. Sensation and sharp and vibration perception were decreased in all patients. Ankle-brachial pressure indices (ABIs) were recorded for four patients with two below 0.8 and two above 1.2.

Tissue loss ranged from superficial to extensive with associated secondary infection. 86% of our patients developed heel ulcers. Duration of time from amputation to tissue loss in the remaining limb ranged from 4 weeks to 30 years.

Discussions: It has long been recognised that the fate of the second leg in diabetics is related to that of the first (2). Patients with diabetes already have 1.5-4.0-fold increased risk of amputation compared to the normal population (1), and the reduction in mobility that occurs post major lower limb amputation may compound this risk. However, biomechanical effects on plantar loading post amputation also increase the risk of tissue loss (3). Therefore careful foot care and patient education should be continued indefinitely.

Clinical relevance: Any unilateral amputee with diabetes is at risk for pressure ulceration in the remaining limb and close observation of the unilateral amputee within the context of a multi-disciplinary team is advisable

References:

- [1] Diabetes in the UK 2010. Available at https://www.diabetes.org.uk/documents/reports/diabetes_in_the_uk_2010.pdf
- [2] Goldner MG. The fate of the second leg in the diabetic amputee. *Diabetes* 1960;9:100-3
- [3] Kanade RV, van Deursen RW, Price P, Harding K. Risk of plantar ulceration in diabetic patients with single-leg amputation. *Clin Biomech* 2006;21(3):306-13

[P39] AN EXPLORATION OF VALUES AND BELIEFS REGARDING PRESSURE ULCER PREVENTION

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Introduction: Values and attitudes impact the delivery of care by influencing intentions (Ajzen, 2005) and affecting nurses' predisposition to implement research findings (Squires et al., 2011). A better understanding of values and beliefs regarding pressure ulcer prevention is required. The aim of this study was to explore values attributed and the barriers and enablers which impact on the provision of preventative care.

Methods: Semi-structured interviews were conducted with managers (n=16) and focus groups (n=5) were held with clinicians. Thematic analysis was used.

Results: Five themes emerged from the data. The 'context' surrounding pressure ulcer prevention involved key drivers and targets. 'Accountability' highlighted prevention as a fundamental aspect of bedside care and 'being held to account'. The 'feedback loop' related to the requirement to report pressure damage and the importance of receiving feedback. 'Teamwork' focused on staffing, leadership and cohesive multi-disciplinary team working. Appropriate knowledge was required to deliver and document care and formed the theme of 'education and documentation'.

Discussions: There was a divergence of opinion regarding the importance of the 'context' with ward-based clinicians viewing the strategic drivers and the 'feedback loop' in a less positive light than managers. Accountability was also viewed from a different perspective with clinical staff describing a personal feeling of guilt when pressure damage occurred. There was no clear sense of 'being held to account' from within the managerial hierarchy. Both 'teamwork' and 'education/ documentation' were topics which generated a breadth of discussion and were clearly viewed as important areas for consideration.

Clinical relevance: The findings highlight the complexities and the many and varied factors which can impact on pressure ulcer preventative care. It is important that a shared goal of pressure ulcer prevention is adopted.

References:

- [1] Ajzen, I. (2005) Attitudes, personality and behaviours. Open University Press, Berkshire. Squires et al., (2011) Individual determinants of research utilization by nurses: a systematic review update. Implementation Science, 6:1.

[P40] BILATERAL HEEL PRESSURE ULCERATION: THE SEQUEL OF FOREFOOT SURGERY IN A PATIENT WITH PERIPHERAL VASCULAR DISEASE

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Introduction: Post-operative care of amputation patients requires multidisciplinary input. Following foot or ankle amputation, 35% of patients progress to a higher level amputation within one year¹. The risk of pressure ulceration in patients with distal leg amputations secondary to peripheral vascular disease is high¹. Specialist input should be sought throughout the entire post-operative process.

Methods: An 85 year old patient underwent a trans-metatarsal amputation of the left foot in February 2017. The patient was non weight bearing for 6 weeks post procedure. Patient had a background of peripheral vascular disease and type 1 diabetes mellitus. Patient was admitted to a care of the elderly ward with reduced oral intake and electrolyte abnormalities. Podiatry input was sought throughout due to wound dehiscence and bilateral heel ulceration.

Results: On clinical examination, foot pulses were not palpable bilaterally. It was possible to detect signals by doppler for both dorsalis pedis arteries. The left signal was monophasic and difficult to detect. The left heel was complicated by pressure damage measuring 35 x 30mm deep to the level of bone without pus formation, odour or spreading redness. The right heel was complicated by necrosis of the posterior lateral aspect that measured 25 x 20 mm.

Discussions: For the older patient, forefoot surgery may influence mobility in the presence of peripheral vascular disease. Immobility is associated with an increased risk of pressure ulceration. The risk of heel osteomyelitis of the calcaneus is also increased in such tissue damage and may prove difficult to treat. Heel skin damage if complicated by infection increases the risk of sepsis and mortality

Clinical relevance: Peripheral vascular disease may increase the likelihood of skin breakdown and in such circumstances, it is foreseeable that tissue repair may be impaired. When forefoot necrosis develops, such surgery is often unavoidable. The need to recognise at risk patients is crucial and specialist input should be sought.

References:

- [1] Pollard J, Hamilton GA, Rush SM, Ford LA. Mortality and morbidity after transmetatarsal amputation: retrospective review of 101 cases. 2006. Journal of foot and ankle surgery, pp.91.

**[P42] STANDARDISING DOCUMENTATION PRESSURE
ULCER RISK IN NEONATES**

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Introduction: No validated research exists for neonatal risk assessment and neonatal population. Having introduced Glamorgan risk assessment scale (Willcock et al, 2009) 6 years ago into paediatric areas, I have adapted this work for neonates- improving standards of documentation in neonatal care Trustwide.

Methods: My aim of improving neonatal pressure ulcer (PU) risk assessment practice using quality improvement methodology, an audit of current documentation within the Neonatal unit and assessment of nurses' knowledge of pressure ulceration occurred. Following training, on risk assessment, ulceration and documentation, a pilot of the Glamorgan scale and a care plan was introduced. 3 PDSA cycles followed, to adapt wording, and re-educate some nurses who were not confident in its use, and to prevent duplication of care documented elsewhere. The finished booklet was agreed fully implemented in practice.

Results: Post education knowledge of nurses increased

- Successful implementation of the Tool, skin checks and care documented as best practice.
- Links with the neonatal unit provides ongoing updates and support

Discussions: Glamorgan Scale has been successfully used by the neonatal nurses within the NICU/SCBU with recognition of its use as an aide-memoire for PU risk. The tool appears successful in highlighting mobility and equipment as the biggest causes of pressure ulcer development in this age group, and the users are aware that improved documentation, makes practice safer and more effective, evidencing their intense care

Clinical relevance: NICE (2012) stated all neonatal and paediatric patients should have a validated risk tool in place. The lack of specified PU risk assessment tool in neonatal care has left a void in current practice. However the Glamorgan scales' use as an aide-memoire to prompt nurses, improves continuity and safety of the neonate.

References:

- [1] National Institute of Clinical Excellence (2014) Clinical Guidance on Pressure ulcers; prevention and management. CG 179. guidance.nice.org.uk/cg179
- [2] Willcock, J., Baharestani, M., M., Anthony, D., (2009) 'The development of the Glamorgan paediatric pressure ulcer risk assessment scale' *Journal of Wound Care*, 18 (1), pp. 17-21

**[P41] DEVELOPING STANDARDISATION IN THE
EVALUATION OF SUPPORT SURFACES**

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Introduction: Pressure ulcer is one of the many skin injuries which not just only significantly affects the quality of life of the patients but also act as a financial burden to the healthcare providers. More than £3.8 million is spent daily for treating pressure ulcers from the NHS. The yearly treatment cost in the UK raised from £2.1 to £5.3 billion. Many devices are consequently developed to help preventing pressure ulcer formations and also easing the pain for the patients. These devices typically support surfaces such as mattresses, however, are non-standardised and hard for the healthcare providers to decide the most adequate intervention for each patient. This problem is twofold and is addressed scientifically and clinical relevantly in this study.

The initial need in standardisation is the terminologies of the support surface including "pressure relief", "pressure re-distribution", "dynamic mattress", and also "static mattress". These terminologies are especially important when it comes to a decision making process for clinicians. Types of the mattress or support surface for the patients may not be prioritised hence standardised and clearly defined terminologies are needed for each type of support surface. Healthcare providers, therefore, can decide the most adequate support surfaces quickly without referring to the mechanisms of the support surfaces. Also, the products with the same functions can easily be brought together and compared.

In many manufacturing industries, there are standards by which products are tested to ensure consistency when evidence is presented. The effectiveness of the pressure relief support surface should also be quantified by a standardised process. Pressure mapping is one of the reliable engineering procedures for acquiring the pressure between two surfaces which can also be adopted to quantify the effectiveness of the pressure relief support surfaces. It is challenging to standardise the pressure mapping of every type of support surface especially for the dynamic support surfaces. The anatomical location for the pressure mapping is also a crucial factor. In this study, these two aspects regarding to the effectiveness qualification is analysed and clinical relevant samples are provided anonymously.

[P43] MEDICAL DEVICE RELATED PRESSURE ULCER IN ACUTE CARE HOSPITAL IN SOUTH KOREA

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Introduction: The use of medical devices is associated with developing pressure ulcer in various patients population.

Methods: The purpose of this study was to quantify the types of medical device related pressure ulcer (MDRPU) and its risk factors by results from secondary analysis of data which was based on pressure ulcer reporting system in 2 acute care hospitals in Korea.

Results: The overall rate of hospital acquired pressure ulcer was 0.11%, the proportion of patients with hospital-acquired ulcers related to medical device was 1.97% (37/1,874). Most of MDRPU stage was stage I (27%), and suspected deep tissue injury (27%), and stage II (46.9%). The most common location for MDRPU was thigh (21.6%), wrist (13.5%), head (10.8%), and heel (10.8%). The most common Medical devices causing pressure ulcer were treatment aid tools (26%), antiembolic stocking (23%), angiocatheter (20%), and oxygenations (14%), monitoring devices (11%). intensive care unit patients had a higher rate of MDRPU compared with other departments. But MDRPU has been underreported, especially pediatric population.

Discussions: It is necessary to perform more frequent skin assessment for patients using medical devices, and collaborate with other health care provider to prevent MDRPU in various clinical setting involving pediatric population.

Clinical relevance: The management of MDRPU has a significant impact on the health status of patients, but the incidence rate was underreported. Further research regarding identifying risk factors and preventive method is needed to improve clinical outcomes.

References:

- [1] Black, J. M., Cuddigan, J. E., Walko, M. A., Didier, L. A., Lander, M. J., & Kelpel, M. R. (2010). Medical device related pressure ulcers in hospitalized patients. *International wound journal*, 7(5), 358-365.
- [2] Murray, J. S., Noonan, C., Quigley, S., & Curley, M. A. (2013). Medical device-related hospital-acquired pressure ulcers in children: an integrative review. *Journal of pediatric nursing*, 28(6), 585-595.

[P44] COMPARATIVE ANALYSIS OF PRESSURE INJURY FREE SURVIVAL OUTCOMES FOR PATIENTS WITH FECAL INCONTINENCE IN ICU: EFFECTS OF A PROTOCOL FOR MANAGEMENT INCONTINENCE-ASSOCIATED DERMATITIS

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Introduction: Prevention of incontinence associated dermatitis (IAD) is important to prevent pressure injury. This study was conducted to evaluate impact on development of pressure injury through the effects of a Management of IAD.

Methods: This quasi-experimental study was designed for a non-equivalent control group study with convenience sample from February, 12th to May, 14th, 2015. 20 Participants in the experimental group were treated with the use of a skin cleanser with 3% dimethicone cream and 23 participants in the control group received only skin cleanser. Score of perineal assessment tool (PAT), and level of edema were evaluated 3 times. The Kaplan-Meier method was used for analysis.

Results: There was no significant difference on developing pressure injury ((experimental: 0(0%) vs control: 4(20%)) and IAD ((experimental: 0(0%) vs control: 4(20%)). The time to develop pressure injury and IAD for control group (median time to pressure injury 6 days, IAD 1day) was faster than the experimental group (median time to pressure injury 16days, IAD 18days). The experimental group demonstrated significant better results in the %PIFS (percent pressure injury free survival) and %ADFS (percent IAD free survival) compared with control group (p = .041, and, p =.041).

