

# Abstracts from the Wounds Australia Conference 14-17 September 2022

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## An audit to assess debridement pad impact for 486 patients with unhealed wounds after six months

Ms Joanna Burnett, **Mr Andrew Kerr**, Ms Margaret Morrison, **Ms Abbe Ruston**

**Objectives:** The aim of the retrospective audit was to investigate the impact of monofilament fibre mechanical debridement on the total cost of wound care dressings.

**Methods:** The audit examined an anonymous set of prescribing data for 486 unique patients from the ePact dataset of the UK NHS Business Service Authority. "The primary inclusion criteria were patients with non-healing wounds, defined as those receiving monthly wound care prescriptions for the previous 6 months". The debridement pad was then introduced to treatment protocol and patients continued to receive wound care prescriptions during the following six months.

Costs were identified for the six months before and six months after the first use of the debridement pad.

**Results:** In the six months after the introduction of the debridement pad, the overall cost of wound care prescriptions fell from £712,467 (A \$1,283,509) to £610,744 (A \$1,110,255), a reduction of 14%. The cost of antimicrobial dressings fell by 33%.

**Conclusions:** Following the introduction of the monofilament fibre debridement pad into the treatment protocol for patients with non-healing wounds, this retrospective audit found a significant reduction in the total cost of wound care dressings.

### References:

Burnett J, Kerr A, Morrison M, Ruston A. An audit to assess the impact of prescribing a monofilament fibre debridement pad for patients with unhealed wounds after six months. *Journal Wound Care*. 2021 May 2;30(5):381–388. <https://doi.org/10.12968/jowc.2021.30.5.381>.

## A next generation silicone foam wound dressing. A 51-wound clinical evaluation

**Mr Simon Barrett**, Ms Brenda King, Ms Donna Welch, Ms Adel Scales, Ms Sophie Nockels

**Objectives:** A clinical evaluation was undertaken to detail the characteristics and performance of a next generation Silicone foam dressing and how it impacted skin sensitisation and medical adhesive-related skin injuries (MARSIs)

**Methods:** The evaluation comprised a minimum of four dressing changes over at least 2 weeks. Fifty patients (51 wounds) were included in the evaluation.

The evaluation was undertaken in a community setting and an acute Diabetic Foot Clinic. Each patient evaluation ran for a minimum of 2 weeks with a minimum of four contacts including the first contact and application of the Silicone foam.

All patients over the age of 18 years who had a wound with low to moderate levels of exudate were invited to be involved in the evaluation. The aim was to include at least 40% of patients with friable and vulnerable skin, or who were known to have experienced MARSIs in the past.

**Results:** At the final evaluation, 57% (n=29) of the wounds were recorded as improved, 37% (n=19) were recorded as static and 6% (n=3) were recorded as having deteriorated.

Silicone foam dressing was rated highly by both clinicians and patients, in all aspects of comfort, softness, ease of removal and ability to stay in place, with no reports of skin damage from the adhesive.

**Conclusions:** In this 51-wound evaluation, the Silicone foam dressing performed well in patient comfort and ease of handling, exudate management and where there was existing poor peri-wound skin condition. Generally, the peri-wound skin condition improved, suggesting that the dressing could be included as part of a holistic wound care plan to support effective exudate management and care of the peri-wound skin.

### References:

Barrett S, King B, Welch D, Scales A, Nockels S. Suprasorb P Sensitive A 51-wound clinical evaluation. *Journal of Community Nursing*, 2021, Vol 17, No 3. <https://www.wounds-uk.com/journals/issue/651/article-details/suprasorb-p-sensitive-51-wound-clinical-evaluation>

## The Utility of Impedance Spectroscopy in Monitoring Skin Barrier Function with Response to Sustained Pressure

**Miss Emily Owen**<sup>1</sup>

<sup>1</sup>University Of Bath, Bath, United Kingdom

**Objectives:** Impedance spectroscopy is a non-invasive technique which can be used to monitor skin barrier function, with potential applications in early-stage pressure ulcer detection. The technique was used in this study to measure cellular deformation, resulting from up to 22.5 mmHg of mechanical loading, on ex vivo porcine epidermal skin. The effect on both intact and pre-damaged (SDS-treated) skin was compared.

**Methods:** The ex vivo porcine pressure model involved applying a mechanical load of 0 mmHg, 7.5 mmHg, 15 mmHg or 22.5 mmHg (N=4) to the epidermis. The skin impedance was monitored for a period of up to 24 h, at 0.1 Hz – 50 kHz, using disposable Ag/AgCl electrodes.

**Results:** After 24 hours, the impedance of the intact skin significantly reduced compared to the control group and was proportional to the degree of mechanical loading. In comparison, the impedance of pre-damaged skin was significantly reduced after only 15 hours. Histology images of skin cross-sections provided qualitative evidence to suggest there was reduced tissue integrity in mechanically-loaded skin (7.5 – 22.5 mmHg), compared to the control groups.

**Conclusions:** The skin impedance protocol is very sensitive to cellular changes, caused by pressure. The pre-damaged skin was more sensitive to pressure than intact skin, as would be expected due to the compromised skin barrier function. The skin impedance technique has strong potential for use in early detection of pressure ulcers, prior to visible indication.

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## Barriers and enablers to implementing evidence into Podiatry practice

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The aim of the study was to use Behaviour Change Theories to identify barriers and enablers to uptake of the Wifl (Wound, Infection and Ischaemia) assessment tool as an Evidence Based clinical guideline tool in a High-Risk Foot Clinic, and then determine interventions needed to help increase use of evidence in podiatry practice.

**Methods:** Semi structured interviews of podiatrists working in a High-Risk Foot clinic were analysed thematically using the Behaviour Change Wheel (BCW) and the Theoretical Domains Framework to explore barriers and enablers to the uptake of the Wifl tool.

**Results:** Five podiatrists of between 4 – 32 years' experience, working at a High-Risk Foot clinic were interviewed. Using the BCW, participants were found to have psychological capabilities, physical and social opportunities and automatic motivation needed to incorporate the Wifl tool in their clinical practice. However, to support successful uptake, interventions are needed to: increase awareness and effectiveness of the tool; enable Wifl functionality in practice; and have Wifl supported by trusted providers in the hospital

**Conclusion:** This is the first study within podiatry identifying barriers and enablers of the use of a clinical guideline tool in a High-Risk Foot Clinic. It illustrates the complexity of behaviour change in evidence implementation using the BCW as a simple but effective framework in identifying these changes, essential in supporting uptake of evidence-based podiatry practice.

## Perceptions of diet quality, advice and dietary interventions in individuals with diabetic foot ulceration.

Miss Hailey Donnelly<sup>1</sup>, Professor Clare Collins<sup>1</sup>, Dr Rebecca Haslam<sup>1</sup>, Ms Diane White<sup>2</sup>, Dr Peta Tehan<sup>3</sup>

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**Objectives:** Dietary intake is a recognised contributor to healing outcomes in diabetic foot ulceration

(DFU) [1]. Current evidence relating to dietary intervention focuses on supplementation to improve wound healing outcomes [2-9]. However, it is currently unknown what individuals with DFU perceive as acceptable types of dietary interventions. Therefore, the aims of this study were to explore perceptions of diet quality and dietary interventions in individuals with DFU, and secondly to determine acceptable dietary interventions in individuals with DFU to assist with wound healing.

**Methods:** A qualitative study using a reflexive thematic approach was undertaken [10]. A heterogenous participant sample, with active or recent history of DFU, was recruited from a high-risk foot service in Newcastle, NSW, Australia. Semi-structured interviews were transcribed, coded, and themes derived by two researchers.

**Results:** Nineteen participants were included with three themes identified: A complex relationship with food, perceptions of food, diet and dietitians, and self-management. Dietary misconceptions were common. Self-perceived diet quality was varied, with many recognising improvements could be made, with most unaware of how their diet could impact wound healing. Many expressed barriers relating to food agency (purchasing, preparing, and accessing food). Participants expressed a strong preference for personalised, face-to-face dietary advice and nutritional supplementation.

**Conclusions:** There is a need for personalised dietary re-education and assistance with food agency in this cohort to overcome commonly held misconceptions of diet and improve dietary intake to facilitate wound healing. This novel finding will help guide future dietary intervention studies in this cohort.

## Pressure injuries in a community hospice service: an explorative study

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**Objectives:** Hospice care patients often have multiple comorbidities and organ failure with poor physiological condition, impaired tissue perfusion and physical function, which increases their risk of pressure injuries (PIs). The Objectives: were to investigate patient comorbidities and their associations with PIs; prevalence and incidence of PIs; and the stage, location, duration and outcome of PIs managed.

**Method:** A retrospective descriptive study was conducted and data was obtained from the electronic records of patients admitted to a Perth metropolitan community hospice care service between 1st January 2019 to 31st December 2019. The number and stage of PIs for those with a cancer diagnosis as compared to a non-cancer end of life diagnosis was determined, as was the prevalence and outcomes of PIs managed.

**Results:** The hospice service cared for approximately 2,727 patients with a mean 26% prevalence rate and 17% incidence rate for PIs. There was no statistical difference in the prevalence (24% -26.5%) or incidence (16% – 18%) rates across the three metropolitan care teams. Stage II accounted for 48% of the pressure injuries followed by Stage I (32%). The sacrum was the most common site for a PI and 61% of the patients died with the PI, while 11% were transferred to a hospital or inpatient hospice service and 28% healed. A cancer diagnosis was found to be associated with Stage I and II PIs while Stage III and IV PIs were associated with non-cancer chronic conditions.

**Conclusion:** Hospice patients are at increased risk of PIs and therefore, require a targeted prevention plan.

## Developing a systemic monoclonal antibody therapy for the treatment of large burn injuries

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**Objectives:** Studies have shown that Flightless (Flii) is elevated in human wounds including burns and reducing the level of Flii is a promising approach for improving wound repair. The most effective approach has been to neutralise Flii activity using localized, intradermal application of Flii neutralizing antibodies (FnAbs). However, large surface area burns are difficult to treat by intradermal injection so the aim of this study was to investigate if systemic injection of FnAbs could improve healing in mice following burn injury.

**Methods:** A partial thickness, 7% (70mm<sup>2</sup>) total body surface area scald-burn injury was created on the dorsal surface of mice (n=8/group) and labeled Alexa-Fluor-680-FnAbs were injected into the intraperitoneal cavity (IP) at time of injury. The burns were imaged on days 0, 1, 2, 3, 4 and 7 using IVIS Lumina S5 Imaging System and healing assessed macroscopically, histologically and using immunohistochemistry.

**Results:** Fluorescent measurements showed that IP injected Alexa-Fluor-680-FnAbs localized at the site of burn injury from day 1 remaining there for whole 7-day study. The burns treated with FnAbs showed a reduction in macroscopic wound area and increased rate of epithelialization compared to controls. Immunohistochemistry for NIMP-R14 showed a reduction in inflammatory infiltrate while CD31/VEGF staining showed improved angiogenesis post-systemic FnAb treatment.

**Conclusions:** These Results: suggest that systemically administered FnAbs are active within the burn site and can improve healing outcomes. The clinical application of systemically injected Flii monoclonal antibodies could therefore be a potential approach for promoting healing of large surface area burns immediately after injury.

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## Physical activity as an adjunct treatment in management of venous leg ulcers: a scoping review

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**Objectives:** The aim of this review was to identify and summarise the barriers and enablers that affects physical activity (PA) participation in people with venous leg ulcers (VLUs).

**Methods:** This review followed the Joanna Briggs Institute methodology for systematic reviews of qualitative evidence [1, 2]. We searched MEDLINE, CINAHL PLUS, PsycINFO and Emcare to identify relevant articles published in English from 1806 to January 2021. Two reviewers independently screened and selected articles against inclusion criteria. Eligible studies were appraised for methodological quality using Joanna Briggs Institute Critical Appraisal tool. Qualitative data were extracted manually. Theoretical Domain Framework was used to map barriers and enablers to physical activity participation.

**Results:** This review included 18 studies. The main barriers for people with VLUs to engage in PA are wound pain, compression-related pain, negative emotions (i.e. fear, embarrassment) and contradictory/unclear information from treating clinicians. The main enablers for PA participation include a clear understanding of the chronic nature of VLUs and reasons for doing PA, a high level of self-belief in their capabilities, and clear/consistent instructions on PA from treating clinicians.

**Conclusions:** Our review identified that people with VLUs experience various challenges preventing them from engaging in PA. Availability of information on benefits of PA and development of self-belief may be particularly important for promoting PA in this cohort. Future interventions are recommended to provide educational information and clear instructions to improve participation. Future study is needed to better understand the preferences of this population for physical activity to design acceptable interventions.

### References:

1. Lockwood, C., Munn, Z., & Porritt, K. (2015). Qualitative research synthesis: methodological guidance for systematic reviewers utilizing meta-aggregation. *International Journal of Evidence-Based Healthcare*, 13(3), 179–187. <https://doi.org/10.1097/XEB.000000000000062>
2. Qiu, Y., Osadnik, C. R., Team, V., & Weller, C. D. (2021). Physical Activity as an Adjunct to Compression Therapy on Healing Outcomes and Recurrence in Patients with Venous Leg Ulcers: A Scoping Review Protocol. *Frontiers in medicine*, 8, 1072.

