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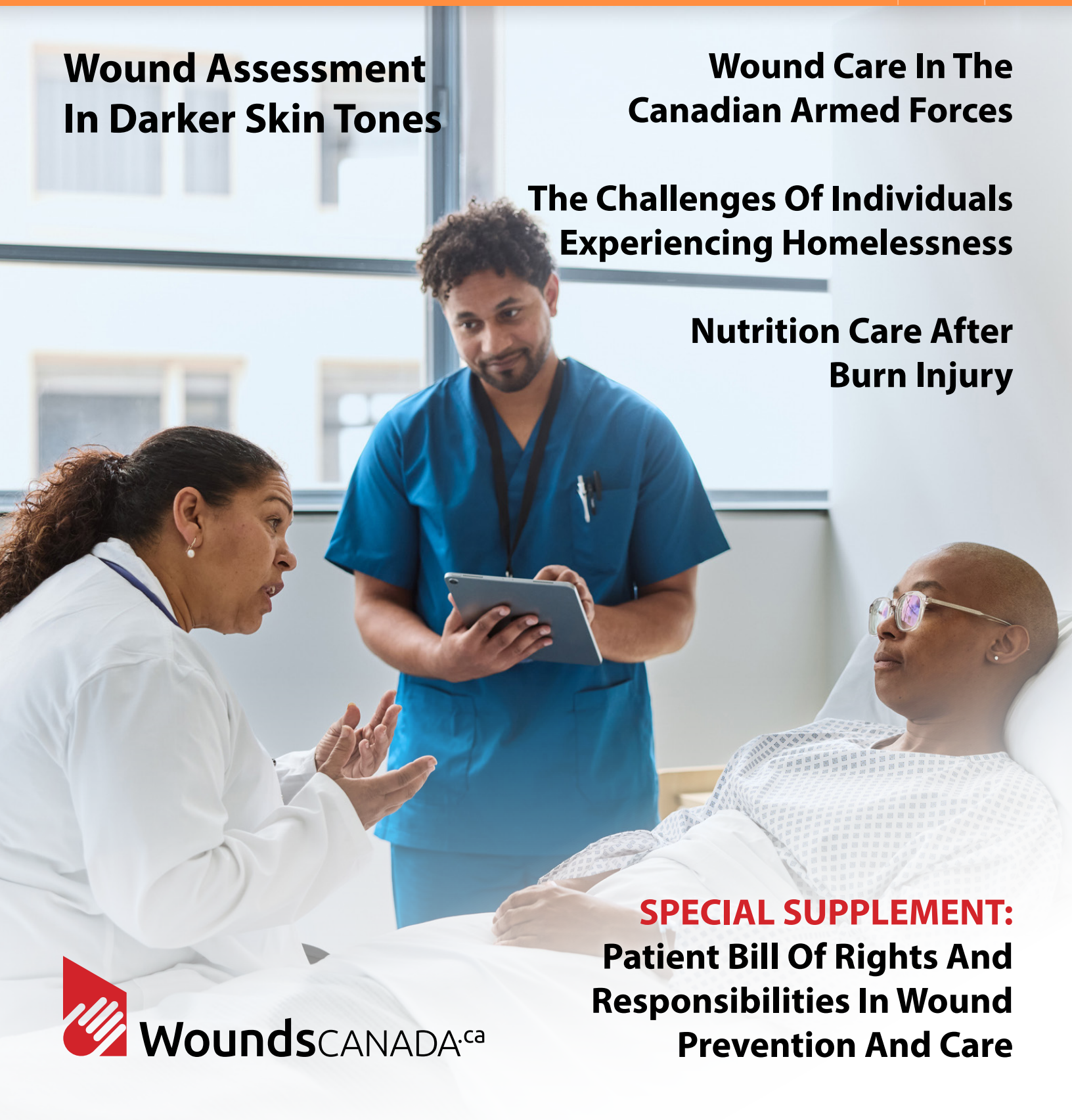
Wound Care CANADA

THE OFFICIAL PUBLICATION OF WOUNDS CANADA



Wound Assessment In Darker Skin Tones

Wound Care In The Canadian Armed Forces

The Challenges Of Individuals Experiencing Homelessness

Nutrition Care After Burn Injury

SPECIAL SUPPLEMENT:
Patient Bill Of Rights And Responsibilities In Wound Prevention And Care

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Wound Care Canada is published by Wounds Canada. Canada's first publication devoted entirely to wound care, *Wound Care Canada* addresses the needs of clinicians, patients, care partners and industry.

Wounds Canada (www.woundscanada.ca) is a non-profit organization of health-care professionals, industry participants, patients and care partners dedicated to the advancement of wound prevention and care in Canada.

Wounds Canada was formed in 1995 as the Canadian Association of Wound Care. The association's efforts are focused on four key areas: education, research, advocacy and awareness, and partnerships.

Building Momentum For Skin Health And Wound Care In 2026

As we move through 2026, Wounds Canada continues to advance its national role as a trusted leader, convener, educator and advocate for skin health and wound prevention and care. Across the country, our work focuses on strengthening capacity, supporting health-care providers, elevating patient and caregiver voices and helping communities and organizations improve outcomes for people living with or at risk of wounds.

This year, Wounds Canada continues to expand education and training opportunities through the Wounds Canada Institute, supporting health-care teams across home and community care, long-term care, acute care and community-based services.

Our programs are helping organizations build practical knowledge, strengthen clinical confidence and embed best practices into everyday care. We are also enhancing our learning platforms and program pathways to better support participants, organizations and system partners.

Planning is also underway for key education and engagement opportunities in 2026, including our Regional Conference in Alberta and our National Conference in Ontario. These conferences will bring together health-care providers, leaders, researchers, partners and community members to share knowledge, strengthen collaboration and showcase best practices and new technologies.

In 2026, we are also placing a strong emphasis on public awareness and accessible knowledge sharing. Through Wound Care Canada, our Limb Preservation Journal, webinars, podcasts, social media and digital resources, we are working to ensure that patients, caregivers, clinicians, educators, decision-makers and partner organizations have access to timely, credible and practical information that supports their ongoing crucial development. Our communications continue to highlight prevention, early intervention, equity, limb preservation, skin health and the importance of coordinated wound care across the continuum.

A major focus of our work this year is the continued dissemination and integration of the *Patient Bill of Rights and Responsibilities in Wound Prevention and Care*. This initiative reflects Wounds Canada's commitment to person-centred care, health equity, advocacy and meaningful engagement with people with lived experience. The principles of the *Patient Bill of Rights and Responsibilities* are informing education, awareness, research and future policy conversations.

Editor's note: *The* Patient Bill of Rights and Responsibilities in Wound Prevention and Care *has been published as a supplement to this issue of Wound Care Canada and is available at* DOI: 10.56885/861701gspubh.

Research and partnership remain central to our strategic direction. Wounds Canada continues to collaborate with academic, community and health-system partners to better understand the experiences of people affected by wounds and to identify community-driven strategies to reduce inequities in wound prevention and care. This work is especially important for rural, remote and underserved communities, where access to timely prevention and treatment can be more challenging.

We are also strengthening our national voice through advocacy, stakeholder engagement and participation in conferences, committees and sector-wide conversations. These activities allow Wounds Canada to draw attention to the burden of wounds, the value of prevention and the need for sustainable investment in education, early intervention and the implementation of best practices.

Together with our members, partners, volunteers, patients, caregivers, health-care providers, researchers, funders and supporters, Wounds Canada is advancing a shared vision: better skin health, improved wound prevention and care and stronger outcomes for individuals, families, communities and health systems.

We look forward to continuing this important work throughout 2026 and thank the Wounds Canada community for being part of this national movement. We hope you enjoy this issue and look forward to continue bringing to you the carefully curated content that reflects the ongoing trajectory of wound care in Canada.

Mariam Botros DCH DE IIWCC
Chief Executive Officer
Wounds Canada

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Wounds Canada Introduces *The Patient Bill of Rights And Responsibilities In Wound Prevention And Care*

The Patient Bill of Rights and Responsibilities (*PBORR*) is one of Wounds Canada's most significant patient-centred initiatives. Developed from the lived experiences of patients and caregivers through the Our Voices, Our Stories project, the document establishes a framework for what individuals should expect when receiving wound prevention and treatment services, while also outlining how patients can actively participate in their own care.

This crucial initiative was led by Dr. Idevania Costa of Lakehead University with support from Wounds Canada and funding from the Social Sciences and Humanities Research Council of Canada. Find out more details here.

The PBORR aims to empower patients and caregivers, improve communication between patients and health-care providers, promote advocacy and support equitable, person-centred wound care across all health-care settings. Rather than focusing solely on clinical treatment, the document recognizes that successful wound care depends on partnership, respect, education and continuity of care. The PBORR is available as a supplement to Wound Care Canada DOI: 10.56885/861701gspubh.

Regional Conference And Skills Lab To Be Held In Edmonton

Wounds Canada is hosting the Western Region Skin Health and Wound Care Skills Lab and in Edmonton on June 16-17, 2026. This event combines practical training with presentations from wound-care specialists and opportunities to learn about new technologies, products and best practices. Find more details here.

National Hybrid Conference 2026 Set For Niagara Falls

Wounds Canada is organizing its National Hybrid Conference from October 22–24, 2026, in Niagara Falls, Ontario. As Canada's largest wound-care conference, the event brings together clinicians, educators, researchers and industry partners.

The conference provides opportunities for continuing education, networking, presentation of new research and discussions on emerging practices in wound prevention and management. Both in-person and virtual participation options are available. Find more details here.

AdDRESSING WOUNDS: Conversations Advancing Skin Health and Wound Care

AdDRESSING WOUNDS is Wounds Canada's podcast series dedicated to advancing skin health and wound care knowledge through engaging conversations with leading Canadian experts.

Hosted by Dr. Douglas Queen, the podcast explores a wide range of topics including best practice recommendations, innovation, health equity, prevention, education, policy and patient-centred care. Designed for health-care providers, caregivers and anyone interested in improving outcomes for people living with wounds, *AdDRESSING WOUNDS* provides accessible, evidence-informed insights that support excellence in skin health and wound management across Canada and beyond. Find out more details here.

Wounds Canada 2026 Webinar Series: Building Capacity in Skin Health and Wound Care

Wounds Canada's 2026 webinar series, Building Capacity in Skin Health and Wound Care, is a national educational initiative designed to help health-care organizations strengthen the systems, leadership, policies and practices required to deliver high-quality skin health and wound care. The series is built around several key themes, including creating a culture of skin health, supporting patient-centred care, developing effective wound-care teams, implementing policies and standards and using data to drive continuous quality improvement. Find out more details here.

2026 Awareness Campaigns

Wounds Canada uses annual awareness campaigns to educate the public, support patients and caregivers and promote evidence-based prevention and management of wounds. The campaigns focus on conditions that are often underrecognized using our educational resources, social media outreach, patient stories, webinars and partnerships to encourage early intervention and improve outcomes across Canada.

Limb Loss and Limb Difference Awareness Month (April): Raises awareness of limb loss prevention, limb preservation and the impact of diabetes and vascular disease on amputation risk.

Wound Healing Awareness Month (June): Promotes wound prevention, early intervention and access to appropriate care to improve healing outcomes and quality of life.

Peripheral Arterial Disease (PAD) Awareness Month (September): Educates Canadians about PAD risk factors, early detection and the importance of preventing limb-threatening complications.

STOP Pressure Injury Day: Highlights the prevention of pressure injuries through risk assessment, early intervention, and shared responsibility across health-care settings.

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CASE REPORT

Photo: Steve Wadden

Wound Assessment And Management Of An Unsheltered Individual: A Community-Based Case Study

By Vanessa Strong, Janet L Kuhnke, Sarah Wilson, Sharon Mackenzie, Felicia Lotsios and Donna Nichalson

How to cite: Strong V, Kuhnke JL, Wilson S, Mackenzie S, Lotsios F, Nichalson D. Wound assessment and management of an unsheltered individual: a community-based case study. Wound Care Canada. 2026;24(1): 12-16. DOI: 10.56885/555285jukxdo

In recent years, the rising number of Canadians experiencing homelessness has drawn the attention of politicians, social advocates, researchers and health-care providers. In 2024, the Government of Canada reported that in 74 communities that participated in a Point-in-Time (PiT) count, nearly 60,000 persons were experiencing homelessness.[1] The Canadian definition of homelessness includes persons living in a range of scenarios, including those who are unsheltered, emergency sheltered, provisionally accommodated and at risk of homelessness.[2] Homelessness from an Indigenous - First Nations, Metis, Inuit, worldview includes "… individuals, families and communities isolated from their relationships to land, water, place, family, kin, each other, animals, cultures, languages and identities", impacting people's ability to "culturally, spiritually, emotionally or physically reconnect with their Indigeneity or lost relationships".[3]

People experiencing homelessness experience barriers to access skin health, foot care and wound assessment and management.[4,5] Barriers include poor nutrition, inability to communicate needs, lack of trust, difficulty managing and monitoring acute and chronic diseases (e.g., blood pressure, blood glucose), lack of access to appropriate medication and wound care.[4,5] Additional challenges include lack of access to fund transportation, organize appointments, use of electronic health tools/applications (e.g., cost and management of electronic devices), finances and the support of a friend or peer to attend appointments.[7-9] Of great concern are clients' descriptions of stigma

when trying to access health.[10] As a result, these persons do not access health care as they may feel judged, embarrassed, shamed or not heard.[10-12]

In this case scenario, the primary care nurses practice at the Ally Centre of Cape Breton clinic and in the Shelter in Sydney NS undertook an initiative to address the crisis of unsheltered homelessness.[12] The study was approved by the Research Ethics Board at Cape Breton University.

Case Presentation

In this case study, we share the story of PD, a 50-year-old male who has a history of living homeless and sleeping temporarily on friends' couches. He is diagnosed with spondylosis disease, history of ischemic stroke of the left cerebellum, hypothyroidism, bipolar manic depression, mental health and addiction issues. He lived with chronic pain that was initially managed with opioids. He then transitioned to methadone and was later switched to Suboxone™ through an Opiate Recovery Program. He then transitioned to his substance of choice, cocaine, and continued to heavily inject for the last 10 years.

He received intermittent care at the Centre, often for urgent issues. He did have a community-based physician and had been advised to find another provider. As a result, he was managed by the nurse practitioner and family physician at the Centre. In the community, he was assessed weekly.

The primary care clinic nurses are part of a harm reduction program. They met PD in the fall after he was discharged from the hospital, where he had been receiving intravenous antibiotics, wound care, pain management, mental health and substance use counselling, as well as nutritional support for early sepsis and a wound infection in his left forefoot. As part of his discharge plan, he was to return to the hospital for ongoing care. Instead, he arrived at the primary care clinic as he has trust-filled relationships with the interprofessional team. As well, he stated transportation to and from the hospital was "not possible as he was in pain and did not have funds".

With teamwork, the primary care clinic completed a holistic clinical assessment.[6] They assessed PD's wound and ordered ongoing oral antibiotics and dressing supplies. The team followed the five steps in the Wound Prevention and Management Cycle: assessing and reassessing at regular intervals; co-developing wound and foot care goals with the client; assembling the interprofessional team focusing on housing, nutrition, diabetes and wound care management; being creative and implementing the plan of care; and regularly measuring and photographing the wound (BWAT) and using this data to communicate wound progress between the team members.[13]

In partnership with the community nurses, the primary care nurses and physicians slowly engaged the client in his wound care plan. Wound progress was monitored using the BWAT and photography. Also, temporary housing was sought and the client agreed to live sheltered. While PD was living in temporary housing, the primary care nurses and physicians were able to regularly visit him to educate and monitor his wound progress, blood glucose levels, risk of infection, nutrition and hydration (See Figures 1-7).

Discussion

For clients experiencing homelessness, foot health, skin care and regular wound assessment and management must be provided in a space where the client can engage in trust-filled communication with health-care providers.[9,10,12]

Utilizing an interprofessional approach including a tailored clinical assessment of client preferences, age, gender, housing situation, mental health and addiction, nutrition, chronic diseases and foot and wound care enabled PD's health to improve. Adhering to best practice recommendations in wound assessment and management[14] provided support for the interprofessional team to co-create a plan in partnership with the client. Stable housing provided easier access to assess and reassess the client's overall health status and wound progress. Listening to PD's preferences and consistently reaching out to the client to reinforce self-care, access to dressing supplies enabled the team to support PD's progress.

Figures 1-7: Wound Progress

Date	Progress Note
 Oct 3, 2025	Living unhoused. Recently discharged from acute care. Reluctant to engage in care for diabetes, mental health or wound care. Wound Assessment: Width: 7 cm Depth: 0.5 cm Length: 6.5 cm. Full thickness, tendons visible. Peri-wound tender and toes and lower leg edematous. Antimicrobial packing in forefoot undermining, super absorbent cover dressing and gauze wrap (client preference). Pain: 8/10 very tender and expressed great discomfort during dressing change He moved his injection site and did not inject in the wound bed.
 Oct 15, 2025	**Week 2 reassessment:** Wound depth is reduced and tendons covered. Antimicrobial dressing and absorbent dressing continue. Wound Assessment: Width: 6.5 cm Depth: minimal Length: 7 cm. Dressing changed three times a week, and sometimes client does not attend nursing primary care clinic appointment. Client experiencing homelessness.
Oct 23, 2025	**Week 3 Reassessment:** Wound bed continues to reduce with a decline in wound area. Drainage increased. In discussion with client, PD was encouraged to come more frequently for wound care. Client experiencing homelessness.
 Oct 29, 2025	**One Month Assessment :** Width: 5 cm Depth: minimal Length: 4 cm. Increased cellulitis surrounding the wound bed, indurated, increased pain and drainage. Nurse practitioner ordered oral antibiotics. Client encouraged to attend primary care clinic for wound care. Pain: 9/10 expressed worsened pain and burning. Client experiencing homelessness.

Oct 31, 2025	Client agreed to move into sheltered housing. In this living scenario, the primary care nurses were able to meet the client to provide regular education to self-manage his diabetes and wound care. As well, the client has access to proper nutrition and hydration through regular meals, foot care, improved hygiene and laundry services, and it was easier to meet with the primary care nurses and physicians.
 **Nov 5, 2025**	**Week 5 Reassessment:** Oral antibiotics completed. Width: 7 cm Depth: minimal Length: 5 cm. Client engaged in wound care and attending clinic with primary care nurses. Client completed his first week in sheltered housing. Client pleased with progress of his wound healing. Pain: decreased 4/10 as wound closed.
 **Dec 2, 2025**	**Week 8 Reassessment:** Client continues to live sheltered. Engaging in self-managed wound care and dressing changes with topical antimicrobial and cover dressing. Visits with primary care nurses for appointments. Width: 6.25 cm Depth: Wound bed red, healthy with minimal slough Length: 3.25 cm.
 **Dec 16, 2025**	**Week 10 Reassessment:** Client continues to live in sheltered housing. Continues to engage in self-care. Client pleased with progress and grateful for nurses and physicians with persisted with his wound care. Width: 4 cm Depth: Red/pink with minimal slough Length: 2.5 cm. Pain: minimal pain, reports itching.
Jan 6 to Jan 28, 2026	Wound area continued to reduce in size. Client attends appointment with the primary care nurse and physician. Client showering and changing his dressing after each shower. Topical multi-composite dressing in place to protect the healing wound bed when PD dons socks and footwear. Wound area continued to close, no signs and symptoms of infection.

Mar 10 2026

By March 10 the area was closed and ongoing education was provided to remind client to protect new skin.

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Felicia Lotsios is a physician with The Ally Centre of Cape Breton, Sydney, Nova Scotia.

Donna Nichalson NP is a nurse practitioner with The Ally Centre of Cape Breton, Sydney, Nova Scotia.

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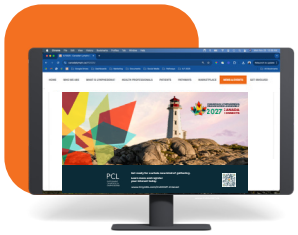

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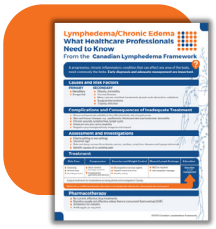

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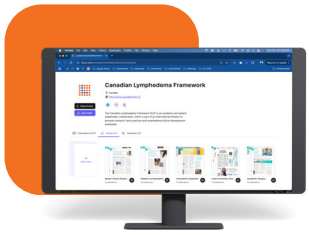

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COMMENTARY


ORIGINAL INVESTIGATION

Developing Consensus Wound Care Research Priorities Among Stakeholders in Canada: A Mixed-Methods Study

Omar Gaballa, MD, BASc,* Virginie Blanchette, PhD, DPM,†‡ Leslie Summers deLuca, PhD,‡ and Ahmed Kayssi, MD, MSc, MPHS

ABSTRACT

OBJECTIVE: The purpose of this work was to identify consensus wound care research priorities in Canada.

METHODS: A sequential mixed-methods approach utilizing a national survey followed by a modified Delphi technique was used to identify consensus research priorities. The modified Delphi process included 3 rounds of voting and 2 virtual workshops for stakeholder discussions. Stakeholders from the wound care community included patients, caregivers, clinicians of various backgrounds, researchers, industry partners and Wounds Canada leaders.

RESULTS: The first Canada-wide survey was respondents (75 English-speaking and 16 French-speaking) submitted 161 priority research questions in clarity and redundancy, resulting in 11 panelists participated in the Delphi process. Three questionnaires and 2 remote wound care research priorities will the panelists will threshold.

social activity, isolation, and ps stress that can impair wound Moreover, wound tion to the human in Canada, ulcers

From Research To Practice: What Canada's First Wound Care Research Priority-Setting Exercise Tells Us

By Ahmed Kayssi MD DrPH FRCSC FACS

How to cite: Kayssi A. From research to practice: what Canada's first wound care research priority-setting exercise tells us. Wound Care Canada. 2026;24(1): 18-20. DOI: 10.56885/915604outlyu

Wound care in Canada is a field defined by an uncomfortable paradox: the burden is enormous, the evidence base is growing and yet the gap between what we know and what we do remains stubbornly wide. In a study recently published in *Advances in Skin and Wound Care*, the authors, of whom I am one, took a step toward closing that gap by doing something that has never been done before in Canada by asking wound care stakeholders, systematically and rigorously, what they think researchers should prioritize.[1]

The authors (Gaballa, Blanchette, Summers deLuca, Kayssi) used a sequential mixed-methods design. A national survey collected research questions from 91 stakeholders across clinical, academic, industry and patient communities. Those questions were refined and then subjected to a modified Delphi process involving 29 expert panelists over three questionnaire rounds and two virtual workshops. The result is a ranked list of 23 consensus research priorities, representing the first time Canadian wound care stakeholders have formally aligned on what the field most urgently needs to know.

Top Priorities

The top three priorities are worth quoting directly. First: what is the incidence, prevalence and healing time for diabetic foot ulcers, venous leg ulcers, pressure injuries and surgical wounds in Canada, and what do they cost the health-care system? Second: how much could be saved by prioritizing wound prevention, and what would that mean for patient morbidity and mortality? Third: how can wound data be collected nationally to inform knowledge translation, quality improvement and research?

These questions share a common logic. Before we can change wound care in Canada, we need to be able to see it clearly, and right now we cannot. As Blanchette and Kuhnke have previously documented, accessible and usable wound data in Canada are remarkably scarce.[2] The absence of a national wound registry, the inconsistency of wound coding across settings and provinces and the concentration of data in acute care to the exclusion of home and community settings where most wound care actually happens are not technical inconveniences. They are structural barriers to the entire research enterprise. You cannot measure what you cannot count and you cannot improve what you cannot measure.

> ***"The 23 research priorities produced by this exercise give researchers a mandate, funders a roadmap and Wounds Canada and its member organizations a defensible basis for strategic investment."***

What strikes us about the consensus list is how consistently it points upstream. The questions that scored highest are not about which dressing to use or which device to apply. They are about incidence, cost, prevention, data infrastructure, education, equity and the design of care systems. This reflects something important about where the field's own experts believe the highest-value work lies. Clinical product research is well-funded by industry and well-represented in the literature. What is underfunded and underrepresented is exactly what our panel identified: the foundational epidemiological data, the health economics, the system design questions and the equity analysis that would allow wound care to make its case to policy makers.

Underfunded And Underrepresented

That last point matters because several of the top priorities are explicitly about making the case. Priority 2 asks how much wound prevention would save. Priority 11 asks how we measure the financial impact of chronic wounds and limb loss and use that data to secure resources. Priority 12 asks what health policies are needed to implement best wound care practices and prevent amputation. These are advocacy questions dressed as research questions, and their rank in the consensus suggests that the wound care community understands that evidence alone is insufficient. The evidence needs to be translated into the language of health economics and policy if it is to move health systems.

Equity Is Vital

The inclusion of equity in the top ten priorities is also notable and appropriate. Priority 7 asks directly: access to wound care is not equal across Canada; what are the factors and how do we address them? The geographic and socioeconomic gradients in wound outcomes in this country are real and documented, and a research agenda that does not foreground equity is unlikely to produce change that reaches the patients who bear the greatest burden of disease.

Acknowledging Limitations

We acknowledge the limitations of our work. The phase one survey response rate was 10%, which is low and introduces nonresponse bias. Representation in the Delphi panel was concentrated in five provinces, with no territorial representation and limited francophone participation beyond the initial survey. Basic scientists and clinical trialists were underrepresented. These are significant gaps in a country where health care is provincially/territorially governed and where the practical experience of wound care varies enormously between an academic centre in Toronto and a remote community in Nunavut.

Our panel also did not include a formal patient advisory structure, which means that patient and caregiver perspectives, while present through lay expert panelists, were not systematically integrated into the governance of the process itself. In a field where patient-reported outcomes are increasingly recognized as central to quality measurement, that is a gap worth addressing in future iterations of this work.

