SUMMER 2021
VOL.19 NO.1

Wound Care CANADA

THE OFFICIAL PUBLICATION OF WOUNDS CANADA

Creating a Community of Practice for Wound Care Leadership

Perspectives on Wound Data in Canada
How many wounds?

Xerostomia and Oral Wounds

Wounds Canada's Fall Conference:
Session Summaries

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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.

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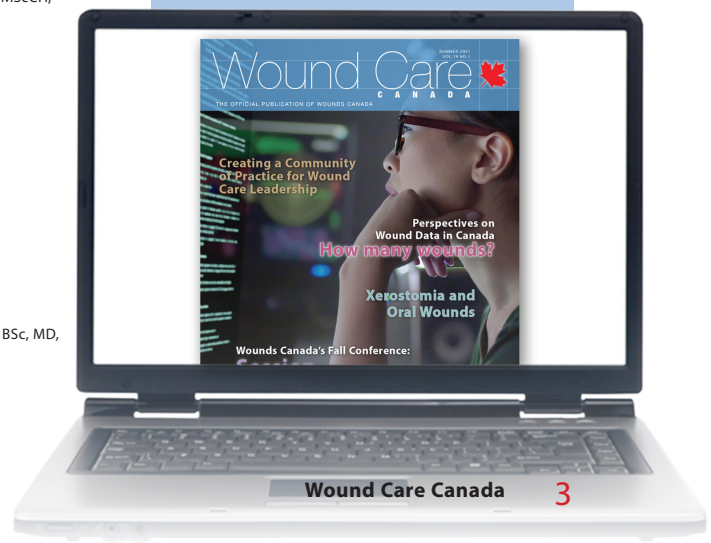
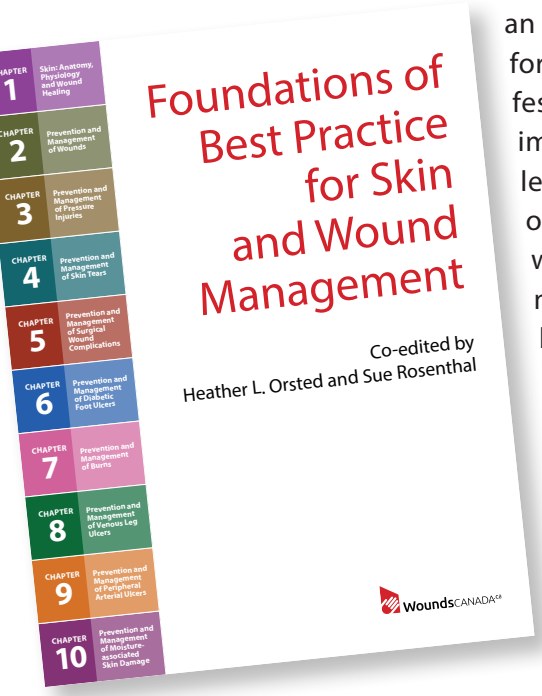
It's free!



News in Wound Care

Foundations of Best Practice for Skin and Wound Management

The *Foundations of Best Practice for Skin and Wound Management* e-book is now on sale in the Wounds Canada eboutique. We're excited to offer all 10 of our popular and easy-to-use best practice recommendations articles in one comprehensive book. It's an excellent resource for health-care professionals looking to improve their knowledge in the areas of skin health and wound management. Developed by teams of interprofessional experts with a deep wealth of knowledge and experience, the chapters that make up this book have been written using a rigorous researching, writing and reviewing process.



Foundations of Best Practice for Skin and Wound Management is a 612-page book containing the full set of recommendations plus an initial chapter that provides an overview of skin anatomy and physiology and the wound healing process. It is recommended that this document be read before using any of the other forms of the best practice recommendations (BPRs). The full document can be purchased for download from the Wounds Canada boutique for CAD $9.99 plus applicable taxes for members (or $12 plus applicable taxes for non-members).