## Can a pressure injury prevention programme for Assistants in Nursing change their knowledge and attitude?

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**Objectives:** The aim of the study was to explore the impact of a bespoke education programme for Assistants in Nursing (AINs) on their knowledge and attitude toward pressure injury prevention. As an unregistered position, until recently there was no standard educational requirements for AINs, and they may not have received any prior education on pressure injury prevention.

**Methods:** A pre- and post-test quasi-experimental observational study was employed using the validated Attitude toward Pressure Ulcer Prevention (APUP)1 survey and a modified Pressure Ulcer Knowledge Assessment Test (PUKAT 2.0)2. An education programme consisting of 6 thirty-minute sessions over a period of 6 weeks was conducted with the surveys completed prior to the education and 3 months following the education sessions.

**Results:** Seventeen AIN's consented to participate in the study and thirteen attended education sessions. At baseline the mean PUKAT 2.0 score was 6.77, and following the educational program was 8.92, with a mean increase of 2.15. The mean APUP score was 39.77 at baseline, and following the intervention was 41.38, showing a mean increase of 1.62. Feedback from participants was positive with all those who attended the education sessions recommending each session was necessary to the programme.

**Conclusions:** In order to prevent the development of pressure injuries, all nursing staff, including AINs, must be aware of the risks and preventative strategies. Our programme aims to address this. The project could easily be expanded to include all AINs and be imbedded into essentials of care or comprehensive care programmes.

### References:

1. Beeckman, D., Defloor, T., Demarre, L., Van Heck, A and Vanderwee, K. (2010). Pressure ulcers: Development and psychometric evaluation of the Attitude towards Pressure ulcer Prevention instrument (APUP). *International Journal of Nursing Studies*. 47, 1432-1441.
2. Manderlier, B., Van Damme, N. Vanderwee, K., Verhaeghe, S., Van Hecke, A. and Beeckman, D. (2017). Development and psychometric validation of PUKAT 2.0, a knowledge assessment tool for pressure ulcer prevention. *International Wound Journal*. 14, 1041-1051.

## Community wounds: Best practice, best products, best outcomes

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**Objectives:** The study aimed to determine the scope of community wounds: client demographics, number and type of wounds, treatments implemented, healing outcomes, actual time and costs to treat.

**Methods:** A descriptive prospective study was conducted 1 July 2020 to 30 June 2021. Assessment and care plan data from all clients with wounds managed by a large Australian community nursing organisation, were entered onto tablets or smart phones at point of care. Ongoing audits ensured data completeness and accuracy. Study endpoints were wound types, numbers, anatomical locations, healing outcomes, length of stay, consumables used, time taken to treat, actual costs to discharge.

**Results:** A total of 49,234 wounds on 21,189 clients, aged 1 to 105 years, were managed during the 12 months. There were 445,440 client visits and 681,342 wound dressings performed, averaging 2000 dressings each day. Some clients had more than one wound. Acute wounds comprised 35.4%, skin tears 16%, leg ulcers 14%, foot ulcers 10%, pressure injuries 9.4%, tumours 1.36% and other wounds (open dermatological lesions) 12.4%. Significantly, 75% of all wounds were discharged healed or to self-care (virtually healed). Venous leg ulcers were the most frequently treated wound and cost the most to treat, followed by acute wounds. The total cost to treat 49,234 wounds to discharge was \$23.2m, which included consumables used and actual costs of nurse time to perform the procedures.

**Conclusion:** Healing outcomes demonstrated the implementation of best practice and best products, produces best outcomes for community clients with wounds and the organisation.

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## Comparing adjustable compression wraps to 4-layer compression bandages in the treatment of venous leg ulcers

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**Objectives:** Compression therapy is the gold standard treatment for venous leg ulcers (VLU)(1). The aim was to compare the efficacy, cost effectiveness and patient and nurse satisfaction when 4-layer compression bandages as compared to adjustable Velcro® compression wraps were used in the treatment of VLU in the community.

**Methods:** A prospective same patient cross-over study was conducted. A convenience sample of 50 patients with VLUs were recruited from a community nursing service in Western Australia. Patients were randomised to receive either 4-layer compression bandaging or an adjustable Velcro® compression wrap for a period of 6 weeks, then crossed to the alternative treatment for an additional 6 weeks. Baseline and weekly wound assessments were recorded. Patients and nurses completed satisfaction surveys at the end of each arm. A cost analysis was completed.

**Results:** Patients experienced a comparable reduction in ulcer size with both compression modality. Nurse satisfaction was generally higher for the adjustable Velcro® compression wraps. Patient satisfaction varied. Primarily, they reported increased ease in wearing appropriate footwear when using the wraps. The relative costs associated with using a reusable wrap as compared to single use compression bandaging was dependent on the duration of treatment and frequency of dressing changes. However, interim analysis suggests that there is a duration of treatment where wraps provide cost benefits, which occurs with a mean of 26 treatments.

**Conclusions:** The use of adjustable Velcro® compression wraps is cost-effective and provides acceptability benefits in the treatment of VLUs in the community care environment.

### References:

1. Harding K. Challenging passivity in venous leg ulcer care - the ABC model of management. *Int Wound J.* 2016;13(6):1378-84.

## Investigation into Effectiveness of Compression Stockings for Lower Leg Re-ulceration Prevention in a Community Cohort

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**Background:** Venous leg ulcers (VLUs) comprise the largest number of wounds in a community nursing organisation<sup>1</sup>. Recurrence of VLUs is reported to be 69%<sup>2,3</sup>. Compression stockings worn post healing of a VLU has been shown to reduce recurrence<sup>3</sup>.

**Objectives:** The aim of this study was to investigate the effectiveness of graduated compression stockings for prevention of VLU recurrence in the community setting. Secondary Objectives: were determination of concordance with treatment, client satisfaction and cost-effectiveness.

**Method:** A descriptive study recruited a convenience sample of community clients post-healing of a VLU. Clients were measured and supplied with compression stockings and provided with verbal and written education on stocking use. Clients completed telephone surveys at 2, 6 and 12 weeks to determine recurrence rates, concordance with treatment, client satisfaction and cost-effectiveness.

**Results:** A total of 24 clients participated, 62% (n=15) completed the study without ulcer recurrence 17% (n=4) had recurrence 21% (n=5) withdrew due to difficulties with application/comfort. The cost of stockings was \$130 compared to potential treatment of a recurrent VLU, which was estimated to be \$990.48 per client.

**Conclusions:** Compression stockings proved a cost-effective intervention for prevention of recurrent VLUs. However, a proportion of study participants reported difficulty with application and removal, which raises the question whether this method of prevention is suitable for older clients who form a significant proportion of those affected by VLUs.

### References:

1. Silver Chain Group. (2022). ComCare Wound Data, 2020-2021. Unpublished report. Author.
2. Kapp, S., & Miller C. (2015) The experience of self-management following venous leg ulcer healing. *Journal of Clinical Nursing.* 24(9-10), 1300-9.
3. Nelson, E., & Bell-Syer, S. (2014) Compression for preventing recurrence of venous ulcers. *Cochrane Database Systematic Review* 2014(9). Retrieved 21.3.2021 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7138196/>

## Pandemic within a pandemic: foot infection in persons with diabetes related foot ulcers and COVID-19

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**Background:** SARS-COV-2 (COVID-19) pandemic was accompanied by public health orders placing restrictions on healthcare and social systems. Most out-patient based services and GP practices closed face-to-face appointments and transitioned to telehealth. Liverpool High Risk Foot Service (LHRFS) remained functionally open but utilised the Australian clinical triage guide for people with diabetes-related foot disease during COVID-19. Only patient's considered 'highly serious' or 'critical' (i.e. infections' or limb threatening condition) were seen face-to-face. Over this period we anecdotally recognised a significant increase in presentations for Diabetes foot Infections (DFIs).

**Methods:** The South West Sydney Limb Preservation and Wound Research Academic unit established a clinical registry in 2018. All data is prospectively entered into REDCap including demographic, laboratory, outcome and clinical data. Infection presentations to the HRFS recorded in terms of an infection episode, hence one patient may have multiple events of infection. In order to capture the increased activity of COVID-19 we plan to collect from 2020 through June 2022. **Pre-COVID data will be from 2018 to early 2020.**

**Results:** We will report the number of DFI events by month and year for 2018-2022 and analyse trends of COVID restrictions to determine if this affected the number and severity of DFI events.

**Conclusion:** COVID-19 public health orders limited access to care. We will conclude if this affected people with foot ulcers accessing timely care and if this caused an increase in the number of infections.

## Clinical outcomes of foot infections in persons with diabetes. Data from the LIV-DFI registry

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**Background:** Foot infections in persons with diabetes is a significant detriment to the patient and accounts for approximately 27,600 hospital admissions every year in Australia. To our knowledge, there is scant data from large datasets reporting on clinical outcomes for foot infections in persons with diabetes (DFIs).

**Aim:** The primary aim is to report the number of DFI episodes and their associated clinical outcomes.

**Methods:** The South West Sydney Limb Preservation and Wound Research Academic unit established a clinical registry in Liverpool Hospital High Risk Foot Service in 2018. All data is entered prospectively into REDCap. Infection presentations to the High-Risk Foot Service are captured and entered in terms of an infection episode, hence one patient may have multiple episodes of infection. Data recorded on REDCap is extensive and includes broad demographic, laboratory and clinical data, in addition to all outcome data. In order to capture the increased activity of COVID-19 we plan to have a cut off period as of June 2022 for full data extraction and analysis.

**Results:** We will report clinical outcomes of interest separately for skin and soft tissue DFI and Osteomyelitis, and stratify infections based on the PEDIS infection grade and severity. Outcome data will include the number of DFI episodes and their outcome; infection resolution, infection failure, % of episodes medically managed, the % of episodes requiring surgery [minor or major amputation, resection, and debridement], duration and type of antibiotic therapy, death.

**Conclusion:** The full data set will be available by the conference presentation and currently includes >400 infection episodes and outcomes. To the best of our knowledge there is no single prospective database as large from > 4 years of collection, reporting on infection outcomes for those with diabetes and foot disease.

## Lighting the way in chronic wound management – a pilot study using blue light photobiomodulation

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**Objectives:** - Internationally, chronic wounds are a serious medical concern that have a significant financial impact on healthcare and a significant impact on patients' quality of life

(1). The chronic wound is challenged by persisting inflammation that prevents the wound from progressing to normal wound healing. Blue Light is known to reduce signs of inflammation, reduces wound associated pain and produces faster tissue regeneration than standard wound care via photobiomodulation (PBM). (2-4). This pilot study (N=10 patients) aimed to explore the use of a blue light emitting device (400-430nm) on chronic non healing wounds and whether there were any alterations in wound metrics and patient reported pain.

**Methods:** All enrolled patients with a wound of chronicity greater than 8 weeks meeting the inclusion criteria were treated with the device for 60-seconds per 20cm<sup>2</sup> (120mW/cm<sup>2</sup>) once weekly following standard care protocols in the outpatient setting for up to 10 weeks.

**Results:** The retrospective analysis of the data found will be presented in this paper with patient cases, super-user information and will provide trends on wound characteristics. At the time of abstract submission and with Covid-19 surge demands Results: are in data collection phase.

**Conclusions:** At the time of abstract submission 2 patients had completed the treatment period showcasing encouraging improvements in wound bed tissue, exudate, and wound size reduction along with wound pain score. Additional patient observations will be included as the pilot study progresses, possibly preceding a larger clinical trial.

### References:

1. Martinengo L et al. Prevalence of chronic wounds in the general population: systematic review and meta-analysis of observational studies. *Annals of Epidemiology*, Volume 29, January 2019, Pages 8-15.
2. Dini V et al. Blue Light emission in the management of hard-to-heal wounds. *Giornale Italiano di Dermatologia e Venereologia* 2020; 1 55
3. Marchelli M et al. Photobiomodulation with Blue Light in non-healing wounds: case series evaluation. *Wounds International* 2019, Volume 10 Issue 3, 63-67.
4. Fraccalvieri M et al. Blue Light for Ulcers Reduction (B.L.U.R) Study 2019 *ClinicalTrials.gov* Identifier NCT 04018924.

## Bacteria-Activated Smart Hydrogel with On-Demand Antibacterial Release Based on Wound Microenvironment Changes.

Dr Hanif Haidari<sup>1</sup>, Mr Richard Bright<sup>1</sup>, Prof Sanjay Garg<sup>1</sup>, Prof Krasimir Vasilev<sup>1</sup>, Prof Allison Cowin<sup>1</sup>, Dr Zlatko Kopecki<sup>1</sup>

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**Objectives:** Targeted antibacterial therapies are rapidly emerging as the new viable strategies to circumvent the escalating threats of infections. Antibacterial treatments that can provide an on-demand release to kill pathogens, maintaining long-term efficacy, offering minimal side effects and without developing bacterial resistance have been a long-standing focus of research interest.