Discussions: These findings provide indicative evidence for the use of skin cleanser and 3% dimethicone cream as an effective care of IAD. Further research is needed to evaluate how to affect moisture cause IAD and pressure injury by measuring the level of tissue hydration and subepidermal moisture.

Clinical relevance: The preventive management of IAD has a significant impact on development of pressure injury, but pressure injury free survival outcomes for patient with fecal incontinence has not been founded clearly. Research of the relationship between IAD and development of pressure injury is needed with large sample.

References:

- [1] Beeckman, D., Schoonhoven, L., Verhaeghe, S., Heyneman, A., & Defloor, T. (2009). Prevention and treatment of incontinence-associated dermatitis: literature review. *Journal of advanced nursing*, 65(6), 1141-1154.

[P46] ADULT COMMUNITY SKIN BUNDLES

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Introduction: An analysis and subsequent shared learning from the development of pressure ulcers with patients on District Nursing Caseloads in the Belfast Health & Social Care Trust (BHSCT)highlighted the following trends:

- Lack of consistency and standardisation of skin assessments.
- Gaps in the records of pressure point checks and care planning.
- Gaps in communication related to adult patients "at risk "of pressure damage.

Methods: An analysis of the existing documentation used indicated the following:

- The existing Skin Bundle used in the acute hospital setting of BHSCT was not transferable to the community setting.
- No BHSCT community skin bundle was available.
- No Regional community skin bundle was available in Northern Ireland.
- The aim of this project was to produce a bespoke community skin bundle which would be beneficial to staff and patients to help reduce the occurrence of "avoidable" pressure damage to patients on a district nursing caseload.

Results: A community skin care bundle and skin record chart was developed and piloted for two months within 13 district nursing caseloads. In response to feedback from the pilot sites the documentation was amended and rolled out across all 52 caseloads

Number of "avoidable" pressure ulcers prior to introduction of community skin bundle.

- 2014: 32
- 2015: 28

Number of pressure ulcers after introduction of community skin bundles.

- 2016: 14

Discussions: Following the introduction of the community skin bundles there has been a 56% reduction in pressure damage for patients on the district nursing caseloads.

Clinical relevance: The community skin care bundle provides a standardised framework for early detection of risks and actions required to prevent further/initial pressure damage-in order to reduce the occurrence of "avoidable" pressure damage. It provides a mechanism of communication of findings and actions within a multi-disciplinary care planning approach in terms of pressure ulcer prevention and management. It could provide a basis for regional acceptance and also transfer to independent sector

References:

- [1] BHSCT Policy- Pressure Ulcer Prevention and Management in Adults and Children

[P45] EFFECTIVENESS OF USING A NEW POLYURETANE FOAM MULTILAYER DRESSING IN THE SACRAL AREA TO PREVENT THE ONSET OF PRESSURE SORES IN THE ELDERLY WITH HIP FRACTURES: RANDOMIZED CONTROLLED TRIAL

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Introduction: Hip fractures in the elderly are a serious problem for the health service due to the high rate of mortality and complications that they produce. One of these complications is pressure sores (PS) that, according to the literature, occur in 8.8% to 55% of patients and mainly arise in the sacral area.

Methods: From March to December 2016, 359 fragility hip fracture patients aged ≥ 65 were randomly divided into two groups: 182 in the control group (standard care) and 177 in the experimental group. In the experimental group the Allevyn life dressing was applied to the sacrum within 24 hours of admission to hospital and kept in place for 8 days.

Results: PS occurred overall in 36 patients (10%): 8 patients (4.5%) in the experimental group compared to 28 (15.4%) in the control group; P=0.001. RRR 71% with NNT of 9 (6-21). In the experimental group the lesions occurred on the 6th day compared to the 4th day of the control group. PS> grade I were also significantly reduced in the experimental group (2.3% vs 8.2%). The mean number of dressings used in the experimental group to cover the 8 days was 1.8 per patient. The dressing produced a mild skin rash in two patients of the experimental group.

Discussions: Using polyurethane foam is effective at reducing the rate of PS in the sacrum in elderly patients with hip fracture. The excellent adhesiveness of this device also enables costs to be kept down.

References: None

[P47] 'TOP TO TOE' SKIN INSPECTION EDUCATIONAL VIDEO

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Introduction: NHS Fife recognises pressure damage as a key harm to patients and a strategic priority to reduce patient harm. The Tissue Viability team submitted a successful bid for an Effective Practitioner project through NHS Education Scotland (NES). The project was to produce an educational video to educate healthcare workers on how to conduct a "top to toe" skin inspection, considered a vital component of pressure ulcer prevention and management.

Methods: As a team we have used our planning skills and also problem solving and creativity to produce an educational video. The learning and reflection from producing this video was recorded in our e-portfolio, utilising tools from Effective Practitioner resources. All aspects of the project involved collaborative working with NES, Clinical photography and Finance department. The focus is on early prevention and detection of pressure ulcers.

Results: We recruited a model to star as the patient and a special effects make-up artist. Different grades of pressure damage were demonstrated on the patient using the special effects make up. The video was filmed in a 'mock' ward area and starred two members of the Tissue Viability team as the nurses. The video includes sound bites from patients and carers around their experiences with pressure ulcers and depictions of pressure damage caused by medical devices.

Discussions: It was decided to launch the video and promote it within NHS Fife. A poster was designed to support the content of the video and was disseminated throughout the clinical areas. There is an opportunity to share it with a wider audience on the WorldWide Web. The key message from the video is about prevention and detection of skin damage.

Clinical relevance: It was decided to launch the video and promote it within NHS Fife. A poster was designed to support the content of the video and was disseminated throughout the clinical areas. There is an opportunity to share it with a wider audience on the WorldWide Web.

References:

- [1] NES Effective Practitioner Resources. 2016. [online] Available at : <http://www.nes.scot.nhs.uk>
- [2] Healthcare Improvement Scotland. 2016. Prevention and Management of Pressure Ulcers Standards.

[P48] THINK PRESSURE - THINK POSTURE DEVELOPING 24 HOUR POSTURAL MANAGEMENT SERVICE IN LOTHIAN

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- 3 City of Edinburgh Council, Edinburgh, United Kingdom
- 4 NHS Lothian, Edinburgh, United Kingdom

Introduction: People with long term health conditions which reduce movement are at risk of experiencing problems with body posture, developing joint and skeletal problems and are at risk of developing pressure ulcers.

In 2009 the Edinburgh Multiple Sclerosis Postural Management Group found that in Lothian approximately half of all people with MS who used a wheelchair had current postural management needs and about a third had never received postural management support before.

Following a stakeholder event in 2012, NHS Lothian, City of Edinburgh Council, Queen Margaret University, third sector partners and service users have been committed to developing 24 hour postural management services in Lothian.

Methods: A multi-agency steering group including and link worker model was established to secure commitment and develop existing provisions.

Results: Since 2016, thirty Postural Management LinkWorkers across Health and Social Care have committed to their role to motivate and support their teams to deliver good postural care at all times. Fifteen Link Workers to date have completed an accredited Postural Care Train the Trainer course. An evaluation of the existing service is underway.

The integrated approach to developing posture management services has promoted sharing of good practice and highlighted the need to raise awareness of the importance of 24 hour posture management in the prevention and treatment of pressure ulcers for service users and their carers.

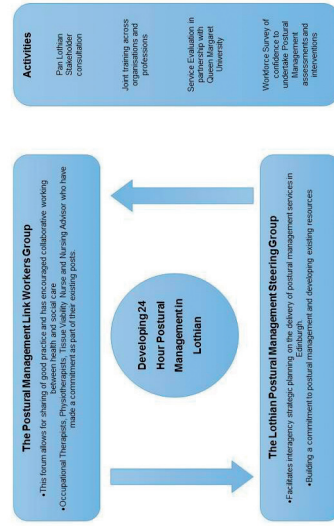
Discussions: Service user and formal carer feedback indicated positive outcomes in relation to clients' comfort, improved skin integrity, improved sleep and reducing pain. Carers report the benefits of posture management in assisting with moving and handling, assisting with personal care tasks and pressure care.

Clinical relevance: Case examples available through the work of the Postural Management Link Workers Group reveals that 24 hour postural care can assist with the management and treatment of pressure ulcers.

"commitment to the education and training of all staff involved in the prevention and management of pressure ulcers, appropriate to roles and workplace setting".

HCIS Prevention and Management of Pressure Ulcers.

References: None



[P49] IMPROVING SUSTAINABILITY OF PRESSURE ULCER PREVENTION WITHIN THE CRITICAL CARE SETTING

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Introduction: Our critical care unit established a Pressure Ulcer Group (PUG) to address the increased incidence of Stage 3 and 4 pressure ulcers, as highlighted by the Trust's Safety Improvement and Tissue Viability Teams.

Methods: PUG's initial aim was to enhance staff education in the areas of identification and reporting, to prevent avoidable pressure damage. Intensive care patients are a particularly high risk group for developing pressure ulcers⁽¹⁾. It became evident that some clinical devices used were contributing to the ulceration observed. Our efforts were refocused on initiating changes in practice, for example using optimal techniques to secure Endotracheal and Nasogastric tubes. We also negotiated with manufacturers to redesign equipment, for example, spinal collars which were unsuitable for patient's needs. Our latest innovation is the Pressure Ulcer Monitoring Dashboard. This incorporates a body map showing the sites and incidence of pressure ulcers each month, the safety cross and a safety message area which raises awareness of current issues.

Results: Our initiatives have stopped the occurrence of avoidable stage 3 and 4 ulceration and improved incident reporting. However, our success in reducing the overall number of incidents has been inconsistent. PUG survey identified deficits in staff knowledge, which are being rectified through additional training and dissemination of updates in our monthly newsletter.

Discussions: The magnetic, colour-coded format of our dashboard is designed to facilitate real time documentation of incidents by reporting staff themselves and provide visual feedback. Combined with their completion of IR1 and Root Cause Analysis forms we hope to create individual ownership of the process. By empowering staff to adopt responsibility for pressure ulcer prevention, instead of reacting to policies cascaded by Senior Staff, we can motivate them to become proactive agents for change.

Further development of staff and processes are being reviewed by PUG and the Tissue Viability Team to identify problem areas and create solutions.

Clinical relevance: Our ultimate objective is the complete prevention of avoidable pressure ulceration within our clinical unit, therefore improving patient outcomes and reducing overall length of hospitalisation.

References:
[1] Apostolopoulou et al. (1) Health Science Journal Volume 8(2014) Issue 3 pg 333

[P50] THE 'OUCH' FACTORS: IMPLEMENTING A REGIONAL APPROACH TO PAEDIATRIC AND NEONATAL PRESSURE ULCER RISK ASSESSMENT

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Introduction: It has been well documented that the neonatal and paediatric population in both hospital and community settings are at risk of developing pressure damage. The NICE guidelines 2014 recommend the use of a pressure ulcer risk assessment tool in these care settings. It was as a result of this recommendation that the Chief Medical Officer tasked the 5 Health and Social Care (HSC) Trusts to implement a regional paediatric pressure ulcer risk assessment tool.

Methods: A project group was convened, October 2014 which comprised five Tissue Viability Nurses, one representing each of the 5 HSC trusts. Two members were paediatric trained including the lead.

The group used improvement methodology including 3 PDSA cycles - inpatient, community and neonatal. The aim was to improve paediatric and neonatal pressure ulcer risk assessment practice. The process began with a literature review, highlighting 12 available scales. The Glamorgan scale was selected by appraising the evidence, devised by Jane Willock (Willock et al, 2009).

Results:

- Production of a resource pack, electronic and hard copy
- Successful implementation of the Glamorgan scale in paediatric care settings
- Successful implementation of the Glamorgan scale in neonatal units - South Eastern Trust and Northern Trust
- Regional launch May 2015 with co-author Denis Anthony
- Insertion of Glamorgan scale into the regional paediatric acute inpatient nursing admission booklet - operational January 2016
- Regional children's advice leaflet production

Discussions: There was a substantial variety in practice across the region. This project supported practice improvement and a consistent approach to pressure ulcer risk assessment across 3 care settings in the 5 HSC trusts. It permitted working in partnership with parents to produce a regional advice leaflet as well as collaborative working with external organisations.

Clinical relevance: Neonatal and paediatrics have the right to be protected from the avoidable harm caused by pressure damage. Implementing the Glamorgan scale has significantly improved the safety of neonates, children and young people throughout the region.