BPR Briefs: A Digest Version of Foundations of Best Practice for Skin and Wound Management is an abbreviated version of *Foundations of Best Practice for Skin and Wound Management* that can be used by clinicians who are already familiar with the full document. The Briefs offer quick and efficient access to "cues for care" as well as actions and policies that support best practice. An important feature of the BPR Briefs is the number of hyperlinks they contain, making them function more like a web-based app than a static resource.

The BPR Briefs can be purchased for download from the Wounds Canada boutique for CAD $9.99 plus applicable taxes for members (or $12 plus applicable taxes for non-members).

Introducing the SHARP program

The Wounds Canada Institute is proud to announce the launch of the SHARP (Skin Health Advocate and Resource Professional) Super Program #1. Crystal McCallum, Wounds Canada's Director of Education, developed and launched this self-paced online program in collaboration with physician lead Robyn Evans after identifying a gap in the educational opportunities for health-care professionals to acquire proficiency in wound prevention and management. They wanted to offer a program that was robust and interprofessional and added value to the wound care community in Canada.

SHARP
Skin Health Advocate and Resource Professional

Historically, Wounds Canada had offered a variety of educational programming in the field and was ready to take it to the next level by securing accreditation. In order to achieve accreditation for the program, "a high level of scientific planning was required," according to McCallum. A committee of 21 diverse wound and education experts was created to conduct an educational needs assessment, identify content and instructors for the program and develop a yearly evaluation plan to ensure the continued growth and success of the program.

The SHARP program was launched in January 2021. It includes 23 interactive modules, eight synchronous webinars, two robust outcome measures and access to a discussion forum with the program faculty. The full spectrum of skin health is addressed through topics such as skin anatomy and physiology, the Wound Prevention and Management Cycle, local wound care and the prevention and management of common wound types. Add in a dynamic roster of instructors who are experts in wound care and education, and we have a program that appeals to a wide range of health professionals. While most of the program's participants are nurses and physicians, there's also a group of paramedics currently completing SHARP!

SHARP's developers expect the program will increase capacity for wound care on the front lines, providing more clinicians with the foundational knowledge needed to prevent and treat wounds using the principles of best practices. The ultimate goal of SHARP, according to McCallum, is "in the long run, to have more clinicians who are experts on the front lines of wound care."

Another Successful Limb Preservation Symposium

Wounds Canada's annual Limb Preservation Symposium, held virtually on May 28, 2021, had 655 participants in attendance. This online event offered a diverse slate of educational sessions on topics ranging from limb preservation in Indigenous communities to collecting and using data for limb preservation. The event featured an

WoundsCANADA.ca

Symposium Series

impressive roster of health-care professionals as presenters and moderators.

The gripping and emotionally resonant keynote address by Neil Hopper, titled "The Wrong Side of the Knife," detailing his experiences as both a vascular surgeon and amputee patient, was an attendee favourite. His talk dealt not only with the physical effects of amputation on his life and career, but also the physical and psycho-socio-emotional impacts his amputation had on him and his family, along with his recommendations for improving the patient experience for others.

Our fully virtual conference platform provided innovative ways for participants to network in the lounge, win prizes through a trivia quiz and other fun challenges and review the latest technology and products in the exhibit hall. It was a packed day of events, and we were pleased to learn from our preliminary feedback that 100% percent of respondents would attend the conference again!

While living in a mostly virtual world during the pandemic has its drawbacks and challenges, it also has a silver lining—we were happy to see more participants from across Canada join us at this symposium who may not have been able to attend the event in person. We had representation from almost every province and territory, as well as attendees from the U.S. and across the globe.

Celebrating May Foot Health Awareness Month

May was Foot Health Awareness Month, and we were happy to have the opportunity to share our world-class resources, such as our Foundations of Best Practice book and our Care at Home series, on our website and social media, and raise aware-

Three More Events to Look Forward to in 2021

Mark your calendars now for Wounds Canada's other virtual events for 2021 and register today!