**Methods:** We demonstrate the development of a stimuli-responsive hydrogel with the on-demand release of silver nanoparticles (AgNPs) triggered by the changes in the wound microenvironment. The hydrogel is prepared by crosslinking N-isopropylacrylamide with acrylic acid while loaded with ultrasmall AgNPs. The hydrogel is optimized for high sensitivity toward the changes in wound pH and temperature resulting in a timely and effective release of silver ions only when they are required.

**Results:** We have shown that our hydrogel is highly sensitive to a typical pathological wound pH and temperature change, evidenced by the restricted release of silver ions at acidic pH (<5.5) (30%) while significantly promoting the release in alkaline pH (90%) which is a typical microenvironment during bacterial wound infection. The in vitro antibacterial test showed minimal killing at pH 4 or 5.5 but dramatically activated at pH 7.4 and 10 to eliminate over 95% of Gram-negative and positive pathogens. Our in vivo studies further support the strong antibacterial properties of this hydrogel while significantly accelerating wound healing superior to a commercial silver product.

**Conclusions:** Therefore, this multifunctional hydrogel presents a highly promising bacterial responsive delivery platform serving as an on-demand carrier to boost the antibacterial efficiency based on physiological needs.

## Identifying disease-specific distress in adults with venous leg ulcers

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**Objectives:** Distress is the experience of feeling overwhelmed by the demands of living with and managing a chronic disease such as VLUs<sup>1</sup>. This is different to depression/anxiety in that distress is focussed on emotional response to the disease experience (i.e., the need for people with VLUs to attend clinics, the need to organise transport and the associated costs, while often feeling tired and overwhelmed). The aim of the study was to identify the presence of VLU distress to inform the development of a scale for assessing this phenomenon.

**Methods:** This three-phase study used: (1) a conceptual framework based on chronic disease distress to conduct a secondary analysis of qualitative data from three previous VLU studies (n = 12 transcripts). Themes were identified from secondary analysis as causing distress; which then guided (2) one focus group and two individual interviews of people with VLUs or who had had VLUs (n = 5); and (3) items generated from phases one and two were subsequently used in a modified delphi survey of health professionals caring for people with VLUs to confirm the distress items.

**Results:** Five VLU-distress themes were identified: emotional distress; healthcare-related distress; interpersonal/social distress; treatment-related distress; and symptom-related distress.

**Conclusions:** Disease-specific distress in VLU was identified and is distinct from anxiety and depression. Some causes of VLU distress overlap with diabetes and Inflammatory Bowel Disease (IBD) distress, but existing diabetes/IBD-distress scales do not explain all the distress experienced by people with VLU and development of a new VLU-distress scale is warranted.

**References:**

- 1 Dibley, L., Czuber-Dochan, W., Woodward, S., Wade, T., Bassett, P., Sturt, J., & Norton, C. (2018). Development and Psychometric Properties of the Inflammatory Bowel Disease Distress Scale (IBD-DS): A New Tool to Measure Disease-Specific Distress. *Inflammatory bowel diseases*. doi:10.1093/ibd/izy108

## Identifying the association between vascular lesions and the STAR Classification System

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**Objectives:** Skin tears are common wounds in elderly clients managed by a community nursing service<sup>1,2,3</sup>. The study aimed to determine associations between skin tears and haematoma, purpura and senile-purpura. Healing times and costs to treat were investigated.

**Methods:** A descriptive retrospective study was conducted using skin tear images uploaded by nurses, on an electronic data base between June, 2016 and December, 2018. Images used were those on the extremities and which healed within 48 days. The Skin Tear Audit Research

(STAR) Classification<sup>1,2,3</sup> was used to classify the tears on admission and on recruitment. Descriptive and non-parametric analysis was conducted to identify relationships between the vascular lesions and STAR 1b, 2b outcomes and costs to treat.

**Results:** There were 2,161 skin tears sustained by 1300 adults (n=632 females, n=668 males) aged 65 to 103 years (medium = 86 years). Tears occurred in 51.4% males, 48.6% females. More tears occurred on the legs as compared to arms (p= 0.001). The majority were classified as STAR 2b. Purpura and senile purpura were not associated with STAR 1b and 2b. Haematoma was associated with the STAR 2b and delayed healing. The median healing time for tears with haematoma (22 days) and without (16 days) was significant (U=788,427.5, z=9.257, p < 0.001). Ongoing analysis will report on the leg skin tears that were reclassified as leg ulcers with subsequent delays in healing and increased costs.

**Conclusions:** Haematoma was associated with the STAR 2b skin tears, delayed healing and increased costs. Some tears evolved into leg ulcers.

**References:**

1. Carville, K., Lewin, G., Newall, N., Haslehurst, P., Michael, R., Santamaria, N., & Roberts, P. (2007). STAR: A consensus for skin tear classification. Available at <http://www.woundpracticeandresearch.com.au/>
2. Lewin, G. F., Newall, N., Alan, J. J., Carville, K. J., Santamaria, N. M., & Roberts, P. A. (2016). Identification of risk factors associated with the development of skin tears in hospitalised older persons: A case-control study. Available at <https://doi.org/10.1111/iwj.12490>
3. Rayner, R., Carville, K., Leslie, G., & Dhaliwal, S. S. (2019). Clinical purpura and elastosis and their correlation with skin tears in an aged population. Available at <https://doi.org/10.1007/s00403-019-01899-9>

## An updated Wound Infection Continuum from the Wound Infection in Clinical Practice Consensus Document 2022

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<sup>1</sup>IWII, Warrnambool, Australia

**Objective:** The aim of 2022 IWII consensus document update was to provide an accessible and useful clinical resource incorporating the latest evidence and current best practice for wound infection and prevention

**Method:** A systematic review of the literature was undertaken to identify research published since 2016. A modified Delphi process was used for definitions within the document. Grading of evidence for clinical effectiveness of wound infection interventions for topical antimicrobial treatments was guided by the PICO approach. Evidence sources were critically appraised using tools recommended by GRADE. Ranking was labelled as high, moderate or low certainty. The document was peer reviewed by leading experts in wound management/ infection.

**Outcome:** The 2022 Wound Infection in Clinical Practice document consists of 15 sections of contemporary wound infection practice, methodology, References: and a glossary. Extensive work has been conducted to update the 2022 IWII-WIC Management Guide and provides a one-page visual tool for wound infection and biofilm management to promote ease of use and accessibility for clinicians

**Results:** The entire document has been published on the International Wound Infection Institute website but additional pdf versions of the WIC and Management Guide are also free to download. One version is the entire diagram, another is just the WIC and the third is the BBWC diagram of the step down / step up care.

**Conclusion:** The focus of this presentation would be on the updated WIC and Management Guide.

## Macronutrient and micronutrient intake of individuals with diabetic foot ulceration: A short report.

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**Objectives:** Adequate nutrition is essential in individuals with diabetic foot ulceration (DFU) [1,2], therefore assessment of dietary intake is critical. A lack of nutrients including protein, zinc, and vitamins C and D have all been associated with poor wound healing [3,4]. However, the comprehensive dietary intake of Australian adults with DFU is poorly understood. The aim of this cross-sectional study was to describe the dietary intake of adults with DFU in an Australian setting.

**Methods:** A sample of adults, with current DFU, were recruited from four high risk foot clinics across New South Wales, Australia. Dietary intake was assessed using the Australian Eating Survey, a self-reported validated Food Frequency Questionnaire [5]. Descriptive analysis was undertaken to quantify dietary intake of core food groups.

**Results:** Participants (n= 115) had a mean body mass index of 36. The mean reported energy intake was 9575kJ/day (±SD 4436). Mean protein intake of 104g/day (±SD 49) is below recommended intake for wound healing, however mean protein intake contribution to energy (19%E) was within recommendations for normal populations. Mean carbohydrate intake

(43%E) was within recommended ranges for healthy populations, however mean total fat intake (36%E) was above recommendations. Micronutrient intake was

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adequate, except folate which was below recommended intake. Sodium, vitamin C, vitamin A, and selenium were above recommended intake.

**Conclusions:** Wound management of individuals with DFU should include regular assessment of dietary intake to recognise deficiencies in macro and micronutrients, and subsequently address these inadequacies to optimise healing.

**References:**

1. Molnar JA, Underdown MJ, Clark WA: Nutrition and Chronic Wounds. *Advances in wound care* 2014, 3(11):663-681.
2. Medlin S: Nutrition for wound healing. *British Journal of Nursing* 2012, 21(Sup12):S11-S15.
3. Bechara N, Gunton JE, Flood V, Hng T-M, McGloin C: Associations between Nutrients and Foot Ulceration in Diabetes: A Systematic Review. *Nutrients* 2021, 13(8):2576.
4. Zhang S-S, Tang Z-Y, Fang P, Qian H-J, Xu L, Ning G: Nutritional status deteriorates as the severity of diabetic foot ulcers increases and independently associates with prognosis. *Exp Ther Med* 2013, 5(1):215-222.
5. Collins CE, Boggess MM, Watson JF, Guest M, Duncanson K, Pezdirc K, Rollo M, Hutchesson MJ, Burrows TL: Reproducibility and comparative validity of a food frequency questionnaire for Australian adults. *Clinical Nutrition* 2014, 33(5):906-914.

## Physical activity as an adjunct treatment in management of venous leg ulcers: a scoping review

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**Objectives:**

- To identify the types of physical activity/exercise interventions have been used as an adjunct treatment to compression therapy;
- To explore the Methods: have been used to evaluate the key outcomes of interest (i.e. time to healing, recurrence rate etc.);
- To explore the effect of physical activity/exercise interventions on patient/clinical outcomes.

**Methods:** This scoping review followed the six-step framework developed by Asksey and O'Malley [1, 2]. We searched electronic databases and trial registration websites for relevant studies and ongoing trials. Two review authors independently screened and selected articles. Findings were presented in a descriptive statistical narrative summary.

**Results:** Physical activity interventions in 10 out of 16 eligible studies comprised only one component, six studies were resistance exercises, three studies reported ankle and/or foot range of motion exercises, and one study reported aerobic/walking exercises. Five studies involved multicomponent exercise interventions. Resistance exercise combined with ankle and/or foot range of motion exercise minimised ulcer size at day 12 (intervention group (IG):4.55±1.14 cm<sup>2</sup> versus control group (CG): 7.43±0.56 cm<sup>2</sup>) and improved calf muscle pump performance at day 8 (ejection fraction: 40% to 65%; residual volume fraction: 56% to 40%). Our study showed no clinical difference in ulcer recurrence between two groups (i.e. IG:12% versus CG: 5%).

**Conclusions:** Resistance exercise was the most common type of physical activity intervention trialled in the published literature. Resistance exercise combined with ankle and/or foot range of motion exercise appears to be effective adjunct treatment. However, the evidence of its effectiveness is still relatively weak; and further research is needed in this area.

**References:**

1. Arksey, H., & O'Malley, L. (2005). Scoping studies: towards a methodological framework. *International journal of social research methodology*, 8(1), 19-32.
2. Qiu, Y., Osadnik, C. R., Team, V., & Weller, C. D. (2021). Physical Activity as an Adjunct to Compression Therapy on Healing Outcomes and Recurrence in Patients with Venous Leg Ulcers: A Scoping Review Protocol. *Frontiers in medicine*, 8, 1072.

## Reducing Surgical Site Infections: An Improvement Science Journey

**Ms Bridie Treloar, Christina Kumar**

Surgical site infections (SSI) are a major contributor to post-operative complications. In April 2019- March 2020 there was a 27% infection rate for colorectal surgeries in patients at the facility. The Perioperative Services team aimed to reduce SSI in colorectal patients to ≤10% by March 2022.

Actions taken: Using Improvement Science methodology, drivers for SSI in perioperative period and evidence based change ideas were identified (surgical bundle). Staff surveys showed limited knowledge on perioperative strategies to prevent SSI therefore education was provided prior to testing changes. Rapid PDSA cycles started with nursing interventions to maintain patient core body temperature during perioperative care. Further PDSA cycles engaged surgeons with tests of change in skin preparation solutions and antimicrobial suture use.

Outcomes: National Surgical Quality Improvement (NSQIP) data for July 2020- June 2021 shows a 10% decrease in SSI for colorectal patients at the facility since commencement of this project.

Lessons learned: By using Improvement Science the team has shown that small changes can have significant influence on outcomes. The use of Improvement Science demonstrates the way forward for sustainability of change, by testing first before implementation. When positive change is demonstrated in small changes over time then wide spread long term changes can be made.

This project is progressing to test changes in dressings and postoperative care to make further improvements and reductions infection rates.

## Uncovering Covert Pathogenic Bacterial Burden in Surgical Site Wounds with Point-of-Care Fluorescence Imaging

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**Objectives:** Detection of high bacterial levels within or near surgical sites is critical to reducing surgical site infection (SSI) rate. The paucity of reliable Methods: to identify bioburden post-discharge has forced reliance on clinical signs and symptoms of infection (CSS) and reactive, rather than proactive, infection management. Fluorescence imaging of bacterial burden (FL) is positioned to potentially flip that paradigm.