References:

Willock, J., Baharestani, M., Anthony, D., (2009) 'The development of the Glamorgan paediatric pressure ulcer risk assessment scale' Journal of Wound Care, 18 (1), pp. 17-21.

[P51] (PU-MAP) PRESSURE ULCER - MEAN ARTERIAL PRESSURE: HOW TO PREVENT PATIENTS DEVELOPING PRESSURE ULCER WHEN UNDERGOING CARDIO-THORACIC SURGERY

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Introduction: Development and prevention of pressure ulcer (PU) in cardiac surgery were researched as an understudy to PPCI trial (Perfusion-Pressure-Cerebral-Infarction).

The aim was to investigate if "Cardiac surgery on Extra Corporal Circulation (ECC) – does high or low – mean arterial pressure (MAP) provoke PU?"

Methods: A single-centre superiority trial with a blinded outcome assessment. 89 patients with coronary vessel and/or valve disease were randomised. They were undergoing cardiac surgery with the use of ECC (MAP higher or equal to 40 mmHG or a MAP of 70-80 mmHG), and were allocated and stratified for surgery type in two parallel groups, 1: 1 ratio.

PU were recorded:

1. In the operating room before the patient is seated
2. On the operating table immediately before transferring to bed
3. 1. postopr. day in ICU
4. 4. postopr. day in the ward

Results: 17 off 82 patients developed pressure ulcer category I postoperatively.

The PU in the low MAP group were all registered in the OR in contrast to the high MAP group where some of the PU were registered in the OR and some in the ICU on the first postoperative day. The PU registered in the OR were absent on the first postoperative day and mostly device related and differed from the PU registered in the ICU which were mostly related to pressure.

Common risk factors in the low and high MAP group were CABG valve surgery as joined procedure, time on ECC and on the operating table. 50% of the patients in the low MAP group had Diabetes mellitus.

Discussions: Duration of time on ECC and the operating table and DM as risk factors corresponds to the findings of several other studies.

The findings specific related to low or high MAP on ECC show that patients in the low MAP group develop PU in the OR which are absent the next day and 64% of the patients in the high pressure group develop PU in the ICU. This might show a tendency towards that the patients in the low MAP group are in a lower risk of the PU developing further.

References: None

[P52] AN EFFECTIVE AND ECONOMICAL APPROACH IN MANAGING WOUND INFECTION IN PRESSURE INJURY USING POVIDONE-IODINE PACKING: A CASE STUDY

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Introduction: Pressure injury is one of the most common health problems, especially with a rapidly ageing population in Singapore. Tissue ischemia has been the main reason behind the occurrence of ulceration, and prevention strategies such as effective offloading of pressure has to be part of the treatment process for healing of pressure injury wounds. However, preventive interventions and some pressure injury treatments can be very costly and not all are able to afford the expensive wound dressing products.

Methods: Povidone iodine (polyvinyl-pyrrolidone-iodine complex) is easily accessible, affordable and has been shown to be an effective broad-spectrum topical antiseptic solution that can be applied in wound care. Three patients with infected pressure injury of stage 3 and 4 were selected for the study. Standard wound cleansing procedure with the use of normal saline 0.9% was performed prior to the dressing. Traditional non-woven gauze pads saturated and moisten with povidone iodine solution were used. The prepared povidone iodine gauze was either packed or applied only to the wound bed. The packing was changed daily, with external secondary dressing changed whenever strikethrough is evident or when dressing is soiled with faeces.

Results: The patients in the study have shown improvement on day 7 to 14, with lesser slough tissue noted and increased percentage of pink granulation tissue was observed.

Discussions: The purpose of this case study is to present a series of patients with infected stage 3 or stage 4 pressure injury who showed clinical improvement after being managed using povidone iodine 10% soaked gauze packing for a period of 1-2 weeks, which is a cost effective method.

Clinical relevance: This study demonstrated povidone iodine is an effective and economical way of managing infected pressure injury; instead of using expensive conventional ant-microbial wound products.

References:

- [1] Brem, H., Maggi, J., Nierman, D., Rolnitzky, L., Bell, D., Rennert, R., & Vladeck, B. (2010). High cost of stage IV pressure ulcers. *The American Journal of Surgery*, 200(4), 473-477.
- [2] Flynn, J. (2003). Povidone-iodine as a topical antiseptic for treating and preventing wound infection: a literature review. *British journal of community nursing*, 8(Sup2), S36-S42.

[P53] NON-POWERED HYBRID THERAPY AND THE IMPACT ON POWERED DYNAMIC USAGE

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Introduction: Whilst it is accepted that pressure ulcer prevention requires a multifactorial strategy, surfaces in terms of profiling beds, pressure reducing mattresses and cushions play a fundamental role. The Belfast Health & Social Care Trust (BHSCT) recognized that due to increasing levels of acuity in the acute hospitals, it needed to provide patients with a very high level of protection from the moment of admission.

Methods: A multi-professional Project Team was established. This team developed and adjudicated a Totally Managed Equipment (TME) contract which specified the need for a hybrid mattress system as standard. Following this, the project implementation plan was rolled out across 4 acute hospitals (~2000 beds). A Monitoring group was established to oversee the contract.

Results: Over the past three years, the Belfast Trust has seen a 50% decrease in the number of inpatients who have developed avoidable deep pressure damage (Incidence is currently 0.05%). Apart from the obvious benefits to the safety, health and well-being of our patients, this reduction represents a £502K in treatment costs¹, whilst it is accepted that a small number of patients will require a powered mattress system (which is available as part of the TME contract), the BHSCT has seen a 76% reductions in overall usage.

Discussions: Prior to the TME contract, vulnerable patients, including those with established pressure ulcers, would wait approximately 4 hours for an electric mattress to be ordered, delivered, inflated and installed. Now, from the moment of admission, we are assured that our patients have access to a hybrid mattress system which is capable of preventing and treating significant levels of pressure damage.

Clinical relevance: The TME contract has contributed to the decrease in the incidence of hospital acquired pressure damage and is releasing time to care, i.e. nurses are spending less time ordering/cancelling systems, and there is a reduction in the moving and handling of various mattress systems. With regards to the reduction in powered units, an additional advantage is noise reduction as the sound of powered units inflating/deflating/alarming could be quite troublesome for some patients, particularly at night.

References:

[1] <https://www.gov.uk/government/publications/pressure-ulcers-productivity-calculator>.

[P54] MANAGEMENT OF A RECALCITRANT HEEL ULCER: A CASE STUDY

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Introduction: Management of a pressure injury wound over the heel can be challenging for both healthcare professionals and patient. This case study demonstrates the management of patient with a complex chronic heel ulcer.

Methods: A review of the case study's medical records was carried out.

Results: A 63-year-old Chinese gentleman, with multiple co-morbidities, presented with a chronic non-healing right heel pressure injury that was developed 1 year ago. On assessment, wound measured at 2x2.5cm, hypergranulation tissue noted, peri wound callus was thickened ulcers was painless, with moderate amount of hemerosous exudate. Management was complicated by presence of peripheral arterial disease, recurrent infection, and patient's wish for non-invasive procedures. Upon discharge, patient was managed in the outpatient wound clinic.

Management include repetitive conservative bedside sharp debridement to remove hypergranulation tissue and biofilm on the wound bed during each clinic visit. Peri-wound hyper keratinocytes was sheared if present. Cadexomer iodine powder was used to reduce bioburden on the wound bed; follow by application of multi-layered silicone border dressing 15x15cm to redistribute pressure, reduce friction and shear at heel area. The dressing also serves to cushion the heel area and increase shock absorption while patient ambulate. Patient and his caregivers were taught to change the dressing at home if it was soaked or dislodged.

Patient was also referred to Podiatrist for foot pressure assessment and recommendation of proper foot wear.

His right heel wound finally healed in less than 3 months.

Discussions: In this case report, patients' preferences and priorities were used to direct their wound management. Their management was supported with the use of multi-layered silicone dressing, antimicrobial which demonstrated positive outcomes and enabled wound healing.

Clinical relevance: Management of a chronic wound was hence complex, requiring close collaboration between physicians, wound care nurses, podiatrists, the patients and caregiver themselves.

References: None

[P56] A REVIEW OF THE IMPACT OF AN INNOVATIVE SOLUTION FOR THE PREVENTION AND TREATMENT OF LOWER LIMB PRESSURE ULCERATION

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Introduction: National Institute of Health and Care Excellence (NICE) guidelines on pressure ulcer prevention and management highlight the importance of appropriate use of pressure redistributing equipment as part of evidence based care strategies (NICE, 2014). Further guidelines; National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance (NPUAP,EPUAP,PPPIA, 2014) state that the appropriate selection and use of pressure-redistributing devices to meet need, achieve positive clinical and financial outcomes is a challenge for organizations and staff alike.

The Western Health and Social Care Trust (WHSCT) Northern Ireland Tissue Viability Nursing Team recognized the over prescription of pressure-redistributing mattresses. The financial and clinical implications led the team to seek alternative devices which would allow cost savings while ensuring that the quality care would not be adversely affected.

Methods: Following a review of pressure-redistributing equipment usage it became evident that dynamic mattresses were being used for the prevention and management of heel damage despite the fact that NICE (2014) recommend offloading in such cases. An evaluation of products designed to off load heels was undertaken resulting in a recommendation for the sole usage across all care setting of a heel protection rangel, a protection boot2, a pressure relief pad3 and a bed end4. This was supported by a robust rolling training schedule in conjunction with the company.

Results: Usage of pressure-redistributing mattress has reduced significantly across the trust, cost saving have been recognized. As patient care needs become more complex, saving has released funding to meet other demands. The fact that these devices are readily available and have an ease of use has reduced staff time spent on requisitioning, installation and usage of dynamic mattresses. Trust documentation has now been amended to reflect this change.

Discussions: The usage of the specialized range I has changed practice in relation to the prevention and management of heel pressure ulceration in our trust, it has benefited staff and clients; from the client perspective effective management with less disruption to their life in terms of usage of medical devices.

Clinical relevance: Evidence based cost-effective care delivery.

References:

- [1] Prolevo
- [2] FootSafe
- [3] HeelSafe
- [4] SoleSafe

[P55] CALCAINEAL ULCERATION AND SEPSIS IN PATIENTS WITH ADVANCED CHRONIC KIDNEY DISEASE

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Introduction: Pressure sores and ulceration carry a significant morbidity and mortality risk associated with economic burden. This often results in lengthy hospital stays, protracted periods of immobility and disability. There is significant risk of concurrent sepsis due to compromise of the skins barrier role, failure to control infection often leads to tissue debridement or amputation. Pressure ulceration is complex, accompanied by various risk factors including loss of nociceptive feedback, vascular disease, tissue ischaemia, a poor nutritional state, critical illness and periods of immobility.

Advanced chronic kidney disease presents significant risk of peripheral ulceration due to several unique factors. Patients on dialysis are often diabetic with suboptimal control, subsequent diabetic neuropathy results in loss of nociceptive feedback. Dialysis patients often experience peripheral arterial calcification and compromised distal tissue perfusion with limited ability to facilitate tissue repair. Dialysis prescriptions obligate 12 hours per week confined to bed with associated heel compression. Finally, fluid accumulation between dialysis sessions tends to pool peripherally, potentially impairing wound healing.

Methods: Six cases of patients with advanced kidney disease, (four dialysis, two transplant), who subsequently developed calcaneal ulceration and sepsis (n=5) were examined.

Results: Mean age was 67 years old, (range 59 - 81 years); five were male. All were diabetic. Mean HbA1c was 70.6 mmol/mol, (range 62 - 84 mmol/mol). Five patients were obese. Mean BMI was 34.2 kg/m², (range 23.6-44.2 kg/m²). One patient was in the 'normal' weight range as per BMI, (18.5-25 kg/m²). All cases featured a period of immobility. Five patients underwent below knee amputation and one patient was unfit for surgery due to co-morbidity and subsequently died. One patient died within a year of amputation due to wound breakdown and sepsis.

Discussions: This review confirms that heel ulceration in patients with advanced kidney disease predicts significant morbidity, (100%), and mortality risk, (33%). There are associations with advanced age, diabetes and obesity.

Clinical relevance: The potential sequelae of heel ulceration and risks associated with advanced kidney disease indicate these patients should have regular foot screening. There is little published in this field, further examination of the clinicopathological pathways is required.