A Mandate For Research

Despite these limitations, we believe the 23 ranked priorities produced by this exercise are in the genuine public good. They give researchers a mandate, funders a roadmap and Wounds Canada and its member organizations a defensible basis for strategic investment. They also give clinicians who want to contribute to the evidence base a clear signal about where that contribution is most needed.

The challenge now is to use them. Research priority lists have a way of being published and then sitting on a shelf while the field continues to work on whatever was already funded. The priorities we identified will only matter if they are actively connected to grant competitions, journal calls, fellowship training and the advocacy conversations that happen between wound care organizations and government. That work belongs to all of us.

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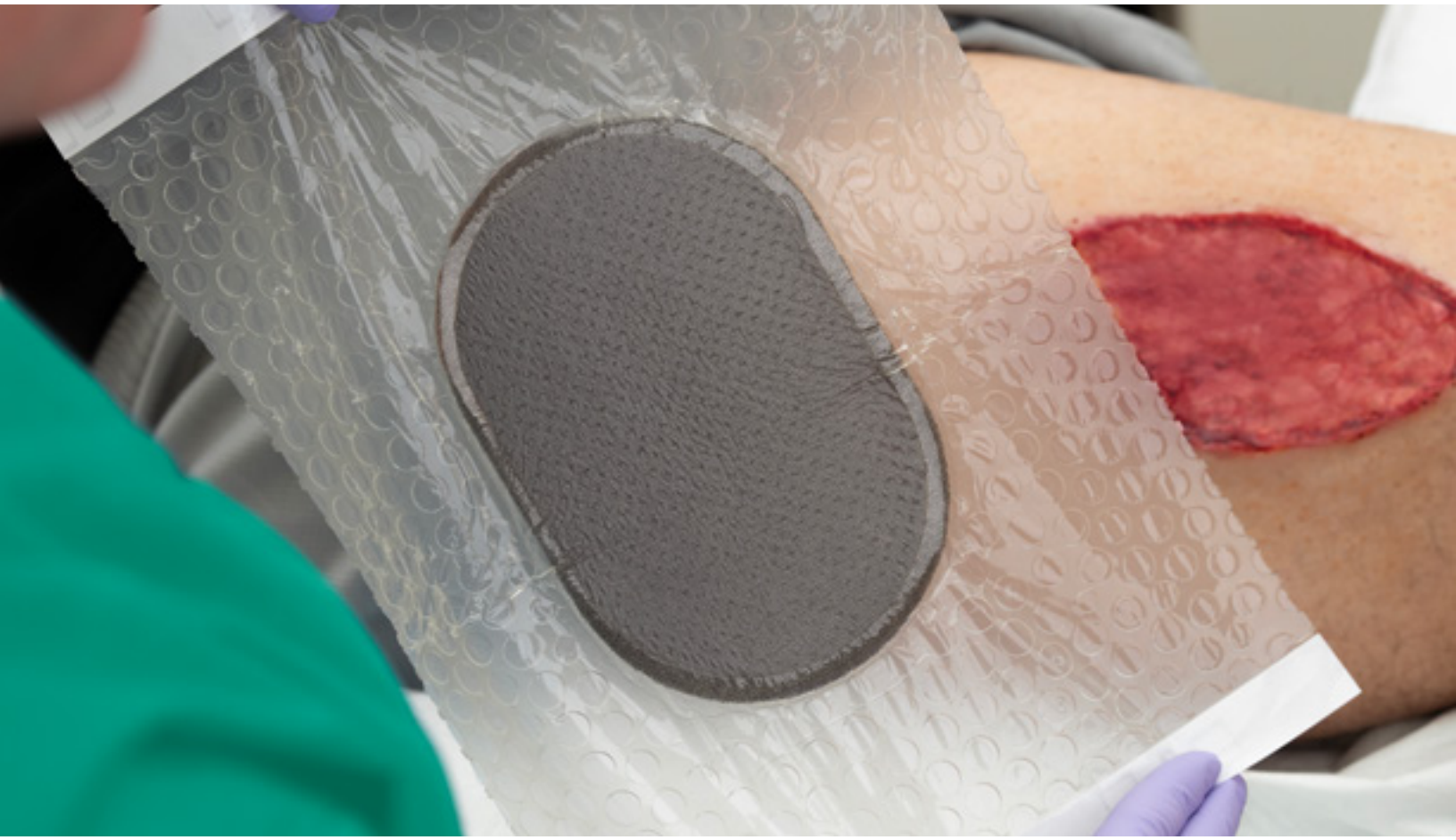

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Nutrition Care For Adults After Burn Injury: Evidence-Based, Practice-Informed Recommendations

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Burn injuries trigger profound metabolic, hormonal and inflammatory responses.[1] Patients with burns experience severe inflammation and oxidative stress, protracted hypermetabolism and catabolism that may persist for a year or more, changes in lipid and carbohydrate (CHO) metabolism, impaired insulin sensitivity, loss of lean body mass and impaired immune function.[2-4]

Appropriate, adequate and timely nutritional support is vital to recovery and the prevention of complications,[1-4] yet much of the literature specific to nutrition intervention for burns is primarily limited to observational studies, or small single centre randomized control trials (RCTs), with scarce large multi-centre RCTs. Guidelines put forth by various nutrition and burn care societies, based on both this small body of evidence and expert consensus, are not updated regularly and are often incomplete.

To better support clinicians, Registered Dietitians (RDs) from burn units across Canada conducted a thorough review of the literature and current best practices to create these comprehensive evidence-based and practice-informed recommendations for nutrition care after burn injury.

Editor's note: This article focuses on nutrition care following burn injury. More general information on the prevention and management of burns can be found in Chapter 8 of *Best Practice Recommendations For Skin Health and Wound Management 2025* (Wounds Canada).

RECOMMENDATIONS

Energy

The hypermetabolic response to burn injury is proportional to the size of the injury and in some cases calorie requirements will reach two times baseline levels.[1-4] This hypermetabolic state may be sustained for months or longer post burn.[1-4] In addition to the size, or Total Body Surface Area (TBSA) burned, the degree of the hypermetabolic response is also influenced by the ambient temperature, thermogenesis of nutrients, early wound excision and grafting, early provision of enteral nutrition support and the number of days that have passed since the injury occurred.[1-3]

Hypermetabolism of thermally injured patients is highly variable, and although total energy requirements cannot be precisely measured, indirect calorimetry (IC) is the gold standard for determining energy expenditure (EE).[1,3,4]

The application of an activity factor (AF) to the measured EE (MEE) will depend on the clinical circumstances.[5] For burn patients, consideration should be given to the frequency and duration of dressing changes, as well as engagement in physical activity and rehabilitation for which an AF of 10-30% will be needed to approximate total EE (TEE).[5] Assessing energy needs as precisely as possible is essential as both 'over' or 'under' feeding burn patients can negatively impact wound healing and increase the risk of infectious complications, as well as impair liver and respiratory function.[1-4] In the absence of IC, various equations are available for estimating energy requirements.

Forty-six equations for estimating energy requirements after thermal injury were reviewed by Dickerson et al. (2002) and none were found to be precise (within 15% of MEE).[6] Of the methods determined to be unbiased, the most precise were Milner, Zawacki and Xie.[6] Wang et al. (2024) assessed the bias and precision of 12 equations and found the Toronto equation to have the lowest bias and the Ireton-Jones (IJ) equation to be the most precise (within 10% of MEE).[7]

Following the Toronto equation, the Harris Benedict equation (HBE) x 1.5 and the Milner equation were the least biased. HBE x 1.5 and the Toronto equation were the most precise after the IJ equation.[7] These and other commonly used equations are listed in Table 1.[6-9] When choosing an equation, or equations, to use, consider the population from which they were derived and the number of days post burn (DPB).

Macronutrients

Currently there are no evidence-based guidelines that outline the best distribution of macronutrients for burn patients. A review of the available literature suggests the following:[4,10,17]

1) Protein: 1.5-2.5 g/kg OR 20-25% of total calories
2) Fat: aim for less than or equal to 30% of total calories
3) CHO: ~ approximately 50% of calories with limit of 5-7g/kg/d preferred over fat as a calorie source

Clinical judgement should be used, particularly in the provision of protein. Higher protein intakes, up to 3.0 g/kg, may be indicated as TBSA burned increases. Renal function should be monitored for signs of azotemia.[2] (See Table 2.)

Micronutrients

Vitamin and mineral requirements are also elevated after burn injury due to hypermetabolism, losses from wounds, increased needs for wound healing and immune function, as well as increased antioxidant requirements in response to inflammation.[1,3,4] A multivitamin mineral supplement, given daily, is suggested for all burn patients regardless of the TBSA burned.[3,15] High dose supplementation for patients with TBSA burns greater than or equal to 20% is recommended for specific micronutrients and for others supplementation is cautioned. These recommendations are outlined in Table 3 and Table 4.

Table 1: Equations for estimating energy expenditure for patients with burn injuries

Author or Method	Equation	Comments
Carlson	BMR x [0.89142 + (0.01335 x TBSA)] x BSA x 24 x AF	0-30 DPB (validated by Milner)
Curreri	25 x body weight (kg) + 40 x % TBSA	Tends to overestimate needs
HBE x 1.5	Male: 66.5 + (13.7 x Wt) + (5 x Ht) - (6.8 x age) Female:655 = (9.6 x Wt) + (1.8 x Ht) - (4.7 x age)	Not significantly different from MEE and one of the most accurate of the commonly used formulas
HBE x 2.0	Male: 66.5 + (13.7 x Wt) + (5 x Ht) - (6.8 x age) Female: 655 = (9.6 x Wt) + (1.8 x Ht) - (4.7 x age)	Tends to overestimate needs Stress factors ranging from 1.5 to 2.0, stratified based on TBSA, have been suggested and used in practice
Ireton-Jones (revised)	Spontaneously Breathing: 629-11(Age) + 25 (Wt) - 609 (O) Ventilator Dependent : 1784 – 11 (Age) + 5 (Wt) + 244(S) + 239 (T) + 804 (B)	O: obesity > BMI 27, T: trauma dx, B: burn dx Yes =1 No =0 S: sex. Male =1 Female = 0
Milner	(BMR x 24 x BSA) x (0.274 + 0.0079 x %TBSA - 0.004 x DPB) + (BMR x 24 x BSA)	Cumbersome to calculate Validated for 0-30 DPB and beyond
Toronto	REE = -4343 + (10.5 x TBSA) + (0.23 x kcal) + (0.84 x HBE) + (114 x T) - (4.5 x DPB)	kcal: calorie intake in the last 24 hrs T: temperature in degrees Celsius Cumbersome to calculate
Zawacki	RMR = 1440 x BSA (m2	Practical, easy to calculate Predominantly European males in study population
Xie	RMR= 1000 x BSA [m2] + (25 x % TBSA)	Practical, easy to calculate Equation derived from Chinese adults who may differ in body size compared to Western counterparts. May overestimate, most relevant in peak period of energy expenditure 1 week to 1 month post injury

TBSA = Total Body Surface Area burned, expressed as %. E.g. 25% TBSA
BMR = 37 - [(age-20)/10]
BSA = (W0.425 x H 0.725) x 0.007184

Table 2: Summary of burn guideline macronutrient distribution recommendations

Guideline	Protein	Carbohydrates	Fat
ASPEN (2016)[10]	1.5-2 g/kg		
ESPEN (2013)[4]	1.5 -2.0 >2.2 g/kg /d with no additional benefit	55-60% of total kcal Should not exceed 5mg/kg/min or 7g/kg/d	35% vs 15% has negative impact on length of stay (LOS) and infection risk.
Galveston Burn Unit (2011)[11]	Protein losses can exceed 150 g /day (0.5 lbs muscle) 1.5-2 g/kg protein in adults	Minimum 2 g/kg/day Maximum 7 g/kg/day	<15% total kcal 2-3% linoleic acid to prevent essential fatty acid deficiency (EFAD)
ISBI (2016)[12]	1.5-2.0 g/kg	N/A	N/A
ISBI (2018)[13]	N/A	N/A	Provision of kcal should be done via CHO and protein rather than fat.
NSW Statewide Burn Injury Service (2011)[14]	1.5-3.0 g/kg IBW OR 20-25% of total kcal <15% 1.0-1.5 g/kg 15- 30% 1.5 g/kg 31-49% 1.5-2.0 g/kg 50+% 2.0-2.3 g/kg	50% of energy. Should not exceed 5-7 mg/kg/min	25-30% of total energy OR 15-20% of NPC
Midland Burn NHS (2018)[15]	1.5-2.0 g/kg	N/A	N/A
Ross Tilley Burn Center (2012)[16]	150 g/day of protein losses OR 20-25 g/m2 TBSA/day in severe burns 1.5-2 g/kg/day in adults	Maximum of 7 g/kg/day	2-4% of total calories from EFA
SEMICYUC - SENPE (2011)[17]	1.5-2.0 g/kg/d OR 20-25% total kcal 1.5g/kg/d is insufficient for +N-balance in first few days	4-5g/kg/d, not greater than 1400-1500 kcal/d from CHO	20-30% of NPC

ASPEN= American Society for Parenteral and Enteral Nutrition
ESPEN = European Society for Parenteral and Enteral Nutrition
ISBI = International Society for Burn Injury
NSW = State of New South Wales, Australia
SEMICYUC - SENPE = Spanish Society of Intensive Care Medicine and Coronary Units – Spanish Society of Parenteral and Enteral Nutrition

Table 3: Micronutrient supplementation for burns 20% TBSA or greater[18-21]

Vitamin/ Mineral	Function	Supplementation TBSA ≥20%	Monitoring
Copper (Cu)	Antioxidant Involved in collagen/elastin synthesis Deficiency leads to impaired wound healing Enteral zinc can cause copper deficiency as Cu and Zn compete for absorption	2-4 mg IV Cu for up to 4 weeks OR No supplementation unless deficient	Routine monitoring: Serum (S)-Cu every 2 weeks OR - On CRRT - Signs of poor wound healing Monitor CRP* Hold enteral Zn if Cu levels decline
Zinc (Zn)	Antioxidant Involved in protein syntheses and immune function Deficiency leads to impaired wound healing and immune function	40 mg IV Zn for up to 4 weeks OR 50 mg elemental zinc daily enteral/oral	Routine monitoring: S-Zinc every 2 weeks Monitor CRP* Discontinue supplementation when <10% TBSA wound remains open OR when serum values are normal Consider IV if enteral Zn supplementation results in low copper levels
Selenium (Se)	Antioxidant Component of selenoproteins involved in cell proliferation and apoptosis Deficiency associated with increased infection rates	200-400 mg IV for up to 4 weeks OR 200-400 mcg/d enteral selenium	Routine monitoring: S-Se every 2 weeks OR - On CRRT - Signs of poor wound healing/infection Monitor CRP* Discontinue supplementation when <10% TBSA wound remains open
Ascorbic Acid (Vitamin C)	Antioxidant Involved in collagen synthesis, capillary strength, and wound healing. Deficiency occurs in alcohol use, smoking, decreased vitamin C intake and increased excretion.	1000-1500 mg daily enteral/oral	Wean to 500 mg/d when <10% TBSA remains open and off CRRT.
Vitamin D	Involved in tissue function including immune system, skin, skeletal muscle, bone/mineral metabolism, and endocrine system. Deficiency correlates with low scar elasticity and reduced skin barrier function. Deficiency post burn impacts bone health. Excess supplementation can result in hypercalcemia	1000-3000 IU /d	Adjust dose based on 25 (OH)D levels Hold for increased Calcium levels

*Of note, plasma concentrations of micronutrients and trace elements are affected by inflammation, and this should be considered in the interpretation of lab values.

Table 4: Micronutrients not routinely supplemented for patients with burn injuries[20]

Vitamin/Mineral	Function	Supplementation TBSA ≥20%	Monitoring
Vitamin A	Deficiency is rare in North America; however, if deficiency occurs it can lead to impaired collagen synthesis and poor wound healing	Do not recommend routine Vitamin A supplementation If wound healing is impaired and pt is receiving corticosteroid therapy, consider 10,000-15,000 IU/d (enteral) for a maximum of 10 days.	Monitor S-Retinol with RBP (retinol binding protein)
Iron	Involved in oxygen binding, transport and metabolism, cellular respiration, and electron transport. Cofactor in collagen synthesis	Not typically supplemented Decrease after burn injury but return to normal without supplementation	Check iron panel in patients with microcytic anemia

Glutamine

Glutamine is a conditionally essential amino acid during periods of critical illness.[4,22,23] In the context of burns, glutamine is rapidly depleted from both muscle and plasma following injury. [1,23, 24] Glutamine is an important fuel source for lymphocytes and enterocytes and is essential to maintaining gut integrity and supporting immune function.[1,4,23-25] In several single centered, randomized studies, enteral glutamine supplementation has been shown to have several benefits, such as:

1) Improved wound healing[23]
2) Reduced incidence of positive blood and/or wound cultures[22-24]
3) Decreased plasma endotoxins[23,25]
4) Decreased intestinal permeability[23,25]
5) Decreased hospital LOS.[22]

The only multicentered, randomized trial of enteral glutamine in burn patients did not look at the same outcomes as previous studies. The authors concluded glutamine did not reduce the time to discharge alive from hospital and resulted in no difference in six-month mortality, LOS, or incidence of bacteremia.[26] There was no harm reported in using glutamine at a dose of 0.5g/kg.[26]

Until more evidence is available, we recommend the use of oral or enteral glutamine be considered on a case-by-case basis.

Monitoring

Ongoing monitoring of the nutrition care plan's adequacy and success includes frequent evaluation of the following parameters:

1) Indirect Calorimetry
- a. Considered the gold standard for assessing energy requirements.
- b. Weekly measurements recommended as needs are ever changing due to surgery, mechanical ventilation, medications and daily care Occupational Therapist [OT] and Physical Therapist [PT]).[11,27]
- c. Include appropriate activity factor based on mobility (discuss with OT/PT).[5]

2) Nutrient Intake
- a. Early provision of oral +/- enteral nutrition (EN) is warranted due to high metabolic demands of burn patients (within the first 4-24hrs of injury[1-4]).
- b. Measure nutrient intake via daily calorie counts.
- c. Identify potential barriers to adequate oral intake such as pain, gastrointestinal dysfunction, dysphagia, fatigue, deconditioning and functional limitations.[28] Discuss management strategies with the team.
- d. If oral intake is <50% of estimated/measured needs, then recommend EN.
- e. Standard enteral formulas are appropriate for burn patients.[4] Choose the formula or combination of formulas that best meets the nutritional needs of the patient and consider post-pyloric EN if the patient experiences gastric intolerance.[1,3,4]

f. The goal is to meet 100% of needs through EN or a combination of EN and oral diet.
g. When transitioning to oral feeds, consider nocturnal feeds.
h. It is appropriate to discontinue EN support when the patient is meeting at least 75% of estimated/measured needs.
i. Oral and enteral nutrition are preferred over parenteral nutrition (PN) to maintain gut integrity, prevent bacterial translocation and support immune function;[1-4] however, PN can be used for burn patients with dysfunctional gastrointestinal tracts.[1,3,4]
j. The risks and benefits of early initiation of PN should be discussed daily with the interdisciplinary team when EN is contraindicated or not tolerated.[29]

3) Anthropometrics/Body Weight

a. Document weight used: Stated pre-burn weight, actual weight or adjusted weight.
b. Consider 'stated pre-burn weight' (if possible, obtain from patient or family) versus 'actual or measured weight' obtained on admission as weight is often confounded secondary to fluid status (affected by fluid resuscitation and fluid shifts).
c. Consider patient's body habitus (physique, body build, muscle mass) before adjusting weight. BMI is not a measure of adiposity and does not differentiate between adipose tissue and lean body mass. A physical assessment should be used to determine if using an adjusted body weight is appropriate for patients with BMI > 30.
d. Measure weekly and monitor long term trends vs day-to-day variations, particularly in the rehab phase of burn care.
e. Weight gain is usually reflective of changes in fluid status.[30]
f. The goal is to minimize weight loss to prevent loss of >10% pre-burn body weight.[30,31]
g. Factors to consider while weighing a patient for the purpose of consistency:
    i. Bed scale vs. stand-up scale
    ii. Dressings (on or off)
    iii. Blankets, pillows, catheter/FMS bags
    iv. Tare / zero the bed scale.

4) Nutrition Focused Physical Exam/Subjective Global Assessment

a. Carry out on burn patients, when feasible, as you would all other hospitalized patients according to hospital practice.
b. Monitor loss of subcutaneous fat and loss of lean body mass (inevitable due to immobility/catabolism).
c. Future considerations for body composition monitoring include the use of: BIA (Bioelectrical impedance), DEXA (Dual-Energy X-Ray Absorptiometry), Ultrasound.

5) Wound Healing

a. Open communication with members of the burn team (i.e., burn surgeon/residents/nursing) re: burn size, depth, location and progression of wound healing (i.e. graft take and granulation).
b. Participate in daily/weekly rounds, view photos, attend dressing changes to better understand the burn wound healing process.

6) Functional Capacity

a. Communicate with OT/PT re: frequency and intensity of mobilization/rehabilitation. This will determine the activity factor added to estimated or measured energy needs.
b. If available, use of hand dynamometer to measure hand grip strength is a predictor of physical, functional and nutritional status.[32]

7) Biochemical Parameters

a. General Chemistry.
b. Acute phase proteins (albumin, pre-albumin, CRP). Observe the trends in the context of inflammation. More useful in the recovery phase vs the acute phase.
c. Micronutrients: zinc, selenium, copper (see micronutrient section).
d. Consider nitrogen balance studies.

8) *Pertinent Medications*

a. Some medications may negatively impact gastrointestinal (GI) function and lead to interruptions in oral or enteral nutrition, placing the patient in a calorie deficit.
    i. Pain medications/analgesics/narcotics - may lead to constipation
    ii. Antibiotics – may lead to nausea or diarrhea.
b. Some medications may be used to treat GI symptoms that are impairing nutrient intake/ digestion/absorption leading to improved nutritional status.
    i. Anti-secretory agents/antacids
    ii. GI motility agents/antinauseants
    iii. Laxatives/Stool softeners
    iv. Discuss bowel regime with the team.
c. Hyperglycemia is detrimental to wound healing.
    i. Insulin or oral hypoglycemic agents may be needed to achieve blood glucose targets
    ii. Discuss blood glucose management with the team.

Conclusion

Nutrition is an integral part of recovery from burn injuries. Providing adequate calories, protein and micronutrients is essential to support wound healing and reduce the risk of complications associated with over or under feeding. These evidence-based, practice-informed recommendations are intended to guide Registered Dietitians in the development and ongoing evaluation of individualized nutritional care plans for burn patients.

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1 Essity group – commissioned laboratory testing at SMTL: Evaluation of absorbency and fluid retention tested against 20 biggest competitors (based on EN 13726). 2024.
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Reimbursement Whirlwind: Evolving Wound Care Payment Models In Canada And The United States

By Therese Laub LPN CWS FACCWS and Douglas Queen BSc PhD MBA

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Wound care reimbursement is undergoing rapid transformation across North America, particularly in the United States. Rising chronic disease prevalence, escalating health-care costs and the shift toward value-based care are reshaping how wound care services and technologies are funded.

Although Canada and the US operate within fundamentally different health-care financing structures, both systems face similar pressures to improve outcomes, reduce preventable utilization, and ensure sustainability. This manuscript examines the evolving reimbursement landscapes in both countries and outlines opportunities for cross-border learning to support more equitable, efficient and evidence-driven wound care.

Chronic wounds represent a growing clinical and economic burden across North America, affecting an estimated 2.5% of the population and generating billions in annual health-care expenditures.[1] Globally, wound care expenditure tops US$300 billion,[2] with the US accounting for nearly US$200 billion[2] and Canada some CAD$13 billion.[3] As treatment options expand and costs rise, reimbursement models are being re-evaluated while maintaining access to effective therapies.[4] Traditional fee-for-service structures are the foundation of wound care reimbursement. These structures are increasingly viewed as misaligned with the multidisciplinary nature of wound management.[5]

Both the United States and Canada are experiencing significant shifts in reimbursement policy, driven by the need to improve outcomes, reduce complications and contain costs.[6]

Despite their structural differences, both systems are moving toward models emphasizing value,

accountability and standardization (See Table 1).[7] As health-care systems adapt to these financial pressures and strive to improve patient outcomes, understanding reimbursement is vital for clinicians, administrators and policymakers.[8]

As wound treatments have advanced their usage has come under scrutiny considering misuse and overuse.[9] Managing the reimbursement of such advanced approaches has been challenging for most health-care systems around the world.[10]

Wound Care Reimbursement In The US

The US reimbursement environment is characterized by fragmentation and complexity.[11] Medicare, Medicaid and commercial insurers each maintain distinct coverage criteria, documentation requirements and utilization controls. This variability creates an administrative burden and inconsistent access to advanced wound therapies.[12]

Coverage for advanced wound therapies—such as negative pressure wound therapy (NPWT), bioengineered skin substitutes and advanced dressings—varies by payer and care setting.