**Methods:** This post-hoc analysis evaluated 58 imaged and biopsied surgical site wounds from the multi-centre FLAAG clinical trial<sup>1</sup>. Diagnostic accuracy measures of CSS and FL were evaluated. A reader study investigated impact of advanced image interpretation experience on imaging sensitivity.

**Results:** Forty-four of fifty-eight surgical site wounds (75.8%) had bacterial loads >104 CFU/g

(median = 3.11 105 CFU/g); however, only 3 of 44 were CSS positive (sensitivity of 6.8%). FL improved sensitivity of bacterial detection by 5.7-fold compared with CSS alone (P = .0005). Sensitivity improved by 11.3-fold over CSS among clinicians highly experienced with FL interpretation (P < .0001). Surgical sites that reach the stage of referral to a wound specialist frequently harbour asymptomatic high bacterial loads that delay healing and increase infection risk. Advanced imaging of pathological bacterial burden improves surgical site monitoring and may reduce the rate of SSIs.

**Conclusions:** Surgical sites that reach the stage of referral to a wound specialist frequently harbour asymptomatic high bacterial loads that delay healing and increase infection risk. Advanced imaging of pathological bacterial burden improves surgical site monitoring and may play a role in reducing rate of SSIs.

**References:**

1. Le L, Baer M, Briggs P, et al. Diagnostic accuracy of point-of care fluorescence imaging for the detection of bacterial burden in wounds: Results: from the 350 patient fluorescence imaging assessment and guidance trial. *Adv Wound Care* 2021;10(3):123-136.

## Not HAPI: Reducing hospital acquired pressure injury on an acute medical ward

**Mrs Mayla Mendieta<sup>1</sup>**

<sup>1</sup>*Bankstown Hospital SWSLHD, Bankstown, Australia*

**Objectives:** In a 10 month period, ward 2J/Medical Assessment Unit had 18 Hospital Acquired Pressure Injuries (HAPI), two of which were classified as Harm Score 2. The aim was to reduce the number of HAPI by 70% by March 2022. A secondary aim was to reduce harm to patients.

**Methods:** Using Improvement Science methodology the team identified the 5 primary drivers that influence HAPI on the ward:

1. Equipment
2. Education
3. Leadership
4. Communication
5. Ward culture

We found out that ward culture around handover was the main driver that influence our HAPI on the ward. Rapid PDSA cycles were used to implement strategies to improve bedside handover and nurses' awareness of their patient's risk of HAPI.

**Results:** Initial review identified one the main drivers of HAPI was ward culture with nurses assuming the risk screening and assessment tools had been completed. An audit of bedside handover revealed a gap in the handover of patients' HAPI risk and skin assessment.

Changes to ward leadership training to ensure that HAPI risk is handed over to the next shift in-charge and appropriate care is implemented.

There has been a 72% reduction in HAPI on ward 2J/Medical Assessment Unit and 50% reduction in harm score 2 HAPI. Bedside handover audits show an increase in accurate HAPI risk and skin assessment handover from 40% to 100%. In December 2021 the ward achieved 100 days without a HAPI.

**Conclusions:** Using Improvement Science methodology the ward was able to identify the root causes of HAPI and implement targeted strategies that have improved outcomes for patients. Addressing culture and improving communication has had a significant impact on HAPI in the acute medical setting.

**References:**

<http://www.cec.health.nsw.gov.au/quality-improvement/improvement-academy/quality-improvement-tools>

## Perth Surgical Wound Dehiscence Risk Assessment Tool (PSWDRAT): development and validation in the clinical setting.

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**Objectives:** Surgical wound dehiscence (SWD) impacts on patient mortality and morbidity and contributes to prolonged hospital stay. The aims of the study were to identify the patient-related preoperative variables associated with SWD and develop a preoperative risk assessment tool (Perth Surgical Wound Dehiscence Risk Assessment Tool — PSWDRAT). A prospective case series was conducted to determine internal validity of the tool.

**Methods:** A three-phase study was undertaken to develop a preoperative patient risk assessment tool. Phase 1 determined variables associated with SWD to develop the risk assessment tool. A univariate analysis and logistic regression were applied to identify predictors of surgical risk, a ROC was used to determine predictive power. A prospective case series tested the inter-rater reliability and predictive power of the tool.

**Results:** One independent risk predictor for SWD was identified: previous surgery in the same anatomical location (p<0.001, odds ratio [OR] 4). Multiple combined factors were integrated into the tool and included: age (p<0.019, OR 3), diabetes (p<0.624, OR 2), obesity (p<0.94, OR 1.4), smoking (p<0.387, OR 2), cardiovascular disease (p<0.381 OR 3) and peripheral arterial disease (p<0.501, OR 3). The predictive power of the tool yielded 71% in a combined data sample.

**Conclusions:** Patients with previous surgery in the same anatomical location were four times more likely to incur a dehiscence. Identification of at-risk patients for complications postoperatively may be integral to reducing SWD occurrence and improving health-related outcomes following surgery.

## The impact of age on wound healing, in the acute trauma setting. A scoping review

**Mrs Larelle Upton<sup>1</sup>**

<sup>1</sup>*Alfred health, Prahan, Australia*

The ability to heal an acute traumatic wound or wounds is a complex matrix of overlapping biological processes impacted by intrinsic and extrinsic human factors. As we age, the body's physiological resilience is compromised and homeostasis becomes difficult to maintain. This scoping review examines the influence of biological ageing and the impact of age-related concerns on wound healing, including frailty, malnutrition, pre-existing medical conditions and clinician practices. Frailty rather than age was seen to have a greater physiological impact on outcome, resilience and healing. Clinician support, education and engagement were fundamental to achieve acute wound healing in the aged population. With an increasing ageing population, specialised knowledge, guidelines and structures to support geriatric care are recommended for best clinical practice.

**Objectives:** The aim of the research was to explore the impact of age on wound healing, in the acute trauma patient population. The review was conducted to establish best practice in caring for the geriatric trauma patient, presenting with acute wounds, in the acute hospital setting.

**Methods:** A scoping literature review was conducted to examine the question- What is the effect of age on wound healing in the acute trauma setting? Compared



to the younger adult population, the intention is to identify the physiological differences in geriatric skin, vulnerability to complications, and responses to nursing treatments; as these impact time to heal and whether complete healing can be achieved.

**Results:** A total of 56 articles were identified for inclusion using the search strategies. Extracted themes examine the influence of biological ageing and the impact of age-related concerns on wound healing, including frailty, malnutrition, pre-existing medical conditions and clinical practices.

**Conclusions:** The raw statistics in the trauma population overwhelmingly dictate age as an independent factor of poor outcome. Using the research to improve practices and outcomes requires looking at more specific factors within the older population. In this scoping review, frailty, malnutrition, pre-existing comorbidities and clinician education have been appraised regarding their impact on healing and outcomes. Infection has been acknowledged as having an impact on healing and outcome. Controlling and optimising pre-existing medical conditions is vital in the trauma population to assist in the resilience required to maintain homeostasis. Trauma wounds are compromised by pre-existing comorbidities, most notably by vascular disease and diabetes. With the impacts of malnutrition enhancing frailty, falls and fragility to comorbidities, improving and optimising nutrition is essential for good outcomes following trauma. As established by the international guidelines and position statements, clinician skill and knowledge is essential for preventing harm and promoting healing and recovery. Disseminating the knowledge and skill to ensure best practice is a continual and challenging issue in the busy clinical environment. Rituals and unsupported practices need to be replaced by those engaging, educating and guiding clinicians in best practice, wound knowledge and skill.

It has been established that the burden to the health system, the individual and the community when a person sustains a traumatic injury is significant. The older patient population are over-represented in poor health outcomes relating to mortality, morbidity, length of stay and delayed wound healing compared to the younger trauma patient.

This scoping review has exposed some points for consideration and discussion to improve clinical practice in this vulnerable patient population. The emerging consensus favours the impact of frailty rather than age as having a greater physiological impact on the outcome, resilience and healing. The frail patient is more susceptible to comorbidities, malnutrition and poor outcomes. Clinician support, education and engagement is required to improve the management of pre-existent comorbidities, optimise nutrition, prevent infection, utilise best practice standards in care, and have a complex understanding of wounds and healing. With an increasing ageing population globally, specialised knowledge, guidelines and structures to support geriatric care are paramount.

## Are we really dealing with the pressure: incidence and management strategies for suspected deep tissue pressure injuries on the foot and ankle. A retrospective clinical audit.

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**Background:** Hospital acquired pressure injuries are one of the most frequently occurring adverse events worldwide. These are largely preventable skin and subcutaneous tissue injuries and impact patient morbidity, mortality and costs of hospital care. Suspected deep tissue injuries are emerging as a more prevalent stage of pressure injury. Aims of this research were to determine the incidence of suspected deep tissue injuries, hospital length of stay and identify any intrinsic or extrinsic factors associated with the time to development of suspected deep tissue injuries.

**Methods:** Patients who were reported as developing a suspected deep tissue injury during hospital admission between January 2018 – March 2020 were identified through the hospital online risk recording system. Data were extracted from relevant health record including demographics, admission data and pressure injury data. Incidence rate was expressed per 1000 patient admissions. Regression analysis was used to determine any associations between time (days) to develop a suspected deep tissue injury and intrinsic or extrinsic factors.

**Results:** There were 651 recorded pressure injuries during the audit period. Of these, 62 (9.5% of n=651) patients developed a suspected deep tissue injury, all at the foot or ankle. The incidence of suspected deep tissue injuries was 0.18 per 1000 patient admissions. For patients who had developed suspected deep tissue injury the mean (standard deviation (SD)) length of stay was 59.0 (51.9) compared the mean (SD) for all admissions was 4.2 (11.8) days. Multivariate regression analysis determined that the longer time (in days) to develop a pressure injury was associated with having a higher body weight (Coef=0.02, 95% CI=0.00 to 0.04, p=0.043), not having offloading (Coef=-3.63, 95% CI=-6.99 to -0.27, p=0.034) and an increasing number of ward transfers (Coef=0.46, 95% CI=0.20 to 0.72, p=0.001).

**Conclusions:** This research identified intrinsic and extrinsic factors that may play a role in the development of suspected deep tissue injuries. A review of risk stratification in health services may be beneficial, with consideration to adjustments of procedural assessments of patients at risk. These findings also warrant further investigation into the role of preventative measures, and risk stratification given the potential impact on morbidity, mortality and health care cost.

## Reshaping wound care: Evaluation of an artificial intelligence app amid the COVID-19 pandemic

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**Objectives:** To evaluate the usability and effectiveness of a digital application for wound care from a clinician-and-patient user perspective.

**Methods:** A quasi-experimental design was conducted in four settings in an Australian health service from July to December 2019 to October 2020. Owing to the coronavirus disease pandemic, the study paused in March 2020 but then restarted immediately after 3 weeks. Data were collected from patients in the standard group (n = 166, 243 wounds), and intervention group (n = 124, 184 wounds). Clinicians participated in a survey (n = 10) and focus group interviews (n = 13) and patients were interviewed (n = 4). Wound documentation data were analysed descriptively. Interviews were thematically analysed.

**Results:** Positive evaluations identified improvements such as instantaneous objective wound assessment, shared wound plans, increased patient adherence and enhanced efficiency in providing virtual care. Compared to the standard group, wound documentation in the intervention group improved significantly (more than two items documented 24% versus 70%, p < .001). During the intervention, 101 out of 132 wounds improved (mean wound size reduction = 53.99 %). The travel-related fuel cost saved for a patient living in a rural area was on average \$72.90.

**Conclusions:** The digital application provided real-time wound data with an interface for communication between the patient and clinician and clinicians in a hospital, community, and outpatient setting in a variety of settings. The use of the application facilitated remote patient monitoring, and reduced patient travel time, while maintaining optimal wound care.

## Skin Tears in an Ageing Population: Evaluation of a first responder STWMP

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Skin Tears in an Aging Population: Workforce Empowerment - evaluation of a first responder skin tear wound management pack

Synopsis: Skin tears are defined as a trauma induced partial or full thickness wound which primarily occur on the extremities of a person with age related skin changes both structural and mechanical, also known as; cuts, lacerations, grazes or skin tears (1). Skin tears can occur in many different scenarios, such as a mechanical fall or incidental shear or friction, most commonly in an elderly population (2). The correct dressing choice is required that addresses coagulation status, infection risk, wound product wastage, pain and quality of life management for the resident. Sussman and Ryan (2019, p. 11) statement to the Royal Commission into Aged Care Quality and Safety Royal Commission on behalf Wounds Australia (2019) identified "The major risks of the use of inappropriate dressings are; delayed healing, wound deterioration, potential infection, pain and stress to the consumer. The impact on cost of treatment of using inappropriate products is significant".