References: None

[P57] EVALUATION OF A NOVEL DEVICE USING BIOMPEDANCE OF THE DETECTION OF EARLY PRESSURE ULCERS, A MULTI-SITE LONGITUDINAL STUDY

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Introduction: Pressure ulcers have a detrimental effect on the health and wellbeing of patients and have a significant impact on resource costs in healthcare. Despite efforts, the problem persists, with estimated rates of up to 25% of hospital acquired pressure ulcers (HAPUs) occurring in the acute care setting. Currently, nurses' visual skin assessment (VSA) is the only available method to detect pressure ulcer development and guide prevention strategies, but can be inaccurate.

Subepidermal Moisture (SEM) is a biophysical marker associated with local inflammation (oedema) which occurs in the first stages of the wound healing process, up to 10 days prior to visible signs of pressure ulcer development on the skin. Studies have demonstrated the feasibility of using SEM measurement for early detection of PUs, allowing for early intervention improving patient outcomes.

Methods: The purpose of this study was to assess, in a prospective, longitudinal study, the use of SEM measurement for the early detection of PUs in patients before clinical judgement using VSA. At-risk patients were assessed daily and followed for up to 20 days. Skin care specialists (e.g., TVNs) conducted risk assessments and VSA. Nurse generalists assessed SEM using a specialized scanner. Participants and patients were blinded.

Results: Over 189 at-risk patients were enrolled from 10 clinical study sites across the UK and US. In this population 40 patients developed PUs. SEM measurement is an accurate method for detecting incipient pressure damage: 87.5% of patients that developed PUs were previously detected by SEM. Importantly, SEM identified the first signs of pressure damage under the skin by an average of 5 days earlier than nurse visual assessment.

Discussions: It is widely believed that most PUs are avoidable. With earlier detection using effective intervention, clinicians can reverse or stop the progression of PUs before significant damage to the patient.

Clinical relevance: SEM measurement can augment current tools by providing objective data on damage under the skin, previously undetectable by nurses VSA. Objective means of identifying early PUs, allows earlier and targeted prevention strategies, to avoid poor patient experience, increased costs, increased length of hospital stay, morbidity and mortality.

Reference:

[1] SEM Scanner

[P58] BUDGET IMPACT MODEL TO AUGMENT THE VALUE OF AN INNOVATIVE DEVICE FOR THE EARLY DETECTION OF PRESSURE ULCERS IN SCOTLAND

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Introduction: Health authorities closely monitor pressure ulcers (PU) as a public health issue with a significant burden on the health care system, which could be reduced through early detection and improved patient management. A new technology using the measurement of sub-epidermal moisture (SEM) for early detection allows targeted care in patients at risk of developing PUs. In light of the target 50% reduction in PU incidence by December 2017 set by NHS Scotland, this research aims to estimating potential payback stemming from device deployment in NHS Scotland.

Methods: A complex budget impact model was developed:

- Incidence of PUs, grade distribution and daily cost of care per grade of pressure ulcer severity (grade 1, 2, 3 and 4) and hospital length of stay based on literature review. Those costs were inflated to 2016 using the Hospital and community health services (HCHS) index to arrive at cost per episode per grade and complication
- Three complications considered (for delayed healing): critical colonization, cellulitis and osteomyelitis. Each was assigned a probability of occurrence, additional LoS and cost of care.
- Expected cost per episode per grade were derived using probability of occurrence.
- Costs were disentangled in labour costs (i.e. nurse time) and material costs (i.e. medical equipment) for each grade.
- Number of hospital beds and admission were obtained from NHS Scotland 2015 data.

Results: Based on the model of current state, use of the specialized scanner is expected to avert over 9,000 PUs/yr. Total savings is estimated to exceed £60M in year 1. Nearly £33M were imputable to labour. Total savings would be expected to grow over £64M by year 3, totalling £186.70M.

Discussions: Based on this study, the initial cost-associated to the purchase of the new device are offset by the savings stemming from reduced costs of care due to reduced number of PU cases.

Clinical relevance: The new device reduces costs associated to PUs by early detecting changes in the skin moisture. It reduces occurrence of early grade PUs and degeneration to a more severe grade, overshooting the target 50% reduction set by NHS Scotland.

References:

[1] SEM Scanner

[P59] REPROGRAMMING EPIDERMIS ON RESIDUAL LIMBS TO BEAR LOAD BETTER

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Introduction: Lower-limb amputees are at elevated risk of developing pressure ulcers due to the contact between the soft tissue of the residual limb and the prosthesis [1]. While much progress has been made in prosthetic design, devices still require the soft tissue to bear load it would not normally encounter. Pressure injuries are less prevalent on sites that do routinely encounter high pressure and shear loads, such as the sole of the foot [2]. One key difference between this site and others is the structure of the skin. Adaptations to the structure and properties of palmoplantar skin [3] may protect it from pressure injuries. In our work, we aim to test the feasibility of reprogramming skin on the residual limb of amputees to express some of the properties of plantar skin, thereby augmenting the skin's capacity to bear load.

Methods: A key step in developing a regenerative therapy for stump skin is to know how the structure of the skin affects its load-bearing capacity, and therefore what properties should be targeted. We have developed an idealized, axisymmetric finite-element model of the residual limb under a standing load.

Results: The model shows that thickening the skin over the whole limb by a factor of 2 decreases the shear strain at the bottom of the limb by 88%. This suggests that local reprogramming of stump skin, targeted to regions of high strain, could be effective in reducing pressure ulcers.

Discussions: We believe skin in regions prone to pressure ulcers has the capacity to differentiate towards more robust, plantar-like skin. Our long-term research aims are to test this capacity through an in vitro skin construct model currently being developed, while using mechanical analysis to predict the impact of changing skin properties on pressure ulcers.

Clinical relevance: By reprogramming the phenotype of epidermis, this novel therapy could greatly improve the rehabilitation of prosthetic users.

References:

- [1] Dudek, N. L., et al. (2005). Arch Phys Med Rehabil 86(4): 659-663.
- [2] Vanderwee, K., et al. (2007). J Eval Clin Pract 13(2): 227-235.
- [3] Evans, N. D., et al. (2013). J Mech Behav Biomed Mater 28: 397-409

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EUROPEAN
PRESSURE
ULCER
ADVISORY
PANEL

STOP

PRESSURE ULCERS

16th November 2017

How can you get involved?

- Host educational activities on prevention and treatment of pressure ulcers
- Organise awareness raising events to share information about pressure ulcers
- Reach out to your local community to inform them about pressure ulcers
- Make policy makers aware about pressure ulcers



one **GOAL** worldwide:
STOP pressure ulcers!

Download support material for free at:
www.epuap.org



Joint EPUAP & EWMA PU prevention & patient safety advocacy project

One year ago, EPUAP and EWMA initiated a joint European advocacy project. The overall aim is to establish a joint EPUAP - EWMA engagement in pressure ulcer prevention and patient safety agendas at the European level as well as at the national level in selected European countries.

Patient safety has been a high priority on the European Commission health care agenda for well over a decade. At the EU level as well as at the national level in many European nations considerable investments have been made by health care authorities to establish organisations and programmes addressing the patient safety agenda.

EPUAP and EWMA have separately been advocating for the prevention of pressure ulcers as a major health care and patient safety issue. However, by combining forces we aim to emphasize the need to add pressure ulcers and particularly their prevention as priority to the European patient safety agenda and to see pressure ulcers prevention as a long term investment in healthcare rather than an expense.

The following project activities have been carried out during the 1st year of the project:

- Desk study mapping of PU prevention activities initiated by national patient safety organisations and collection of data on PU prevalence and incidence. Publication of an article about the results is expected during Autumn 2017.
- Participation in a number of meetings with the OECD Health Care Quality Indicators (HCQI) task force with the purpose of advocating for the development of quality indicators for pressure ulcer prevention and treatment
- Meeting with representatives of the European Commission, DG SANTE: Matthias Schuppe, policy officer responsible for patient safety, and Gerhard Steffes, policy officer on health programme and chronic diseases;
- Publication of background article 'Patient safety across Europe: the perspective of pressure ulcers' on the EWMA and EPUAP websites.
- Continuous screening of media for information about activities of the European Commission and European Parliament of relevance to the project.
- Joint EPUAP-EWMA session at the EWMA conference 3-5 May in Amsterdam, the Netherlands

To find out more about the project you can attend the Joint Session EPUAP – EWMA PU prevention & patient safety advocacy project on Wednesday, 20 September 2017 in Hall 2A from 13:15 to 14:30, chaired by Lisette Schoonhoven and Zena Moore. The session will include the following presentations:

- The concept of pressure ulcers as a key patient safety indicator; Lisette Schoonhoven
- Pressure ulcer prevention pathways; Zena Moore
- Barriers and enablers to pressure ulcer prevention in the Czech Republic; Andrea Pokorná
- Pressure ulcer, 20 years of prevalence monitoring and practical action in a Swiss university hospital, Hubert Vuagant
- What does the European data tell us? Laura Conaty

If you want to share your opinion about the necessary actions for PU prevention and treatment at national and European level, stop by the EPUAP stand #23 to leave a message on our '**EPUAP & EWMA Patient Safety Awareness Board**'.

Follow us on Twitter #Europe4PUprevention to stay updated about the latest developments.

The project is supported by an unrestricted educational grant from: Logos of 3M, Hartmann, Molnlycke and Smith & Nephew

Other companies interested in supporting this initiative through an unrestricted educational grant, is welcome to contact EPUAP Business Office at office@epuap.org or EWMA Secretariat at ewma@ewma.org

EPUAP Investigator Awards

The Scientific Committee of the European Pressure Ulcer Advisory Panel (EPUAP) has unanimously selected Prof. Amit Gefen, as 2017 Experienced Investigator Award winner. The EPUAP 2017 Life Achievement Award was also unanimously awarded to Prof. Michael Clark.



The laureates will be acknowledged during the EPUAP Investigator Awards 2017 session on 21st September, 10:45 – 11:45, Hall 2A:

- Deformed cells as failing structures: The journey of a mechanical engineer in the labyrinth of biology to seek the reason for pressure ulcers; *Amit Gefen*
- Lately it occurs to me, what a long strange trip it's been; *Michael Clark*

Journal of Tissue Viability & Journal of Clinical Biomechanics Awards

in partnership with

Journal of Tissue Viability & Journal of Clinical Biomechanics Award prizes can be awarded for the completed research in biomechanics or clinical research.



EPUAP 2017 Laureates:

- Surfaces for health: Early detection of skin damage using biomarkers; *Jibbe Soetens*
- Musculoskeletal finite element model of the foot: Loading and direct dynamic validation; *Antoine Perrier*
- Real world evidence of HAPU reduction using a novel early detection device measuring Sub-Epidermal Moisture (SEM); *Rachael Lester*
- Assessment and consideration of foot risk factors is essential to proactively prevent hospital acquired heel pressure injuries; *Jo Scheepers*

The laureates will be acknowledged during the Journal of Tissue Viability & Journal of Clinical Biomechanics Awards session on 20th September, 13:15 – 14:45, Hall 2A.

EPUAP & Stryker Quality Improvement Travel Awards: Partners in Prevention

in partnership with

EPUAP & Stryker Quality Improvement Travel Award aims to recognize and acknowledge the innovative quality improvement projects relating to the prevention of skin breakdown.



EPUAP 2017 Laureates:

- Tissue Viability Society guidelines for assessing seating and posture: Understanding the association between pressure ulcers and sitting in adults; *Carol Bartley, Melanie Stephens*
- Improving pressure damage detection in the community using continuous pressure monitoring of patients; *Nicci Aylward-Wotton*
- Zero Heroes: Working together to achieve no hospital acquired pressure ulcers; *Aoife McDonnell*
- Systematic effort reduces pressure ulcers with 50%; *Aase Fremmelevholm*

The laureates will be acknowledged during the EPUAP & Stryker 2017 Quality Improvement Project Awards session on 20th September, 15:45 – 16:45, Meeting room 3.

EPUAP & 3M Pressure Ulcer and IAD Innovation Awards

in partnership with

This award acknowledges innovative approaches in the treatment and prevention of pressure ulcer and IAD.



EPUAP 2017 Laureates:

- The Ghent Global IAD Categorisation Tool (GLOBIAD) for incontinence-associated dermatitis: International development and reliability study; *Karen Van den Bussche*
- Translating evidence-based device-related pressure injury prevention strategies to the intensive care environment: The SUSTAIN study; *Fiona Coyer*

The laureates will be acknowledged during the 3M Satellite Symposium on 21st September, 08:00 – 09:00, Hall 2B.