Medicare coverage often depends on demonstrated medical necessity and adherence to evidence-based guidelines.[17]

Documentation as a reimbursement determinant: Documentation has become a central mechanism for controlling costs. Insufficient or imprecise documentation can result in immediate denials, prior authorization failures and post-payment audits.[15]

Wound Care Reimbursement In Canada

Canada's universal health-care system provides publicly funded wound care services, with reimbursement decisions made at the provincial or territorial level. This structure promotes equity and standardization but can slow the adoption of new technologies.[18] As a public system, Canada focuses on more social elements (See Table 2), such as integration and equity of care.[19] Similar to the US, cost containment is also a driver.[20]

Coverage decisions for advanced wound therapies are influenced by clinical evidence, cost-effectiveness analyses and provincial formulary inclusion.[21] In Canada, documentation influences program evaluation, future funding decisions and resource allocation.[22]

US vs Canada: Possible Integration Of Models

Prior authorizations, clinical documentation and coding accuracy are crucial for securing reimbursement.[24] However, gaps remain, particularly for newer technologies and out-of-pocket costs can be significant for patients when therapies fall outside established coverage policies.[25]

Canada, where the reimbursement landscape for advanced wound therapies is primarily governed by provincial and territorial health ministries, which determine coverage within their publicly funded health systems, has its own challenges.[26]

Table 1: Key Trends in the US Landscape

Key Trends in the US Landscape	
Shift Toward Value-Based Payment	The transition from fee-for-service to value-based models continues to accelerate. Bundled payments, accountable care organizations (ACOs), and pay-for-performance initiatives incentivize reductions in complications, readmissions and total cost of care.[13, 14]
Regulatory Tightening	Medicare and Medicaid have increased scrutiny on documentation accuracy, coding precision and appropriate utilization of advanced therapies, contributing to rising denial rates and audit activity.[15]
Private Payer Alignment	Commercial insurers increasingly mirror federal value-based strategies, often adding payer-specific formularies and coverage restrictions for wound care products and technologies.[16]
Shift to Outpatient and Home Based Care	To reduce costs and align with patient preferences, wound care is migrating from inpatient settings to outpatient clinics and home health environments.[12]

Table 2: Key Trends in the Canadian Landscape

Key Trends in the Canadian Landscape	
Cost Containment and Standardization	Provincial health authorities rely on standardized formularies, clinical guidelines and cost-effectiveness assessments to manage expenditures.[21]
Regulatory Tightening	There is increasing emphasis on multidisciplinary wound care teams and standardized care pathways, consistent with broader Canadian health system reforms.[22]
Private Payer Alignment	Canada prioritizes equitable access to wound care services, though disparities persist in rural and remote communities.[23]

Table 3: Complementary Strengths in Wound Care Reimbursement

Complementary Strengths in Wound Care Reimbursement			
Domain	**United States[27]**	**Canada[28]**	**Implications for Future Models**
Access to Innovation	Faster adoption of advanced wound therapies when coverage exists; market-driven uptake	More cautious, formulary-based adoption	Create clearer, evidence-responsive pathways that balance innovation with stewardship
Equity of Access	Highly variable based on payer, geography and care setting	More uniform access across populations	Equity should be intentionally built into reimbursement design
Cost Control	Reactive mechanisms through audits, utilization controls and policy corrections	Proactive system-level cost containment	Shift from reactive correction to prevention-focused alignment
Incentive Structure	Increasing movement toward value-based and outcome-focused models	Limited linkage between reimbursement and wound-specific outcomes	Align funding with healing trajectories, complication reduction, and continuity of care
Administrative Burden	High documentation and compliance demands	Lower administrative complexity for clinicians	Preserve accountability while protecting clinical time

Possible Integration Of Models

The future of wound care reimbursement lies not in choosing between these models, but in integrating their strongest elements.

Coverage decisions are influenced by clinical evidence, cost-effectiveness assessments and local formulary listings. While some advanced wound therapies may be included in hospital or community care budgets, others—especially newer or higher-cost products—may require special approval or may not be funded at all.[27] Private insurance can sometimes supplement public coverage, but access varies widely across provinces/territories and between urban and rural settings. As a result, Canadian patients may experience variability in access to advanced wound therapies depending on their location and the policies of their local health authority.[28]

Across both systems, documentation has evolved from a clinical record to a primary tool of reimbursement governance.[29] Both countries face similar pressures—rising chronic disease burden, increasing wound complexity, escalating costs and demand for measurable outcomes—but employ different mechanisms to address them.[1,5] A comparative analysis reveals complementary strengths in each system, suggesting opportunities for hybrid reimbursement models that balance innovation, equity and sustainability (See Table 3).

Despite fundamentally different health-care financing structures, wound care reimbursement in both the US and Canada is being reshaped by the same underlying pressures: escalating chronic disease burden, rising costs associated with wound complications and increasing scrutiny over clinical variation.[30] These shared pressures are driving parallel trends while the mechanisms used to implement them differ markedly between the two countries.

Shared Direction: Value, Accountability And Cost Containment

Both countries are moving, deliberately but unevenly, away from pure fee-for-service models toward reimbursement approaches that emphasize value, outcomes and prevention of downstream costs.[31]

Policymakers on both sides of the border are increasingly focused on reducing avoidable hospitalizations, infections, amputations and prolonged lengths of stay related to chronic wounds.[39] However, how that value agenda is operationalized differs significantly.

In the US, value-based care is being layered onto an already complex multi-payer system.[32] This has resulted in intensified utilization management at the claim level, with reimbursement increasingly dependent on documentation precision, medical necessity thresholds and payer-specific coverage policies. Clinicians experience this shift directly through denials, audits and recoupments.[6]

In contrast, Canada's single-payer framework enables value-based principles to be applied at the system level. Provincial and regional authorities are embedding outcome accountability into funding models through global budgets, performance agreements and standardized pathways. Rather than claim-by-claim denials, the financial impact is felt through program scope, resource availability and service capacity.[26]

Advanced Therapy: Shared Scrutiny, Different Barriers

Access to advanced wound therapies is tightening in both countries, reflecting heightened concern over cost, evidence standards and system sustainability. Yet the barriers clinicians encounter differ in form and timing.

US clinicians may experience relatively rapid access once approval is granted, but face increasing hurdles upfront through prior authorization, narrowing indications and escalating documentation requirements.[33] Canadian clinicians, by contrast, face slower adoption cycles driven by formulary inclusion processes, regional approvals and budget impact analyses that evaluate affordability at scale.[34]

The result is a shared reality: access to advanced therapies is no longer based solely on clinical appropriateness, but on whether the therapy fits within broader economic and policy constraints.

Documentation As A Reimbursement Lever

One of the clearest points of convergence is the expanding role of documentation as a reimbursement gatekeeper. In the US, documentation has become a punitive mechanism: failure to meet evolving standards can result in immediate nonpayment or post-payment recoupment.[31] In Canada, documentation functions more as a justificatory mechanism, influencing future funding decisions, program evaluation and system confidence, rather than individual clinician payment.[35]

In both systems, documentation is no longer simply a clinical record; it is a primary tool of cost control.

Equity Considerations Shaping Policy

Equity concerns are increasingly influencing reimbursement discussions in both countries, though they arise from different systemic challenges.[36] The US grapples with disparities driven by insurance status and income, while Canada faces inequities related to geography, workforce availability and regional resource distribution.[37]

As a result, reimbursement reforms in both systems are being evaluated not only for cost savings, but for their impact on access to wound care for vulnerable populations, particularly those in rural, long-term care and home-based settings.[4,38]

Standardization And Its Impact On Clinical Practice

Finally, both countries are moving toward greater standardization of wound care delivery through defined pathways, algorithms and escalation criteria.[39] Variation in care is increasingly viewed as a financial risk.[40]

For US clinicians, this standardization is largely payer-driven and tied to reimbursement compliance.[41] For Canadian clinicians, it is system-driven and tied to resource allocation and service planning. In both cases, clinical autonomy remains, but must now operate within defensible, standardized frameworks.[42]

Key Takeaway for Wound Care Clinicians

- The US model excels at accelerating innovation but struggles with equity.
- The Canadian model protects access but can limit therapeutic flexibility.
- A hybrid reimbursement approach, equitable, outcome-driven and evidence-responsive - offers the clearest path forward.

In both the US and Canada, wound care clinicians should expect tighter reimbursement controls, higher documentation expectations and reduced tolerance for variation without clear justification. While both countries are responding to the same economic and clinical pressures, they are pursuing fundamentally different reimbursement strategies: the US is tightening control at the point of payment, placing increasing administrative and documentation burdens directly on clinicians, whereas Canada is tightening control at the system level, prioritizing sustainability, equity and standardization over speed of access.

Toward A Joint US–Canada Framework

Both countries recognize that chronic wound care requires multidisciplinary expertise, longitudinal management and timely access to appropriate therapies. Reimbursement models must evolve to support early intervention, coordination across care settings and integration of digital tools.

Despite structural differences in health system design, the US and Canada are confronting the same underlying challenge: chronic wound care is being reimbursed through regulatory and payment frameworks that fail to reflect its clinical complexity, longitudinal nature and impact on system-wide outcomes.

Both countries recognize that wound care cannot be sustainably managed as a narrow procedural service. Effective wound management requires advanced clinical judgment, coordination across care settings and timely access to appropriate interventions.

Reimbursement models that emphasize episodic transactions over longitudinal management risk driving delayed healing, avoidable complications and higher downstream costs.

A shared path forward requires balancing access with accountability. The US can benefit from greater national standardization, system-level oversight and support for coordinated care models, while Canada can strengthen responsiveness by enabling faster, criteria-based access to advanced therapies and reinforcing clinician discretion within standardized frameworks. Neither innovation nor equity should be treated as mutually exclusive goals.

Both systems must move toward reimbursement strategies that:

- Recognize wound care as a distinct, multidisciplinary specialty
- Support early intervention, reassessment and escalation when clinically indicated
- Incentivize coordination across post-acute and community care settings
- Leverage digital and AI tools to enhance—not replace—clinical judgment.

Aligning reimbursement with the realities of wound pathophysiology and care delivery is not simply a financial imperative, it is a patient safety issue. By learning from each other's strengths, the US and Canada have the opportunity to advance reimbursement models that promote healing, reduce preventable utilization and support sustainable, high-quality wound care across the continuum.

Conclusion

Both the United States and Canada are experiencing substantial shifts in wound care reimbursement, with a common trend towards value-based models and cost containment. However, the US system is more fragmented and market-driven, leading to greater variability in coverage and access, while Canada's publicly funded approach aims for standardization and equity, albeit with regional differences. Providers in both countries must stay informed about policy changes to ensure continued access to effective wound care for their patients.

A Case Study In Innovation[43, 44]

The WiSeR (Wound care, Innovation, Science and Research) program is an initiative focused on advancing wound care practices through research, education, and the implementation of innovative solutions. In the United States, the WiSeR program aims to improve patient outcomes by standardizing wound care protocols, integrating cutting-edge technology and fostering collaboration among health-care professionals.

Within the US, the WiSeR program has been implemented in various health-care settings, including hospitals, clinics and academic institutions. The program emphasizes evidence-based practices, continuous professional development and the use of data analytics to track and enhance wound healing outcomes. It also provides training and resources for health-care providers to ensure best practices in wound assessment, management and prevention.

As of January 2026, the WiSeR program has not been officially launched in Canada. However, there is growing interest among Canadian health-care professionals and organizations in adopting similar evidence-based wound care frameworks. The success of WiSeR in the US and the increasing need for advanced wound care solutions in Canada suggest that the program, or a comparable model, may eventually be introduced to the Canadian health-care system. Adoption would likely involve collaboration with Canadian health authorities to tailor the program to local policies, resources and patient needs.

In summary, the WiSeR program is making significant strides in improving wound care in the US through innovation, research and education. While it has yet to be established in Canada, its proven benefits and the demand for improved wound care practices indicate a strong possibility for future adoption north of the border.

The reimbursement landscapes in the United States and Canada are undergoing profound transformation. While the US system is tightening controls at the point of payment, Canada is tightening controls at the system level. A hybrid model—equitable, outcome-driven, evidence-responsive and innovation-enabled—offers the clearest path forward for wound care reimbursement across North America.

Assessment, documentation and establishing medical necessity are foundational pillars in the provision of quality health care. Thorough patient and wound assessment enable health-care professionals to collect critical information about a patient's condition, symptoms and history, which informs accurate diagnoses and effective care planning. The assessment process also supports continuity of care, ensuring that relevant details are communicated during transitions between providers or settings.

Documentation plays a vital role in both clinical practice and the broader health-care system. Accurate, timely and comprehensive records serve as a legal record of care provided, facilitate communication among multidisciplinary teams and support quality assurance and risk management efforts. Proper documentation is essential for demonstrating medical necessity, the justification for specific treatments, procedures or services based on clinical evidence and patient need. Medical necessity is not only crucial for ethical care delivery but also for securing insurance coverage and compliance with regulatory standards. When assessment findings and interventions are clearly documented, it ensures transparency, accountability and continuity, ultimately safeguarding both patient welfare and provider integrity.

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A member of the CAF's Medical Training Group takes part in a training exercise with simulated wounds as part of Operation UNIFOR. Photo: Cpl Daniel Chiasson.

Wound Care In The Canadian Armed Forces: From Tactical Combat Casualty Care To Recovery

By Ian Corks

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Wound management within the Canadian Armed Forces (CAF) extends well beyond the combat zone. From hemorrhage control under fire to long-term rehabilitation in Canada. It is a critical component of a system that is integrated with the Canadian civilian health-care structure, and one that emphasizes professional development and innovation. *Wound Care Canada* recently talked with two key officers in the Canadian Forces Health Services (CFHS) about wound care within the CAF: LCol Andrew Beckett, a trauma surgeon, and Maj Doug Murphy, a Senior Practice Leader for Primary Care..

LCol Andrew Beckett is a senior CAF clinician and trauma surgeon and currently serves as Head of Trauma Surgery at St. Michael's Hospital (Unity Health Toronto), Toronto ON.

Maj Doug Murphy BScN is a Senior Practice Leader for Primary Care in the CAF. In addition to his military duties, Maj Murphy maintains active clinical practice as a casual nurse in the Emergency Department and Post-Anesthesia Care Unit (PACU) at a local hospital in Ottawa ON.

WCC: *The Canadian Armed Forces operates what is described as "a fully integrated health system". Can you explain what this means?*

LCol Beckett: Wound management within the Canadian Armed Forces (CAF) extends far beyond the battlefield. Through the Canadian Forces Health Services (CFHS), the Canadian Armed Forces (CAF) operates a fully integrated health system designed to support serving members across the continuum of care.

Military wound care is often associated with combat trauma, yet much of the daily work of CFHS resembles a comprehensive civilian health-care network—primary care clinics, rehabilitation services, mental health care and chronic disease management. What distinguishes it is the system's constant readiness to pivot from peacetime clinical practice to austere operational environments at a moment's notice.

CFHS functions as a national health-care delivery organization within the CAF. Across Canada, military clinics provide primary and occupational care to service members, supported by regional health services groups and centralized leadership. Interdisciplinary teams—physicians, nurses, medical technicians, physiotherapists, pharmacists and mental health professionals—work collaboratively to maintain operational fitness.

On deployment, that same system compresses into highly mobile, scalable teams. Personnel who typically practice in structured clinical environments must be prepared to deliver care in resource-limited, unpredictable settings. Training emphasizes adaptability, triage discipline and coordinated evacuation planning.

WCC: *What specific training is provided in terms of medical care from a military perspective? Either on deployment or otherwise?*

Maj Murphy: A career in the CAF medical services involves training that varies by occupation. However, as Nursing Officers, we follow a unified principle: to prepare CAF clinicians to deliver safe, effective medical care from the point of injury through progressive levels of care in deployed and domestic operations.

In addition to their civilian professional qualifications, CAF medics complete military-specific training that prepares them for operational environments. This includes *Tactical Combat Casualty Care* (TCCC) and periodic refreshers. These include battlefield trauma simulation exercises to reinforce high-acuity decision-making; chemical, biological, radiological and nuclear (CBRN) medical response training and prolonged field care (austere medicine) scenarios, reflecting real-world constraints in remote or contested environments.

This layered approach ensures that personnel can provide immediate lifesaving care, manage casualties during delayed evacuations and integrate seamlessly into higher levels of medical support in deployed settings.

WCC: *Can you expand on the role of Nursing Officers in the CAF?*

Maj Murphy: CAF Nursing Officers (NOs) are commissioned officers and licensed Registered Nurses who deliver clinical care, health promotion and leadership in both domestic clinics and deployed medical units. They play key roles in primary care, inpatient care, operational health planning and health-system leadership.

To become a Nursing Officer, individuals must:

- Hold a recognized Bachelor of Nursing and be a licensed Registered Nurse (RN) with a provincial or territorial regulatory body.
- Complete Basic Military Officer Qualification (BMOQ).
- Compete a RQ Nur Lt course – that includes familiarization and exposure to military health services
- Undertake Clinical Phase training that includes 900 hours of preceptorship in a civilian hospital.

Ongoing professional development is an expected component of military health practice.

Nursing Officers frequently expand into specialized areas such as: Surgical or perioperative nursing; Critical Care; Primary Care (extension from the parent occupation Medical Surgical Nurse Officer (MNSO); Mental health; Nurse Practitioner (NP) and Leadership and clinical governance roles.

These pathways align with real CAF career trajectories and reflect the organization's emphasis on evidence-based practice, clinical excellence and leadership development.

WCC: *In terms of nursing and similar services, do you engage with or encourage personnel to pursue continuing education activities, for example, courses/ certification such as Wounds Canada's Accredited Wound Care Champion program or NSWOC (Nurses Specialized in Wound, Ostomy and Continence Canada)?*

Maj Murphy: Yes — the Canadian Armed Forces, including the CFHS, does actively support and encourage continuing education for Nursing Officers and related health personnel. Wounds Canada's Accredited Wound Care certificate is listed as one of the programs available for funding through our Continuing Professional Development (CPD) program. CAF policy encourages that ongoing professional development is an expected and supported component of military health practice.

WCC: *Wound management is obviously a crucial component, both during deployment and afterwards. How does the CAF keep up with the latest advances, in terms of best practices, products, technology, etc.?*

Maj Murphy: The CAF maintains current, evidence-based wound-care practices through continuous professional education through the Canadian Nurses Association, and here in Ontario we also follow the Best Practice Guidelines published by the Registered Nurses' Association of Ontario (RNAO). Combined with ongoing health-system modernization efforts, a strengthened clinical-governance framework and alignment with national standards, the CAF ensures that its clinicians are consistently updating and enhancing their clinical practice.

Participation in Wound Canada conferences further supports this commitment by enabling CAF attendees to access the latest research, technologies and wound-care innovations. These events provide opportunities to bring back updated clinical knowledge, best practice recommendations and examples of emerging dressings and therapeutic products, ensuring that CAF Health Services remain aligned with contemporary national and international standards of care.

WCC: *What is the main difference between wound care provided under the Tactical Combat Casualty Care (TCCC) program and typical wound management?*

Maj Murphy: *Tactical Combat Casualty Care*, or TCCC, wound care is designed for combat conditions, where the priority is preventing death from the most immediate battlefield threats, often at the expense of ideal long-term wound healing.

TCCC Priorities ('Life Before Limb') are performed under fire, in unstable or hostile environments. Limited time, supplies, lighting, personnel and evacuation options are key factors. Wounds are often traumatic, penetrating and explosive or blast-related.

Considerations include combat conditions, such as ongoing enemy threat; the need for rapid movement; mass casualty situations and minimal equipment.

Once removed from the combat environment, typical wound management begins with prevention and proceeds by prioritizing optimal healing, patient comfort, infection control and preservation of viable tissue. These interventions are delivered in controlled clinical environments with access to comprehensive resources and skilled personnel. Wounds are often chronic, surgical or non-traumatic.

Treatment in this 'no threat' environment allows for full assessment, access to imaging and lab services, specialized dressings and longer-term planning.

WCC: *Naturally, a lot of effort is directed at combat and potential emergency or hazardous deployment. What structure is in place for caring for and managing wounds sustained by personnel afterwards? How does CAF handle these individuals to optimize healing and prevent complications?*

LCol Beckett: Wound care in operational environments is guided by the principles of *Tactical Combat Casualty Care* (TCCC). Unlike conventional civilian wound management—where rapid hospital access is assumed—TCCC prioritizes immediate life-saving interventions under hostile or austere conditions.

Hemorrhage control is paramount. Tourniquets, hemostatic agents, pressure dressings and rapid damage control techniques are employed early. Care progresses through defined phases: care under fire, tactical field care and evacuation care. Each phase reflects the realities of environment, threat level, and available resources.

Once patients reach higher echelons of care, wound management increasingly aligns with advanced civilian trauma standards, including surgical debridement, vascular repair, negative pressure wound therapy and staged reconstruction.

Maj Murphy: Once a CAF member transitions out of the tactical environment, their care is managed within the broader CFHS system. This system is designed to provide comprehensive, long-term clinical care that supports recovery, rehabilitation and sustained readiness. CFHS clinics function as primary and continuing care hubs for CAF members and typically provide:

- Ongoing wound assessment and management, including monitoring, treatment planning, and escalation to specialty care when needed.
- Follow-up appointments to ensure continuity of care and timely recovery.
- Interdisciplinary services, including nursing, primary care providers, mental health professionals, physiotherapists and other rehabilitation specialists.
- Preventive and occupational health services, such as screenings, medical surveillance, and readiness assessments.

CAF Health Services Centres deliver both primary and tertiary care to serving CAF members in Canada and on deployed operations. Their integrated, multidisciplinary model ensures that members receive coordinated, patient-centred care from initial injury or illness through recovery, reintegration and maintenance of operational fitness.

WCC: *Is there any specific training or mandate concerning prevention of limb loss due to wounds?*

LCol Beckett: Modern military trauma doctrine emphasizes limb preservation whenever feasible. Early hemorrhage control, rapid surgical debridement, vascular repair and coordinated reconstructive planning are foundational principles.

Multidisciplinary collaboration—including trauma surgeons, vascular specialists, rehabilitation teams and wound care nurses—supports limb salvage strategies from the point of injury through definitive reconstruction. Lessons learned from recent operational deployments have reinforced the importance of early intervention and staged reconstruction in optimizing long-term outcomes.

Maj Murphy: CAF addresses limb-loss prevention through a broader framework that includes wound-care protocols, medical and occupational health standards, injury-prevention programs and comprehensive rehabilitation systems. Together, these integrated policies and practices aim to reduce the risk of severe injuries, support early intervention and ensure optimal recovery outcomes for members across training, operational,and garrison environments.

WCC: *Prevention is a key aspect of wound management in all aspects of life. Do personnel (medical or otherwise) receive any training in this regard?*

Maj Murphy: Yes — CAF personnel do receive training related to injury prevention and, by extension, wound-prevention which is woven throughout CAF health promotion, injury prevention, and clinical practice training for medical personnel.

WCC: *How does the CAF work within the broader Canadian health-care system?*

LCol Beckett: A defining strength of military healthcare in Canada is its integration with civilian academic centres. Many CAF clinicians maintain appointments at tertiary hospitals, such as St. Michael's Hospital in Toronto, where I practice, and other major trauma institutions across the country.

This dual-role structure provides substantial advantages for many areas of care, including wound care. Military clinicians maintain exposure to high-acuity civilian trauma systems, advanced reconstructive techniques and research-driven innovation. Conversely, lessons learned in combat casualty care—particularly in hemorrhage control and damage control resuscitation—have informed civilian trauma protocols.

For complex wound cases requiring subspecialty input, formal referral pathways ensure continuity of care between military and civilian systems.

Military wound care in Canada does not exist in isolation. It operates within a collaborative national framework, integrating civilian trauma expertise, evidence-based wound management and operational doctrine.

At its core, CFHS combines readiness, innovation and comprehensive follow-up care. Whether managing catastrophic battlefield injuries or complex chronic wounds at home, the mission remains constant: preserve life, optimize function and sustain the health of those who serve.

WCC: *What can a nurse or other clinician expect from a career in the CAF?*

LCol Beckett: For nurses and clinicians, a career within CFHS offers a distinctive professional pathway. Scope of practice is often broader than in civilian settings, particularly in operational environments. Clinicians develop expertise in trauma management, leadership under pressure and interdisciplinary collaboration.

Opportunities include domestic clinical practice, deployment roles, advanced training and leadership development. The environment demands adaptability and resilience—but offers meaningful service and professional growth.

The role historically described as 'Medical Assistant' has evolved within CAF occupational structures, reflecting expanded training and paramedic-aligned competencies in both field and clinic environments. As operational demands change, so too do classification titles and scopes of practice.

Maj Murphy: A career in the Canadian Armed Forces as a nurse or clinician offers the opportunity to deliver meaningful patient care while developing as a leader within a national, integrated health system. CAF clinicians benefit from diverse and unique clinical experiences, funded education and professional development pathways, as well as exposure to operational and expeditionary environments that are not available in typical civilian practice. As the CAF Health Services continue to modernize in close collaboration with Canadian health-care partners, clinicians can directly contribute to system-level improvements with tangible impact. For those who value purposeful clinical work, leadership growth and the flexibility to serve in varying locations and missions, this career path provides a highly rewarding and multifaceted professional journey.