There are various products in place at present in the aged care sector to manage skins tears. Currently, these options require the skilled nurse to use an aseptic technique and a combination of various products, as well as, a dressing pack to address the complexity of the aging skin. This research project evaluated the introduction of a Skin Tear Wound Management Pack (STWMP) which included all key elements for skin tear wound management within its' content, previously found separate in practice. Each STWMP had two sides to its packaging, one side to advise the "user" registered/enrolled nurse (not specialised in wound care) or non-regulated worker the steps on how to use the content. The other side will be a pictorial diagram of the International Skin Tear Advisory Panel (ISTAP) classification, so the "user" can look at the skin tear in front of them and determine if it is an appropriate skin tear to dress as a first response or alternatively escalate concern to a registered nurse or wound care specialist.

The primary aim of the eight week project, across four site was to evaluate implementation of a STWMP in which any health care worker could apply the correct regime, decreasing the risk of progression of a skin tear to a chronic or complex wound. Skin Tears in an Aging Population: It's Up to Us to be the Leaders of Workforce Empowerment 2 The Results: showed a reduction in skin tear healing time, reduction in staff time and a more accurate classification of the correct type of wound. In addition it highlighted some design features and the impact of pre education and socialisation of the STWMP in practice.

The overall outcome of the study demonstrated that STWMP was used in preference to regular practice, saving nurses time and empowering the unregulated healthcare workers to maintain resident's safety, prevent infection. The STWMP promotes best and early practice for all residents' skin in a multidisciplinary team that had a resident centred approach. Affiliation Declaration:

#### References:

1. LeBlanc K, Campbell K, Beeckman D, Dunk A, Harley C, Hevia H, et al. Best practice recommendations for the prevention and management of skin tears in aged skin. United Kingdom: Wounds International; 2018.
2. Rando T. Simplifying wound dressing selection for residential aged care. *Journal of Wound Care*. 2018;27(8):7.

## Can pulse oximetry identify peripheral arterial disease? A systematic review of the literature

Dr Peta Tehan<sup>1</sup>

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**Objectives:** Peripheral arterial disease (PAD) is associated with ulceration, gangrene, amputations and mortality. Clinicians therefore routinely perform point of care tests to identify PAD in high-risk populations to allow for early intervention. Pulse oximetry has been suggested as a useful adjunct test in lower limb vascular disease screening. The aim of this systematic review was to determine the sensitivity and specificity of pulse oximetry in the lower limb for identifying PAD.

**Methods:** MEDLINE, EMBASE and CINAHL were searched from database inception to 13 July 2021 to identify studies of the sensitivity and specificity of pulse oximetry in any people which used valid diagnostic imaging as a reference standard. Two authors screened papers for inclusion and appraised quality of included studies using QUADAS-2.

**Results:** A total of 4626 records were screened and four were included. 471 people aged 41 to 80.6 years participated in the studies. All studies were cross sectional and conducted in hospital settings. Sensitivity values for pulse oximetry compared to diagnostic imaging in identifying PAD ranged from 44.4% to 76.7%, and specificity values ranged from 85.3% to 96.1%. Methodological quality appraisal indicated generally low risk of bias, however spectrum bias was notable.

**Conclusions:** There is currently inadequate evidence to support the use of pulse oximetry for identifying PAD. Current evidence suggests that pulse oximetry has low levels of sensitivity and is therefore likely to miss PAD when it is present.

## The power of electronic wound data for ensuring best practice outcomes

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**Objectives:** The delivery of best practice in wound management is a top priority for an Australian community and aged care nursing organisation. Accurate data entry is a fundamental requirement for monitoring wound management outcomes across the organisation, especially when in 2021, >50,000 wounds on 21,000 clients were managed. The aim is to ensure consistent, accurate data for monitoring best practice and benchmarking purposes.

**Methods:** Prior to roll out of an electronic platform for the management of wound data, nurses within the organisation underwent targeted education and, in some instances, interrater reliability testing for data entry. Prospective assessment and care plan data from all clients with wounds is entered at point of care onto tablets or smart phones and automatically uploaded to the organisation's data management system. Ongoing audits ensures completeness and accuracy of data for wound types, numbers, anatomical locations, healing outcomes, length of stay, consumables used, time taken to perform dressings and time and costs

(consumables and nurse time) to treat. Regular monitoring of the wound outcomes using dashboards ensures best care is delivered. Identified documentation errors are rectified and feedback provided to the nurse if required.

**Results:** Accurate electronic wound data enables benchmarking of wound healing outcomes for individual nurses and across teams, states and nationally within the organisation. Additional benchmarking of outcomes for wound types, treatments used, time to heal and costs to treat is undertaken.

**Conclusions:** Accurate prospective wound data facilitates monitoring of best practice outcomes and informs resourcing and education requirements within the organisation.

## Clinical and psychosocial predictors of venous leg ulcer recurrence: a longitudinal study

Dr Kathleen Finlayson<sup>1,2</sup>, A/Prof. Christina Parker<sup>1,2</sup>, Dr Charnie Miller<sup>3</sup>, Prof. Helen Edwards<sup>1</sup>, Dr Jill Campbell<sup>4,5</sup>

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**Objectives:** The study objectives were: firstly, to identify recurrence rates of venous leg ulcers within 12 months of healing and, secondly, to identify the clinical, medical and psychosocial predictors of venous leg ulcer recurrence.

**Methods:** Secondary analysis was undertaken of data collected in a multi-site study conducted in community and hospital outpatient settings. Adults being treated for venous leg ulcers were recruited within 4 weeks of ulcer healing and data were collected upon recruitment, then every three months for 12 months after healing,

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or until ulcer recurrence if that occurred before 12 months. Factors associated with time to recurrence were analysed using a Cox proportional hazards regression model.

**Results:** In a sample of 143 adults (mean age 73 years [SD 13.6]), 49.6% experienced a venous ulcer recurrence in the 12 months after healing. Clinical and psychosocial factors significantly associated with increased risk of ulcer recurrence were haemosiderosis

( $p=0.006$ ), longer sitting times/day ( $p=0.007$ ), lower social support scale scores ( $p=0.002$ ) and prescribed antidepressant medications ( $p=0.035$ ).

**Conclusions:** Results from this study confirm a high recurrence rate in adults who experience venous leg ulcers, and provide information on early risk factors - some of which are modifiable and thus may guide early intervention.

**References:**

1. Finlayson KJ, Parker CN, Miller C, Edwards HE, Campbell J. (2021) Decreased mobility, lack of social support, haemosiderosis and use of antidepressant medications may predict recurrent venous leg ulcers within 12 months of healing. *Phlebology*, early on-line, 1-10, DOI: 10.1177/02683555211063986

## The Development and Psychometric Testing of a Knowledge Tool on Incontinence-Associated Dermatitis for Clinicians

**A/Professor Michelle Barakat-Johnson<sup>1</sup>**, Professor Dimitri Beeckman<sup>2</sup>, Dr Jill Campbell<sup>4</sup>, Ms Ann-Marie Dunk<sup>2,5</sup>, Dr Michelle Lai<sup>1,9</sup>, Dr John Stephenson<sup>1,9</sup>, Professor Fiona Coyer<sup>1,4,10</sup>

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**Objectives:** To develop and evaluate psychometric properties of a tool assessing clinician knowledge of incontinence-associated dermatitis.

**Methods:** This was a three-phase study comprising a literature search; expert panel consensus process; and pilot-testing. Local and international experts developed a preliminary tool based on an extensive literature review. Survey Results: from an expert panel of 15 senior clinicians and consumers yielded item- and scale-level content validity ratios (CVRs) and content validity indices (CVIs). Pilot-testing was conducted on 204 clinicians in September-November 2019. Analysis involved confirmatory factor analysis and composite reliability testing.

**Results:** The 18-item knowledge tool reflected three domains of incontinence-associated dermatitis: etiology and risk, classification and diagnosis, and prevention and management. Items demonstrated high scale CVR scores on relevance (0.75) and clarity (0.82); and high scale-CVI scores on relevance (0.87) and clarity (0.91). Construct validity was demonstrated by good model fits in the confirmatory factor analysis process for etiology and risk and prevention and management of IAD. Model convergence was not achieved in the classification and diagnosis subscale. Composite reliability was good in the converging domains (0.75 for etiology and risk; 0.75 for prevention and management). Respondents had good understanding of etiology and risk (72.6% correct responses); fairly good understanding of prevention and management of IAD (64.0% correct responses) and moderate understanding of classification and diagnosis (40.2% correct responses).

**Conclusions:** The instrument demonstrated good psychometric properties and provides preliminary evidence that it can be applied to evaluate clinician knowledge about incontinence-associated dermatitis.

## Wound Hygiene from conceptualisation to implementation into clinical practice and along the wound healing continuum.

**Mrs Terry Swanson<sup>1</sup>**

<sup>1</sup>WERC, Warrnambool, Australia

**Objective:** This presentation will focus on the paradigm of Wound Hygiene and provide information of the where the concept came from, how it was developed and research into implementation into practice along the wound healing continuum.

**Methods:** Two consensus documents 1-2 and one international survey<sup>3</sup> provides the information and guidance for the clinician to provide therapeutic periwound and wound cleansing, debridement, refashioning of the wound edges, as well as options and recommendations for proactive wound dressing application.

**Results:** The latest 2022 publication<sup>3</sup> provides the clinician with definitions, the how and why hard to heal wounds require such proactive assessment and treatment. Barriers to implementation and practice are explored and options provided. Identification and management of unhealthy granulation is provided along with other tissue types. What is new is how to manage the wound as it heals. Over 57% of clinician responding to an international survey<sup>2</sup> knew of the concept of Wound Hygiene and of those, over 75% had implemented Wound Hygiene into their practice. The respondents also reported that following implementation of Wound Hygiene over 80% reported improved healing rates.

**Conclusions:** This presentation will provide a review of the development of Wound Hygiene with Results: from the survey in 2021 and how best to manage hard to heal wounds in 2022.

**References:**

1. Murphy C, Atkin L, Swanson T et al. International consensus document. Defying hard to-heal wounds with an early antibiofilm intervention strategy: Wound Hygiene. *J Wound Care* 2020;29(Suppl 3b):S1-28. <https://doi.org/10.12968/jowc.2020.29.Sup3b.S1>
2. Murphy C, Atkin L, Hurlow J et al. Wound hygiene survey: awareness, implementation, barriers and outcomes. *J Wound Care* 2021;30(7):582-590. <https://doi.org/10.12968/jowc.2021.30.7.582>
3. Murphy C, Atkin L, Vega de Ceniga M, Weir D, Swanson T. International consensus document. Embedding Wound Hygiene into a proactive wound healing strategy. *J Wound Care* 2022;31:S1-S24

## Engagement, activation and client centred goal setting: shifting compliance to partnership in compression therapy

**Mr Taliesin Ellis**

**Objectives:** Illustrate how the seminal work of Hibbard and Greene (2013) can be implemented in compression therapy to facilitate client engagement and activation throughout long-term compression therapy; Describe Patient Activation Measures used to quantify client engagement prior to and during compression therapy; Describe how client centred goal setting enshrines engagement and facilitates greater activation outcomes in relation to self-care during compression therapy.

**Methods:** A linear, non-random cohort of 6 clients was selected to have Patient Activation Measures (PAM) quantified using the Insignia © PAM score tool at or near commencement of their compression therapy. PAM scores were used to determine levelled client centred goal setting. PAM scores were remeasured after 6 weeks and 12 weeks to further facilitate levelled goal setting.

**Results:** PAM scores for the 6 clients correlated with their levels of engagement and capacity for self-care throughout the period of compression. Summative and qualitative analysis are currently being collated.

**Conclusions:** Early indications from this client cohort are that PAM scores and levelled client centred goal setting are effective in promoting greater client engagement. Client centred goal setting allows for clients to remain motivated toward maintaining therapy and thereby facilitates timely healing outcomes in relation to compression therapy.

**References:**

1. Hibbard, J and Greene, J 10.1377/hlthaff.2012.1061 HEALTH AFFAIRS 32, NO. 2 (2013): 207–214
2. Hibbard, JH, Mahoney, ER, Stockard, J, Tusler, M, "Development and Testing of a Short Form of the Patient Activation Measure Health Services Research" Volume 40, Issue 6p1 December 2005:1918-1930
3. Insignia Health. "Patient Activation Measure; Copyright 2003-2011, University of Oregon

## Deferiprone and gallium-protoporphyrin chitogel reduces infection and inflammation in *Staphylococcus aureus* biofilm wound infection

**Ms Tahlia Kennewell<sup>1</sup>**, Dr Hanif Haidari<sup>1</sup>, Dr Suzanne Mashtoub<sup>2,3</sup>, Professor Gordon Howarth<sup>3,4</sup>, Professor Peter-John Wormald<sup>5,6</sup>, Associate Professor Sarah Vreugde<sup>5,6</sup>, Professor Allison Cowin<sup>1</sup>, Dr Zlatko Kopecki<sup>1</sup>

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**Objectives:** *Staphylococcus aureus* (*S. aureus*) is one of the most common causes of infection and rising antimicrobial resistance is increasing treatment difficulty. Chitosan-dextran based hydrogel (Chitogel) loaded with iron chelator Deferiprone (Def) and haem analogue Gallium-Protoporphyrin (GaPP) has shown antimicrobial effects against both Gram-positive and Gram-negative bacteria. This study investigates the efficacy of Chitogel loaded with Def and GaPP in a *S. aureus* biofilm infected wound murine model.