Smith&Nephew Workshop



20th September, 13:15 – 14:15, Meeting room 1

Title: Raising standards of care for reducing PU incidence and maintaining skin integrity

Speakers:

Importance of a holistic approach to PU prevention (and treatment)

Zena Moore, *School of Nursing & Midwifery, Royal College of Surgeons in Ireland, Ireland*

Effectiveness of using a new polyurethane foam multi-layer dressing in the sacral area to prevent the onset of pressure ulcers in the elderly with hip fractures: A pragmatic randomized controlled trial

Cristiana Forni, *Rizzoli Orthopaedic Institute, Italy*

Measuring Microclimate: An RCT to explore the influences of foam dressing on pressure prone areas

Bill McGuinness, *La Trobe University, Australia*

Bruin Biometrics Workshop



20th September, 15:45 – 16:45, Hall 2B

Title: Using SEM measurement for PU prevention: From theory to practice

Speakers:

The biology of PUs and why earlier detection enables tissue rescue

Amit Gefen, *Tel Aviv University, Israel*

Using SEM Measurement for timely detection of pressure damage (a review of clinical evidence)

Lisette Schoonhoven, *University of Portsmouth, UK*

Prevention of Hospital Acquired Pressure Ulcers using SEM Scanner: From Theory to Practice

Rose Raizman, *Scarborough Rouge Hospital, Canada*

Hands-on Learning with the SEM Scanner

Jeanette Milne, *Northumbria Healthcare NHS Foundation Trust, UK*

Frontier Workshop



20th September, 17:00 - 18:00, Hall 2B

Title: Automated Patient Repositioning with Toto® Touch

Speakers:

Repositioning as part of a pressure ulcer prevention programme

Dimitri Beeckman, *Ghent University Belgium*

Introducing Toto Touch

Simon Bosley, *Frontier Medical*

The use of the Toto system within an acute setting

Heather Hodgson, *NHS Glasgow Queen Elizabeth University Hospital*

Victoria Warner, *Chesterfield Royal Hospital*

The use of the Toto system within a community setting

Marjolein Woodhouse, *Solent NHS Trust*

3M Symposium



21st September, 8:00 – 9:00, Hall 2B

Title: End IAD today, prevent it tomorrow

Speakers:

Specific factors associated with the development of Incontinence-Associated Dermatitis (IAD) in ICU patients suffering from fecal incontinence and introduction of the Ghent Global IAD Categorization Tool (GLOBIAD) to categorize IAD severity

Dimitri Beeckman, *Ghent University, Belgium*

What should be ideal properties of a skin protectant to prevent and treat IAD?

Jan Kottner, *Charité-Universitätsmedizin Berlin, Germany*

Experiences with an advanced elastomeric barrier to treat moisture lesions

Claire Acton, *St. Thomas London, UK*

EPUAP & 3M IAD Award

Lisette Schoonhoven, *University of Southampton, UK*

Mölnlycke Workshop

21th September, 9:00 – 10:00, Meeting room I

Title: Mepilex® Border Sacrum and Mepilex® Border Heel

Brief introduction: The workshop is bringing you the latest enhancements in pressure ulcer prevention dressings. You know there is substantial clinical and scientific evidence, but what about the practicalities in your facility, of applying prophylactic dressings correctly, ensuring compliance with inspection protocols and overall successful implementation of new protocols?

Allow the experts to answer your questions and to demonstrate the use of prophylactic dressings and experience for yourself the ease of application and inspection of the new Mepilex® Border Sacrum and Mepilex® Border Heel.

Speakers:

Joyce Black, *University of Nebraska, Omaha, USA*

Nick Santamaria, *University of Melbourne, Australia*

Jacqui Fletcher, *Jacqui Fletcher Wound Care – Independent Consultant, UK*

Elaine Thorpe, *University College London Hospital, UK*



Mölnlycke Symposium

21th September, 14:15 – 15:45, Hall 2B

Title: Evidence-based pressure ulcer prevention: Setting the standard.

Hosted by Joyce Black (University of Nebraska, Omaha, USA)

Brief introduction: Pressure ulcer prevention remains a frequently occurring problem that is associated with a huge economic, health-related and social burden. The implementation and adherence to evidence-based preventive strategies are key to reducing the impact of pressure ulcers.

The main topic will cover: Utilisation of research findings as a basis for making evidence-based decisions
Identification of key factors that are critical to the successful implementation of pressure ulcer prevention protocols in different health care systems

Success stories with different pressure ulcer preventive interventions and how they have been used to influence hospital management and change clinical practice

Speakers:

Zena Moore, *School of Nursing & Midwifery, Royal College of Surgeons in Ireland, Ireland*

Fiona Coyer, *School of Nursing, University of Technology and Metro-North Hospital Health Services, Queensland, Australia*

Elaine Thorpe, *University College London Hospital, UK*

Amit Gefen, *Tel Aviv University, Israel*

Nick Santamaria, *University of Melbourne, Australia*

Chenel Trevellini, *St. Francis Heart Hospital, Roslyn, New York, USA*

Paulo Alves, *Catholic University of Portugal, Portugal*



Mölnlycke Workshop

21th September, 16:15 – 17:15, Hall 2B

Title: Mölnlycke® Turning and Positioning Systems

Brief introduction: The workshop introduces solutions for continuous pressure ulcer prevention that address patient and caregiver safety.

Experience how Mölnlycke® Z-Flo™ Fluidized Positioners offer enhanced protection by conforming to the anatomy and maintaining the desired position of patients over time. These positioners can be a solution for protecting areas such as the occiput, but also for facilitating the turning of patients and ensuring offloading. They also have a special niche in the neonatal intensive care unit setting where they offer an increased sense of security and a calming effect, thereby enhancing sleep quality.

Also experience the Mölnlycke® Tortoise™ Turning and Positioning System which offers an easy way to turn the patient protects the caregiver and enhances the preventive aspects of the support surface. The system will aid in pressure ulcer prevention, offer the benefit of conformal positioning for your patients and minimise the risk of care giver injury.

Speakers:

Joyce Black, *University of Nebraska, Omaha, USA*

Paulo Alves, *Catholic University of Portugal, Portugal*



4th EPUAP FOCUS MEETING

Pressure Ulcers in an Adult and Pediatric
ICU Population: Science and Practice United

www.focusmeeting2018.org

21 – 23 May 2018

Turku University Hospital
Turku, Finland



PROGRAMME TOPICS

- Patient risk profiles for pressure ulcer development in the ICU: biomechanic and clinical insights
- Effective patient repositioning and patient handling in the ICU: a risky business!
- Pressure ulcer classification and documentation in the ICU: a pathway to patient safety improvement?
- Medical device related pressure ulcers in the ICU: prevention and treatment
- Skin disorders in the critically ill patients: assessment and differential diagnosis
- Interactive case discussions on prevention and treatment options of patients with pressure ulcers in the ICU
- Evidence about high-tech support surfaces in the ICU
- Preventing heel pressure ulcers in the ICU: latest evidence
- Staffing levels and patient safety in the ICU: the case of pressure ulcers
- Preventing and treating pressure ulcers in our youngest: cases from the Pediatric Intensive Care Unit (PICU)

Early Registration Deadline:
March 10, 2018

Local organisers:
Finnish Wound Care Society
and
Turku University Hospital

EPUAP Business Office

Codan Consulting
Provaznicka 11, Prague 1
office@epuap.org
www.epuap.org
Tel.: +420 251 019 379
Fax: +420 251 019 361



CONFERENCE VENUE:

Waterfront Belfast

2 Lanyon Place, Belfast, BT1 3WH
Northern Ireland

EPUAP 2017 Conference Secretariat

Tel: +420 731 555 750
office@epuap.org

CONFERENCE HOURS

Tuesday, 19 September

16:00 – 18:00 Pre-registration at the conference venue

It is possible to upload oral presentations. More information will be available at the registration desk.

Wednesday, 20 September

07:30 – 18:00 Registration

09:00 – 10:30 Opening ceremony

10:30 – 18:00 Scientific sessions

09:00 – 17:00 Commercial exhibition

19:00 – 20:00 Welcome reception at the Belfast City Hall

Thursday, 21 September

08:00 – 17:15 Registration

08:00 – 17:15 Scientific sessions

09:00 – 17:00 Commercial exhibition

19:30 – 23:00 Conference dinner at the Titanic Museum

Friday, 22 September

08:00 – 12:45 Registration

09:00 – 12:45 Scientific sessions

08:30 – 12:00 Commercial exhibition

CERTIFICATES OF ATTENDANCE

All participants will be able to print their certificate after 14.00 hours on your last day of attendance or after 11.00 hours on the last day of the conference.

CME – CONTINUED MEDICAL EDUCATION

The 19th EPUAP Annual Meeting has been accredited by the European Accreditation Council for Continuing Medical Education (EACCME). The 19th Annual Meeting of the European Pressure Ulcer Advisory Panel is designated for a maximum of, or up to 14 European CME credits (ECMEC).

In order to obtain the CME credits, your attendance must be verified for each of the days that you wish to obtain the credits. In order to verify the attendance please go to the registration desk every day (before 15:00 hours on Wednesday and on Thursday and before 10:00 hours on Friday), and scan your badge at the CME station. You will be able to print out your certificate after 11:00 hours on the last day of your attendance.

TAXI

Taxi Company: Value Cabs

Phone Number: 028 90 80 90 80

More information about taxi services in Belfast (including contact telephone numbers) will be available at the registration desk.

BADGES

All participants and exhibitors should wear the name badge at all times throughout the whole conference programme including the social events. Each badge contains a specific QR code which allows the delegate to enter the pre-ordered workshops and pre-paid social events.

Using the Lions Lead Retrieval System the badge can also facilitate the contact exchange between the delegate and exhibitor at the exhibitor's stand; by simple scanning the QR code the delegate can share his/her contact with the exhibitor.

ENTITLEMENTS

Full conference registration:

- Final programme and abstract book
- Admission to the full conference programme, coffee breaks & buffet lunch
- Welcome reception on 21st September at the Belfast City Hall

1-day registration:

- Admission to all sessions and symposia of the day, coffee break & buffet lunch.

CLOAKROOM

The cloakroom is located on the ground floor, near the entrance to the venue. Please follow the signs. The cloakroom is unattended.

LUNCH AND COFFEE BREAKS

Lunch and coffee breaks will be served in the exhibition area in Hall 1, located on Level 1.