Ian Corks is Editor, *Wound Care Canada.*

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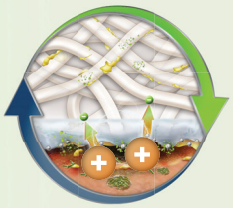

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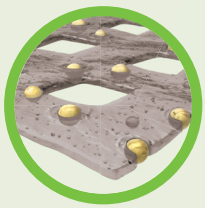

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Skin, Wound And Foot Care For Individuals Experiencing Homelessness In Canada

By Erin Telegdi, Janet L Kuhnke, Laurie Parsons, Sharon MacKenzie, Sandra Fitzpatrick, Salman Alam and Ashly O'Neil

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Across Canada, there is growing awareness of the health and well-being of individuals experiencing homelessness (IEH), including the impact to skin health, foot health and the risk for the development of wounds and wound-related complications.[1] While best practice recommendations for the prevention and management of wound care are robust, and there are strong efforts to support the integration of wound care best practice across all provinces and territories,[2] there remains a need for increased attention to providing wound care for IEH, who present as a high-risk and under-prioritized population.[1,3]

If we are to truly embrace the concepts of diversity, equity and inclusivity, we must accept that institutionalized care will not be a fit for everyone. Although person- and patient-centred care are often used interchangeably, there is a distinction which should be understood. In the true sense of the word, a patient is defined as the 'one who suffers'. Although it places the patient at the centre of the care model, it does not necessarily consider the full scope of what it means to be a person. Person-centred care acknowledges that an individual does not exist in isolation, but in the broader context of family, intersectional social location and social and political norms. It should include the concepts of relationship, family and client-centred care as parts of the whole person, which may come into conflict with the health-care system, when decisions are made about treatment plans and when trying to achieve the best health-care outcome for the person at the centre

of the circle of care.[4] This is an important concept when one considers wound healing outcomes in IEH, as reasons for homelessness are as multifactorial as barriers to care. It is also important to understand that the incidence of IEH is as high in rural and remote communities as in many Canadian inner cities.[5] In both, IEH may be between 0.20-0.35% of the total population.

It is well recognized that health-care outcomes are tied to social determinants of health.[6] The traditional model of appointment and follow-up may not work for structurally excluded persons experiencing health care issues. As a result, IEH experience significant barriers to receiving timely and effective health care. This is true of rural populations where access can be further limited by non-medical factors such as reduced transportation, child care and elder care.[7] Community care has also been shown to give better adherence to therapy, can be patient specific instead or tied to the more rigid plans of larger central care and cultural safety.[8] This is especially true in addressing chronic disease issues where the longitudinal intersection of the person and health-care systems can be lengthy.

Therefore, in the spirit of being inclusive of the diverse populations which access health-care systems in Canada and addressing these concepts, we came together as three committed teams to highlight ways in which concerted and strategic efforts are being made to provide high quality foot health, skin and wound care to IEH in our communities. This presentation is from geographically and demographically diverse locations: Calgary, Toronto, and Cape Breton. We aim to highlight efforts to promote best practices for IEH that are evidence-informed, low-barrier, and meet the needs specific to each community served. As well, we highlight similarities, differences, innovations and implications for future research, program and system level change recommendations for increasing equity in health outcomes and improving the skin health of IEH.

Individuals Experiencing Homelessness: Who They Are?

Care of persons' skin and wounds when experiencing homelessness is a present and ongoing challenge in Canada. IEH occurs in all communities across Canada[9] and the numbers of IEH are growing.[10] Compared with a point-in-time count in 2018, a count conducted in 2024 showed that the number of people living in an unsheltered location quadrupled (a 303% increase), making this the fastest-growing segment of the homeless population.[11] Holistic care of IEH is crucial as the relationship between homelessness and health outcomes are related, complex and interrelated.[12]

Persons experiencing homelessness include four categories, that are not all inclusive. These include persons:

1) unsheltered (living in parks, tents, sidewalks, garages, attics)
2) emergency sheltered – living in shelters for the night, in a shelter due to family violence or fire
3) people housed provisionally or in interim housing while waiting for permanent apartments or housing and
4) those persons living at risk of homelessness due to unstable employment, unemployment, housing where they may be evicted, or experiencing violence, trauma.[13]

It is important to note that while making up only 5% of the Canadian population according to the 2021 census, 35% of homeless individuals identified as Indigenous during the 2020-2022 national Point-in-Time count.[14] The overrepresentation of Indigenous peoples amongst IEH highlights ongoing colonial violence as a significant structural determinant of health. Further, there exists a distinct and self-determined definition of Indigenous homelessness:

"Indigenous homelessness is a human condition that describes First Nations, Métis and Inuit individuals, families or communities lacking stable, permanent, appropriate housing, or the immediate prospect, means or ability to acquire such housing. Unlike the common colonialist definition of homelessness, Indigenous homelessness is not defined as lacking a structure

of habitation; rather, it is more fully described and understood through a composite lens of Indigenous worldviews. These include: individuals, families and communities isolated from their relationships to land, water, place, family, kin, each other, animals, cultures, languages and identities. Importantly, Indigenous people experiencing these kinds of homelessness cannot culturally, spiritually, emotionally or physically reconnect with their Indigeneity or lost relationships."[15]

Prioritizing Skin Health And Wound Care For Persons Experiencing Homelessness

Individuals experiencing homelessness (IEH) require comprehensive health assessments including management and treatment for acute and chronic illnesses.[1,16] Assessments should be tailored to meet the person's needs, be relevant to age, gender, Indigenous heritage and presenting mental health, physical and social needs.[1] Health assessment should include nutrition, mental health, cognitive status, substance use and medication(s), oral health, skin assessment, wound assessment and foot health screening. Conducting focused and regular assessments are essential with the goal of improving health outcomes; this includes providing a care environment that promotes safety and trust for those accessing services.[17] This may be challenging as clients may come to an appointment and not be able to return or be assessed for follow-up.[18] In Switzerland, researchers studied 123 IEH; they report that mental health, musculoskeletal and psychiatric issues were a priority. As well as needing support to navigate the health care system, IEH may be hesitant to access or seek care.[19,20]

Individuals experiencing homelessness are often unable to access basic amenities such as washrooms, showers, hygiene items, laundry services, adequate nutrition or weather-appropriate clothing and footwear. These conditions are compounded by lack of transportation requiring long periods of ambulation, few opportunities for lower leg elevation, including safe periods of sleep, improperly fitted mobility devices and lack of access to find shelter from extreme weather conditions.[21] Significant systemic barriers prevent unhoused individuals from receiving consistent and adequate health care. Appointment-based primary and specialty care result in IEH being systemically marginalized from receiving needed care for acute care and chronic disease management. In order to provide equitable access to skin, wound and foot care services to IEH, organizations providing these services must find ways to meet the needs of the populations they serve, including offering drop-in services that are flexible, allow for drop-in access and offer consistency in both access to health-care providers and collaboration to ensure continuity of care. Further, these services must be adequately resourced to not only provide skin, wound and footcare, but also meet the basic needs of IEH including access to clothing, socks, nutrition, transportation assistance, and robust care coordination to support follow-up, as well as referrals that address social determinants of health including income and housing support.[3,17,18]

Therefore, we present three interdisciplinary, integrated, and comprehensive approaches in promoting skin checks, wound care and foot care for individuals who are unhoused. The following details the importance of building integrating teams to address prevention, low-barrier and trauma-informed point of care service and embedded evaluation.

Case A: Toronto, Ontario

Best Practices to Improve Skin, Wound, and Foot Care for Individuals Experiencing Homelessness: South Riverdale Community Health Centre, Toronto ON

Background: South Riverdale Community Health Centre (SRCHC) in East Toronto is one of 75 CHCs across Ontario; in 2026 they celebrated 50 years of service.[22] As a model of care, CHCs serve populations that have traditionally faced barriers in accessing health services. This includes IEH, individuals who are non-insured and people living in poverty. SRCHC uses a values-based model of care grounded in a commitment to reconciliation and relationship, health equity and social justice, meaningful engagement, holistic approach and evidence and

values informed practice. In the 2024/2025 fiscal year SRCHC served 15,402 individuals across its network of programs. Of these, 63% identified as racialized, 57% were living on a family income below $40,000 and 30% live with more than 10 acute, recurrent, or chronic conditions.[22] In 2024/2025 the centre recorded over 148,113 encounters in their Electronic Medical Record (EMR).

SRCHC's work is grounded in integrated, interprofessional and collaborative holistic care. As an anchor member of the East Toronto Health Partners Ontario Health Team (ETHP OHT), SRCHC helps to align priorities and integrate care across organizations to build a healthier and more equitable East Toronto.[23]

This inquiry, therefore, demonstrates how SRCHC has adopted best practices for the prevention, assessment, and management of skin, wound and foot care with a specific focus on efforts to improve health equity for people accessing care within the Substance Use & Mental Health (SUMH) department, including 'People Who Use Drugs' and IEH.

SRCHC was an early adopter of harm reduction-grounded care for People Who Use Drugs. In a recent demographic survey of clients who provided housing information, 9% reported experiencing homelessness; this high proportion of individuals engage with SUMH services. As well, skin health, wound and foot care has been a high-demand service specifically within the Moss Park Consumption and Treatment Service (CTS) program. CTS focuses on supervised consumption and overdose response for People Who Use Drugs along with wrap-around services such as nursing-led primary health care and social service supports. During the 2024/2025 fiscal year, the team saw over 900 individuals. The persons accessing this service are at increased risk of inequitable health outcomes related to being un/under-housed and further complicated by substance use and substance use stigma.[12,24] At the intersection of experiencing homelessness and substance use, multiple factors have been identified that increase the risk of skin breakdown and complicate wound healing.[18,25] For People Who Use Drugs, stigma experienced within the health-care system results in barriers to accessing appropriate and compassionate care for skin, wound, and foot health issues.[26]

In 2019, East Toronto Health Partners Ontario Health Team (ETHP OHT) became one of the first health teams to join the Registered Nurses Association of Ontario's (RNAO) new Best Practice Spotlight Organization® Ontario Health Team (BPSO® OHT) program.[27] The goal of the BPSO® program is to optimize health outcomes through consistent use of evidence-based practices and staff engagement to create cultures of learning and improvement.[28] The ETHP joined the BPSO® OHT to leverage RNAO's guidelines and implementation processes, anchoring their work within evidence-based frameworks, and aligning with the quintuple aims of improved provider experience, patient outcomes and experience, lower cost of care and improved health equity.[29] SRCHC has been one of the champion organizations of this work with a focus on facilitating change, transferring evidence into practice and evaluating and monitoring outcomes within a health equity lens.

Methods: In 2024, the team selected the RNAO Best Practice Guideline (BPG) for Diabetic Foot Ulcers: Prevention, Assessment and Management[30] in alignment with Ontario Health's prioritization of lower limb preservation (LLP). The SRCHC formed an interprofessional working group to focus on guideline implementation including clinical leaders, Registered Nurses (RN), Registered Practical Nurses (RPNs), Chiropodists (DCh) and Information Management (IM) specialists to work toward conducting a gap/opportunity analysis. Opportunities and change ideas were first identified by the group in a brain-storming session and then voted on individually by group members based on priority, feasibility and impact of intervention. This resulted in the collective selection of multiple recommendations/good practice statements from the guideline to be implemented (See Figure 1), including standardized wound assessment tools and documentation, building wound care capacity across teams, and mapping and standardizing

Recommendations and Good Practice Statements
Self-Management
Recommendation 1.0: When delivering self-management support, the expert panel suggests that health providers use person-engagement strategies that are tailored to persons at risk of or living with a diabetic foot ulcer and their care partners.
Wound Assessment
Good Practice Statement 3.0: It is good practice for health providers to regularly conduct a comprehensive and consistent wound assessment and document the presence and characteristics of a diabetic foot ulcer.
Specialized Wound Care Team
Recommendation 3.0: The expert panel suggests that health service organizations implement a specialized wound care team to support persons at risk of or living with diabetic foot ulcers.
Plan of Care/Treatment
Good Practice Statement 4.0: It is good practice for health providers to implement a plan of care with the person living with a DFU and their care partners that includes evidence-informed management options.
Recommendation 4.0: The expert panel suggests that health providers use virtual care platforms in conjunction with in-person services to supplement the provision of diabetic foot care services.

Figure 1: BPG Recommendations and Good Practice Statements Implemented by SRCHC's Foot Health Working Group. Permission: South Riverdale Community Health Centre

both internal and external escalation of care pathways. Subsequently the group developed an implementation and evaluation plan to address skin, wound and foot care for SRCHC clients across programs.

Results: As part of this working group, there was an increasing awareness that IEH and substance use are populations at increased risk for skin, wound and foot complications. The SUMH Department RNs, particularly those within the Moss Park CTS, perform a high volume of complex wound care, resulting in 227 encounters between October 1st, 2025 - January 31st, 2026 (See Figures 2 and 3). SRCHC's BPSO® OHT BPG implementation offered an opportunity to increase standardization and quality of care, strengthen integration across the CHC and its partners and embed IM systems to optimize the EMR for clinical and demographic data collection. This embedded infrastructure enables evaluation and demonstration of the impact of this work within the department and across the organization.

Initial presentation: Traumatic wound	Near full resolution

Figure 2 & 3: An Individual Experiencing Homelessness presents with a soft tissue infection caused by a traumatic injury – from initial presentation to near full resolution. Permission: Erin Telegdi

Integrated and Values Based Care Within The Moss Park

CTS To Enhance Accessibility

The Moss Park CTS offers low-barrier harm reduction care for People Who Use Drugs, many of whom experience homelessness. A key health-care feature is the consistent presence of RNs for most operating hours, with services running Monday-Saturday, including late evenings. People accessing services may receive nursing care on a drop-in basis, including into the evening hours when service volume and demand for clinical care is highest. This ease of accessibility supports the development of strong therapeutic relationships and facilitates holistic care (See Figure 4). As the Moss Park CTS program has evolved it has incorporated the interprofessional clinical team from within the larger CHC. The service now offers drop-in Nurse Practitioner (NP) hours multiple times a week in the late afternoon and evening, as well as episodic drop-in chiropodist (DCh) hours, where health education and health promotion activities related to foot health have been provided. Facilitated by warm handovers from CTS RNs, community health workers and harm reduction workers, the DCh has built strong relationships and trust with the CTS community, which has supported uptake of consultation, treatment and provision of off-loading devices and orthotics. The strong focus on relationship-building at the CTS has resulted in successful integration of NP and DCh drop-in hours, with interprofessional care leveraged to provide an increasingly wide range of health-care services and increased continuity of care. Crucial to these efforts is the embeddedness of healthcare within the CTS service. Bringing care to people and meeting them where they are at is a fundamental way in which SRCHC's work is grounded in health equity.

Figure 4: The Clinic Room at the Moss Park Consumption and Treatment Service. Permission: SRCHC. Permission Erin Tegladi

Assess Need, Standardize Documentation and Increase Capacity

The Foot Health Working Group conducted a detailed gap/opportunity analysis to assess program strengths and needs (See Figure 5).

A key issue identified was the lack of standardized assessment tools for wound care and accompanying documentation, as no consistent approach existed in the EMR, nor was there a wound care workflow across the organization. While Wounds Canada's (2025) Inlow's 60-Second Diabetic Foot Screen[31] is already standardized within our Diabetes Education Community Network of East Toronto program, this was not yet fully utilized across all programs. With IM support we adopted the Bates-Jensen Wound Assessment Tool (BWAT)[32] within the SRCHC EMR. We also made the decision to collect additional information related to wound etiology, cause(s) of wound, spaces to document a wound management care plan and contributing social factors (See Figure 6). This facilitated a more accurate depiction of the complexity of care and increased care consistency within and across programs. Training on the BWAT tool was then provided to all clinicians. This provided opportunity for clinicians to discuss the BWAT use, ask questions and provide feedback.

In partnership with the Downtown East Toronto (DET) OHT, education was offered to nurses across SRCHC, including RNs. This educational opportunity, facilitated by Wounds Canada, focussed on best practices in wound and foot care. This inter-organizational capacity building opportunity coupled with the intra-organizational adoption of the BWAT has worked to set a foundation for increasing the standard of care and consistency of documentation within the organization.

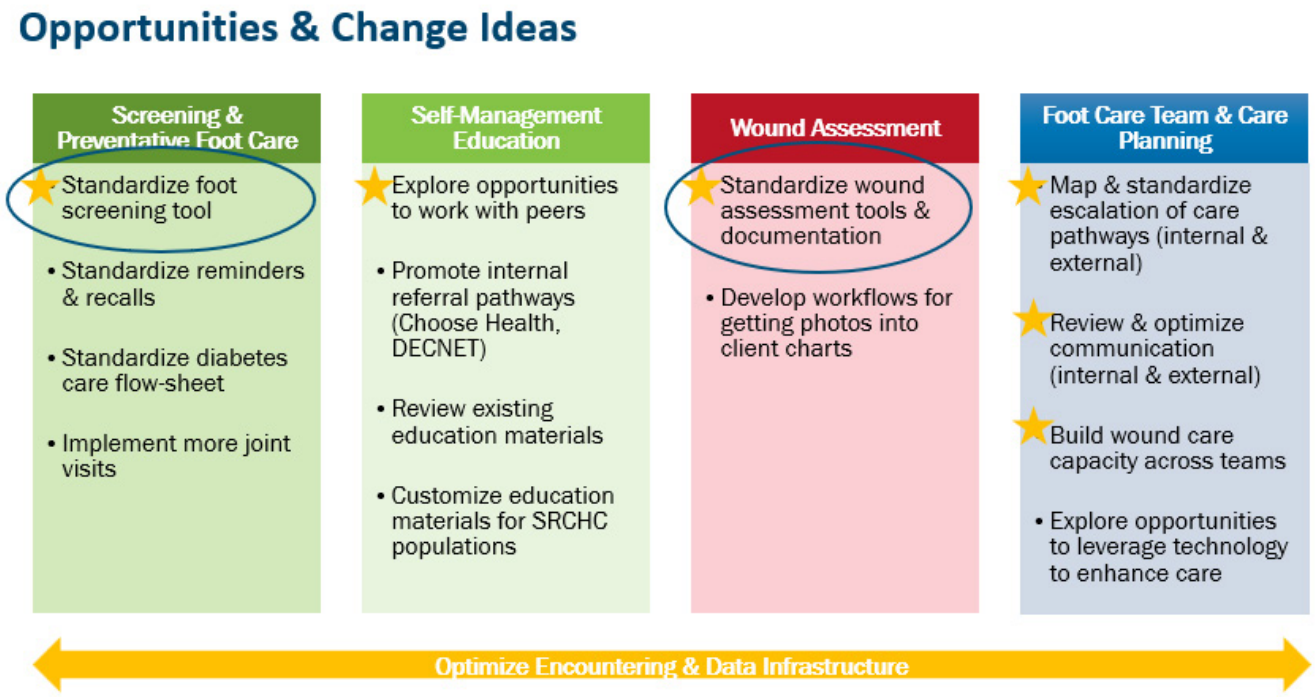

Figure 5: Foot Health Working Group Needs Assessment. Permission: SRCHC.

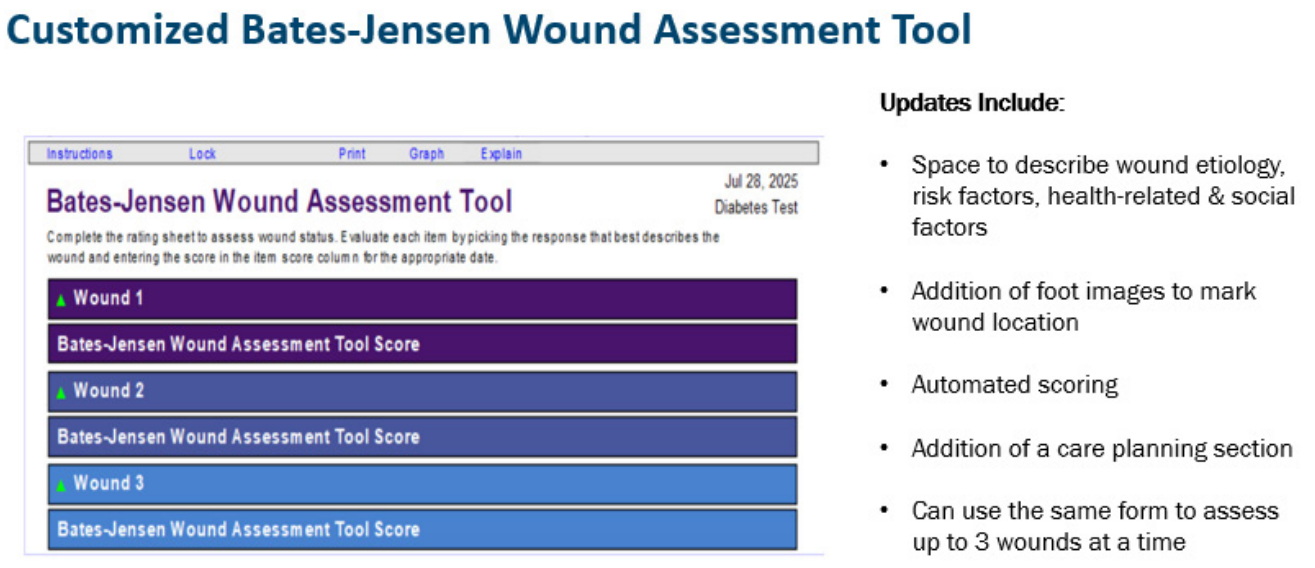

Figure 6: Bates-Jensen Wound Assessment Tool as Developed by the Foot Health Working Group and with the Support of Information Management Specialists. Permission: SRCHC.

Additionally, work was done to leverage partnerships in the DET OHT to develop and standardize escalation of care pathways for individuals with wound complications requiring specialty follow up, including timely access to vascular assessment and treatment plans.

Footwear Provision: Meeting Basic Needs

In the fall of 2025, the Foot Health Working Group was able to secure project funding to provide new footwear to clients. With guidance from the DCh and foot care RPN, winter boot and running shoe styles were pre-selected for their foot health promoting features, such as wide toe boxes, waterproof materials, Velcro™ or lace fastening, and supportive sole structure. RNs in the SUMH Department were provided with foot measuring devices so that correct sizes could be selected and footwear ordered for individuals identified as high risk for lower limb complications. This initiative began its rollout in the winter season and enabled IEH to access weather-appropriate footwear. In addition to footwear, foot care kits were created and provided to clients, and included items such as socks, gentle cleansers, foot files, and moisturizer to promote skin health (See Figure 7).

Still in its early stages, this initiative has thus far resulted in 58 clients receiving footwear, including 20 who identified as IEH. This intervention has enabled individuals, who cannot afford appropriate winter footwear, and are at high risk of exposure-related injuries, to receive well-fitting and season-appropriate shoes. Community health workers and RNs involved in fitting and connecting high-risk CTS community members to winter boots note the positive impact of choice - that is, being able to pick one's own winter boots and not have to rely on donations that may be of poor quality and/or fit. For some, this was the first time in many years that they had a new pair of winter boots that were fitted for them and that they were able to choose. They also reflected on the positive emotions expressed by community members when they received footwear - that this gesture made them feel loved and cared for, and that this new footwear would help them to care for their health. One person put on their new boots and danced. While this initiative has helped to reduce the risk of skin breakdown, it has also promoted people-centered care and dignity, and enhanced feelings of inclusion and being cared for in community. Based on impact as assessed in this early stage, this initiative had its funding extended and will be able to support the provision of appropriate footwear for the change in seasons.

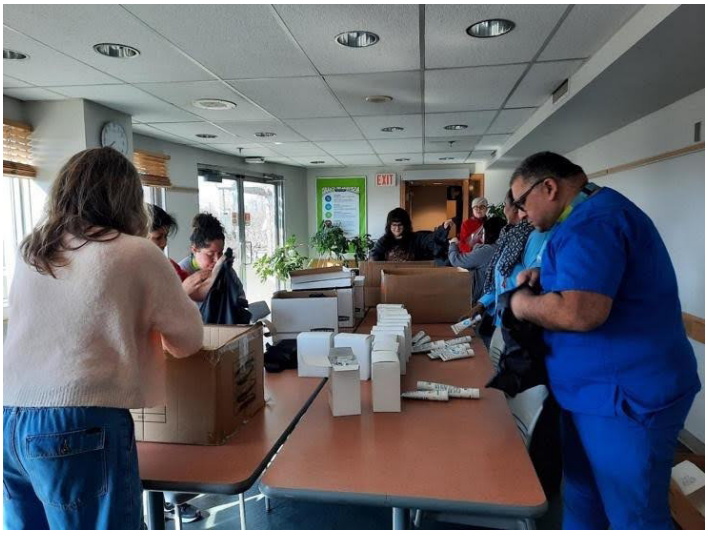

Figure 7: The Foot Health Working Group Making Foot Care Kits for Clients. Permission: SRCHC

Figure 8: A Pair of Fitted, Waterproof Boots. These replaced a pair of plastic sandals in the middle of the winter, where Toronto saw heavy snowfall. Permission: SRCHC

Demonstrating Impact

Infrastructure to demonstrate impact has been embedded into the BPG implementation Working Group from the outset, with participation of the IM team integral to the process and to the interprofessional team. To date, data collected from our EMR demonstrated 14 instances of use of the new BWAT tool representing 10 individuals, in addition to 183 60-Second Inlow's Diabetic Foot Screening assessments[32] completed during the same period, reflecting the preventative work embedded in our Diabetes Education Community Network of the East Toronto program. To increase uptake of the BWAT tool, we are including training in our new hire, on-boarding processes and increasing ease of access to the tool within the EMR interface. The Working Group is developing wound care-specific custom encounter forms that include encodes relevant to chronic and lower limb wound care in order to increase data reliability and accurately reflect complexity of care. The iterative work of the IM team allows for ongoing assessment of Working Group initiatives, as well as ongoing improvements to streamline workflows for clinicians and demonstrate the impact of prioritizing skin, wound, and foot care for IEH who access SRCHC services.

Discussion: While SRCHC's implementation of the Diabetic Foot Ulcers: Prevention, Assessment and Management[30] remains in its early stages, there have already been significant learnings as they relate to meeting the skin, wound and foot health needs of IEH and sustainability of evidence-based practice.[33]

Ongoing Education And Training For Staff

Increasing wound care capacity across the SUMH Department RN team through education/training and standardization of wound assessment and care planning via adoption of the BWAT has served as fundamental first steps in working toward continuous improvements in skin, wound and foot care. This has improved consistency in wound care treatment plans, which has supported our shared-care model and supported RNs who are building their own capacity in wound care knowledge, skill and judgment. As a next step for standardization, we will be implementing the integration of Inlow's 60-Second Diabetic Foot Screen[31] across the organization, including training and workflows to broaden its use. Within the SUMH Department, this approach will promote regular screening for clients with diabetes, improve detection of peripheral neuropathy across multiple aetiologies and support the identification and management of associated risk factors.