- Annual **fall conference** taking place from Thursday, October 21 to Saturday, October 23, 2021, featuring experts from across Canada providing a national perspective on key issues in wound care
- **French-language wound symposium** on Sunday, October 24, 2021
- **Pressure injury symposium** on Thursday, November 18, 2021, which addresses key issues in pressure injury prevention and management

ness about foot health and prevention of diabetic foot ulcers and other complications.

We teamed up with two organizations during the month for diabetic foot-related webinars to get our message out to a wider audience.

- We collaborated with the Indigenous Diabetes Health Circle for "Take Your Socks Off: Why It Will Save Your Feet," a Zoom event featuring Lindsey Cosh, the organization's foot care program director, John Monroe, a patient with lived experience, and Mariam Botros, Wounds Canada's CEO.
- We joined forces with Diabetes Canada for a Facebook Live event "Foot Care to Prevent & Manage Diabetic Foot Ulcers," where health-care experts Robyn Evans, Zaina Albalawi and Crystal McCallum discussed prevention and management techniques, as well as available resources for DFUs.

Although foot health was our focus for the month of May, we think about it all-year round. We co-hosted the interactive webinar "Your Role in Improving the Population Health of People at Risk or Living with Diabetic Foot Complications" with the Association of Family Health Teams of Ontario (AFHTO) back in April. Participants were invited to learn about their own role in improving the health of people at risk or living with diabetic foot complications across the full continuum of care settings to improve patient experience, outcomes and costs.

Hellos and Goodbyes at Wounds Canada

Peggy Ahearn, our Director of Strategic Initiatives for the last 11 years, has retired. **Katie Bassett,** Wounds Canada's Communications Specialist, has moved on to a new position, but is still acting as a consultant for our various publications. Thanks to both of you for your commitment and teamwork and good luck from all of us at Wounds Canada!

Laura Clarke joins our team as Communications Specialist and looks forward to assisting Wounds Canada with its vision for 2021 and beyond. She will be working closely with members of the education, knowledge translation and advocacy teams to promote Wounds Canada as an important voice in Canada's health-care system and a driver of change in patient care. With experience across multiple industries including health care, non-profit, government, politics, advertising, education, publishing and travel, she is excited to assist Wounds Canada in delivering its message on a national scale.

Our current board members are:

Barbie Murray, BScN RN MCISc-WH – *President*
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Grants and Scholarships

At Wounds Canada, our aim is to make a difference in the lives of all wound patients through resources that relate to patients, their families and the wound community. The launch of our grant, scholarship and bursary programs through our charity arm is an integral part of our goals in 2021 and will help equip the next generation of frontline clinicians with the skills they need to provide the best possible wound care across Canada. These grants, scholarships and bursaries will fund research, drive wound-related education, build community, support mentorship and promote awareness.

We're particularly proud to announce two new awards honouring leaders in the wound care community. The **Pamela E. Houghton Grant** will provide one recipient with $1000 for the purposes of research with a mentorship component. It honours Houghton's tireless commitment to fostering community and advocating for wound prevention and management, as well as her time spent volunteering with Wounds Canada in the areas of research, writing, critical review, advice and active participation in events. Many of the students she has mentored have continued to become leaders in the field themselves and, with this scholarship, we honour her legacy of research, leadership and mentorship.

The **Morty Eisenberg Scholarship** honours immediate Wounds Canada board past president Morty Eisenburg, whose visionary leadership helped to establish the Wounds Canada charity.

In 2021 Wounds Canada will be disbursing funds for the following awards:

Research Grants

- The Pamela E. Houghton Grant ($1000)
- Wounds Canada Young Investigator Grant ($1000)
- Wounds Canada Open Grant ($1000)

Scholarships

- The Morty Eisenberg Scholarship (One scholarship available: covers the cost of the SHARP Super Program #1)
- Indigenous Health-care Professional Scholarship (One scholarship available: covers the cost of the SHARP Super Program #1)
- Open Scholarships for Unregulated Care Providers (Six scholarships available: covers the cost of the Skin and Wound Care for Unregulated Care Providers Program)
- Wounds Canada Advanced Education Scholarships (Four scholarships available: $500 each for students wishing to further their education in wound prevention and management)
- Bursaries for Students Needing Financial Assistance (Two bursaries available: $500)

Please visit Grants and Scholarships and Bursaries for details.