**Methods:** Mice wounds infected with 5×10<sup>7</sup> CFU *S. aureus* (Xen29) were covered with a dressing to allow biofilm formation. Def, GaPP and Def-GaPP Chitogel treatments were applied every second day. Bacterial burden was monitored daily using IVIS Lumina XRMS imaging system. On day 10 mice were humanely killed and wounds collected for analysis.

**Results:** Bacterial burden was significantly decreased on days 6 and 8 compared to the control when treated with Def-GaPP (log<sub>10</sub> 1.0 and 1.2 respectively), Def (log<sub>10</sub> 0.9 and 1.8 respectively) and GaPP (log<sub>10</sub> 1.3 and 1.4 respectively). Live/Dead staining confirmed a reduction of biofilm biomass in Def-GaPP treated wounds. Wound healing was impaired by GaPP treatment with increased macroscopic wound gape and histological dermal gape however this effect was not seen when Def and GaPP treatments were used in combination. Additionally, Def-GaPP treatment reduced neutrophil infiltration into the infected wound matrix and increased the presence of anti-inflammatory M2 macrophages.

**Conclusions:** By reducing bacterial burden and promoting an anti-inflammatory environment, Def-GaPP Chitogel shows antimicrobial efficacy in *S. aureus* infected wounds and a potential as an effective treatment for cutaneous wound infection.

## Influence of ventral layers of bedding on development of pressure injuries: a narrative review

**Dr Kristen Pearson<sup>1</sup>**, Dr Cooper Moody<sup>1</sup>

<sup>1</sup>Northern Health, Bundoora, Australia

**Objectives:** We hypothesise that ventral bedding (bedclothes resting over a person in bed) may have a significant effect on development of pressure injuries, particularly on feet. The object of this study was to review published studies which explore aspects of ventral bedding and any association with pressure injury.

**Methods:** A search of Medline (Ovid), Embase and CINAHL was conducted between July-October 2020. Inclusion criteria included a focus on ventral bedding and pressure injuries or the factors which contribute to them. Exclusion criteria included papers published before 1995, a focus on the interface surface and those unavailable in English.

**Results:** The search identified 499 studies, screened for inclusion and exclusion criteria, resulting in 15 full text relevant articles. The review found limited evidence for association between ventral bedding and pressure injuries. There is a modest evidence for an association between pressure injuries and the nature of bedding ie. textiles used, influence on microclimate, and minimizing friction/shear. Evidence regarding direct pressure, Methods: of application and layers of linen is sparse. Best practice guidelines make recommendations regarding bedding application techniques, but there is little data to justify these.

**Conclusions:** The nature and application of ventral bedding has a theoretical yet under-researched role in pressure injuries. Linens with low-friction and microclimate control should be considered for patients at high risk. Simulation and/or computational models could be utilized to study effects of method of bedmaking, choice of textile and layers of bedclothes on shear and friction, microclimate and direct pressure before designing clinical studies.

## Role of granzyme K in atopic dermatitis

**Dr Christopher Turner<sup>1,2</sup>**, Prof David Granville<sup>3</sup>, Prof Allison Cowin<sup>2</sup>

<sup>1</sup>Monash University, Melbourne, Australia, <sup>2</sup>University of South Australia, Adelaide, Australia, <sup>3</sup>University of British Columbia, Vancouver, Canada

**Background:** Granzyme K is a serine protease with minimal presence in healthy tissues while abundant in inflamed tissues. Initially thought to play an exclusive role in immune-mediated cell death, extracellular granzyme K can also promote inflammation.

**Objectives:** Evaluate the role of granzyme K in the pathogenesis of atopic dermatitis, the most common inflammatory skin disease.

**Methods:** A panel of human atopic dermatitis and control samples was analysed to determine if granzyme K is elevated. Next, to determine a pathological role for granzyme K in dermatitis-like skin inflammation, oxazolone-induced dermatitis was induced in granzyme K knockout and wild-type mice.

**Results:** In human lesional atopic dermatitis samples, there was an increased number of granzyme K+ cells compared to healthy controls. Granzyme K knockout mice exhibited reduced overall disease severity characterized by reductions in scaling, erosions, itch-behaviour, and erythema. Surprisingly, the presence of granzyme K did not increase the overall pro-inflammatory response in wild-type mice; rather, granzyme K impaired angiogenesis, activated mediators of itch, increased

microvascular damage and micro-haemorrhage. Mechanistically, granzyme K contributed to vessel damage through cleavage of syndecan-1, a key structural component of the glycocalyx, which coats the luminal surface of vascular endothelia.

**Conclusion:** Granzyme K may provide a potential therapeutic target for skin conditions associated with persistent inflammation, itch, vasculitis, and pathologic angiogenesis.

## Health care professionals' perceptions on cost and resource utilisation for treatment of diabetes-related foot disease

Dr Nikki Frescos<sup>1</sup>, Dr Michelle Kaminski<sup>1</sup>, Professor Shirley Jansen<sup>2</sup>, Ms Lucy Stopher<sup>2</sup>

<sup>1</sup>La Trobe University, Bundoora, Australia, <sup>2</sup>Sir Charles Gairdner Hospital, Perth, Australia

**Objectives:** Contemporary data from Australia on the financial burden and resource utilisation for the treatment of diabetes-related foot disease (DFD) is ambiguous. Therefore, this study aimed to investigate the frequency and type of resource utilisation at the individual level as per perceptions of health care professionals (HCPs).

**Methods:** Semi-structured interviews with expert HCPs actively involved in the management of DFD was conducted using a pre-specified discussion guide. The study sample was purposefully selected to ensure equal representation across HCPs.

**Results:** Twelve HCPs participated in the interviews. Preliminary Results: show there is variation in the frequency and type of resource utilisation based on the particular HCP, the practice setting and the procurement arrangements. A major theme arising from the interviews was the delay in treatment for specialist care. The complete Results: of the interviews will be later applied to the Markov model to estimate the annual cost of DFD management within Australia.

**Conclusions:** Delays to treatment in DFD have implications for tissue and limb salvage in this growing and morbid disease process, with long term impacts on the patient, health care costs and society. While some of this cannot be easily quantified, this study will identify and bridge the gaps between current Australian literature on DFD costs, evidence-based guidelines and the variation in service provision and barriers to access, which will help to inform optimisation of service delivery.

## Exploring the utility of point-of-care ultrasound as a tool for wound assessment

Dr Frances Henshaw<sup>1,2</sup>, Dr Charlotte Dando<sup>3</sup>, Ms Georgia Lane<sup>4</sup>, Professor Cathy Bowen<sup>3,5</sup>

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**Objectives:** Diabetes-related foot ulcers (DRFU) are a common, costly and devastating consequence of diabetes (1,2). Currently, wound management decisions are based largely on visual observations of superficial wound tissues (3). To date ultrasound has not been extensively tested in populations with DRFU'S except in a small case series (4) This study explores the ability of podiatrists to interpret ultrasound wound images.

**Methods:** Following a short briefing session, podiatrists with previous musculoskeletal ultrasound-imaging training were asked to review a number of static sonographic images of active DRFU. Their written reports were coded and grouped into themes for analysis. Ethical approval for the study was obtained (RESP/17/49 and HERC/15/LPOOL/297)

**Results:** Podiatrists from the UK and Australia with training in using ultrasound were consistently able to identify and describe characteristics associated with DRFU from a single wound ultrasound image. The reported findings between podiatrists was found to be similar between raters, especially in regards to bone morphology. However greater variability was seen in the reporting of more wound specific soft-tissue observations.

**Conclusions:** This series of studies highlights the utility of ultrasound as an adjunct to traditional wound assessment which can provide diagnostically meaningful information to assist in clinical decision making. Future research will be needed to determine if routine incorporation of ultrasound to wound assessment improves patient outcomes. With the establishment of appropriate protocols and training pathways is it envisaged that moving forwards, ultrasound will be able to facilitate more timely, appropriate patient care and improve health outcomes for those with DRFU.

### References:

1. Jodheea-Jutton A, et al. Health economics of diabetic foot ulcer and recent trends to accelerate treatment. *The Foot*. 2022 Feb 4:101909.
2. Ahmed MU et al., Prevalence and Burden of Diabetes-Related Foot Disease in New South Wales, Australia: Evidence from the 45 and Up Study Survey Data Linked with Health Services Data. *International Journal of Environmental Research and Public Health*. 2021 Jan;18(21):11528.
3. Nix D. Skin and wound inspection and assessment. In: Bryant RA, Nix DP (eds). *Acute and chronic wounds*. Missouri, USA: Elsevier Mosby, 2012
4. Henshaw, FR., et al. "Point of care ultrasound imaging as a wound assessment tool in diabetic foot ulcers: a case series." *Journal of Wound Care* 29.Sup8 (2020)

## Enhancing healthy skin and wound prevention outcomes in the Intensive Care Unit – changing practice

Ms Tabatha Rando<sup>1</sup>, Ms Leslie Ann Rosler<sup>1</sup>, Ms Marian Leek<sup>1</sup>, Ms Angely Bolzon<sup>1</sup>, Mr Ujjwal Adhikany<sup>1</sup>, Dr Rebecca Munt<sup>1</sup> <sup>1</sup>Royal Adelaide Hospital

**Objectives:** The aim of the study was to explore the impact of a healthy skin and wound prevention programme by measuring nursing staff knowledge and patient wound prevalence in the Intensive Care Unit (ICU) pre and post intervention. A secondary aim was to identify the impact of the education and implementation program on pressure injury (PI), skin tear (ST) and incontinence associated dermatitis (IAD) prevalence and incidence rates in the ICU.

**Methods:** A prospective quality improvement project based on the plan-study-do-act methodology included three phases:

1. Pre-Intervention Data Collection (December 2020) - Wound Prevalence Survey (full body skin inspection) & Staff Knowledge Quiz
2. Intervention Phase – Staff Education, Evidence Based Protocol Implementation & Evidence based products available in units
3. Post-Intervention Data Collection - Wound Prevalence Survey (full body skin inspection) & Staff Knowledge Quiz

**Results:** Pre-intervention data demonstrated two thirds of ICU patients had one or more wound. ICU Pressure Injury prevalence was 37.5%, IAD prevalence 12.5% and ST prevalence was 4%. ICU PI incidence reporting rate was 11%. Device Related PI rate was 56% of all PIs identified. Staff knowledge about wound prevention averaged 50%.

**Conclusions:** As a result of the Covid-19 surge, post implementation data will be collected in May 2022 and the data will be presented as comparative outcomes.

## Understanding the patient and carer experience of living with a pressure injury: A meta-synthesis.

Dr Adam Burston<sup>1,2</sup>, Dr Sandra Miles<sup>1,2</sup>, Professor Paul Fulbrook<sup>1,2,3</sup>

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Pressure injuries cause significant harm, contributing to increased mortality and financial burden on the healthcare system. Substantial research on risk assessment, prevention, and treatment exists, but limited research exploring the experience of living with pressure injury is evidenced.

**Objectives:** The aim of this meta-synthesis was to describe the patient and carer experience of living with a pressure injury.

**Methods:** A review protocol was registered, a modified PICO approach developed, and a systematic literature search conducted. The PRISMA 2020 checklist was used for reporting, and the CASP qualitative checklist for evaluating the quality of research. Thematic content analysis was undertaken on extracted data.

**Results:** Twelve studies met the inclusion criteria. Meta-synthesis led to the construction of three themes: loss of autonomy and independence, psychological effects, and adjustment. Within these primary themes, sub-themes of; dependence, social isolation and social avoidance behaviours, feelings and emotions, loss, managing, physical consequences, service provision, and functional challenges, were identified.

**Conclusions:** Addressing the psychology and mindset of those involved and supporting people to navigate the pressure injury episode are two unique and clinically relevant considerations that must guide provision of pressure injury care. Adaptation to a pressure injury is complex and contextually driven, and this adaptation creates additional psychological burden. Interventions must encompass all aspects of the experience yet research into experiences is limited. Further research to support suitable interventions is necessary.

## Preliminary findings of the development and pilot-testing of an end-of-life wound assessment tool.

**Dr Sharon Latimer**<sup>1,4</sup>, Dr Rachel. M. Walker<sup>1,3,4</sup>, Dr Gillian Ray-Barruel<sup>4</sup>, Mrs Joanie Shaw<sup>2</sup>, Ms Tracey Hunt<sup>2</sup>, Ms Kristyn Mackrell<sup>2</sup>, Professor Brigid. M. Gillespie<sup>1,2,4</sup>

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**Objectives:** The study aim was to develop, and pilot test an end-of-life wound assessment tool to distinguish between these wounds and pressure injuries in dying adults.