Staffing Capacity

Embedding drop-in DCh services into the Moss Park CTS has inspired the creation of a dedicated DCh position within the SUMH Department, which will greatly increase the accessibility of this crucial specialty service for IEH.

Partnerships And Care Pathways

Continuing to leverage partnerships across OHTs, work will be undertaken to optimize standardized escalation pathways for individuals with wound complications requiring specialty follow up, as well as looking to increase internal capacity to assess and manage wounds related to vascular disease as part of limb preservation efforts.

EMR Infrastructure

Led by IM and informed by clinician feedback, work will continue to build infrastructure within the EMR to support clinicians in their uptake of best practices in skin, wound and foot care. This will enhance data quality, support a shared-care model and facilitate an accurate reflection of the complexity of care and demonstrate impact of the work being done to support IEH.

Conclusion: IEH are a population at increased risk for skin, wound and foot complications. Meeting the complex needs of IEH through relationship-based, integrated and low-barrier approaches is a priority for SRCHC's SUMH Department. The Foot Health Working Group has provided an invaluable opportunity to focus attention on building capacity across the organization and developing infrastructure to meet the needs of IEH in the community and enhance a values-based commitment to meeting people where they're at.

Case B: Calgary, Alberta

Providing Wound Care To A Downtown Population Of IEH

Background: The Sheldon Chumir Wound Clinic (SCWC) is a downtown inner-city clinic where complex wounds are assessed and treated.[34] Care is provided seven days a week from 0800-1600 hours. The clinic is adjacent to a busy urgent care centre, a safe drug administration centre and two organizations dedicated to addressing the needs of IEH: the Mustard Seed organization and the Drop-In Center. Physicians staff the clinic Monday-Fridays and are available for consultations. The building also houses an Indigenous care centre, urgent care centre, family medicine clinic and an infectious disease/sexually transmitted disease (STD) clinic. The clinic sees a wide range of wound aetiologies in two streams. The first is a traditional stream where patients are referred and seen in clinic with a traditional appointment and treatment process. The second stream is a drop-in line, where patients are treated according to their choice of when to present for care. In the second stream, the most common wound aetiologies are trauma (burns, bites, person on person violence wounds) and frostbite.[35] Other wound aetiologies identified are chronic venous ulceration and neuropathic wounds, especially from diabetes.

It was recognized that many of the IEH were not doing well in the traditional appointment based 'front desk' system and that care was not perceived as being culturally sensitive. It was recognized by front line staff that patients were coming into clinic with wet/inappropriate dressings and infected wounds because of missed appointments. Reasons for missed appointments were transportations issues, early appointment times conflicting with mealtimes at local centres, substance and mental health issues and even not having a reliable means to check the time. As most did not have cell phones, rebooking appointments was difficult and many patients were being re-referred to the clinic after being triaged in the urgent care centre because of new wound infections. This also compounded the total cost of care and increased the amputation risk. Patients were also very discouraged or triggered by the presence of security personnel who were active in this busy downtown medical centre.

This led to rethinking how to provide non-judgemental and barrier free care. It was decided to abandon the time-based appointment system and to create a drop-in line. Patients were made aware that the clinic would devote a nursing line to the drop-in system from 0830-1530 hours and appointments were not required. So long as they attended between these hours, they would be assessed. As most patients were referred from the urgent care centre a chit system was initiated. This was a paper document which had the clinic opening times and could be shown to security personnel who were then trained to recognize this as a valid reason for being in the building. The patient was only required to show the chit and a verbal exchange with security was not required.

The population was studied from January-December 2021. Since initiating this model over two thirds of patients have kept their follow-up appointments. The drop-in service was accessed by 119 patients for a total of 798 clinic visits. The average patient age was 46.0 years (73.9% male, 26.1% identified as female). Of these 76.8% were eligible for the drop-in line and returned for more than one visit. Of these 26.8% (n = 32) were followed until wound closure. Of note, patients who were followed until wound closure were seen on average for 9.9 total visits over 120.8 days, compared to just 3.0 visits over 21.4 days for those lost prior to wound closure.[35]

As outcome data is not available from before initiating this system, it is difficult to say with certainty that this has improved wound closure and reduced amputation rates, but informal discussion with patients suggests that this system is considered culturally safer for this population.

Case C: Cape Breton, Nova Scotia

Providing Foot Health In A Primary Care Clinic With A Focus On Diabetes Mellitus: A Qualitative Inquiry

Background: Health of feet and wound care for individuals experiencing homelessness (IEH) are of significant importance due to the increased risk of infection, barriers to care and lack of timely access to services.[36,37] Skin and wound conditions may include arm, face, leg and foot trauma, skin maceration/infections, nail infections/trauma, callous (mild to significant), corns and foot deformity.

Foot health is especially important for IEH and/or for those at risk of foot complications, especially when persons live with diabetes mellitus, diagnosed or undiagnosed. Provision and education on basic foot health involves building a trust-filled relationship, offering of foot hygiene, skin and nail care and conducting foot, sock and footwear assessments for all weather conditions.[18,37,38] Foot care services are typically provided by licensed nurses and chiropodists/podiatrists with specialized training.[39] Offering funded foot health services in primary care provides a gentle reminder of how assessment of an individuals skin and foot health can improve their overall health and well-being.[18]

Method: The following is part of a larger study. In this inquiry, researchers aimed to evaluate the services offered via the foot health program operationalized at the Primary Care Clinic (PCC), which also offers Harm Reduction services (Sydney NS). Weekly foot heath clinics are held by a registered nurse trained in Advanced Foot Care in primary care and focus on provision of foot care, preventative education, assessment of skin infection(s) and provision of socks and fitted footwear. The Bates-Jensen Wound tool and the Inlow's 60-second Diabetic Foot Screen are embedded in the EMR. This study took place at The Ally Centre located in an urban setting of approximately 30,000 persons[40] in a province of 98,808 (2022) persons.[9] According to the Homeless Hub (2021), 325 persons were experiencing homelessness; 37% experienced chronic homelessness; and approximately 20% abide in emergency shelters.[9]

Foot Health Program

The Foot Care program has been operationalized by the PCC team for several years. The nurses alongside the peer, outreach and overdose prevention workers, identify clients at risk of skin, foot and footwear issues. As well, clients who access the harm reduction site, overdose prevention services and drop-in-setting (tea, coffee, meals, clothing, clean injection supplies) are welcomed to attend the foot health clinic via appointment or drop in and off-site outreach foot care is also available.

Research Ethics Board approval was from Cape Breton University and The Ally Center of Cape Breton.

Data Collection: To evaluate our foot health services we conducted face-to-face interviews 25-35 minutes between September to December 2025. A twenty-dollar coffee card was given to each participant upon completing the research interview. Interviews were open-ended and the main questions focused on why the client attends the foot health clinic, what were the benefits, and what were areas for improvement.

Data Analysis: Interview data was hand recorded and typed verbatim. Participants reviewed their typed answers with the researcher and added in additional notes as needed. Themes that emerged from the data focused on the benefits of the foot health service and areas for improvement.[41,42]

Eight adults engaged in in-depth research conversations (1 female; 7 males, 39-72 years). Participants attended the foot health clinic weekly, then twice monthly or monthly. Five of the eight participants smoke one-pack of cigarettes (or more) daily and three identify as having diabetes mellitus. Each receives care for mental health issue(s) and

substance use disorders from the physicians, nurses, a social worker and a psychiatrist. All participants are housed in shelters, supportive housing, live with family or in an apartment.

Findings

Knowledge of Nail and Skin Pathologies: The primary finding consistent across participants' stories was the presence of maceration, pain, blisters, and nail and skin infections (fungal, bacterial) that drew them to seek foot care. This varied depending on their underlying health issues, footwear, weather conditions (hot, humid, cold, snow/ice) and housing situation.

Overall, participants exhibited good general knowledge of the need for basic foot care and footwear. For several, seeking care was initiated when told they have diabetes. One participant noted:

> "Well for start, I have diabetes, for maybe two years or longer now. I was on the street, then a little apartment and now in supportive housing, which I love. I have probably got decreased circulation from smoking. In the last two years, my vision has changed a lot. I cannot cut my own nails or really see to cut them on my own. Because the nurse cares for my nails and skin, it makes me feel like I belong to society, like when I worked full time. When I come for foot care, the nurse helps me with socks and shoes; they talk to me and share health information with me. As well, they trim and file my fingernails the way I like."
> *(Participant 1)*

For three participants, living with peripheral arterial disease (PAD) and wounds was identified as a key risk factor for leg and foot problems and for seeking foot care.

One stated:

> "Well, hands and feet are very important to me. I have worked hard all my life. Feet are like the barometer of my health even though I smoke. When I had my stroke, I developed skin and toenail fungus, it smelled terrible, I was embarrassed. It was the foot care nurses that helped to identify the pain in my skin [feet] with my doctor, as well they got me proper wound care. My hand is crooked from the stroke, and the nurses trim my fingernails every few weeks as I cannot do that."
> *(Participant 2)*

Another stated:

> "The foot care nurses trim my nails, but they also check the swelling in my legs, I used to wear compression socks before I became homeless. Now that I am in the shelter the nurses are helping get my 'leg tests' [ankle brachial index] and compression socks organized…I need my foot care to stay alive. I think foot care is like the overall general health monitor. If you do not have good feet, you do not have good health. As well, I like to walk…I miss walking long distances outside to hunt."
> *(Participant 6)*

A third participant stated, the key is to:

> "Just show up and get foot care. When I started to come here, I was living with a lady that died. I had no doctor. I came in crying for help. I would have lost my legs to wounds after my heart surgery. See my right leg is not perfect but at least I look after it now, and I can walk. I still smoke, but I am trying to reduce the number I smoke.

> I come to the PCC for foot care every month. I could not walk, I had shoes with a deep crack in the bottom, they gave me new shoes. As well, I think they called it 'athletes' feet, my skin was broken and sore; so painful I could hardly walk. The nurses saved my feet. My nails were curled forward like the letter 'C' under my feet. The nurse was very good; she washed my feet and slowly trimmed them back to a good length."
>
> *(Participant 7)*

Challenges To Applying Foot Health Knowledge: All participants discussed changing vision and not being able to reach their feet to safely trim or file their nails. Reasons included: weight (abdominal girth), lack of physical flexibility, vision changes, lack of foot instruments to accurately trim and file, lack of privacy in the shelter and lack of confidence. One participant stated:

> "I come to the clinic to get the nurse to remove all the callous from my heels and the sides of my feet. I can sort of do it at home, but the foot nurse does a better job. As I walk great distances, I am glad for the foot care and monthly foot care; my feet would not be in as good shape as they are. As well, I can access dry socks; they are so expensive these days, you know just one more thing to buy on my cheque."
>
> *(Participant 8)*

Another stated that living in shared housing with family does not mean he has someone to help with his foot care. He stated:

> "To me, footcare is health, I know that you must look after your toes or you will end up losing them from the cold, wet boots, and sleeping in the woods. Hey, look at me, if it was not for foot care nursing, I would have probably lost all my toes. What I have had to do to get my two big toenails back is a lot. I come regularly and they are now starting to grow back. I had really bad skin and nail fungus. The doctor has helped too. I walk long distances 12-15 kilometers every day and when my nails do not feel right in my running shoes I go and see the foot care nurse. As well, the foot care nurse files my fingernails; this is important as I always forget. When I was homeless in the tent my toes and skin on my feet were in bad shape. This is why I regularly come here to get them done."
>
> *(Participant 5)* (See Figure 9.)

Figure 9: Summer Footwear And Borrowed Socks

Complicated Living

One of the common themes from the participants was the challenge and responsibility of living with co-occurring diseases, such as: mental health issues (schizophrenia, bi-polar), diabetes, PAD, heart attacks, smoking and substance use and addiction (opioids, stimulants, alcohol). Many slept with their socks and shoes on for fear of them being stolen. For some, accessing foot care was complicated by unstable housing or changes in housing (moving from a shelter to supportive living, loosing housing due to

mental health and social issues).

A participant described the following about the importance of foot health:

> "If you want to be able to walk properly, you must keep your feet clean, have dry socks and shoes. Clean socks are important. I come here because the doctor and the nurses helped diagnosis my skin disorder and got me a dermatologist appointment. They care about my substance use and have helped get me support.
>
> I could not get this organized on my own due to my health. The clerk calls and emails me to remind me of my appointments and I really like this, otherwise I would miss my appointments.
>
> In terms of shoes, appropriate shoes and boots, relevant to the weather are key. The cost of boots and shoes is crazy and then the soles fall of my used runners and then I have to try and find another pair. Because I only buy used from the recycle stores it is not like I can take the shoes back to the stores and say hey, 'the soles fell off'."

Figure 10: "These were worn out when I bought them"

(Participant 4) (See Figure 10.)

Living with complex diseases can be challenging. A participant stated the following about why he visits the clinic:

> "Well you know, I come for foot care because I get to talk about my health in general. You know if I have any 'heart flutters' the nurse is going to assess me and help me see my heart doctor or the physician here. Or if my 'surgical wound' is tender the nurse is going to check it for me. When the nurse does the foot care, I get to share about my health and things I am working on, like smoking less."
>
> *(Participant 4)*

Money Matters

All participants described the importance of having access to funded foot healthcare. Participants were deeply aware of the general cost of foot care at various service providers across the city. Prices described varied from $45.00 to $125.00 per visit. They shared that foot care should be funded at no charge especially when living with a "couple of diseases" *(Participant 3)*. A participant stated:

> "When I worked, I had lots of money for foot care. I used to go for manicures. I used to get acrylic nails for $45.00 every two weeks. Then I earned $3,000.00 a month and money was not an issue. Now I am at $1,000.00 a month and have diabetes. So, I use $217.00 for rent and $785.00 for food, toilet paper, a bus pass, garbage bags, clothes and soap. I am not complaining as my rent is covered. I am grateful for what I get… but I know foot care is usually $55.00 to 65.00 dollars, especially for people with diabetes that is not fair and is too costly."
>
> *(Participant 1)*

Two participants shared that offering foot care as part of the community care was appreciated.

> "I come as the foot care is free, let's be realistic, I do not have an extra fifty bucks and a taxi ride to get to a foot care clinic on my fixed income. I tried to go to a clinic, but I left it was too expensive, so I just let my nails grow, I could not reach them"
>
> *(Participant 5)*

Another stated:

> "I live in a building where people are paying $55.00 to 125.00 to have their nails cut and sometimes up to $250.00 if it is a 'fancy nail place'. I wonder how they afford that? I had my nails cut too short at one of those places, so now I come here, every month and you the foot nurse often approaches me to remind me; the team here has saved my feet."
>
> *(Participant 7)*

Discussion: This small community-based inquiry was conducted with persons who live with complex disease(s) and who have experienced homelessness. The rich data collected revealed that participants often stated they were grateful for the foot care, socks and footwear service. In individual interviews each person described the importance of affordable, accessible foot health care services. They emphasized that publicly funded foot health services were essential, including upstream health education that could lead to the prevention of skin, nail and foot and ankle issues.[39,43]

Participants views were based on attending the foot care services as they knew the nurses also check their overall skin health and discuss any other issues. As well, at the footcare visit, if a health issue was identified (new wound, rash, trauma) the nurse would ask a team member to assess them and this often led to timely care and follow-up wound treatment.[1,44] This is similar to the literature where interprofessional teams deliver a wide scope of services to individuals in a timely manner, often using a drop-in approach.[44] As well, participants described that attending the foot health clinic may have been a step in building trust with the PCC team members.[43]

Participants acknowledged that their housing status impacted their ability to engage in self-care (e.g., showers, bathing, dressing in clean clothes, eating) and that the stability of their housing influenced their self-care.[45] Each described their preferences for how they used to care for themselves and how foot care was a space they could discuss they their life challenges, hopes and clinical health issues.

The foot care program has quickly become the most well-attended and sought-after service within the clinic, with consistent participation and strong follow-up from clients. This level of engagement highlights how much participants value access to foot care services. The non-judgmental, client-centered approach utilized by the foot care nurses fosters trust and creates meaningful opportunities for relationship-building, health education, early intervention and connection to additional supports within the clinic.

Three Case Study Results

Several common themes are noted across these case studies, including the acknowledgment that IEH with skin, wound and foot complications often present with complex, multiple acute and chronic health conditions. Diabetes and peripheral vascular disease, similar to the general population, account for significant risk related to skin, wound and foot health.[46] Additionally, immunosuppression, lack of sleep and malnutrition are risk factors experienced by IEH that contribute to both skin breakdown and impaired wound healing.[1,2]

Key learnings from these case studies speak to the need for well-funded and resourced programs to address the complex health needs of IEH. For clients this includes timely access to interdisciplinary teams with ongoing opportunities for skin health, wound

care programs and foot care services.

For clinicians, standardization of foot health and wound care assessment and management are key to consistency in care planning, low-barrier access and referrals to specialty care. As well measurement of foot outcomes need to be strategically embedded within in EMR systems.

Overall Discussion

The three case studies presented here demonstrate the importance of addressing skin, wound and foot care in IEH. Strong interdisciplinary teams can meet the unique needs of IEH in their communities through programming that is integrated with strong internal and external partnerships resulting in the provision of low-barrier, trauma-informed and evidence-based care. More research is needed to further explore how to best co-create health services to meet IEH needs.

At point-of-care, these case studies have demonstrated the importance of finding ways to meet people where they are at, providing care that is trust-filled, non-judgmental, trauma-informed and evidence-based. Building strong interdisciplinary teams that are able to provide this appropriateness of care requires efforts of organizational leadership to address pay-equity, robust orientation, training and staff engagement and strong efforts to support staff retention. Providing trauma-informed care requires consistency of services and staff. This consistency is key to building strong therapeutic relationships rooted in trust and facilitates follow-up and consistency of care.

Designing low-barrier programming requires meeting the unique needs and environmental conditions of the population served, and will vary across urban and rural settings, with consideration for varying provincial/territorial and municipal resources and health-care priorities. Across all three case studies, we find that skin, wound and foot health for IEH is not recognized or prioritized at the government level, requiring creative and iterative program planning at the organizational level to fill this gap and provide needed services to this high-risk population.

These case studies have also demonstrated the need for increased research on the unique risk factors and care needs related to skin, wound and foot health for IEH, as well as more robust education for care providers to meet the needs of this population. Stronger engagement from government is required to prioritize and adequately fund care for IEH and, ultimately, prioritize housing to increase the overall health and well-being of IEH.

Overall Conclusion

Individuals experiencing homelessness represent a population with unique and largely unmet needs related to skin, wound and foot health. The three case studies presented in this inquiry highlight the ways in which strong interdisciplinary teams across Canada are engaging in robust and innovative approaches to care to meet the needs of this population. These case studies all demonstrate the strong impact of intervention and program planning and serve as exemplars for approaches to care for IEH. Evidence-based, low-barrier and trauma-informed care are fundamental aspects of care provision for IEH. Additionally, consideration for the unique needs based on local populations and local contexts are necessary for the creation and operation of programs that are responsive to the complex and varied needs of IEH across Canada. These approaches to care work synergistically to create increased quality of care and improved equity of outcomes for skin, wound and foot health in this equity-deserving population.

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PERSPECTIVE

The Wounds We Dress And The Ones We Carry: Moral Injury In Modern Wound Care

By Isaac Zralii Nurse Aide

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As professionals in the wound care sector, we are assumed to be experts in the vocabulary and in the observation, assessment, management and prevention of skin injuries. We can categorize wounds based on type and severity, and we are dependent on our observational skills. Wounds are measurable, billable and protocol driven. In today's health-care systems, wound care clinicians are not only treating tissue damage; we are navigating ethical fractures that create wounds that surpass length, width and depth parameters. The intersection of wound care and these fractures reveal a quiet crisis in modern medicine-one that not even the balsam of Gilead could soothe.[5]

Every day, wound care clinicians frequently encounter patients whose conditions reflect prolonged neglect, systemic inequalities and failures in continuity of care. Chronic pressure injuries, diabetic ulcers and infected surgical wounds frequently tell stories of delayed intervention, understaffing and fragmentation amongst care teams. Issues such as poverty, immobility, chronic illness, malnutrition and general institutional failure become focal points on wound care prevention and management. Clinicians begin to be the masters of wearing many hats, not only that of wound care specialist, but also social worker, nutritionist, and case manager.

To treat a Stage IV pressure injury is, in many cases, to confront the reality that it never should have existed. Wound care offers a unique lens into the deeper fractures of health care. A wound is a failure of integrity-of the skin, yes, but also of the systems meant to protect it. When a pressure injury develops, the question should not only be "how do we treat it?" but also "why did this happen, and what does it say about our capacity to provide ethical care."

Moral injury, a concept first developed in military contexts,[1] has gained traction in health care as clinicians confront situations that violate their ethical commitments. Moral injury is not burnout; it is not fatigue. It is the psychological, emotional and ethical harm that occurs when clinicians are unable to provide the care they know patients need because of systemic constraints.[2,3] In wound care, this collision between professional values and institutional realities is not abstract—it is visible, measurable and, often, preventable.

Quantifiers, much like diagnostic billing codes, look at the conciseness of moral injury origination: 1) Was there a 'betrayal' of what is deemed morally or ethically right. 2) Was that betrayal instigated by or encouraged by a person of authority? 3) Was this action/behaviour centred in a high stakes situation? 4) All three?[3]

I experienced this directly during the COVID-19 pandemic while working as a traveling Certified Nursing Assistant (or CNA, a US version of Nurse Aid/ Personal Support Worker in Canada) in New York City. Patient rounding–checking on patients at least every two hour–is a fundamental standard of care.

There is a recommendation of alternating purposeful rounding with Registered Nurses (RN) for a full scope of patient observation coverage. During purposeful rounding, patient repositioning for comfort or for pressure injury prevention is considered part of the 'Five P's', a guideline on rounding criteria.[4] On one shift, I was stopped by an RN and instructed not to enter any COVID isolation rooms, despite having proper PPE and training. The choice was clear; follow orders or risk termination. At that moment, my professional and moral obligations collided with institutional authority. This was just one of the moral 'injuries' I acquired during my health-care career.

Research links moral injury in health care to anxiety, depression, disengagement, and increased risk for suicidal ideation and attempt.[5-8] It is not just the witnessing of suffering that causes harm, but the forced participation or inability to intervene in systems that perpetuate it. Moral injury is not a failure of the individual. It is a signal of systemic dysfunction--the healthcare-industrial complex is septic. Many of us, as health-care providers, have shifted into survival mode. When individuals are operating in a physiological or physical sphere of survival, we cannot shift into healing mode-- the mode that we need to be operating in--to be stewards of care for members of our communities.

When HCPs Do Not Feel Safe, Paitents Are Not Safe

Jeanne Vanella, DNP notes that when health-care providers "do not feel safe, patients are not truly safe."[9] Moral injury cuts deep into our professional and moral ethics, in that it targets the very oath of care that we have dedicated our lives and careers to.[10]

How then do we begin the healing process when we have been morally wounded? Much like a physical wound, recognition is key. Having the framework and the vocabulary to describe the wound within a context is critical. We must be willing to start the hard conversations about our own professional wounds and how they may distort our frame of reference and our ambitions in healing physical wounds.
For organizations, prevention--how can executive leadership create safe work environments where the risk for ethical and moral violations-- are minimized? Does direct staff, including the nurse aids/personal support workers, feel supported in their role? Is there enough staff and resources for them to perform in their role in a way that aligns with their professional code and moral duty? As clinicians, we are charged with a bi-fold focus; prevention and healing.

Prevention for us looks different, it requires the courage to stand up as leaders against the systems that drive and perpetuate ongoing moral injury in our colleagues. Healing is the ability to take a step back and examine ourselves for signs of moral injuries. Are there memories of our careers that still elicit strong visceral reactions of anger, shame, regret? Healing also looks like acknowledging that our fellow colleagues may also have unaddressed wounds. We can collectively say "OUCH!" and begin our healing process.

Like physical wounds, there are suggestions for care supports: therapeutic techniques specific to moral injury and health-care worker trauma with trained psychological professionals, peer led support groups (such as www.dontclockout.org[11]) and/or removing ourselves from work environments that increase the risk for ongoing injury. The future of wound care depends on clinicians to be able to think critically, not only on skin integrity, but also on soul integrity.

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Additional Reading

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Hypochlorous Acid And Secondary Intention Healing Of Fournier's Gangrene: Results Of A Prospective Clinical Assessment

By Anne-Marie Trudel and Jessica Larose RN BScN ISPSCC NSWOC(c)

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The optimal management of Fournier's gangrene requires a multidisciplinary approach, integrating pharmacological and surgical interventions. The standard post-debridement treatment typically involves negative pressure therapy, sometimes combined with an instillation procedure, to prepare for surgical reconstruction or tertiary closure. However, this approach may be challenged in certain contexts, particularly in patients with physiological or logistical constraints.

To explore an innovative alternative, we assessed the use of hypochlorous acid (VASHE®, Urgo Medical, 2025)[1] in a series of cases. This broad-spectrum antimicrobial solution, which is non-cytotoxic, stands out for its ease of use and its application requiring only a single health-care provider. Our analysis of multiple clinical cases demonstrated the feasibility of second-intention healing following extensive surgical debridement of the genital and perineal region. Moreover, the results suggest a positive impact in terms of cost savings, time savings for nursing staff, simplification of material procurement and improved accessibility, particularly in outpatient settings. This prospective clinical assessment was conducted over two years and included a cohort of five patients hospitalized for Fournier's gangrene at CHU de Québec – Université Laval between 2022 and 2024. Regular photographic follow-ups documented the progression and healing of the wounds.