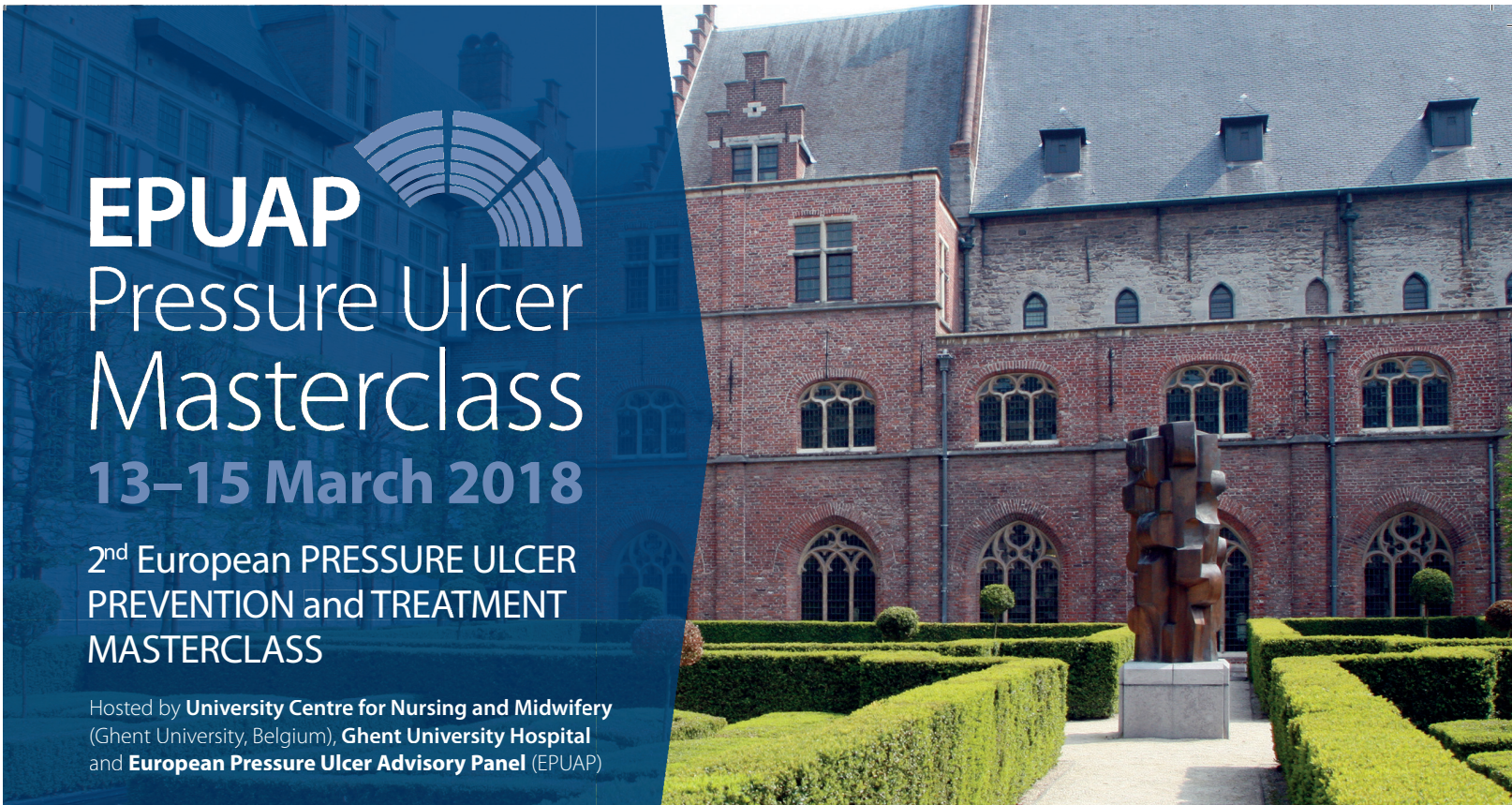
INFORMATION FOR SPEAKERS

From Tuesday, 19 September it is possible to upload the oral presentations at the Speakers Upload Centre. Please bring your presentation on a memory stick to the Speakers Upload Centre at least 2 hours before your presentation. The Speakers Upload Centre is located on the 3rd level. There will be signage on site throughout the venue. More information is available at the registration desk.

The Speakers Upload Centre opening hours:

Tuesday, 19 September	16:00 – 18:00
Wednesday, 20 September	07:30 – 18:00
Thursday, 21 September	07:00 – 18:00
Friday, 22 September	07:30 – 10:45

A technician will assist you in transferring the presentation to a central conference server. The technician will perform a quick run of your presentation in order to check whether the presentation runs correctly and that all parts of the presentation are copied. At the end of the conference, all presentations will be deleted so no copyright issues will arise.



EPUAP Pressure Ulcer Masterclass 13-15 March 2018

2nd European PRESSURE ULCER
PREVENTION and TREATMENT
MASTERCLASS

Hosted by **University Centre for Nursing and Midwifery**
(Ghent University, Belgium), **Ghent University Hospital**
and **European Pressure Ulcer Advisory Panel (EPUAP)**

Dates: 13-15 March 2018

Location: Universitair Ziekenhuis Gent (Ghent University Hospital), De Pintelaan 185, B- 9000 Gent, Belgium

Organization: University Centre for Nursing and Midwifery (Ghent University), Ghent University Hospital and EduWond in collaboration with the European Pressure Ulcer Advisory Panel (EPUAP)

Chairs of the Masterclass:

- Prof. dr. Dimitri Beeckman (Ghent University)
- Mr. Steven Smet (Ghent University Hospital)

Main topics:

- Pressure ulcer etiology (biomechanics, pressure induced deep tissue injury, microclimate)
- Pressure ulcer risk assessment
- Pressure ulcer diagnosis and classification
- Device related pressure ulcers
- Health economics
- Support surfaces for prevention and treatment: biomechanics and clinical evidence
- Case discussions for prevention and treatment (critically ill patients, pediatrics, rehabilitation, palliative care, bariatric patient)
- Repositioning

- Treatment: cleansing, debridement, assessment and treatment of infection and biofilms, wound dressings, biological dressing, growth factors and biophysical agent
- Guideline development
- Implementation, quality indicators, quality improvement projects
- Basic principles about research and pressure ulcers

Admission fee:

- 1400 EUR for non-industry including accommodation
- 1700 EUR for industry including accommodation
- 1000 EUR for non-industry without accommodation
- 1300 EUR for industry without accommodation

Entitlements: Online course materials, coffee and lunch breaks, networking social event, hotel accommodation

Application will open in October 2017.

EPUAP Business Office:

+420 251 019 379
office@epuap.org

www.epuap.org

www.pressureulcermaster.org





The European Pressure Ulcer Advisory Panel was established as a charity in 1996 in London to lead and support all European countries in the efforts to prevent and treat pressure ulcers.

EPUAP has continuously worked on:

- ◆ research and education on pressure ulcers
- ◆ raising awareness on the importance of prevention and treatment of pressure ulcers
- ◆ provide knowledge on adequate patient centred and cost effective pressure ulcer care

Membership

The EPUAP has around 350 members and it is governed by an executive board elected for a term of 3 years by the trustees of the charity. EPUAP is registered as a charity under the UK legislation.

Why become an EPUAP member?

- ◆ Receive regular information related to pressure ulcer prevention and management
- ◆ Benefit of a special EPUAP member registration fee at the annual meeting
- ◆ Get advice on issues related to the prevention and treatment of pressure ulcers
- ◆ Get advice in your daily practice upon the implementation of the guidelines.
- ◆ Receive important publications from our corporate sponsors
- ◆ Networking opportunities with other professionals from the same or related fields
- ◆ Share your projects and information about pressure ulcers with other members
- ◆ The opportunity to join regional or local projects and get support from the EPUAP



MEETING ROOMS

Ground floor

Entrance: Riverside

Riverside foyer: registration desk and organiser's office

Level 1

Hall 2A (plenary hall): Key sessions, award sessions, free paper sessions and interactive sessions will take place here.

Hall 2B: Free paper sessions, EPUAP workshops and industry sessions will take place here.

Level 3

Speakers Upload Centre

Meeting room 1: Free paper sessions, EPUAP workshops and industry sessions will take place here.

Meeting room 3: Free paper sessions, EPUAP workshops and industry sessions will take place here.

EXHIBITION

The most important companies in the field of pressure ulcer and wound management will present the latest products and developments in this field. The exhibition is open during the conference programme. You can visit the exhibition during coffee and lunch breaks which will be served in the exhibition area. The exhibition is located on Level 1 in Hall 1.

LANGUAGE

English

INTERNET AND WIFI

Free WiFi is available all through the venue. In order to access the free WiFi, you need to choose the **Waterfront Wi-Fi** network and you will be redirected to a landing page. Choose the link for public users, enter a valid e-mail address and check a box accepting the Waterfront terms and conditions.

POSTER AREA

The poster area is located in the Hall 1 (Level 1) in the exhibition area. Please follow the signage or ask the personnel at the registration desk for more information.

The posters should be set up on **20th September from 07:00 – 09:00**.

Equipment for setting up the posters will be provided at the registration desk upon request. Assistance will be available in the poster area during the time period mentioned above. Poster presenters should be present at their poster during the coffee and lunch break in order to provide more information or answer questions to fellow delegates.

All posters must be removed latest at 12:00 hours, Friday, 22nd September. The conference secretariat takes no responsibility for damaged or left posters.



Belfast is a wonderfully compact, walkable city with a wealth of culture, history and heritage. This vibrant city is renowned the world over for the warmth of its people, and prides itself on its hospitality. In the last decade over £1 billion has been invested in Belfast's tourism infrastructure making the city an exciting and inspiring destination on the rise. Accolades include being voted one of the world's top destinations by National Geographic Traveller, and The Financial Times listing Belfast in the 'top 10 destinations' in the world for conferences and major events.

About conference venue

Belfast Waterfront on 2 Lanyon Place, Belfast, BT1 3WH is an award-winning, purpose-built conference, arts and entertainment centre offering a variety of facilities, conveniently located within a ten minutes' walk from the city centre.



Travelling to Belfast Waterfront

By train

The nearest train station is Central Station, which is in East Bridge Street, around five minutes' walk from the venue. There is a regular train service to Dublin and the average journey time is approx. two hours. For train timetables, visit www.translink.co.uk.

By bus

The nearest bus station is the Laganside Bus Centre, which is approx. two minutes' walk from Belfast Waterfront. There is a bus stop on Oxford Street, directly outside the building.

The main bus provider in Belfast is Translink, which runs both Ulsterbus and Citybus Metro services.

By taxi

Belfast is served by both public and private hire taxis. Public hire taxis can be hailed from the street or from dedicated taxi ranks. Private hire taxis must be booked in advance. More information about private hire taxi services in Belfast (including contact telephone numbers) will be available at the registration desk.

By car

Belfast Waterfront is located in Lanyon Place, just off Oxford Street in the city centre. If you are traveling on a major road into the city, follow signs for the city centre and Belfast Waterfront via East Bridge Street or Oxford Street.

There are two 24-hour car parks located near Belfast Waterfront, offering more than 800 parking spaces. The multi-storey Lanyon Place car park is located 100 metres from the venue. The car park at the Belfast Hilton Hotel is also multi-storey and is next door to the building.

The EPUAP delegates arriving by car will receive parking discount vouchers, more information available at the registration desk.





28th Conference of the European Wound Management Association

EWMA 2018

in cooperation with the Polish Wound Management Association

ABSTRACT DEADLINE:
1 DECEMBER 2017

KRAKOW, POLAND
9-11 MAY 2018

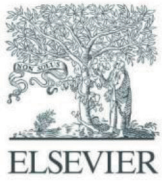


POLISH WOUND
MANAGEMENT ASSOCIATION



WWW.EWMA2018.ORG
WWW.EWMA.ORG
WWW.PTLR.ORG.PL





CLINICAL BIOMECHANICS

Edited by Amit Gefen



Clinical Biomechanics is an international multidisciplinary journal of biomechanics with a focus on medical and clinical applications of new knowledge in the field.

The science of biomechanics helps explain the causes of cell, tissue, organ and body system disorders, and supports clinicians in the diagnosis, prognosis and evaluation of treatment methods and technologies. *Clinical Biomechanics* aims to strengthen the links between laboratory and clinic by publishing cutting-edge biomechanics research which helps to explain the causes of injury and disease, and which provides evidence contributing to improved clinical management.

A rigorous peer review system is employed and every attempt is made to process and publish top-quality papers promptly.

Clinical Biomechanics explores all facets of body system, organ, tissue and cell biomechanics, with an emphasis on medical and clinical applications of the basic science aspects. The role of basic science is therefore recognized in a medical or clinical context. The readership of the journal closely reflects its multi-disciplinary contents, being a balance of scientists, engineers and clinicians.

Disciplines covered include biomechanics and mechanobiology at all scales, bioengineering and use of tissue engineering and biomaterials for clinical applications, biophysics, as well as biomechanical aspects of medical robotics, ergonomics, physical and occupational therapeutics and rehabilitation.



VISIT THE JOURNAL HOMEPAGES:

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Orthopaedics



WELCOME RECEPTION

The Welcome Reception will be held at Belfast City Hall, which is located in the heart of Belfast city centre on Donegall Square. Belfast City Hall is one of Belfast's most iconic buildings; it first opened its doors in August 1906 and nowadays it is Belfast's civic building. On the 20th September the Belfast City Hall will open its doors to EPUAP 2017 conference delegates who will enjoy a relaxed Welcome Reception giving the opportunity to make acquaintance with new colleagues and catch up with old friends.

We thank Belfast City Council for their kind generosity for the use of City Hall and the provision of hospitality.

The Welcome reception is free of charge but it is necessary to register, more information available at the registration desk.

Date & Time: 20th September 2017, 19:00
Venue: Belfast City Hall, Donegall Square
Programme highlights: Belfast City Hall tours (tours start at 18:15 and 18:30, it is necessary to register in advance), Belfast Trust Choir performance



CONFERENCE DINNER

The Conference Dinner will take place at the Titanic Belfast, the world's largest Titanic Visitor Experience. It is located at the heart of the waterfront Titanic Quarter, the historic site of where the RMS Titanic was designed and built. The EPUAP delegates will dine in the Titanic Suite, a breath-taking room inspired by the Titanic's interiors, including a replica of liners Grand Staircase. Delegates will have the chance to network as they enjoy a delicious meal, full of the best of Irish flavours. This evening will be sure to be a memorable event not to be missed!