**Methods:** Following a review of the literature<sup>1</sup>, we developed an end-of-life wound assessment tool. Sixteen international wound and palliative care experts critiqued the tool over two Delphi panel rounds. The tool comprises three sections: screening; wound assessment; and confirmation and management. Key features of an end-of-life wound (terminal ulcer) include the patient is actively dying, receiving regular pressure injury prevention strategies, and the wound develops suddenly in the absence of pressure/shear. Using a prospective observational study design, tool pilot testing is ongoing in palliative care and medical units at three Queensland hospitals. Dying adult patients who rapidly develop an atraumatic wound are eligible for recruitment. Research assistants conduct an assessment using the tool.

**Results:** Between March 2021-Feb 2022, 10 potential participants were assessed for eligibility, with 7 approached (2 refused; 1 unable to consent) and 4 recruited. Most study participants were male (n = 3) with a primary diagnosis of metastatic carcinoma (n = 3). All participants were assessed as developing an end-of-life wound.

**Conclusions:** The prevalence of end-of-life wounds is unknown because they are under-recognised and therefore, under-reported. Our end-of-life assessment tool was developed to assist clinicians differentiate between these wounds and pressure injuries. If validated, the tool will contribute to the accurate collection of prevalence data, reduce pressure injury misclassification and facilitate the implementation of specialised patient care.

### References:

1. Latimer, S., Walker, R. M., Ray-Barruel, G., Shaw, J., Mackrell, K., Hunt, T., & Gillespie, B. M. (2021). Defining and describing Terminal Ulcers in dying adults: An integrative review. *Advances in Skin & Wound Care*. doi: 10.1097/01.asw.0000798032.98853.95

## Utilizing total RNA sequencing to investigate the host response and microbial role in DRFU wounds

**Dr Michael Radzieta**<sup>1,2,3</sup>, Dr Matthew Malone<sup>1,2,3</sup>, Saskia Schwarzer<sup>1,2,3</sup>

<sup>1</sup>Western Sydney University, Campbelltown, Australia, <sup>2</sup>Ingham Institute for Applied Medical Research, Liverpool, Australia, <sup>3</sup>South West Sydney Local Health District, Liverpool, Australia

**Objectives:** Diabetic related foot ulcerations (DRFUs) remain a common comorbidity in patients with diabetes. Studies into the mechanisms driving DRFU pathology have mainly focused on genomic studies of the wound microbiome to identify potential taxa associated with poor health outcomes. Therefore, we aimed to take a novel approach using total-RNA sequencing to study the host and microbial transcriptomes between patient groups.

**Methods:** DRFU tissue punch biopsies were collected and stored at -80 degrees in RNAlater stabilisation solution. Total-RNA was isolated mechanically using the Direct-zol RNA isolation kit as per the manufacturer's instructions. Sequencing libraries were then created using the Zymo-Seq Ribozero library prep kit prior to sequencing on the Illumina NovaSeq platform. Generated reads were then filtered and aligned to a human reference genome

(GRC38.p12), with unmapped reads retained for microbial analysis. For host analysis, gene and isoform level quantification was performed using RSEM. For microbial analysis, unmapped reads were used as input to the SqueezeMeta pipeline for assembly

(RNAspades) of reads followed by taxonomic and functional annotation to the Genbank and KEGG databases, respectively. Count data from both datasets was analysed using EdgeR to identify differentially expressed genes (DEGs) between patient groups.

**Results:** Host analysis identified that signatures of mechanical stress, microbial colonization, early immune response and inflammation are enriched within DRFUs compared to healthy tissue. Comparisons between healing and non-healing DRFUs identified B cell activity as being positively correlated with healing wounds via the enrichment of CXCR5, MS4A1 and the humoral immune response pathway. Microbial analysis identified that the metatranscriptome is highly heterogenous between patients, however the expression of biofilm related transcripts is higher within non-healing DRFUs compared to clinically infected and healing DRFUs. Analysis comparing the microbiome of non-healing DRFUs with localised chronic biofilm infection and acutely infected DRFUs identified the enrichment of genes and pathways which promote motility and infection, including toxin production, flagellar assembly and pilus assembly/twitching.

**Conclusions:** We identified that biofilm may be a major contributor to the chronic nature of DRFU. The removal of biofilm from the ulcer may contribute to the activation of the humoral immune response and B cell activity which is correlated with healing wound trajectories. Conversely, microbiome analysis of acutely infected DRFUs suggests that bacteria may switch to a planktonic state which actively produce virulence determinants resulting in clinical infection, likely driven by commonly observed pathogens including *S. aureus*, *Streptococcus* spp and mixed proteobacteria. Collectively, these Results: outline the importance of personalised approaches to treatment based on the individual patient needs, which should focus on the physical removal of biofilm aggregates using Methods: such as sharp debridement.

## Implementing the Wound Management Pilot Project in Residential Aged Care Facilities

**Dr Michelle Gibb**<sup>1</sup>, Mrs Katie Garrett<sup>2</sup>, Mrs Christine Ash<sup>2</sup>

<sup>1</sup>Wound Specialist Services, Brisbane, Australia, <sup>2</sup>Gold Coast Primary Health Network, Gold Coast, Australia

**Objectives:** The aim of the pilot project was to develop a nurse led service delivery model to improve access and equity to specialist wound advice, to build capacity

of care providers, and to improve outcomes for residents with complex or chronic wounds across the primary health network region.

**Methods:** The 12-month pilot project involved 57 residential aged care facilities in the eligible primary health network region to participate in the educational intervention consisting of a virtual membership program including lessons, webinars, and virtual peer support group. Knowledge, confidence, and skill were evaluated pre- and post-implementation using survey and semi-structured interview. A sub-set of 26 aged care facilities participated in the clinical intervention consisting of telehealth and onsite consultations. The clinical intervention components included referral pathways, triage and intake practices, processes for the provision of services, clinical governance, and collaborative relationships to improve coordination of care across the continuum.

**Results:** Evaluation data collected incorporated a range of outcome measures including process, resident and health service outcomes, and data on cost-effectiveness and efficiency.

**Conclusions:** Providing evidence of the effectiveness and acceptability of the nurse-led model of service delivery and documenting factors that impede or facilitate implementation will help to identify ways to enhance the care and quality of life of older persons in residential aged care with complex chronic wounds, and our understanding of how to implement them.

## Worldwide incidence of wound dehiscence in general surgical patients: A systematic review and meta-analysis.

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**Objectives:** To estimate the worldwide incidence of surgical wound dehiscence (SWD) and associated factors in adult general surgical patients.

**Methods:** A systematic review and meta-analysis of published studies in MEDLINE (Ovid), CINAHL

(EBSCO), EMBASE (Elsevier) and the Cochrane Library from 1 January 2010 to 23 April 2021 was undertaken. Eligible cross-sectional, cohort and observational studies available in full and English text were included. Data extraction and quality appraisal were undertaken independently by three reviewers. The I<sup>2</sup> statistic was used to explore heterogeneity. Random effects meta-analytic models were used in the presence of substantial heterogeneity. Subgroup, meta-regression and sensitivity analyses were used to explore sources of heterogeneity. Publication bias was assessed using Hunter's plots and Egger's regression test.

**Results:** Of 3,633 publications retrieved, 27 studies were included. Meta-analysis pooled data from 743,347 patients from 24 studies. The pooled 30-day cumulative incidence of SWD was 1% (95% CI 1% to 1%). SWD incidence was highest in hepatobiliary surgery, at 3% (95% CI 0% to 8%). Multivariable meta-regression showed SWD was significantly associated with duration of operation and re-operation (F [2,10] =7.93 p=.009), explaining 58.2% of the variance.

**Conclusions:** 1% of general surgical patients develop SWD but this is likely an underestimate. Most studies predated the agreed global definition for SWD and measured it as a secondary outcome. Wider uptake of this definition will inform SWD surveillance and improve accuracy of reporting.

## Preparation for development of the next edition of the Venous Leg Ulcer Guideline

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**Objectives:** Extensive preparatory work is undertaken by Guideline Governance Groups (GGGs) before critical appraisal of literature for an evidence-based guideline. The aim of this paper is to provide overview of preparation for the next edition of Clinical Practice Guideline for the Prevention and Management of Venous Leg Ulcers (working title) being developed by Hong Kong Enterostomal Therapists Association, New Zealand Wound Care Society, Wounds Australia and the Wound Healing Society of Singapore.

**Methods:** Scoping of venous leg ulcer (VLU) literature published 2016–2022 was undertaken to identify quantity and level of new evidence. A stakeholder survey is being undertaken (currently under consideration by ethics committees in Australia and NZ). The survey will open for patients, caregivers, health professionals and other stakeholders in July 2022. The survey measures priority stakeholders place on clinical topics from previous guideline editions, as well as importance stakeholders place on clinical outcomes from VLU interventions.

**Results:** Using the guideline search strategy, 12,711 potentially relevant publications were identified, with screening identifying 3,132 of these publications as eligible for further consideration. These publications are being screened against the inclusion criteria and Results: will be presented. The stakeholder survey results, which will inform development of clinical questions explored in the guideline, are anticipated by September 2022.

**Conclusions:** Contemporary guideline development processes require extensive background preparation. Scoping the literature allows GGGs to develop a strong understanding of the volume and quality of relevant new literature. Collecting stakeholder feedback allows GGGs to develop clinical questions, content and resources of relevance to stakeholders.

## An investigation into compression therapy and sNPWT sub-bandage pressures

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**Objectives:** The aim was to investigate sub-bandage pressures beneath:

1. A variety of compression bandages
2. Single use negative pressure wound therapy devices (NPWT);
3. Compression bandages when used in combination with NPWT.

**Methods:** A comprehensive sample of compression bandaging systems and sNPWT devices commercially available in Australia was used. A 20cm long, novel fibre optic pressure sensor was affixed to the leg of a healthy volunteer. All bandages and devices were applied by the same experienced nurse. Measures were recorded using the fibre optic sensor under compression bandages and NPWT systems when applied singularly and in combination. Measurements were recorded with the volunteer in supine, seating and standing postures.

**Results:** The study provided data on sub-bandage pressures achieved under 49 compression bandages when used singularly or combination or with NPWT modalities. Maximum pressures were obtained at a variety of points along the lower leg. Overall, pressures ranged from a minimum of 0.02 mmHg to a maximum

173mmHg and varied according to bandages when used singularly, or in combination and the volunteer's posture. The use of NPWT beneath compression bandages produced areas of high pressure beneath these modalities.

**Conclusions:** The study provided valuable data on sub-bandage pressures when used singularly and in combination with sNPWT modalities. The Results: of this study will also contribute to the evidence for use of sNPWT systems in the treatment of VLUs.

## Save Our Skin (SOS)

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**Objectives:** Incontinence associated dermatitis (IAD) can be difficult to diagnose and differentiate from other skin conditions such as sacral PI [1]. The SOS project provides clinicians with a structured way of implementing collective and reliable evidence based practices, to improve care processes and patient outcomes. Pre project, the identification and treatment of IAD was varied and did not align with best practice guidelines. The assessment of IAD was based on experience, not on a validated IAD tool. Treatment was based on habitual nursing practices rather than current evidence [2].

**Methods:** The SOS project was developed using an implementation science framework. To evaluate the translation of knowledge into practice and the sustainability of practice-change interventions, each site conducted PI, IAD and moisture associated skin damage (MASD) prevalence audits during the pre and post-implementation phases of the project.

**Results:** Post-implementation saw a reduction in PI and IAD by 87% and MASD by 91% compared to pre-implementation. Furthermore, there was a 100% reduction in all sacral injuries; IAD, MASD, PI and skin tears. SOS also resulted in a 20% increase in clinician awareness.

**Conclusions:** Due to the success of SOS a further six bundles have been developed to target the implementation of evidence based pressure injury prevention strategies [3]. SOS has been adopted as the standard of practice in Western NSW Local Health District and is currently being rolled out across its 38 facilities.

This project has led to collaboration with Clinical Excellence Commission (CEC) and Agency for Clinical Innovation (ACI) to develop state-wide clinician resources, educational videos and flyers.

### References:

1. Beeckman D, Campbell J, Campbell k, et al. Incontinence-associated dermatitis: moving forward, best practice principles. *Wounds Int.* 2015.
2. Beeckman D, Van Lancker A, Van Hecke A, Verhaeghe S. A systematic review and meta-analysis of incontinence-associated dermatitis, incontinence, and moisture as risk factors for pressure ulcer development. *Res Nurs health.* 2014; 37 (3): 204-18.
3. National Pressure Ulcer Advisory Panel, European Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of pressure Ulcers: Clinical Practice Guideline. 2nd edition ed: Cambridge Media on behalf of National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure injury Alliance; 2014.

## Factors influencing lower extremity amputation outcomes in people with active foot ulceration in regional Australia

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**Objectives:** This study aimed to determine what factors contribute to the likelihood of lower extremity amputation (LEA) in people with active foot ulceration in regional Australia. This retrospective study audited patients with active foot ulceration in a multidisciplinary high risk foot service (HRFS) in regional Australia.