Introduction

Fournier's gangrene is defined as an acute necrotizing fasciitis of the genital region, characterized by a rapid progression and a frequently poor prognosis, with a mortality rate approaching 40%.[2] First described by Alfred Fournier in 1883,[3] this rare condition predominantly affects males, with an incidence of approximately 1.6 cases per 100,000 per year in the United States,[4] primarily among individuals aged 50 to 79 years,[6] with a male-to-female ratio of about 10:1.[6] While less common, cases have also been reported in pediatric patients, particularly those aged 0 to 3 months.[7] Pathogenically, this polymicrobial infection—involving both anaerobic and aerobic bacteria—originates in the skin tissues before progressing to deeper structures. The rapid expansion of inflammation induces tissue ischemia, ultimately leading to necrosis of soft tissues and fascia. Comorbidities such as diabetes, immunosuppression or obesity significantly contribute to disease development and aggravation. Given the clinical similarities to other infections, such as cellulitis, a rigorous diagnostic evaluation is essential. Early treatment with intravenous antibiotics combined with prompt surgical debridement remains crucial to improving patient prognosis. Additionally, post-operative management, particularly wound healing follow-up, represents a major challenge due to the complexity of lesions and the often fragile condition of affected patients.

Negative pressure therapy (NPT) has been established as the gold standard for managing post-surgical wounds following debridement in Fournier's gangrene cases.[8] However, alternative treatments documented in the literature include medical-grade honey,[9] biological debridement using maggots, hyperbaric oxygen therapy[10] and various surgical reconstruction techniques, such as grafts and flaps.[11] Additionally, antimicrobial solutions, including Dakin's Solution™, iodine and chlorhexidine, have been used for wound irrigation, although their cytotoxic effects on regenerating tissue remain a concern.[12,13]

The present clinical evaluation highlights the potential of hypochlorous acid as a promising alternative for wound management by secondary intention in Fournier's gangrene, particularly in cases where conventional approaches face limitations due to logistical, physiological or financial constraints. The non-cytotoxic properties of hypochlorous acid, combined with its broad-spectrum antimicrobial activity and ability to disrupt biofilms, position it as a viable therapeutic option when primary closure or reconstruction is not feasible. Furthermore, its ease of application and capacity for patient-administered wound care in outpatient settings enhance accessibility while optimizing health-care resources.

Materials And Methods

This prospective observational study was conducted over two years at CHU de Québec – Université Laval and involved a series of consecutive clinical cases of Fournier's gangrene presenting post-debridement wounds. No formal clinical research protocol was developed, as the study reflects our routine clinical practice.

The experimental treatment was based on the application of hypochlorous acid solution. Following debridement, non-woven gauzes impregnated with the solution and wrung out were applied directly to the wound bed to maintain controlled moisture and promote hypergranulation, angiogenesis and epithelialization. A secondary non-occlusive dressing composed of abdominal compresses was subsequently applied. Care was provided one to two times daily by nursing staff during hospitalization, then continued as self-care post-discharge.

The total treatment duration ranged from 30 to 84 days, leading to complete second-intention healing in five of the six cases, while one patient required scrotal reconstruction using an anterolateral thigh flap.

The solution was chosen due to its demonstrated antimicrobial efficacy (99.9% elimination rate) against a broad spectrum of microorganisms, including gram-positive and gram-negative strains—such as methicillin-resistant *Staphylococcus aureus* (MRSA) and *Pseudomonas aeruginosa*—as well as its ability to reduce *Clostridium difficile* endospores. This therapeutic strategy was considered in a clinical context where the scarcity of literature on Fournier's

gangrene limits the recruitment of large cohorts for randomized studies.

We describe below the clinical outcomes observed in a series of five patients.

This version enhances scientific clarity and precision while ensuring accessibility for a medical readership.

Case 1

Patient Profile: A 70-year-old male with a past medical history of hypertension, osteoporosis, benign prostatic hyperplasia and IgGκ lymphoplasmacytic lymphoma. Initially hospitalized for a bone marrow allograft, he developed perianal erythema extending to the medial half of his left buttock during his stay. Within 24 hours, the clinical picture rapidly progressed to marked scrotal swelling with intensification of the erythema and escalating pain that necessitated regular administration of analgesics.

Clinical Evolution and Initial Management: Twenty-four hours after symptom onset, a CT scan (TAC TAP) revealed the presence of a perianal fistula without an associated abscess, as well as scrotal cellulitis without any fluid collection. Seven days post-allograft, against a background of febrile neutropenia and skin sepsis secondary to an ano-rectal fistula, the patient was transferred to the intensive care unit. The initial surgical approach was conservative, consisting of close observation and continuation of antibiotic therapy, as there were no strong clinical indications of necrotizing fasciitis.

Surgical Intervention and Local Treatment: Once laboratory parameters stabilized and scrotal drainage was deemed necessary, a perineal surgical debridement was performed, which confirmed the diagnosis of Fournier's gangrene. Pus cultures identified the following microorganisms:

- *Pseudomonas aeruginosa*
- *Enterococcus faecalis*
- *Enterococcus faecium*
- *Bacteroides thetaiotaomicron (belonging to the B. fragilis group).*

A single debridement was sufficient. Initially, a conservative regimen utilizing a chlorhexidine-impregnated interface was instituted for 35 days. Thereafter, care was transferred to the enterostomal therapy team which implemented the application of moist dressings saturated with a hypochlorous acid solution (VASHE®). Administered over a total period of 42 days, this treatment achieved complete second-intention healing without the need for surgical reconstruction or skin grafting. Furthermore, the self-management of dressings reduced direct physical contact and minimized the risk of secondary infections in the context of the patient's immunosuppressed status.

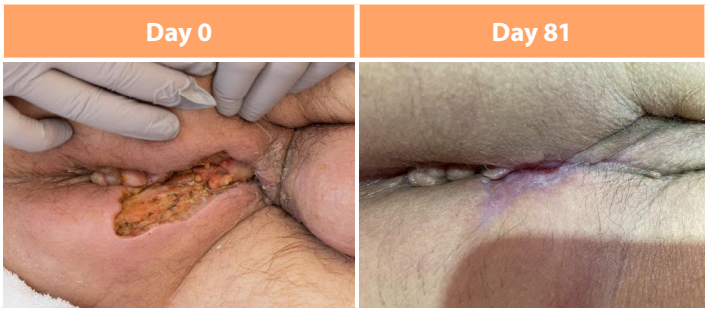

Figure 1: Case 1

Case 2

Patient Profile: A 48-year-old male with a history of type 2 diabetes mellitus, hypertension and dyslipidemia, compounded by poor personal hygiene and malnutrition. He presented to the emergency department with scrotal edema that emerged six days after he self-drained a perineal nodule adjacent to the anus. The edema rapidly evolved into scrotal induration, and the patient reported a febrile episode on the night preceding his admission.

Clinical Evolution and Initial Management: The emergency physician's examination revealed pronounced scrotal erythema, accompanied by edema and induration, yet no evidence of necrosis, palpable mass, discharge or urinary symptoms. Based on the strong clinical suspicion of Fournier's gangrene, the patient was admitted and underwent surgical debridement within 24 hours of evaluation by the urologist. Pus cultures subsequently identified the following pathogens:

- *Streptococcus agalactiae* (Group B)
- *Anaerococcus vaginalis*

- *Peptostreptococcus anaerobius*
- *Staphylococcus anaerobius*
- *Staphylococcus capitis.*

Surgical Intervention and Local Treatment: Over a 21-day period, four surgical debridements and nine operating room-based negative pressure therapy (NPT) sessions. These repeated interventions were necessitated by technical difficulties with achieving an adequate seal on the device and the requirement to maintain an extended gynecological positioning, precluding bedside procedures. Given the multiple unsuccessful attempts at NPT, we proposed an alternative treatment strategy as a moist dressings saturated with the hypochlorous acid solution.

Outpatient Follow-Up: Eager to resume a normal lifestyle, the patient was trained in self-care and transitioned to this conservative treatment regimen. After 55 days of hospitalization, he was discharged home. Outpatient follow-ups conducted at two and six weeks post-discharge confirmed complete wound closure by second-intention healing, achieved after a total of 86 days of therapy.

Figure 2: Case 2

Case 3

Patient Profile: A 68-year-old male with a history of hypothyroidism, gastroesophageal reflux disease, dyslipidemia, hypertension, hemorrhoids and cigarette smoking. Socially, the patient is vulnerable—living alone in subsidized housing without familial support—and has been unable to work for several years due to chronic arthritic conditions.

Clinical Evolution and Initial Management: The patient presented to the emergency department with progressive perianal edema accompanied by an erythema extending to the scrotum. Upon admission, the enterostomal therapy team promptly addressed his concerns—particularly his anxiety regarding a potential cancer diagnosis. Subsequent clinical examinations, complemented by imaging studies, confirmed the diagnosis of Fournier's gangrene. Although a urology consultation was sought and the potentially lethal nature of the condition was explained, the patient refused surgical debridement while consenting to receive targeted antibiotic therapy. Pus cultures isolated the following microorganisms:

- *Streptococcus mitis*
- *Escherichia coli*
- *Klebsiella pneumoniae*
- *Actinomyces odontolyticus*
- *Streptococcus constellatus*
- *Staphylococcus epidermidis.*

Therapeutic Management: In the absence of surgical intervention, the primary objectives were to decrease the microbial burden, reduce odour and promote autolytic debridement. The treatment strategy involved applying a moist dressing saturated with a hypochlorous acid solution. Remarkably, after only seven days of treatment, the wound demonstrated complete resolution of necrosis with the establishment of 100% healthy granulation tissue. The patient was then transitioned to a self-care regimen, ultimately achieving complete secondary-intention wound healing without the need for reconstructive surgery or skin grafting.

Figure 3: Case 3

Case 4

Patient Profile: A 68-year-old male with a history of smoking, type 2 diabetes mellitus, obesity and sleep apnea. His medical records are further notable for paraplegia (from the D8 level since 2008 following a postoperative complication of a disc herniation), a diversion colostomy (since 2019 due to a chronic pressure injury) and an indwelling catheter (since 2020) for neurogenic bladder management. Additionally, he benefits from an intrathecal baclofen pump to control musculoskeletal spasticity.

Clinical Evolution and Initial Management: Physical examination revealed subcutaneous emphysema within the scrotum. On the day of admission, an initial surgical debridement was performed collaboratively by the general surgery and urology teams. The diagnosis of Fournier's gangrene affecting the left hemiscrotum was established, with a suspected urethro-scrotal fistula as the underlying cause. Initially, a moist dressing impregnated with PHMB (polyhexamethylene biguanide) was applied, and targeted intravenous antibiotics were initiated following microbial isolation. The organisms identified were:

- *Streptococcus dysgalactiae*
- *Streptococcus anginosus*
- *Enterococcus faecalis*
- *Proteus penneri*
- *Bacteroides fragilis.*

Rationale for Abandoning Negative Pressure Therapy (NPT): The use of NPT was contraindicated due to the presence of a urethral fistula (a contraindication as per INESSS guidelines) and significant technical challenges. In particular, intense muscular spasms prevented the maintenance of an aseptic gynecological position necessary for effective NPT application.

Surgical Intervention and Local Treatment: Four surgical intervention were required. We began a hypochlorus acid wet dressing to facilitate care and encourage a return home as soon as possible at the patient's request. The patient was discharged after 14 days of hospitalization. Home-based follow-up, supervised by the local CLSC, continued for an additional 39 days, during which complete secondary-intention wound healing was achieved, despite the patient's inability to independently manage his wound care.

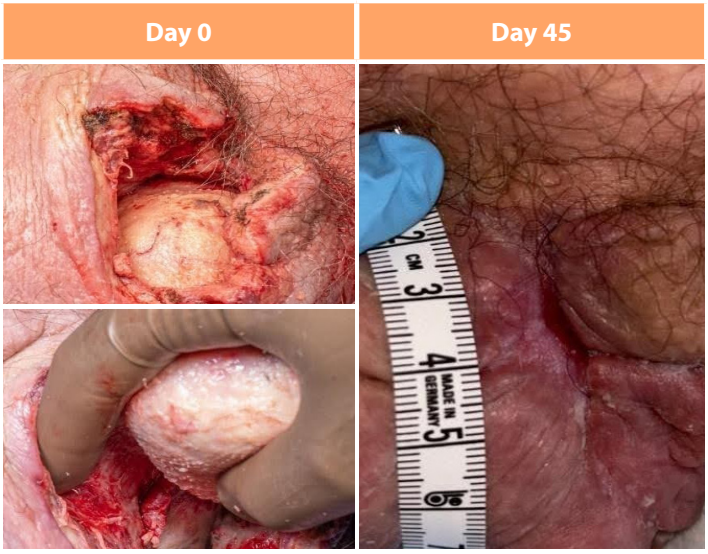

Figure 4: Case 4

Case 5

Patient Profile: A 44-year-old male with a history of moderate-to-severe traumatic brain injury sustained at age 18. Despite his work incapacity, he remains functionally independent for activities of daily living. His medical record is further complicated by psychiatric disorders, polytoxicomania (involving PCP, cocaine, THC and alcohol) and HIV positivity since 2010.

Clinical Evolution and Initial Management: The patient presented to the emergency department after a fall down the stairs, complaining of localized coccygeal pain. Radiography revealed only a slight displacement of the coccygeal bones, without evidence of fracture. However, within the following

24 hours, he developed a marked increase in redness along with scrotal edema. Clinical examination revealed:

- Pronounced erythema and edema
- Testicular and penile pain
- Palpable subcutaneous emphysema in the left groin
- Suprapubic induration extending toward the right abdominal and inguinal wall.

An extensive debridement of necrotic tissues was performed, including a scrotectomy that exposed both the spongy and cavernous bodies. A moist dressing impregnated with PHMB was applied, after which the patient was transferred to the intensive care unit.

Intraoperative cultures yielded the following microorganisms:

- *Streptococcus anginosus*
- *Escherichia coli*
- *Actinomyces turicensis*
- *Bacteroides fragilis*
- *Peptoniphilus asaccharolyticus.*

Initial Management and Surgical Interventions: Three debridements and a revision of the PHMB-based NPT were performed. After that, a multidisciplinary consultation (involving urology, anesthesia and intensive care) highlighted significant challenges—marked agitation, severe pain and a recurrent need for propofol and fentanyl boluses at each dressing change. We transitioned to hypochlorous acid–moistened dressings once a day. The benefits was important : reducing analgesic burden, lessening the dressing-related pain and simplifying the procedure. After discharge and outpatient follow-up via the local CLSC, he underwent a pedicled anterolateral thigh flap graft on day 45.

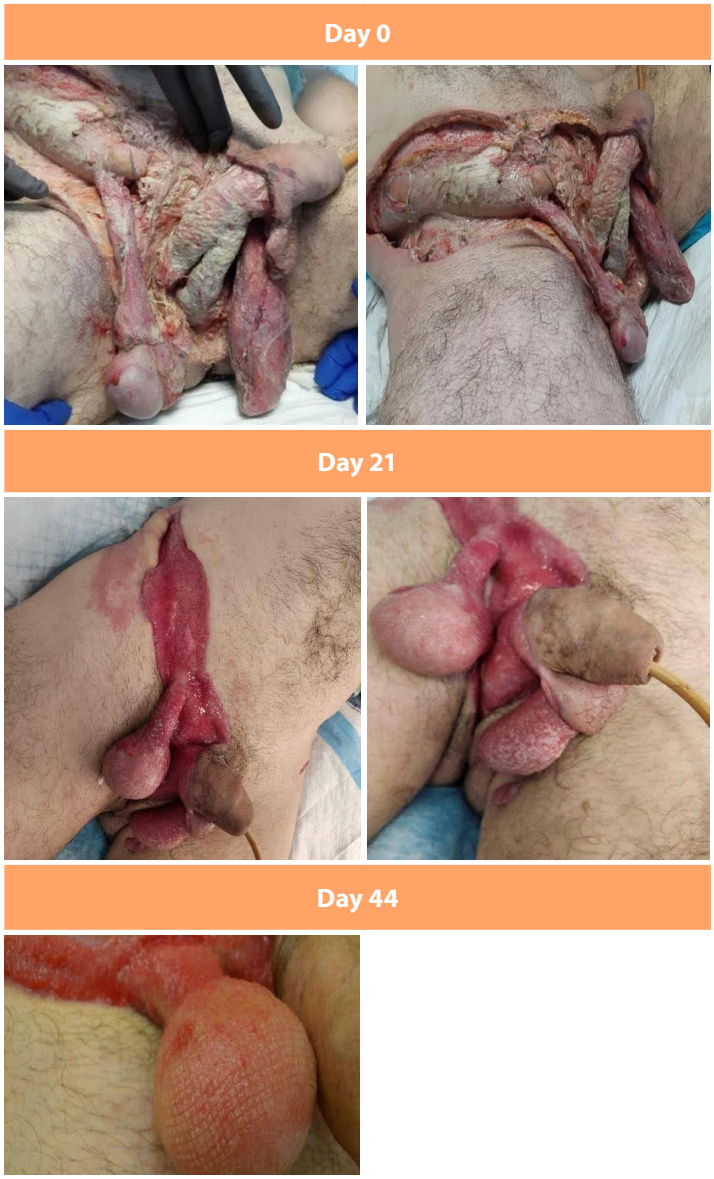

Figure 5: Case 5

Discussion

Fournier's gangrene is a rapidly disseminating polymicrobial infection characterized by a synergistic interaction between aerobic and anaerobic bacteria, with common pathogens including *Escherichia coli* and various *streptococci.*[5] The clinical presentation can sometimes mimic cellulitis, underscoring the importance of early and accurate diagnosis—especially in light of the condition's mortality rate, which approaches 40%.[5]

In this series of cases, the diagnosis was made clinically at the presentation of the patient in the emergency department, confirmed with appropriate imaging and culture results and subsequently addressed with surgical debridement. Initially, negative pressure therapy (NPT) was used post-debridement in three of the five cases. However, technical difficulties—such as seal loss in anatomically complex regions, excessive pain during dressing changes and the repeated need for narcotics

and sedatives—as well as organizational constraints (limited access to the operating room, nursing staff shortages, and material resource limitations) prompted the investigation of alternative therapeutic approaches.

The interdisciplinary adoption of moist dressings with hypochlorous acid (VASHE®) was driven by its broad-spectrum antimicrobial properties, non-cytotoxic profile, ability to disrupt biofilm formation and facilitation of accelerated wound healing. These cases support that this strategy can reduce the frequency of invasive interventions while significantly enhancing patient comfort through decreased pain and sedation requirements during dressing changes.

These preliminary findings suggest that a combined strategy—initial aggressive surgical debridement followed by conservative management with hypochlorous acid–based moist dressings—may represent a appropriate alternative to conventional protocols in the management of Fournier's gangrene, particularly under clinical and organizational constraints.

Complementary Perspectives

Comparative Analyses: A detailed comparative study between conventional NPT and the hypochlorous acid moist dressing approach (evaluated both clinically and in terms of overall costs) could help better define the indications and limitations of each modality.

Mechanistic Insights: Investigating the cellular and biochemical mechanisms by which hypochlorous acid accelerates hypergranulation may enrich our understanding and guide the development of future therapeutic strategies.

Quality of Life and Psychological Impact: Assessing patient quality of life and the psychological impact—especially in patients who decline surgical interventions—represents a promising research project to optimize a comprehensive, multidisciplinary care approach.

Such lines of inquiry pave the way for prospective randomized studies that will be essential to definitely establish the efficacy and safety of hypochlorous acid in the management of this devastating condition

Advantages of the Hypochlorous Acid–Moistened Dressing Approach in the Management Of Fournier's Gangrene When NPT Is Not Possible

1. *Ease of Application:* In the setting where negative pressure (NPT) requires experienced nursing staff to ensure adequate sealing due to the difficult anatomical location of Fournier's gangrene wounds—the application of a hypochlorous acid–impregnated moist dressing is markedly simpler. This technique is intuitive enough to be self-administered by patients, particularly after discharge, without the need for advanced technical skills.

2. *Reduction in Dressing Change Time:* Data indicate that performing a dressing change with NPT generally requires approximately 50 to 60 minutes, even when executed by specialized teams. In contrast, the procedure for changing a moist dressing using a hypochlorous acid solution takes around 10 minutes. This significant time saving can enhance workflow efficiency on an institutional level and reduce the workload for nursing teams.

3. *Optimization of Personnel Deployment:* The setup and change of NPT necessitate the involvement of at least two experienced nurses, often supported by one or two health-care aides (to facilitate proper "gynecological" positioning and ensure asepsis). Conversely, hypochlorous acid–moistened dressings can be applied by a single nurse—or even self-administered by the patient—which is particularly advantageous during periods of staffing shortages, as witnessed in the post-pandemic context.

4. *Decreased Use of Sedatives and Opioids / Pain Management:* Repeated dressing changes with Negative Pressure Wound Therapy in sensitive perineal and inguinal regions often induce stress, pain and agitation, thereby requiring frequent administration of anxiolytics, narcotics and sedatives. Although NPWT is not systematically associated with severe pain, the patient's experience may vary depending on the location and size of the wound, the patient's sensitivity, the level of pressure applied, the condition of the tissues and particularly during dressing changes.[14]

Pain associated with NPWT is generally most significant during dressing changes. The anatomical location of wounds associated with Fournier's Gangrene involves a particularly sensitive area that is often difficult to dress. This frequently necessitates the use of stronger adhesives and adjunctive accessories to improve sealing (e.g., stoma paste or protective rings), thereby increasing the body surface area exposed to adhesive materials.

Pain management in our cohort primarily relied on the administration of narcotic analgesics prior to dressing changes, either subcutaneously or orally, while taking into account the timing of dressing replacement and the peak onset of action of the medication administered. In two cases, pain was omnipresent and became a significant factor contributing to the decision to modify the treatment approach in order to relieve the patient and reduce the use of opioids and anxiolytics associated with dressing changes. Another patient presented with paralysis, which prevented an adequate assessment of pain. In the remaining cases, pain was not considered a determining factor in treatment decision-making.

In contrast, the hypochlorous acid dressing approach minimizes or even eliminates the need for these pharmacological agents, as patient reports frequently describe the procedure as virtually painless, with only minor discomfort during genital manipulation.

5. *Enhanced Patient Experience and Autonomy:* Empowering patients to manage their own care is a cornerstone of this approach. Enabling self-administration during outpatient follow-up facilitates a quicker return to normal activities, improves quality of life and reinforces patient engagement in their recovery process.
6. *Cost and Resource Utilization Comparison:* Economic and operative time data—collected in varied settings such as CHU de Québec – Université Laval and CIUSSS de la Capitale Nationale—underscore the advantages of the hypochlorous acid dressing method when compared with various NPT modalities.

Overall Impact On Management

- *Cost and Resource Reduction:* Switching from NPT to hypochlorous acid–moistened dressings leads to a substantial decrease in per-change cost and diminishes the time allocated by health-care personnel. This reallocation of resources can improve overall care efficiency.
- *Enhanced Quality of Care and Patient Comfort:* The reduced need for sedation—consequently allowing for a gradual discontinuation of narcotics—lowers the morbidity associated with dressing changes. Patients report greater comfort and tolerance, factors which are essential for optimal wound healing and treatment adherence.

Table 1: Comparative Table Example (Data for a Community Hospital):

Therapeutic Modality	Total Cost per Change (CAD)	Nursing Time (minutes)	Required Personnel	Number of Changes per Week
Hypochlorous acid–moistened dressing (VASHE® 118 mL + 4×4 gauzes)	$56.91	~10* (or 0 minutes if self-administered in outpatient settings)	1 (or self-administered)	7
NPT (e.g., Renasys black sponge & PHMB)	$279.81	50 (average)	2	3

* The indicated time for the hypochlorous acid dressing may vary by setting: in a hospital, minimal assistance (approximately 10 minutes) might be needed; in an outpatient setting, self-administration can eliminate direct nurse involvement.

Alternative NPT options, such as Renasys PHMB™-based NPT and 3M™ instillation, have total costs of approximately $255.00 CAD and $1473.00 CAD per change, respectively, requiring considerably more time and personnel.

- *Potential Intraoperative Benefit:* Due to its non-cytotoxic characteristics and its ability to penetrate tissues to disrupt established biofilm structures, further exploring the perioperative use of hypochlorous acid—during debridement and wound irrigation—may reduce the number of successive debridements required, thereby optimizing surgical management.

Study Limitations

- *Small Cohort Size:* The rarity of Fournier's gangrene limits the number of cases, making it difficult to conduct a randomized study.
- *Non-Comparative Evaluation:* The study is non-comparative; outcomes might differ when comparing with other antimicrobial agents that were not evaluated.
- *Need for Prospective Trials:* Prospective, randomized studies are needed to confirm these preliminary results and to refine the indications for this treatment approach.

Conclusion

Our case series documents that the use of hypochlorous acid–moistened dressings results in rapid wound healing, a significant reduction in costs and a marked improvement in patient quality of life, and can be a good alternative to the usual procedure like NPT. Complete secondary-intention wound closure was obtained on average within 50 days. Based on these findings, we continue to recommend and utilize this approach for managing Fournier's gangrene, particularly in scenarios with organizational constraints or during periods of specialized resource scarcity.