Date & Time: 21st September 2017, 19:30
Venue: Titanic Belfast
Programme highlights: Harpist, Irish dancers, live band





Gold sponsors

 <p>3M www.solutions.3m.co.uk Stand 12</p>	 <p>Apex Medical www.apexmedicalcorp.co.uk Stand 27</p>	 <p>Arjohuntleigh www.arjohuntleigh.com Stand 12</p>
 <p>Care of Sweden www.careofsweden.com Stand 14</p>	 <p>Linet www.linet.com Stand 38</p>	 <p>Mölnlycke www.molnlycke.cz Stand 29</p>
 <p>Polymem www.polymem.com Stand 15</p>	 <p>Sage Products www.sageproducts.com</p>	 <p>Stryker www.stryker.com Stand 3&4</p>

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 <p>Acelity www.acelity.com Stand 13</p>	 <p>Hartmann www.hartmann.info</p>	 <p>Smith & Nephew www.smith-nephew.com Stand 16</p>
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Cleanses & debrides!



HydroClean® plus

With its unique *Rinsing-Absorption Mechanism*^{1,2}, HydroClean® plus is the patented Hydro-Responsive Wound Dressing that promotes autolytic debridement.

Efficient wound healing begins with effective wound cleansing.

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HydroTherapy
Simple and effective.



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1 Humbert P, Faivre B, Véran Y et al. On behalf of the CLEANSITE study group. Protease-modulating polyacrylate-based hydrogel stimulates wound bed preparation in venous leg ulcers a randomized controlled trial. *Journal of the European Academy of Dermatology and Venereology* 2014;28(12):1742-1750.
2 Kaspar, D (2011). Therapeutic effectiveness, compatibility and handling in the daily routine of hospitals or physicians' practices. HARTMANN Data on file: Hydro-Responsive Wound Dressing (HRWD) and AquaClear Technology are trademarks of HARTMANN.





3M
www.solutions.3m.co.uk

3M Science has allowed unique innovations to protect patient skin and manage wounds. Our broad portfolio makes it easy for you to choose the right products: from wound dressings, compression systems to advanced skin protection. We can help you deliver compassionate care that will provide you cost effective outcomes. We welcome you at our 3M Stand.

Stand 12



Abigo
www.abigo.com

Sorbact® Right from the Start - Prevents and Treats wound infections. Welcome to ABIGO Medical - booth 33.

Stand 33



Acelity
www.acelity.com

Acelity™ are a global advanced wound care company that leverages the strengths of Kinetic Concepts, Inc. and Systagenix Wound Management, Limited. Headquartered in San Antonio, Texas, with 5,000 employees around the world, our portfolio includes negative pressure wound therapy, advanced wound dressings, negative pressure surgical incision management, and epidermal harvesting.

Stand 13



Advanced Medical Solutions Ltd

Advanced Medical Solutions
www.admedsol.com

Advanced Medical Solutions is a leading developer and manufacturer of innovative and technologically advanced wound care products. A UK company with over 25 years of experience within the wound care market. The ActivHeal range has been developed to have simple and clear packaging, to be cost effective, is easy to use and supported by our university approved education programme. Activheal has just launched its new website www.activheal.com

Stand 23



Apex Medical
www.apexmedicalcorp.co.uk

APEX provides advanced pressure area care equipment, electric profiling beds and moving and handling equipment to the Acute and Community sectors globally. APEX have a long history of designing and manufacturing advanced pressure area care products throughout the World. Please come and visit us on our stand to learn more about our exciting range of products, which have been designed specifically with wound care in mind.

Stand 27



Arjohuntleigh Getinge Group
www.arjohuntleigh.com

ArjoHuntleigh is a world-leading provider of integrated products and solutions that improve the lives of patients and residents with reduced mobility. We help healthcare facilities deliver wellness and effective everyday care, early mobilisation, safe patient handling, venous thromboembolism prevention, pressure injury prevention, hygiene routines, bariatric care and diagnostics. With extensive knowledge and experience, we strive to improve efficiency and ensure a safer and dignified environment for caregivers and their patients.

Stand 8+9



B.Braun Medical
www.bb Braun.cz

B.Braun supplies the healthcare market with products in the areas of anaesthetics, intensive care medicine, cardiology, extracorporeal blood treatment and surgery as well with services for hospitals & homecare "Sharing Expertise" is our promise to share, effectively utilize and commit to expanding medical knowledge and expertise in healthcare through dialog with our partners.

Stand 43



BioMonde
www.biomonde.com

BioMonde is a Multinational wound care company specialising in the manufacture and distribution of Larval Debridement Therapy (LDT) products. Our state of the art pharmaceutical production units in the UK, Germany and USA, together with our commitment to research, development and education, make BioMonde the first choice in wound debridement.

Stand 41



Bruin Biometrics
www.bruinbiometrics.com

BBI develops biosensor diagnostics to detect disease earlier and more accurately than current methods. SEM Scanner is a hand-held non-invasive device for the early detection and prevention of early-stage pressure ulcers, identifying damage up to 12 days earlier than visual observation. SEM Scanner makes pressure ulcer prevention possible by "Making the Invisible Visible".

Stand 32



Care of Sweden
www.careofsweden.com

Care of Sweden is Sweden's largest manufacturer of high quality mattresses used in the prevention and treatment of pressure ulcers. Our solutions and products can be found in 30+ countries while being undisputed market leader in Sweden.

Stand 14





Carital Group
www.carital.com

The Carital Group is a Finnish privately held healthcare technology company. We develop, manufacture and market pressure relieving medical mattresses, patient transfer solutions, advanced solutions for psychiatric care, patient positioners, seating systems and related products & services for patient care. The clinical competence of the Carital Group is based on international clinical research run globally by ourselves in co-operation with customers, universities and specialists.

Stand 40



Coloplast Ltd
www.coloplast.cz

Dealing with wounds on a daily basis can be challenging. At Coloplast we want to help reduce this complexity and ensure that everyone caring for wounds feels confident that they are helping to optimise the healing process and providing patients with the best care. That's how we Make Every Day Count.

Stand 10



Crawford UK
www.crawfordandcompany.com

Crawford Woundcare range includes: KerraMax Care; super-absorbent dressings for improving patient care, KerraFoam Gentle Border; super-smart foam dressing, KerraCel; new gelling fibre dressing, KerraLite Cool – soothing and debriding, KerraContact Ag; advanced silver wound contact dressing, KerraPro; Pressure Reducing Pads and footwear ranges KerraPed and KerraPed Plantar Ulcer.

Stand 11



Drive DeVilbiss
www.drivedevilbiss.co.uk

Drive DeVilbiss Healthcare are one of the leading manufacturers and distributors of durable medical products in the world today. Visit Stand 31 to demo our popular MAP system and pressure prevention products, including our new Hybrid-Air Mattress! For further information on our products contact info@drivedevilbiss.co.uk.

Stand 31



EPUAP
www.epuap.org

The European Pressure Ulcer Advisory Panel works to provide the relief of those suffering from or at risk of pressure ulcers through research, education and influencing pressure ulcer policy in Europe. The EPUAP Annual Meeting 2018 will take place 12 – 14 September 2018 in Rome, Italy. Save the date and visit www.epuap2018.org.

Stand 24



ETAC / R82
www.etac.com
www.r82.co.uk

Etac R82 supplies R82, Etac, Molift, Immedia, Convoid and Star Cushion branded products in the UK and Ireland. Our extensive range of high quality assistive products for disabled children and adults includes wheelchairs, buggies, standing, walking, toileting and bathing aids also manual and mechanical transfer aids and pressure care solutions.

Stand 22



EWMA
www.ewma.org

Visit the Leading Conference on Wound Management; the EWMA Annual Conference taking place in Krakow, Poland from 9 – 11 May 2018. Experience high level scientific presentations, hands-on workshops and networking events. The European Wound Management Association (EWMA) is a European non -profit umbrella organisation, linking national wound management organisations, individuals and groups within wound care.

Stand 20b



Frontier
www.frontier-group.co.uk

Frontier Medical Group is a market leading company manufacturing and supplying innovative pressure area care solutions for healthcare providers both in the UK and internationally including the Re-pose®, Ultracore and Toto® ranges.

Stand 30



Joerns / Medstrom
www.joerns.com

Medstrom Healthcare and Joerns work together to bring innovative and effective pressure area care products to market. Our most innovative surface Dolphin Therapy simulates immersion in a fluid medium and is the most effective therapy surface for the prevention and treatment of pressure ulcers in highly complex patients. Visit us at stand 25.

Stand 25



Journal of Wound Care (JWC)
www.info.journalofwoundcare.com

The Journal of Wound Care (JWC) is widely acknowledged as the global leader in wound care publications, internationally recognised and respected for the quality of our articles. Guided by key opinion-leaders, JWC defines cutting edge wound care practice, identifying future trends in the field and communicating best current practice.

Stand 1



Lohmann & Rauscher
www.lohmann-rauscher.com

We can't wait to see you on the L&R stand (formerly known as Activa Healthcare). Have you tried our Debrisoft lolly yet? Everything you love about Debrisoft in a lolly. It's ideal for cavity wounds and hard to reach areas. See you soon!

Stand 19b



Levabo
www.levabo.dk

Heel up and all up are Levabo's new products in the treatment and prevention of pressure ulcers. Heel up and all up are user-specific disposable products with an ergonomic design. The external layer is made of soft, flexible, heat and moisture absorbent nonwoven material.

Stand 45



LimbO Products
www.limboproducts.co.uk

The LimbO lets patients shower or bath and keep their dressings, casts or PICC lines 100% dry, enhancing their daily wellbeing. Easy to use and comfortable with no constriction. Available on prescription in the UK and distributed worldwide.

Stand 17



Linet
www.linnet.com

The LINET offers a full range of active therapy mattresses adjusted for various hospital departments and diagnoses of individual patients. LINET therapy systems together with special hospital bed features are therefore highly effective in the prevention of pressure ulcers and achieve therapeutic effect in the treatment of pressure ulcers.

Stand 38



Medicare Innovations
 (Talarmade Limited T/A)
www.talarmade.com

Medicare Innovations (a Talarmade company) is an innovative manufacturer of pressure care solutions. Our product brand 'Prolevo' is fast becoming a major choice for clinicians for use in injury treatment. We support the 'CPR for at risk Feet' initiative in the UK and our team look forward to meeting you.

Stand 7



Meditec Medical Ltd
www.meditecmedical.ie

Meditec Medical, a wholly Irish owned company, with headquarters in Dublin, has been designing, manufacturing, and delivering cutting edge technology in the area of pressure relief mattresses, and patient support surfaces. Meditec Medical is synonymous with quality innovative medical equipment.

Stand 19a



Mölnlycke
www.molnlycke.cz

Mölnlycke is a world-leading medical solutions company. We're here to advance performance in healthcare across the world, and we aspire to equip everybody in healthcare with solutions to achieve the best outcomes. We collaborate with customers to understand their needs. We design and supply medical solutions to enhance performance at every point of care – from the operating room to the home.

Stand 29



Polymem
www.polymem.com

Ferris Mfg. Corp. (PolyMem) PolyMem is a unique and patented multifunctional polymeric membrane dressing (not a foam). PolyMem = More Healing & Less Pain.

Stand 15



Position Health
www.mooringsmediquip.com

Position Health is the pressure ulcer prevention and treatment division of DM Systems, Inc. Our flagship line of products include our heel offloading boots, the Heelift, and a new innovative TurnAssist repositioning system. No matter what clinical setting, Position Health have the tools and the expertise to deliver to patients and caregivers.

Stand 39



Roho
www.permobilus.com

ROHO is the worldwide leader of seating solutions that prevent & treat pressure ulcers. ROHO's technology provides skin protection & positioning in a variety of applications: from wheelchair cushions, to therapeutic mattresses, to wheelchair backs & more.

Stand 6



Seating Matters
www.seatingmatters.com

Seating Matters are changing the world of health care seating. Our expertly designed therapeutic seats are the first and only seating range to be supported by comprehensive clinical evidence. We recognised the effect sitting has on people's wellbeing and quality of life and partnered with Ulster University, world leaders in health science research. The results from the research were staggering to include an 88.3% reduction in pressure injury incidence. Seating Matters manufacture a range of adult, children and bariatric chairs to make life more comfortable for clients in need.

Stand 44

 **Smith & Nephew**
www.smith-nephew.com

We're here to help you reduce the human and economic cost of wounds. We do that through a pioneering approach to the design of our products and services that improve patient outcomes, and at the same time conserve resources for health care systems.