**Methods:** Neurological, vascular, and wound characteristics were systematically extracted, along with demographic information. Participants were followed for at least 12 months until healing or LEA occurred. Correlations between LEA and clinical and demographic characteristics were assessed using the Pearson's product moment correlation coefficient and chi squared test for independence. Direct logistic regression assessed the independent contribution of significantly correlated variables on the likelihood of LEA.

**Results:** Of note, 1876 records were hand screened with 476 participants (25%) meeting the inclusion criteria. Geographical distance from the HRFS, toe systolic pressure (TSP), diabetes and infection were all significantly correlated with LEA and included in the logistic regression model. TSP decrease of 1 mmHg (OR 1.02, 95% CI 1.01-1.03), increased geographical distance (1 km) from HRFS (OR 1.006, 95% CI 1.001-1.01) infection (OR 2.08, 95% CI 1.06-4.07) and presence of diabetes (OR 3.77, 95%CI 1.12-12.65) were all significantly associated with increased likelihood of LEA.

**Conclusions:** HRFS should account for the disparity in outcomes between patients living in close proximity to their service, compared to those in rural areas. Optimal management of diabetes, vascular perfusion and control of infection may also contribute to preventing LEA in people with active foot ulceration.

## Diamond-silk dressing: A multifunctional platform for wound monitoring and healing applications

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**Abstract:** We aim to develop biocompatible silk dressings, integrated with temperature (nanodiamond) and pH (fluorescein) sensors, capable of monitoring early signs of infections and healing disruptions non-invasively via light-based measurements. These hybrid dressings have strong potential to bring a paradigm shift to the current wound management and care procedures.

**Introduction:** Assessing wound repair requires the removal of dressings, which is painful and disruptive to healing and is based on subjective visual observation of the wound. Improving this process is crucial, as monitoring wound status could enable earlier interventions to reduce the complications that arise from wound infection. Measuring the temperature and pH of the wound surface can provide objective indicators of wound progression<sup>1,2</sup>. A clinically diagnosed wound infection elevates the temperature by 3-5° C compared to healthy skin<sup>1</sup> and the pH of wound fluid rises<sup>2</sup> prior to the onset of local infection. Alkaline wound pH enables the invasion of microorganisms, while an acidic wound environment aids healing through protease activity, increased oxygen release, and reduced microbial growth. Hence temperature and pH are useful and robust biomarkers that can provide real-time insights into the healing responses.

**Methods:** Silk fibroin was obtained from *B. mori* silk cocoons. The extracted silk solution was mixed with nanodiamonds and electrospun into nanofibrous membranes. Confocal and wide field microscopes were used to perform temperature sensing (using green 532 nm excitation) and pH sensing (using blue 470 nm excitation).



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Human skin keratinocyte (HaCaT) cell lines were used to study cell growth for the hybrid membranes. The in vivo biocompatibility on wound healing was tested on 8–10-week-old C57BL/6J mice, using a murine model of wound healing<sup>4</sup>. Bacterial suspensions of *P. aeruginosa* ATCC 9721, *E. coli* ATCC 11775, and *S. aureus* CIP 68.5 were used to test the biocidal properties of the hybrid membranes.

**Results:** We showed that electrospun silk membranes embedded with nanodiamond sensors could monitor temperature changes in the wound relevant range of 32–40 °C<sup>3</sup>. In vitro tests revealed that hybrid membranes enabled eukaryotic cell attachment and promoted healthy cell growth. Furthermore, the membranes were biocidal towards major skin wounds infecting bacteria, *P. aeruginosa* and *E. coli*. In an in vivo wound healing model, the hybrid membranes enabled wound healing and did not cause adverse effects on wound closure<sup>3</sup>. Moreover, the pH-sensitive fluorescein sensor can be encapsulated within a silk matrix to provide measurements of acidity or basicity in vivo<sup>5</sup>.

**Conclusions:** In conclusion, multiple fluorescent sensors embedded in silk dressings can be used as a platform for biosensing as well as providing a network of fibres that support healthy wound healing processes.

**References:**

1. A Chanmugam, et al. *Advances in Skin & Wound Care*, 30 (9), 2017.
2. S Ono, et al. *Burns*, 41 (4), 2015.
3. A Khalid, et al. *ACS Applied Materials & Interfaces*, 12(43), 2020.
4. L Dunn, et al. *Journal of Visualized Experiments*, 75, 2013.
5. A Khalid, et al. *Sensor and actuators B. Chemicals*, 311, 2020.

## Biodegradable Temporising Matrix- a paediatric case series

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**Objectives:** Artificial dermal templates have changed the way acute and reconstructive burns and complex wounds are treated. Biodegradable Temporising Matrix (BTM) is a completely synthetic version that assists with dermal regeneration while temporarily closing a wound [1]. Our aim for this study was to collate a large case series of paediatric patients requiring application of BTM to improve wound healing and overall patient outcome.

**Methods:** A prospective database conducted at the Queensland Children's Hospital identified all patients where BTM was applied. Patient demographics, mechanism of injury, reason for application of BTM, scar management requirements post application and overall cosmetic and functional outcome for patients were collated.

**Results:** A total of 58 children were found throughout the Surgical Division. Wounds consisted of acute burn injuries, electrical injuries, friction injuries, reconstructive scar cases, vascular anomaly patients, degloving injuries, fasciotomies and necrotising infective conditions. Complications such as infection, BTM non-adherence and graft loss were low.

**Conclusions:** BTM is an appropriate option for treating deep, full thickness burns and complex wounds. Through our experience over the past four years, we have identified key aspects to improve BTM integration and skin graft take to improve patient outcomes.

**References:**

1. Greenwood JE. The evolution of acute burn care - retiring the split skin graft. *Ann R Coll Surg Engl*. 2017;99(6):432-8. doi:10.1308/rcsann.2017.0110.

## Healing the body by amputation: The experience of end-of-limb

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**Objectives:** Peripheral Artery Disease (PAD) Results: in significant challenges to wound healing and is a growing burden on the health system. Studies that seek to measure treatment outcomes in this challenging population have been difficult with wound healing or limb salvage not necessarily providing meaningful endpoints. This study aimed to understand the experience of chronic limb threatening ischaemia (CLTI) to guide clinicians in patient- and family-centred discussions and care-planning.

**Methods:** A longitudinal, qualitative design via semi-structured interviews of 14 patients and 13 family carers. Forty-two interviews were conducted: soon after advice to have a major amputation and where amputation followed, a second interview 6-months post-procedure was sought. Interpretative phenomenological analysis was guided by the philosophical framework of Merleau-Ponty.

**Results:** People with CLTI faced an existential crisis due to the catastrophic impact of creeping decay of their flesh and vascular system, relentless pain, and a sense of spreading poison from gangrene, infection and drugs. These infiltrated the interweaving of the physical and existential body, causing functional decline and sometimes cognitive impairment. Participants described shifting body boundaries through decay and surgery, which resulted in an unreliable body.

**Conclusions:** Patients are required to make decisions about treatment in this unreliable body with often clouded sensorium. Assessment and management of the person with CLTI requires early discussions about treatment options including the possibility of amputation and its potential to arrest further decline of the body and support the body's existential expression.

**Keywords:**

Chronic limb-threatening ischaemia, critical limb ischaemia, amputation, qualitative research, pain, ulceration, and gangrene

## The efficacy of topical agents managing chronic wound biofilm infections: a systematic review

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**Objectives:** Topical agents are often used to manage chronic wound infections, despite their limited in vivo evidence. A systematic review was undertaken to evaluate the evidence for commonly used topical agents for the purpose of treating chronic infections caused by biofilm.

**Methods:** In vitro, animal, and human in vivo studies where topical agents were tested for their efficacy against biofilm for use in wound care. For human studies, only those which utilised appropriate biofilm identification techniques were included.

**Results:** A total of 640 articles were identified, with 43 included after meeting eligibility. In vitro testing accounted for 90% (n = 39) of included studies, five studies using animal models and three human studies. Sixteen different laboratory models were utilised, with the most frequent the minimum biofilm eradication concentration (MBECC) / well plate assay (38%, n = 15 of 39). Forty-four commercially available topical agents were grouped into twelve categories with the most tested agents being silver, iodine and polyhexamethylene biguanide. In vitro Results: on efficacy demonstrated iodine as the highest mean log<sub>10</sub> reduction (4.81, ±3.14).

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**Conclusions:** There is disparity in the translation of laboratory studies to researchers undertaking human trials examining the efficacy of commercially available topical agents. There is insufficient *in vivo* evidence to definitively recommend any topical agent over another for the treatment of chronic wound biofilms. The heterogeneity identified between study designs (*in vitro* to *in vivo*) further limits the generalisability of results.

## A standardised approach to data collection on Diabetes-related foot ulcers: A Liverpool HRFS snapshot

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**Objectives:** Give an overview on diabetes related foot ulceration (DRFU) in Liverpool Hospital High Risk Foot Service (HRFS), South Western Sydney, using the data collected with the standardised electronic forms on the National Association of Diabetes Centres (NADC) HRFS REDCap database.

**Methods:** Data from new patients presenting to Liverpool Hospital HRFS was collected using the NADC REDCap database over a 12 month period.

**Results:**

- 132 patients with 231 ulcers.
- 111 (85%) had type 2 diabetes, 5 (4%) had type 1 diabetes and 15 (11%) did not have diabetes.
- Three quarters (97, or 73.5%) of patients were male.
- Mean age of patients was 62.71 (SD= 12.94).
- Almost half (46.8%) of all ulcers were neuropathic aetiology and very few (11.3%) were ischaemic.
- 30.7% of ulcers were on the hallux.
- Majority (35.1%) located on the plantar aspect of the foot.
- 56 wounds (24.2%) were surgical sites, and 40 (17.3%) were the result of intrinsic foot deformity.
- Wifl system was used to classify DRFUs; 57.1% were small and shallow and 12.6% were “extensive”.
- There was some missing data from the ischaemia component, however of 173 wounds recorded here, 107 were classified as having an ABI >0.79, and 20 with an ABI <0.40.
- Over half (57.1%) of wounds did not have any signs of infection, and there was only one individual with signs of SIRS.

**Conclusions:** By collecting data using the standardised forms developed by the NADC, we are contributing to nationwide HRFS auditing, benchmarking and opportunities for collaborative research surrounding DRFUs.

## Chronic oedema in the aged care community – The hidden epidemic

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**Objectives:** The aim of the study was to explore the prevalence of chronic oedema in the ageing population that receive homecare. A secondary objective was to explore an education framework to support the workforce needs to manage chronic oedema in the ageing population.

**Methods:** An audit of chronic oedema was performed by an organisation that delivers homecare packages in Sydney. A screening tool was developed based on the ILF LIMPRINT (1). It includes both subjective and physical assessment. The quick, easy to implement screening tool was developed specifically to meet the needs of the ageing population. Care Managers screen new clients and current clients at their annual review.

**Results:** At the time of submitting this abstract 461 clients have been screened and 38% have some form of chronic oedema. This has led the organisation to review its workforce requirements.

**Conclusions:** The rise in the number of older adults is linked to an increase in the presence of chronic comorbidities including chronic oedema. Chronic oedema is associated with reduced mobility, wounds and an increase in the incidence of cellulitis. Early identification and management of chronic oedema in the ageing population is essential to avoid the potential for other significant medical issues. It must be supported by a workforce that has both the skills and clinical reasoning to manage this epidemic.

**References:**

1. The Development and Validation of the LIMPRINT Methodology. Christine Moffatt, Peter Franks, Vaughan Keeley, Susie Murray, Gregoire Mercier, and Isabelle Quéré. *Lymphatic Research and Biology* Volume 17, Number 2, 2019.

## Creating Space to Care: Comprehensive Care in Community Wound Care setting – Quality Improvement project

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**Objectives:** To improve the quality & quantity of comprehensive nursing assessments for clients requiring wound management.

**Methods:** Using Improvement Science methodology, the team identified primary and secondary drivers for delivery of comprehensive care to clients with wounds in the community and reviewed aspects of the existing practices and processes. Using NSQHS Standard 5 Comprehensive Care, the team identified key opportunities for improvement.

Electronic documentation varied across nursing staff and were found to lack structure, relevance and adequate wound assessment. As a result, we created:

- Triage phone call conversation prompts and a pre-completed note for clear systematic documentation, which was implemented across the nursing team in August 2021.
- A pre-completed note for the initial assessment and comprehensive care plan, was implemented in March 2022.
- Case review prompts were designed to support staff in their preparation.
- A Care Partnership tool which allows clients and their carers to participate in their care planning.

**Results:** A proof of concept for quality improvement, the Triage documentation implementation began in March 2022 across all five community nursing teams in South Western Sydney Local Health District, with plans to subsequently implement Initial Assessment and Comprehensive Care Plan documentation.

**Conclusions:** Implementation of structured electronic documentation tools for Triage, Initial Assessment and Comprehensive Care planning demonstrated improvement in the quality of comprehensive care for clients requiring wound care management.