Disclaimer: *The authors affirm that no monetary compensation was received, and no affiliations with any medical or pharmaceutical companies influenced the study.*

Editor's note: *In the interests of education, accuracy and disclosure, case reports or studies published in Wound Care Canada occasionally, by necessity, mention trade names, commercial products, companies or organizations. Mention of these does not in any way imply endorsement by Wounds Canada, its editors or editorial board*

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Wound Assessment In Individuals With Darker Skin Tones: A New Resource For Canadian Nurses

By Loukia Papadopoulos MSc

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Developed through a collaboration between the Ontario Black Nurses' Network (OBNN) and nursing students at Trent/Fleming School of Nursing, Trent University (Peterborough ON), the *Skin and Wound Resource Toolbox: Assessment of Dermatologic And Wound Conditions In Black Skin* is a response to what is considered to be a longstanding lack of representation of the specific challenges of Black and Brown skin in wound and general health-care education, literature and clinical practice. Traditional nursing and anatomy resources have historically focused on generalized approaches to patient care, often overlooking the unique characteristics and presentations of skin conditions in diverse populations. This gap has contributed to challenges in accurately assessing and treating skin and wound conditions in darker-skinned individuals.

Shelly Philip LaForest RN BN MN CVAA(c) PhD(c), Executive Director, Ontario Black Nurses' Network.

To address this issue, the resource toolbox provides educational materials that highlight the presentation of skin disorders, wound processes and skin assessments on Black and Brown skin tones, meeting a profound long-standing need in Canada. Through increased representation and culturally inclusive education, the toolbox, available at https://ontarioblacknursesnetwork.ca/skin-resource-toolbox aims to strengthen clinical knowledge, improve health-care competencies and support equitable patient care.

Wound Care Canada talked with Shelly Philip LaForest, Executive Director, Ontario Black Nurses' Network.

WCC: *What inspired the Ontario Black Nurses' Network to create the Skin and Wound Resource Toolbox, and what gap in health care does it aim to address?*

Shelly Philip LaForest: One of our key organizational members, Lori Zozzolotto, who is also an NSWOCC (Nurse Specialized in Wound, Ostomy and Continence Canada) spent many years guiding skin and wound care education across the province. Lori shared that she noticed the lack of representation and resources that were specifically tailored to Black and Brown skinned individuals. With Lori's guidance and expertise, we developed this repository to share with a wider public audience.

This repository addresses a critical gap because it houses resources in one place. It is a dynamic and evolving document, collaborative in nature, which helps to maintain its relevance and currency.

WCC: *How does the Skin and Wound Resource Toolbox help improve outcomes for Black patients and other racialized communities experiencing skin and wound conditions?*

Shelly Philip LaForest: Individuals have a level of trust in their care providers when seeking help. When individuals feel that their care providers are knowledgeable on how conditions present themselves on Black and Brown skin, this can lead to improved health-seeking behaviour, earlier diagnosis and adequate and appropriate treatment. This helps to reduce inequities, highlight and encourage culturally responsive care delivery and support a way for providers and the public to quickly access resources.

For example, results from a study by Oozageer Gunowa et al.[1] identified that darker skin individuals are diagnosed late with pressure injuries and that education that was geared specifically towards assessment was superficially curated.

WCC: *Why is it important for health-care professionals to understand how skin conditions and wounds may present differently on darker skin tones?*

Shelly Philip LaForest: Clinicians may miss early signs of skin problems in dark skin as many tools are based on light skin, and conditions often look vastly different on dark versus light skin tones. For example, hyper- or hypo-pigmented conditions can be more noticeable and/or take longer to heal. Dermatological issues impact an individual's physical health but can also affect one's self-esteem, which is why this needs to be addressed if we want to apply a holistic approach to health-care treatment.

In the absence of understanding these differences, this 'colour-blind' approach can reinforce racial inequities and patterns of oppression.[2]

WCC: *Can you explain some of the key resources or tools included in the toolbox for nurses and frontline health-care workers?*

Shelly Philip LaForest: Of great note, the toolbox is free to view and is publicly accessible on the Ontario Black Nurses' Network's website (ontarioblacknursesnetwork.ca). A downloadable PDF is available and has resources that show images of conditions on Black and Brown skin. It also provides easy-to-navigate links and summaries of research, educational tools, media, and journal articles.

WCC: *What challenges have nurses and patients historically faced in wound care and dermatological assessment that this initiative seeks to change?*

Shelly Philip LaForest: Narratives from health-care providers indicated that there has been a historical blindness, and a lack of awareness and education with dermatological assessments on darker skin tones.

Black and Brown patients were, and continue to be, significantly underrepresented in educational curriculum, teaching materials, textbooks, etc. As an example, an analysis conducted by Louie & Wilkes[3] discovered that dark skin tones were grossly underrepresented in images found in medical textbooks and significantly contributed to clinicians' ability [or inability] to recognize diseases.

As a result, Black patients have higher mortality rates from serious skin conditions due to late diagnosis and treatment.[4] For example, over a five-year period, melanoma survival is substantially lower for Black patients (74.1%) than for White patients (92.9%).[5]

WCC: *How is the OBNN collaborating with health-care organizations, educators or policymakers to expand the use of this resource?*

Shelly Philip LaForest: OBNN hosts this free repository as a means to bring together and collaborate with, health-care organizations, educators, researchers and policymakers. A unified approach can serve as a change agent for improved health-care outcomes.

WCC: *Have you seen early feedback or success stories from nurses or health-care teams using the Skin and Wound Resource Toolbox?*

Shelly Philip LaForest: Yes, several educational programs have embedded this tool into their health assessment courses and this tool has also been introduced at various provincial and national forums to skin and wound care specialists. Awareness has increased and clinicians are strongly encouraged to contribute additional resources to continue this collaborative reference.

WCC: *What are the OBNN's broader goals for advancing equity, education and patient outcomes through initiatives like this one?*

Shelly Philip LaForest: The network aims to encourage progressive and meaningful discussion about health equity, through formal and informal channels. As an initiative led by practitioners who are also part of this representative sample, the goal is to increase trust among patients and to contribute to changing health-care practices and systems.

Loukia Papadopoulos MSc is Assistant Editor, *Wound Care Canada*.

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Artificial Intelligence In Wound Care And Diabetic Foot Management

By Dr Ahmed Elawadi BVSc IIWCC LM101 LM201

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Chronic wounds are a major health-care challenge worldwide and are associated with substantial morbidity, mortality, reduced quality of life and increased health-care expenditure. Among chronic wounds, diabetic foot ulcers (DFUs) represent one of the most complex and resource-intensive complications of diabetes mellitus. It is estimated that 15%–25% of individuals with diabetes will develop a diabetic foot ulcer during their lifetime.[1] Recurrence rates remain high, with more than 40% of patients experiencing ulcer recurrence within one year.[2]

The pathophysiology of diabetic foot ulcers is multifactorial and includes peripheral neuropathy, peripheral arterial disease, repetitive trauma, infection, impaired immunity and delayed wound healing.[3] Delayed detection and inadequate monitoring often contribute to wound progression, infection, hospitalization and lower extremity amputation.

Current wound care practice still relies heavily on periodic clinical examinations, visual assessment, manual wound measurements and subjective interpretation by health-care providers. Although multidisciplinary wound care teams improve outcomes, access to specialized wound care services remains limited in many regions.[4] Furthermore, considerable inter-observer variability exists in wound classification, grading and documentation.

Artificial intelligence (AI) has recently emerged as a promising technology capable of transforming wound care and diabetic foot management. By combining machine learning algorithms, computer vision, thermal imaging and predictive analytics, AI systems can support clinicians in screening, wound assessment, diagnosis, monitoring and treatment planning.[5] AI has the potential to shift wound care from a reactive model focused on treating advanced wounds toward a predictive and preventive health-care model.

This article reviews the current scientific evidence supporting AI applications in wound care and diabetic foot management and discusses their clinical relevance, limitations, and future implications.

The Clinical And Economic Burden Of Chronic Wounds

Chronic wounds affect millions of patients globally and impose a substantial clinical and economic burden on health-care systems.[6] Healing often requires prolonged treatment periods involving repeated clinic visits, dressing changes, advanced therapies, infection management and multidisciplinary follow-up.

Diabetic foot ulcers are particularly associated with increased morbidity and mortality. Studies have demonstrated that the five-year mortality rate associated with diabetic foot complications is comparable to several major malignancies.[7] In addition, DFUs remain one of the leading causes of non-traumatic lower extremity amputations worldwide.

Health-care costs associated with chronic wound management are considerable. Depending on wound severity and complications, annual treatment costs may range from approximately $5,000 to $15,000 USD per patient, with significantly higher expenditures observed in hospitalized or surgically managed patients.[8] The indirect burden includes reduced productivity, psychosocial distress, caregiver burden and long-term disability.

Several gaps continue to limit optimal diabetic foot management, including:

- Delayed identification of high-risk patients
- Lack of objective biomarkers for wound progression
- Variability in wound assessment between clinicians
- Limited predictive models for healing outcomes
- Insufficient longitudinal monitoring
- Fragmented integration of clinical and imaging data
- Limited access to multidisciplinary wound care services.

Challenge	Clinical Impact
Delayed detection	Late presentation and increased complications
Inter-observer variability	Inconsistent wound assessment
Limited quantitative biomarkers	Difficulty monitoring progression
Fragmented data systems	Poor continuity of care
Limited multidisciplinary access	Delayed specialist intervention

These limitations highlight the need for standardized, scalable and technology-driven approaches to wound assessment and monitoring.

AI Technologies In Wound Care

Artificial intelligence refers to computational systems capable of performing tasks that traditionally require human intelligence, including pattern recognition, classification, prediction and decision support.[9] In wound care, AI applications are primarily based on machine learning and deep learning techniques.

Machine learning models commonly used in wound care include:

- Logistic regression
- Random forest algorithms
- Support vector machines
- Ensemble learning systems.

Deep learning approaches have become particularly important in image-based wound analysis. Commonly used architectures include:

- Convolutional neural networks (CNNs)
- U-Net segmentation models
- YOLO (You Only Look Once) object detection systems
- Faster R-CNN detection frameworks.

These technologies allow automated analysis of wound images and support tissue segmentation, wound classification, infection detection, wound measurement and healing prediction.

AI systems are increasingly integrated with smartphone imaging, cloud-based platforms, thermal imaging systems, wearable sensors and telemedicine infrastructure to create scalable digital wound care ecosystems.

AI Applications In Diabetic Foot and Wound Management

Screening and Risk Prediction: One of the most promising applications of AI in wound care is the early identification of patients at risk for wound development or deterioration. Predictive models can analyze electronic health records, vascular risk factors, neuropathy status, laboratory findings, comorbidities and patient history to stratify risk and identify high-risk individuals.[10]

AI-driven risk prediction systems may support:

- Early intervention programs
- Population-level screening initiatives
- Prevention-focused diabetic foot clinics
- Resource allocation for high-risk patients
- Reduction in preventable hospital admissions.

AI Application	Clinical Function
Risk prediction	Identifies high-risk patients
Computer vision	Detects and classifies wounds
Automated measurement	Measures wound size and depth
Healing prediction	Estimates healing probability
Thermal imaging	Detects inflammation early
Telemedicine monitoring	Enables remote follow-up

The transition from reactive wound treatment to predictive prevention represents a major paradigm shift in chronic wound management.

Automated Wound Assessment: Traditional wound assessment methods are often subjective and prone to variability. AI-powered wound assessment systems provide objective and standardized evaluation using digital imaging and computer vision.

Automated wound assessment applications include:

- Wound size and depth measurement
- Tissue identification (granulation, necrosis, slough)
- Identification of wound edges
- Documentation standardization
- Monitoring of wound progression over time.

These technologies may improve consistency between clinicians and enhance documentation accuracy across care settings.

Early Detection and Diagnosis: Computer vision technologies enable AI systems to identify wounds from digital images and classify them according to wound type. AI systems have demonstrated utility in distinguishing diabetic, venous, arterial and pressure ulcers.

Thermal imaging and hyperspectral imaging technologies further enhance early detection by identifying inflammation and perfusion abnormalities before visible tissue breakdown occurs.[11] Temperature asymmetry detected through infrared thermography may identify pre-ulcerative diabetic foot changes several days before clinical ulcer formation.

This early detection capability may allow clinicians to intervene before significant tissue damage develops.

Wound Classification and Severity Grading: AI systems can support wound classification and severity grading using established clinical frameworks such as the Wagner classification system.[12] By analyzing wound images and tissue characteristics, AI algorithms may assist clinicians in identifying:

- Infection risk
- Ischemic changes
- Tissue viability
- Severity progression
- Need for advanced intervention.

Standardized classification may improve treatment stratification and support multidisciplinary communication.

Healing Prediction and Clinical Decision Support: Predicting wound healing remains one of the most clinically valuable applications of AI. Healing prediction models incorporate multiple variables, including:

- Wound size
- Tissue composition
- Depth
- Perfusion status
- Infection markers
- Glycemic control
- Patient comorbidities.

Machine learning models trained on large wound datasets have demonstrated the ability to estimate healing probability and healing timelines.[13] Such systems may assist clinicians in identifying patients requiring advanced therapies, vascular intervention, or intensified monitoring.

AI-supported clinical decision systems may also improve treatment planning and reduce unnecessary delays in escalation of care.

Remote Monitoring and Telemedicine: Telemedicine has become increasingly important in chronic wound management, particularly in geographically

underserved regions and among patients with mobility limitations.

AI-powered remote monitoring systems combine smartphone wound imaging, cloud-based analytics and longitudinal data tracking to support ongoing follow-up outside traditional clinic environments.[14] These systems may:

- Reduce clinic dependency
- Improve continuity of care
- Enhance patient engagement
- Facilitate earlier detection of deterioration
- Expand access to wound care expertise.

Remote AI-assisted monitoring became particularly relevant following the COVID-19 pandemic, which accelerated the adoption of virtual health-care models globally.

Clinical Performance Of AI In Wound Care

Recent studies have demonstrated promising diagnostic performance for AI systems in wound care applications. Diagnostic accuracies reported in the literature commonly range between 80% and 95% in image-based wound assessment tasks.[15]

Several systematic reviews and meta-analyses have highlighted the strong potential of deep learning models in diabetic foot ulcer detection and classification. Deep learning approaches generally outperform traditional machine learning methods due to their ability to process complex image features and large datasets.[16]

A multicentre prospective study by Cassidy et al. evaluated AI-based diabetic foot ulcer detection using more than 2,000 wound images and demonstrated high sensitivity for wound classification in real-world clinical environments.[17]

Similarly, Silva et al. conducted a systematic review analyzing more than 100 studies focused on AI applications in diabetic foot management and reported strong diagnostic performance while emphasizing the need for larger-scale validation studies.[18]

Chen et al. demonstrated that AI performance in image-based wound classification was comparable to expert clinician interpretation in several datasets.[19] However, dataset heterogeneity and lack of standardized imaging protocols remain significant challenges.

Additional studies have shown that AI systems can support prediction of wound healing outcomes and earlier identification of high-risk patients.[20]

Study[15-19]	Year	Main Findings
Cassidy et al.	2023	High sensitivity in DFU detection
Silva et al.	2025	AI accuracy 80–95%
Chen et al.	2025	Comparable to expert clinicians
Margolis et al.	2023	Healing prediction models effective
Bhatt et al.	2025	Thermography useful for prevention

Advantages Of AI In Wound Care

AI offers several important clinical, operational, and economic advantages in chronic wound management.

Clinical Advantages

- Earlier detection of complications
- Objective and standardized wound assessment
- Reduced inter-observer variability
- Improved treatment planning
- Faster identification of deterioration
- Enhanced longitudinal monitoring
- Improved access to specialist expertise.

Operational Advantages

- Faster clinical workflows
- Improved documentation accuracy
- Reduced administrative burden
- Enhanced telemedicine capabilities
- Better resource allocation
- Scalability across multiple care settings.

Economic Advantages

- Reduced hospitalization rates
- Lower complication rates
- Fewer preventable amputations
- Reduced clinic visits through remote monitoring
- Potential reduction in overall chronic wound care costs.

Importantly, the greatest value of AI may not solely be wound measurement accuracy, but rather its ability to support prevention of wound deterioration and facilitate earlier intervention.

Advantages	Limitations
Standardized assessment	Small datasets
Faster workflows	Limited real-world validation
Reduced variability	Workflow integration challenges
Early detection	Regulatory barriers
Remote monitoring	Clinician trust concerns

Limitations And Challenges

Despite significant progress, several important limitations currently restrict widespread AI integration into wound care.

Data and Technical Challenges: Many existing studies rely on relatively small or non-diverse datasets. Variability in image quality, lighting conditions, wound presentation and annotation methods can negatively impact algorithm performance.[21]

Additional technical limitations include:

- Lack of standardized imaging protocols
- Inconsistent annotation quality
- Limited external validation
- Dataset bias
- Poor representation of diverse populations.

Clinical and Integration Challenges: Real-world implementation remains challenging due to workflow integration issues, regulatory requirements, clinician acceptance and infrastructure limitations.

AI systems must also demonstrate:

- Reliability across diverse clinical environments
- Transparency and explainability
- Regulatory compliance
- Data privacy protection
- Integration with electronic medical records.

Clinician trust remains an essential factor. AI should be viewed as a decision-support tool that augments clinical judgment rather than replacing health-care professionals.

Future Directions In AI-Based Wound Care

The future of AI in wound care is likely to focus increasingly on predictive and preventive health-care models.

Several emerging directions include:

- Prediction of ulcer formation before visible breakdown
- Integration with wearable sensors and smart insoles
- Continuous thermal monitoring systems
- Explainable AI models for improved transparency
- Fully integrated digital wound care ecosystems
- Personalized treatment recommendations
- AI-assisted robotic wound care technologies.

Thermal imaging technologies may become particularly valuable in diabetic foot prevention programs by identifying inflammatory changes before ulcer formation occurs.

Integration of AI with remote monitoring and telemedicine may also help expand access to wound care services in rural and underserved communities where multidisciplinary expertise is limited.

Large-scale randomized clinical trials and real-world implementation studies will be essential to establish clinical effectiveness, cost-efficiency and long-term patient outcomes.

Clinical Translation And Emerging Innovation

Recent innovations demonstrate how AI research is beginning to translate into real-world wound care applications.

AI-powered thermal imaging systems are being developed to identify temperature variation and inflammatory changes associated with early diabetic foot complications. Such technologies aim to detect high-risk areas before visible tissue breakdown occurs and may support preventive diabetic foot screening.

Similarly, AI-driven wound imaging and monitoring platforms now provide automated wound measurements, progression tracking and standardized documentation across clinicians and care settings. These technologies support both in-clinic and remote patient monitoring models.

The integration of these tools into routine clinical workflows may help bridge the gap between scientific research and practical wound care delivery.

Conclusion

Artificial intelligence is rapidly emerging as a transformative force in wound care and diabetic foot management. AI technologies have demonstrated significant potential in screening, wound assessment, classification, healing prediction, remote monitoring and clinical decision support.

Current evidence suggests that AI systems can achieve high diagnostic accuracy and may improve standardization, efficiency and early intervention in chronic wound management. Importantly, AI may enable a shift from reactive treatment toward predictive and preventive care models.

However, despite promising results, widespread clinical adoption remains limited by data quality concerns, lack of large-scale validation, workflow integration challenges and regulatory considerations. Continued collaboration between clinicians, researchers, engineers and health-care organizations will be essential to ensure safe, effective and equitable AI integration into wound care practice.

As health-care systems continue to evolve toward digital and data-driven models, AI has the potential to significantly improve diabetic foot prevention, reduce complications and amputations, enhance access to care and, ultimately, improve patient outcomes.

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Key Clinical Takeaways

- AI can support earlier detection of diabetic foot complications before visible ulceration.
- Automated wound assessment may reduce inter-observer variability.
- Deep learning models demonstrate strong accuracy in wound classification.
- Thermal imaging may identify inflammatory changes before tissue breakdown.
- AI-assisted remote monitoring supports telemedicine and continuity of care.
- Current limitations include dataset variability and lack of large-scale validation.
- The future direction of wound care is shifting from treatment toward prediction and prevention.

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Recognizing The Real Barrier To Smarter Wound Care: A North American View

By M Sean Agnew BA

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Mr. L is a 68-year-old man living with diabetes. One morning he notices a small blister on the bottom of his foot. At first it seems minor. He cleans it, covers it with a bandage and assumes it will heal on its own.

Weeks pass before the wound is evaluated by a specialist. By then infection has begun to develop. Circulation is compromised. What began as a small ulcer now requires advanced treatment, repeated clinic visits and careful monitoring.

For clinicians who treat chronic wounds, this story is not unusual. It is routine.

Chronic wounds, particularly diabetic foot ulcers, venous leg ulcers and pressure injuries remain among the most complex and costly conditions managed by modern health-care systems. In Canada alone, hundreds of thousands of individuals live with compromised wounds at any given time, placing substantial demands on hospital and community care services.[1] Diabetes-related complications remain a leading cause of non-traumatic lower-limb amputations nationwide.[2]

A wound left unchecked behaves much like a small leak in a ship's hull. Ignore it long enough, and the vessel begins to sink.

Yet, medicine increasingly has the tools to detect these problems much earlier.

The Real Problem

The real barrier to smarter wound care isn't technology. It's the system.

The problem in wound care is not a lack of innovation. Health-care systems across North America often struggle to use the innovations that already exist.

Across research laboratories, biotechnology companies and clinical innovation centres, a new generation of wound technologies is emerging. Smart dressings can detect biochemical changes in the wound bed. Artificial intelligence (AI) platforms analyze wound images and predict healing trajectories. Remote monitoring tools allow clinicians to observe wound progression from a patient's home rather than waiting for the next clinic visit.

The science is advancing rapidly. The systems surrounding it, however, are not always keeping pace. Technology accelerates--systems hesitate.

The next revolution in wound care will not come from a laboratory.

It will come from redesigning the systems that allow clinicians to use the tools they already have.

A Quiet Technological Revolution

Over the past decade, wound care has entered a period of remarkable technological progress.

Sensor-enabled dressings are being designed to detect changes in temperature, oxygen levels, and pH—physiological signals that may indicate infection or impaired healing before visible symptoms appear. Artificial intelligence systems can quantify wound dimensions and analyze healing patterns from digital images. Remote monitoring platforms enable clinicians to follow wound progression between clinic visits.

In many ways, the shift resembles what happened in meteorology several decades ago. Weather forecasting once relied on local observation–-cloud formations, wind patterns and atmospheric pressure readings. Today, satellite systems allow storms to be detected long before they reach land.

Wound care is beginning to develop a similar predictive capability. Signals that once went unnoticed can now be detected sooner. Earlier signals allow earlier intervention. Earlier intervention saves tissue, mobility and sometimes entire limbs. At least in theory.

The Implementation Paradox

Despite rapid technological progress, clinicians encounter a persistent paradox. Innovation appears everywhere--implementation too often does not.

New wound technologies emerge at remarkable speed. Yet their path into routine clinical practice remains slow. In health care, progress rarely depends only on what can be invented. It depends on what clinicians are allowed to use. And in many environments, that pathway remains complicated.

The US Model: Innovation At Full Speed

Few countries generate medical innovation on the scale of the United States.

Academic medical centres, biotechnology firms, venture capital networks and entrepreneurial clinicians collectively form one of the most powerful medical innovation ecosystems in the world. In wound care alone, advances in biomaterials, imaging systems, digital documentation platforms and therapeutic technologies continue to emerge at extraordinary pace.

But invention and adoption are not the same.

For many clinicians, integrating new technologies into everyday practice resembles navigating a maze of reimbursement codes, payer policies and documentation requirements.

For practitioners already managing patients with diabetes, peripheral arterial disease and multiple comorbidities, this complexity can feel like steering a Formula One racing car through a city traffic jam.

The capability for speed exists. The environment does not always allow it.

The Canadian Model: Stability, With A Different Kind Of Friction

Canada approaches health care through a different structural philosophy.

The country's publicly funded health-care system is designed to ensure equitable access to medically necessary services. Guided by the principles of the Canada Health Act, the system emphasizes universality, accessibility and coordinated delivery of care across provinces and terrritories.[3]

Health systems evaluate new technologies through structured processes that assess clinical evidence, cost-effectiveness and health system impact before widespread adoption occurs.

This approach can slow early adoption. But once technologies enter provincial care pathways, they can be implemented consistently across large patient populations.

If the American model sometimes resembles a sports car racing forward but braking unpredictably, the Canadian system resembles a cargo vessel crossing the ocean—steadily if slowly, deliberate and capable of delivering solutions at scale once the course is set.

Both systems have strengths, both encounter friction.

Lessons From The Global Laboratory

Several health-care systems outside North America are already experimenting with ways to integrate digital wound care more effectively.

In Denmark, telemedicine programs allow community nurses to capture wound images that specialists review remotely. In Singapore, AI–supported wound assessment tools integrate directly into electronic medical records. The United Kingdom's National Health Service has explored remote monitoring programs designed to support wound care across rural populations.

Across these models, one principle consistently emerges. Technology should reduce distance:

- Distance between patient and clinician
- Distance between observation and decision
- Distance between risk and intervention.

In a connected health-care ecosystem, the wound clinic no longer exists solely within hospital walls. It extends into homes, community clinics and digital networks. The clinic becomes a system.

The Real Determinant Of Impact

The success of smart wound technologies ultimately depends on something less visible than the technologies themselves. It is dependent on system design.

A sensor capable of detecting infection early has limited impact if reimbursement policies discourage clinicians from using it. Artificial intelligence platforms provide little value if they cannot integrate with electronic health records.

Remote monitoring technologies generate large volumes of clinical data. Without clear response pathways, that data becomes noise rather than insight.

Health-care innovation rarely fails because ideas are lacking. More often it fails because systems cannot deploy those ideas efficiently. In modern medicine, the bottleneck is rarely invention. The bottleneck is integration.

A North American Opportunity

Despite their differences, the US and Canada possess complementary strengths.

The US contributes unmatched innovation capacity through research universities, biotechnology development and entrepreneurial investment. Canada offers coordinated health-care infrastructure capable of implementing solutions across large populations.