Stand 16

 **Stryker**
www.stryker.com

Stryker's Medical division develops innovative medical equipment focused on improving outcomes for patients and caregivers. We offer a broad portfolio of products across the continuum of patient care; from the workplace to the ambulance, into the emergency department and through patient discharge. Our product portfolio includes, but is not limited to: resuscitation devices, hospital beds, electric stretchers, temperature management systems and preventative skin injury and infection solutions. We are focused on safety, prevention, and ease of use – bringing caregivers' confidence and delivering proven outcomes.

Stand 3&4

 **Sumed International**
www.sumed.co.uk

Sumed has over 30 years of experience in pressure area care, working closely with clinicians and carers to promote pressure relieving solutions and improve patients' quality of life. Sumed® are committed to continually improving quality and product performance and always strive to develop and introduce cost effective innovative solutions for our customers

Stand 18

 **Trulife**
www.trulife.com

Trulife is an internationally based and managed group engaged in the creation, development, manufacture and marketing of niche healthcare products. Main product areas include:

Stand 26

- Operating room- Extensive range of silicone Gel Pads & Positioners providing effective pressure relief and positioning during all surgical procedures.
- Breastcare- A range of silicone & non-silicone Breast Forms, Bras & Accessories for post-mastectomy wear.
- Prosthetics- Lower limb prosthetics, artificial limb components and systems.
- Orthotics – Soft and rigid Orthotic Bracing, Collars & Ankle Foot Orthoses.
- Wheelchair Cushions- Range of high quality foam, air & gel pressure relieving Wheelchair Cushions.

 **Tissue Viability Society (TVS)**
www.tvs.org.uk

The TVS is dedicated to all issues of tissue viability, a growing healthcare speciality that primarily considers all aspects of skin and soft tissue wounds. The TVS' largest single area of activity is its annual conference – SAVE THE DATE #TVS2018 - 25/26 APRIL and visit our stand to find out more!

Stand 2a

 **Urgo Medical**
www.urgo-group.com

URGO Medical is the Healing Company committed each day to improve wound care treatments for both patients and health care professionals by offering highly innovative solutions.

Stand 5

 **VisitBelfast**
www.visitbelfast.com/conference

Stand 2b

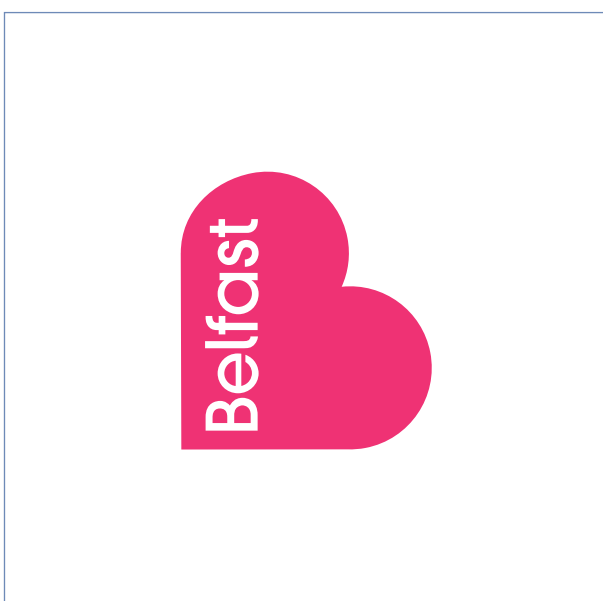
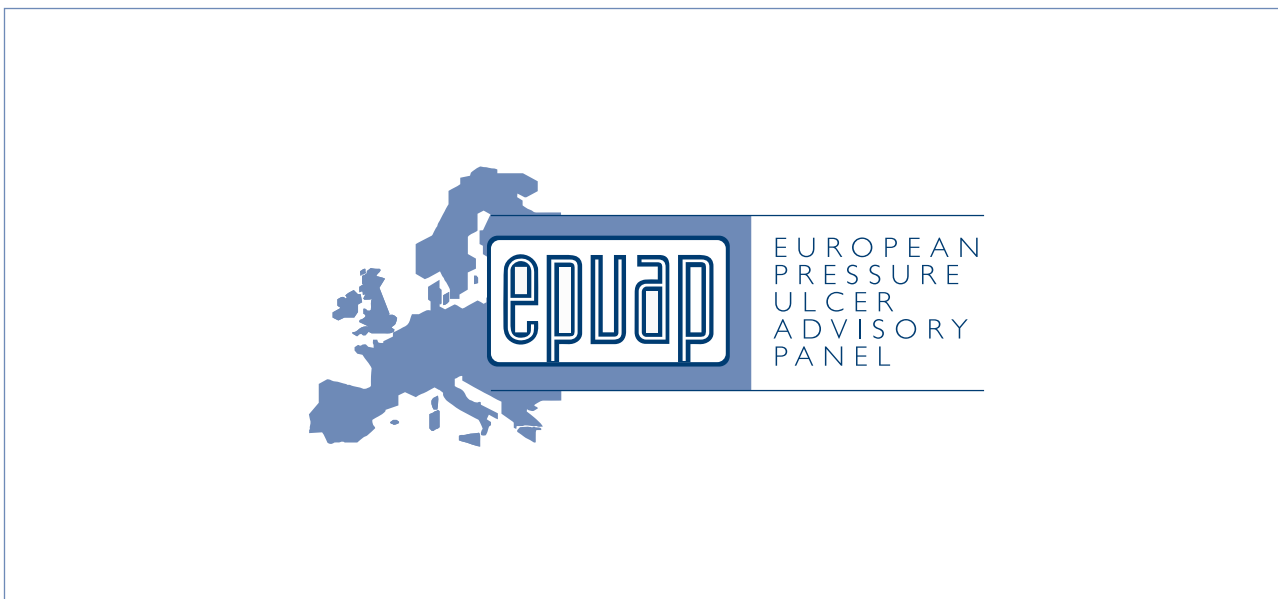
 **Wounds UK**
www.wounds-uk.com
www.woundsinternational.com
www.woundsme.com

Wounds International is a major international healthcare communications business with a global reach in wound management. Our mission is to deliver innovative educational materials, online, in print and in person that successfully meet the needs of those practising wound healing across different geographies. With extensive experience in the field of wound healing, we provide high-quality independent medical education using multiple platforms. Our aim is to support practitioners by providing insight into latest developments and condensing the available evidence into concise and practice-based guidance for everyday wound management.

Stand 20a

3M	12	BioMonde	41	ETAC / R82	22	Polymem	15
Abigo	33	Bruin Biometrics	32	EWMA	20B	Roho	6
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Apex Medical	27	Coloplast Ltd	10	Journal of Wound Care (JWC)	1	Stryker	3+4
Arjohuntleigh Getinge Group	8+9	Crawford UK	11	Lohmann & Rauscher	19B	Sumed International	18
B.Braun Medical	43	Drive DeVilbiss	31	Levabo	45	Talarmade	7
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				Meditec Medical Ltd	19A	Urgo Medical	5
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				Moorings Mediquip	39	Wounds UK	20A

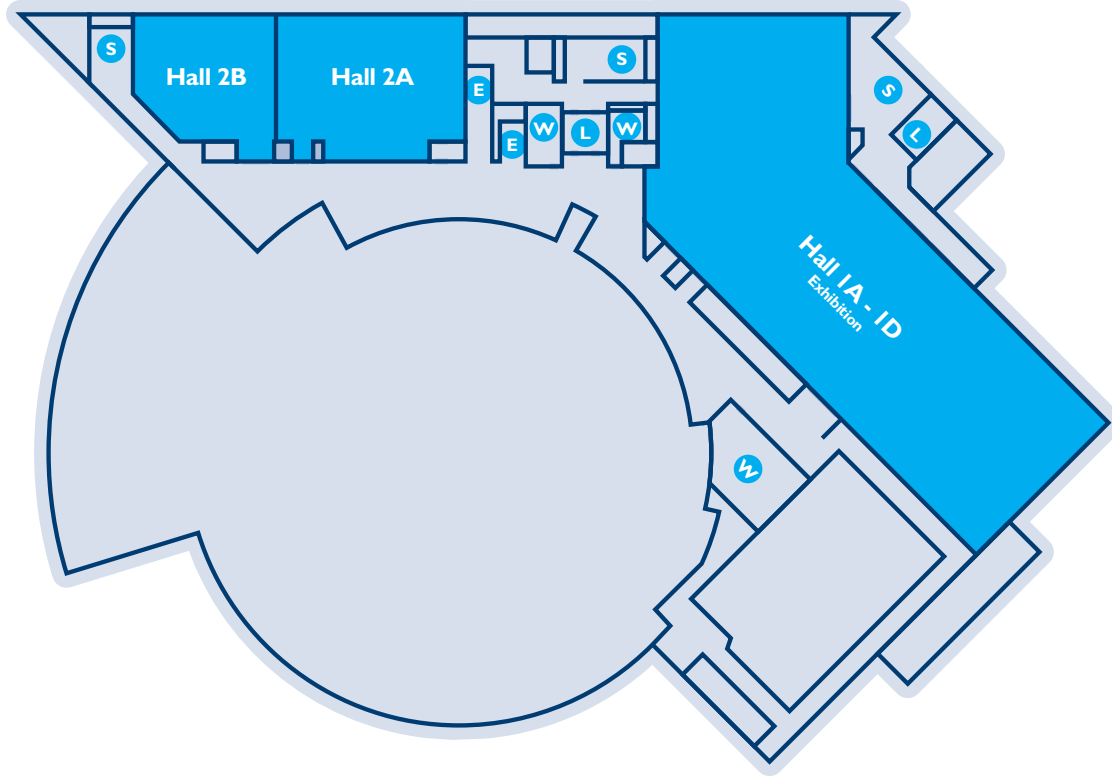




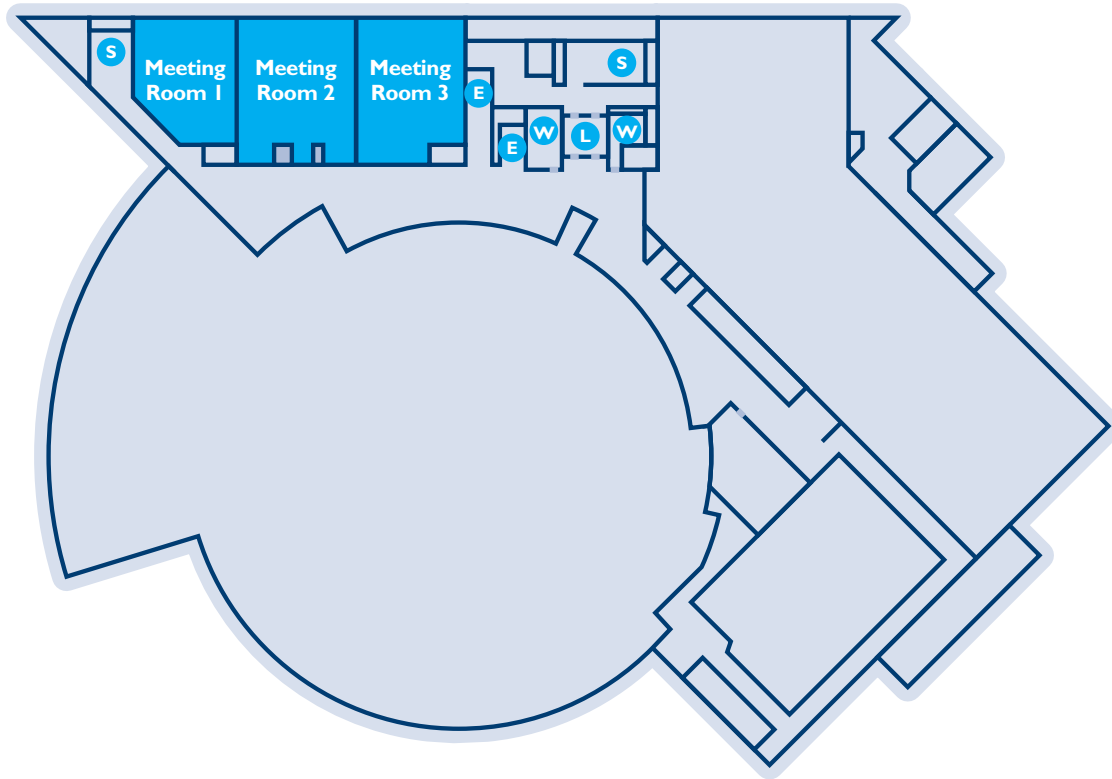


FLOOR PLAN

1st LEVEL



3rd LEVEL



- S** Stairs
- L** Lift
- W** Toilet
- E** Escalator



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