If these strengths align, the result could be a new model for digital wound care. One in which clinicians identify complications earlier, intervene sooner and prevent deterioration before it escalates.

Instead of asking how to treat advanced wounds, health-care systems may more frequently ask how to prevent them.

The System Decides

Smart wound technologies represent one of the most promising frontiers in modern health care.

Sensors, AI and remote monitoring platforms can transform wound management from reactive treatment into proactive prevention.

But technology alone cannot deliver that future. The systems surrounding innovation—policy frameworks, reimbursement models, clinical workflows and digital infrastructure—determine whether these tools become everyday instruments of care or remain isolated breakthroughs.

Because, ultimately, the future of wound care will not be decided in laboratories. It will be decided in the systems that allow clinicians to act on what science already knows.

Innovation may build the tools. But the system decides whether healing happens in time.

M Sean Agnew is Chief Growth Officer, iovuCare, Winter Park FL.

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CASE REPORT

Management Of A Diabetic Foot Wound: A Case Study

By Paulette Dugas RN IIWCC-CAN AWCC and Tara Salsman BScN MN RN CCNE

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Diabetic foot ulcers remain a significant complication of diabetes, often requiring prolonged, multidisciplinary management to prevent infection, hospitalization and amputation.[1] This case study describes the treatment of a diabetic foot wound in a 67-year-old long-term care resident with multiple comorbidities in a rural setting in Nova Scotia. The individual demonstrated intermittent non-adherence to treatment recommendations, contributing to recurrent callus formation and episodes of infection. Despite challenges along the way, progressive healing was achieved guided by the Wounds Canada Best Practice Recommendations for Skin Health & Wound Management (2025).[1,2] While the Wound Prevention and Management Cycle outlined in the recommendations is conceptualized as a five-step process, this case served to highlight that wound healing is not always linear or neatly cyclical in practice. The care team involved in this case found themselves frequently having to revisit earlier steps in the cycle as new setbacks emerged. Factors such as infection, pain and wound dressing management contributed to multiple revisions of the care plan.

Through consistent monitoring, repeated debridement, timely infection management and ongoing collaboration between the wound care consultant, nursing staff and the resident, complete wound closure was achieved in January 2025. This case underscores the importance of persistence, flexibility and relationship-centered practice in supporting long-term healing and preventing ulcer recurrence in the complex environment of long-term care.

Diabetic foot ulcers remain a complex and persistent challenge in long-term care (LTC), often requiring sustained interdisciplinary collaboration to prevent infection, hospitalization and potential amputation. This case study outlines the year-long management of a resident in a nursing home, with multiple and complex comorbidities and intermittent adherence challenges, a true picture of the realities of wound prevention and management in current practice.

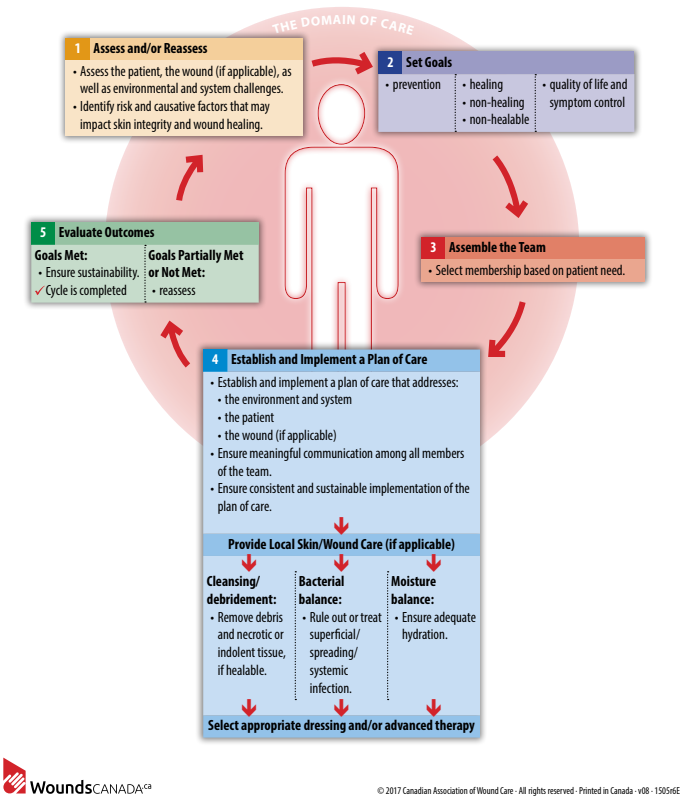

Figure 1: Wound Prevention and Management Cycle.

It is key that clinicians be diligent and prepared to move back and forth between steps as new complications arise—such as recurrent callus formation, infection and barriers to off-loading—requiring renewed assessment, adaptation and reengagement with the patient and care team. The progression of this wound, coming finally to complete closure in January 2025 despite several challenges, highlights the importance of consistency, persistent reassessment and ongoing partnership between the resident, wound care consultant and nursing staff in the long-term care setting. This case exemplifies how collaborative, adaptive practice is essential to achieving successful outcomes within the Wound Prevention and Management Cycle. (See Figure 1.)

Case Presentation

This case study presents the management of a diabetic foot wound in a 67-year-old female residing in a long-term care facility. For the purposes of this case study, the resident will be called RA. RA's medical history includes Type 2 diabetes mellitus, hypothyroidism, gout, osteoarthritis, obesity, venous stasis edema and recurrent DVT. RA received oral antibiotics several times to treat recurrent diabetic wound infection. RA had reportedly demonstrated intermittent non-adherence to the current treatment plan, including inconsistent off-loading and use of improper footwear. Her wound care treatment plan had consisted of cleansing the wound and peri-wound with BIOCHL Pure Cleanse™, applying Inadine™ to the wound bed (cut to fit size), covering with Primapore™, changing dressing Q 7 days or more frequently if the Inadine turned white, monitoring for signs and symptoms of infection and ensuring the nursing staff and not the resident were removing the dressing.

All of this contributed to recurrent callus formation and repeated wound infections. In February 2024, the resident's physician completed a referral requesting that the Wound Care Consultant complete debridement of a wound on the resident's right hallux.

RA's blood sugars remained consistently between 6-8 because of diet and oral antidiabetic medications. RA is mobile with the assistance of a wheeled walker. She cannot wear offloading footwear as her level of mobility would put her at high risk for falls; though she wears a soft slipper with no tread, which also puts her at an increased risk for fall or injury. Although RA has significant edema in both legs, she resists keeping her legs elevated.

Discussion

The Wound Consultant (WC) first visited RA on March 5, 2024, to review the resident's record and complete an initial assessment. WC could not palpate dorsalis pedis pulse due to edema; pulse was audible via hand-held doppler, waveforms multiphasic bilaterally. Loss of protective sensation was noted, as determined by monofilament testing score of 6/10. Resident's level of pain was difficult to assess as related to the wound due to comorbidities of gout and osteoarthritis that also contribute to the experience of pain.

RA has compression stockings that she is meant to be wearing, however, she refuses to wear them due to the pain and discomfort of the wound. WC was unable to complete an accurate assessment of the wound at right hallux because of the callus.

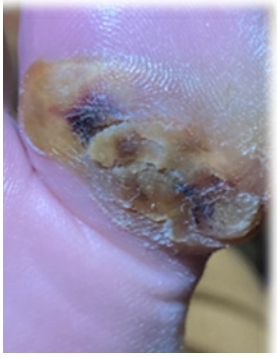

Figure 2: Baseline - February 28, 2024.

The presence of exudate at the lateral edges indicated further investigation was required. (See Figure 2.)

Debridement of the wound was completed by the WC on March 21, 2024, when a large amount of hard dry callous was removed, exposing a wound measuring (L) 2.2cm x (W) 1.0cm.

Figure 3: April 26, 2024 - Infection present.

On April 26, 2024, the WC made an on-site visit to find infection present in the wound and RA receiving oral antibiotics to treat the same. (See Figure 3.)

Assessment revealed increased pain and increased drainage, which was now purulent. The periwound was red and warm with no odour present. Due to active infection and increased pain, no debridement was completed during the visit. It was determined that pain management would be required prior to any future debridement.

The WC returned to see the client on May 7, 2024, to perform debridement of the wound. A large amount of loose, dry callous was removed; measurements post debridement were (L) 3.5cm x (W) 2.0cm x (D) 0.2cm. Education was provided to RA regarding the importance of offloading and wearing proper footwear even when inside. The WC visited on June 18, 2024, to perform another debridement. A large amount of hard dry callous was removed. Measurements post debridement were (L) 1.5cm x (W) 1.3cm, indicating improvement. During visit, the WC again reinforced with RA the importance of offloading and wearing proper footwear even when inside.

On August 28, 2024, the WC returned for an on-site visit at RA's LTC home to debride wound. Again, a large amount of hard dry callous was removed. Measurements post debridement were (L) 1.8cm x (W) 1.0cm.

The WC returned once again on October 30, 2024, to debride the wound and a large amount dry callous was removed. During assessment, it was noted that there was presence of 'debris' in the wound – which proved to be cat hair. This indicated to the WC that the resident had not been offloading the affected area as had been suggested in previous consult visits. The WC learned that RA would often shower without informing nursing staff, leaving the wound exposed, moist and at risk for further infection. (See Figure 4.)

Figure 4: October 30th, 2024 - infection present, large amount of callous and debris.

Prior to this consultation visit, the physician had seen RA and started her on oral antibiotics for seven days due to infection. Measurements post debridement at this visit were (L) 2.0cm x (W) 0.5cm. During the visit the WC, RA and nursing care team made the decision that RA would not shower or remove dressing on her own. RA agreed to having a sponge bath only and nursing staff would remove the dressing, rather than client doing so on her own. (See Figure 5.)

Figure 5: Same day - post debridement.

The WC visited again on November 14, 2024, to reassess and perform another debridement. During this two-week period, the WC noted there had been improvement. The amount of callous that had formed was now less and was not as hard, which allowed for a much easier procedure.

Figure 6: November 14th, 2024 - Post debridement.

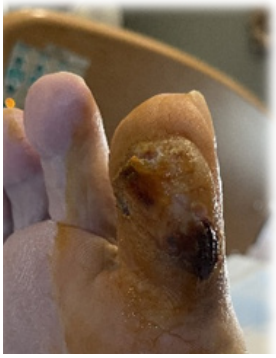

Figure 7: January 22, 2025.

Figure 8: Same day, post-debridement. Wound is fully closed.

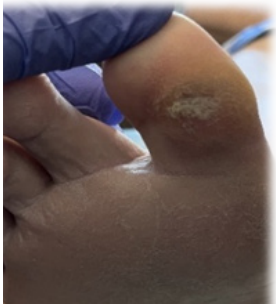

Figure 9: February 20, 2026 - Wound remains closed, small amount of callous.

This improvement acted as evidence that the resident had been adherent to the treatment plan as had been discussed at the last WC visit. (See Figure 6.)

A final on-site visit with the purpose of assessment, then debridement was made by the WC on January 22, 2025. At this visit, a large amount soft callous was easily removed during debridement, revealing a completely healed wound underneath. (See Figures 7 & 8.)

Conclusion

Although the wound has successfully closed, preventing recurrence remains a priority for RA's care team. (See Figure 9.)

Long-term management must focus on maintaining stable blood sugars, ensuring proper footwear, promoting regular foot checks and supporting healthy daily activity. As previously stated, this case reinforces that the Wound Prevention and Management Cycle described in the Wounds Canada Best Practice Recommendations for Skin Health & Wound Management (2025) is not always a neat, five-step loop; rather, it often requires clinicians to return to previous steps, reassess and re-engage when new complications emerge. Throughout RA's year-long healing trajectory, progress depended on consistent, evidence-informed practice paired with a realistic, compassionate partnership between the wound care consultant, nursing team and the resident herself. Even when RA struggled with footwear choices, leg elevation or dressing management, the team adapted the plan to meet her where she was, ultimately supporting behavioural changes that promoted healing — such as RA's agreement to switch to sponge baths.

This case exemplifies how persistence, flexibility, and collaborative communication with the patient are essential to attaining positive wound outcomes in the growingly complex practice setting of long-term care. Wound management cannot be approached only as a technical sequence of interventions but requires care to be a relationship-centred process in which consistent engagement can guide patients toward more lasting improvements in their health.

Disclaimer: *This document incorporates generative AI assistance (Microsoft Copilot) in helping to refine or reword sections of the authors' original work. All outputs were reviewed, verified and revised by the authors to ensure accuracy, integrity and alignment with academic standards.*

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A Shear-Dissipating Multilayer Dressing For Pressure Injury Prevention: What It Means In Practice

By Professor Amit Gefen

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Pressure injuries (PIs) of the heel are common in acute care, long-term care and surgical settings. These injuries often begin as deep tissue damage before becoming visible at the skin surface, making early identification difficult and delaying intervention.[1-6] For that reason, prevention is a primary focus of care. The International Clinical Practice Guideline recommends the use of prophylactic dressings, particularly multilayer silicone-foam dressings, for patients at high risk.[1] However, clinicians are often faced with multiple product options and limited clarity on how these dressings differ in performance. This article aims to translate our recently published research[7] into practical clinical language, with a focus on how dressing design influences the management of shear forces which are recognized as a critical contributor to PI development.

Exposure to shear forces is a key factor contributing to the risk of PIs. Shear in tissues typically occurs when the skin remains relatively stationary against a contacting surface while deeper tissues move, such as during repositioning or when the head of the bed is elevated and gravity pulls the body toward the foot of the bed (See Figure 1).

These internal soft tissue distortions can damage cells, impair tissue perfusion and ultimately contribute to deep tissue injury.[2-5] Research on the causes of PIs has established that sustained shearing of skin and subdermal soft tissues is strongly associated with PI development. In other words, pressure alone does not explain the full risk. For many vulnerable patients, especially those who are immobile, critically ill, sedated or recovering after surgery, it is the combination of pressure and shear, which commonly occurs in clinically relevant

scenarios, that is harmful to cells and tissues.[2-5] In practice, this means that patients who appear adequately supported may still be at risk due to internal soft tissue deformations caused by shear forces.[2-5]

Prophylactic dressings are intended to locally reduce the mechanical forces acting on vulnerable body areas. Their protective effects may include reducing friction at the skin surface, helping manage moisture from perspiration and, most importantly, absorbing and dissipating shear forces before those forces are transmitted to the skin and deeper tissues. However, not all dressings achieve these effects to the same extent. In particular, not all dressings are effective in dissipating shear forces, which is the most important role of a preventative dressing. The internal dressing structure, material properties and how the layers interact under load are key determinants of the protective performance of dressings. This is an important practical point, because products that look similar at the bedside, or that are marketed with similar medical claims, may not behave similarly when exposed to patient movements or transfers causing shear (See Figure 1), to repeated loading, or to moisture exposure.[8]

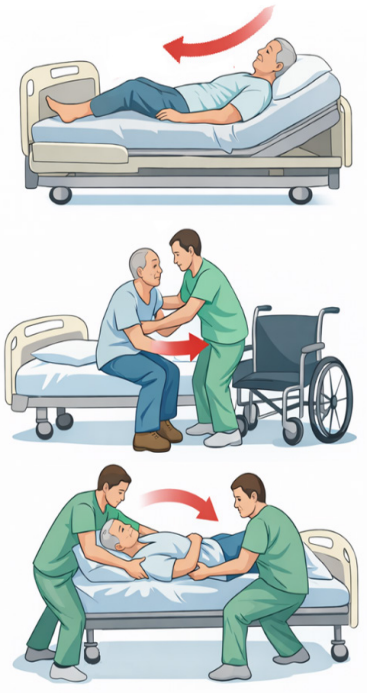

Figure 1: Common clinical scenarios leading to shearing of skin and subdermal soft tissues: Sliding in bed (top), transfer from a bed to a chair (centre) and repositioning in bed (bottom). The support surface alone, as good as it may be, would not be sufficient to protect the skin and subcutaneous tissues from the shearing forces generated in each of these situations. Effective preventative dressings must be placed at the high-risk anatomical sites, particularly at the sacral region and on the posterior heels, to provide focused shear mitigation.

Why Shear Matters In Everyday Clinical Care

From a clinical perspective, shear is typically harder to appreciate than pressure because it is not directly visible (as it occurs internally in the body), and it is also often less intuitive to understand. Yet it is highly relevant to common care situations. A patient may appear comfortably supported on a mattress, but if their body gradually slides downwards in the bed, skin and deeper soft tissues may be exposed to considerable distortions or deformations. The heel is especially vulnerable because it has a relatively small contact area, a prominent bony structure and soft tissues that can be compressed and simultaneously exposed to high shear between the rigid and curved bone and the support surface.[2-5] This helps explain why heel injuries can begin in deeper tissues and only become visible later, when tissue damage is already advanced and presents itself clinically.[4,5] This also explains why prevention must go beyond redistribution of the interface pressure per se. Support surfaces remain essential, but they cannot fully address all the shear occurring within the soft tissues. A dressing placed over a vulnerable heel (or other body regions which are known to be at risk of PI such as the sacrum) can act locally where the risk of damage caused by shear is high. If the dressing is designed appropriately, it may help absorb part of the damaging mechanical energy that would otherwise reach the soft tissues of the patient, where it can lead to cell death and structural tissue damage. That local effect of alleviating shear forces is clinically important because it targets the specific mechanism that often drives PIs in general and deep tissue injury in particular.

The Research

The new Allevyn Complete Care™ (Smith+Nephew Limited, UK) dressing evaluated in the recent published research[7] uses a multilayer design in which the internal dressing layers can slide relative to one another, that is, they are not fixed or glued together (See Figure 2). This feature enables the dressing, also known as ACC, to effectively absorb the

applied shear forces within the dressing itself, which in turn limits the transfer of these forces to the skin and subcutaneous soft tissues. In simple terms, the dressing acts as a "buffer zone" between the patient and the support surface, similarly to how shock absorbers protect passengers in a car from being exposed to high forces when the car crosses a bump on the road. Similarly, instead of allowing most of the shear forces to pass through to the body tissues, the dressing manages much of these forces internally through controlled layer-on-layer movements that occur within the dressing (See Figure 2).

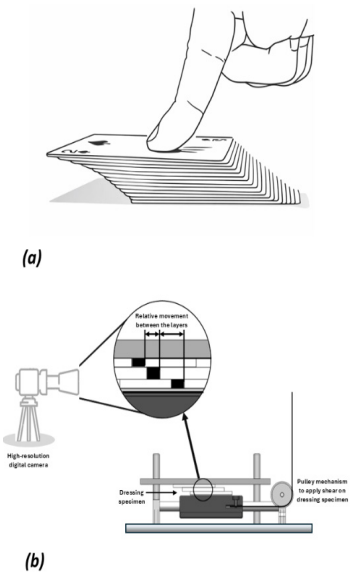

Figure 2: Relative movements of layers within the multilayer dressing dissipates shear forces before they can reach the skin and underlying tissues. (a) A deck of cards provides a good analogy of the layer-on-layer motion occurring inside the dressing. Combined pressure (from the bodyweight, represented by the pressing finger) and shear forces (from patient movements as shown in Figure 1, represented by the cards sliding upon each other) move the top cards, but their ability to slide upon each other prevents the shear forces from distorting the bottom of the stack (representing the dressing interface with the skin). (b) The movement of the layers inside the dressing was evaluated experimentally in a bioengineering laboratory using a custom-made system. The system was used to apply clinically relevant shear levels to the dressing to simulate the layer-on-layer sliding induced by patient movements, and a high-resolution digital camera was used to monitor that relative movement between the dressing layers.[7]

This point is especially important because many products are described as "multilayer," but a multilayer structure alone is not enough. To effectively mitigate shear within a preventative dressing, the dressing must do more than simply contain multiple internal layers. It must use those layers effectively, in a functional way, so that the layers can distort and move relative to each other and dissipate shear motion. At the same time, the dressing must remain structurally stable (intact and structurally functional) under the loading so that this protective effect is maintained over time. Our published work highlights this principle clearly: the protective benefit is not just about thickness or softness, but about how the dressing handles frictional and shear-related energy internally.[6-8]

Another relevant finding is that the protective effect of the dressing was maintained under moist conditions and repeated movement.[7] This matters in real clinical practice because dressings used for prevention are not applied in ideal laboratory dryness. Patients sweat, move, are repositioned and remain on dressings for prolonged periods. A dressing design that performs well only when new and dry may not provide reliable protection in day-to-day care and cannot be applied for several continuous days of PI prevention. The dressing evaluated continued to show strong protective performance under conditions intended to simulate these clinical realities, which strengthens the clinical relevance of the findings.[7]

How The Research Was Conducted

The research combined advanced laboratory testing with computer modeling of the heel.[7] The laboratory work used advanced digital-optical methods to measure how much shear-related mechanical energy the dressing could absorb internally (See Figure 2). Under simulated clinical conditions, the ACC dressing absorbed approximately 93% of that energy.[7] Put simply, most of the damaging shear was managed and dissipated inside the dressing rather than being passed on to the soft tissues of the patient. The computer modeling then examined what this meant for the soft tissues of the heel from a clinical perspective. These computer simulations showed that the dressing substantially reduced soft tissue deformations and stress levels in both the skin and deeper soft tissues, which is important because excessive deformations are strongly associated with massive cell death and soft tissue damage in

the cascade of PI development, i.e., the PI vicious cycle.[2,3] The modeling also showed that the dressing eliminated the highest levels of tissue deformations and stresses, that is, the mechanical loading levels at which tissue breakdown is most likely to begin. This is clinically meaningful because PIs and, specifically, deep pressure injuries often originate at localized sites of high internal soft tissue loading, not simply at the skin surface. A preventative dressing design that reduces these tissue stress peaks may therefore provide protection where it is needed most.

The published study[7] further reported that the dressing substantially lowered the above-median deformations and stresses in both skin and adipose tissues and importantly, the dressing was able to fully eliminate the highest stress exposures in the top quartile of the modeled tissue loading distributions. In practical terms, this means that the dressing did not merely produce a small average benefit, but rather, that it specifically reduced the most dangerous loading concentrations in the soft tissues of the supported posterior heel. That is exactly the effect clinicians would hope for in a prophylactic dressing intended for patients at high risk for heel PIs. Taken together, these findings indicate that this dressing not only reduces overall tissue loading but specifically targets the most harmful stress concentrations associated with PI onset.

What Does This Mean For Clinicians?

For clinicians, the key takeaway is that effective PI prevention depends not only on reducing the interface pressures between the body and a support surface, but also, critically, on managing the shear forces acting on the body region which requires protection. This is highly relevant in patients who are immobile, have impaired sensation, are hospitalized in intensive care and are partially conscious or unconscious, are undergoing long surgical procedures or are otherwise at elevated risk of heel PIs. For these patients, a dressing design which dissipates shear may provide meaningful additional protection complementary to that of the support surface.

The practical implication is not that prophylactic dressings replace established prevention measures such as use of an adequate support surface and routine skin assessments. They do not. Application of a preventative dressing must always be an adjunct, not a replacement, for comprehensive PI prevention strategies. Repositioning, support surfaces, skin inspection, moisture management and individualized risk assessments remain essential. However, when a dressing is used, its primary mode of action should be meaningful local shear mitigation at body regions under risk. On that basis, this dressing is promising because it directly targets a key risk factor, namely shear, that can be effectively mitigated, at least in large part, by a good preventative dressing.

This also matters for education and bedside conversations. Clinicians often hear general statements that prophylactic dressings are beneficial, but they are not always given a clear explanation of why. The published research[7] offers a clinically understandable answer: the dressing works by taking up shear internally, thereby protecting tissues from distortion in shear and focal excess or sustained loading at damaging levels. Framing the mechanism this way may help clinicians make more informed product choices and may also support better adherence to prevention protocols.

Product Selection And Institutional Policy Development

For those involved in product selection for clinical use, formulary decisions, procurement and institutional policy development, product choice should be informed by mechanism of action supported by published peer-reviewed research evidence, not just cost, thickness or the general label "multilayer." This latter distinction is particularly relevant for procurement decisions, where product categories alone (e.g., "multilayer silicone-foam") may not reflect meaningful differences in bioengineering laboratory and ultimately in clinical performance.

For example, thicker dressings are not necessarily better dressings, and multilayer dressings are not necessarily effective shear-dissipating dressings.

What matters for prophylaxis is whether the dressing design can actively absorb and dissipate shear internally (so that soft tissues remain predominantly shielded from the harmful effect of shear forces) while the dressing structure remains stable during the intended period of use. Dressings that actively dissipate shear may provide additional critical protection alongside a support surface, since the dressing focuses on local shear mitigation, which is not easily achieved by a support surface alone, even when using high-end support surfaces. From a systems perspective, investment in effective prevention technologies, and in particular a dressing design that has proved to effectively mitigate shear forces, may help reduce the downstream clinical and financial consequences associated with PIs. Benefits would include, for example, lower treatment burden, shorter stays and less litigation related to preventable harm.

Conclusion

A shear-dissipating multilayer dressing demonstrated the ability to substantially reduce the shear forces associated with heel PI development.[7] By absorbing shear internally and reducing tissue deformations, this type of dressing may offer meaningful clinical benefits. Specifically, the evidence reported for the ACC dressing indicates that it can substantially reduce the transfer of damaging loads to heel tissues and eliminate the highest soft tissue stress concentrations under simulated clinical conditions.[7] For clinicians, the take-home message is that PI prevention should not focus on redistributing pressures alone. Shear is a critical risk factor, and it should be addressed directly by a preventative intervention which focuses on dissipating that shear before it is transferred to the skin and from there to deeper soft tissues. Advanced designs of dressings, which specifically mitigate shear, should therefore be considered as part of all comprehensive PI prevention approaches and clinical programs.

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