Do you know someone who would benefit from taking the Wounds Canada Institute's program for unregulated care providers?

Wounds Canada would like to remind you about one of our most important programs: Skin and Wound Care for Unregulated Care Providers. Unregulated care providers have played a crucial role in the delivery of care before and during the COVID-19 pandemic. Many care providers have faced a steep learning curve delivering proper wound care during the pandemic. This program is designed to help meet the skin health and wound prevention-related learning needs of unregulated care providers, such as personal support workers, health-care aides, home support workers, personal care attendants and even family members who are caring for a loved one. If you know of a team member or care partner for one of your patients

who could benefit from this program, please recommend they visit the WCI website.

RESEARCH UPDATE: Wound Care Delivery During COVID-19

The preliminary findings of our qualitative study exploring the experiences and learnings of frontline wound care clinicians during the COVID-19 pandemic were recently published in the May 2021 issue of *Wounds International*. Two hundred and forty-five individuals participated in the qualitative survey that focused on how the delivery of care changed during the pandemic and how health-care providers adapted delivery of wound care services with patients and their families. Using a Likert Scale, and the option to provide additional details, participant responses touched on five overarching themes: increased use of virtual technology, unequal clinician access to technology, unequal patient access to and expertise in using virtual care technology, increased clinician flexibility, and lack of skin and wound education. It is our hope that this research may lead to:

- additional research and the development of future policies to provide more sustainable access to wound care clinics
- increased development opportunities of wound care competencies
- improved usage and equitable access to virtual care in wound prevention and care.

See page 24 for a summary of this study and other imformation on the impact of the COVID-19 pandemic on wound care.

Partnering with the Canadian Lymphedema Framework

Wounds Canada is thrilled to partner with the Canadian Lymphedema Framework in presenting the *Moving Evidence into Practice* virtual conference, December 3–4, 2021. This interactive, collaborative event gives our organizations the opportunity to highlight the association between lymphatic dysfunction and the increased risk of wound formation—and help both organizations increase the awareness about this important but not widely known link for health professionals, policy makers and the general public. Through this partnership, we can reach more people than ever.

By working together, our organizations will present a stimulating, engaging event that will increase clinician knowledge, present new research and strengthen both the Canadian and international communities of patients and practitioners.

Specifically, this collaboration will help to:

- emphasize the importance of improving the health of patients living with lymphedema
- highlight their risk of developing non-healing lower limb wounds
- provide strategies and solutions to reduce the incidence of wound development
- manage wounds when they do occur.

The results will be improved quality of life for patients and more effective use of health-care resources in all regions of Canada.

+ 51% more closed wounds[1*]

PICO◊ sNPWT† has been shown to significantly reduce wound area and depth when compared with tNPWT‡ in patients with VLUs and DFUs over 12 weeks.[1]

Turn around wound healing trajectory more effectively than standard dressings and tNPWT with PICO.[2]

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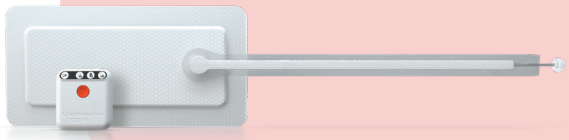

PICO◊ 14
Single Use Negative Pressure
Wound Therapy System

Helping you get **CLOSER TO ZERO◊**
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References: 1. Kirsner R, Dove C, Reyzelman A, Vayser D, Jaimes H. A prospective, randomized, controlled clinical trial on the efficacy of a single-use negative pressure wound therapy system, compared to traditional negative pressure wound therapy in the treatment of chronic ulcers of the lower extremities. *Wound Rep Regen.* 2019. May 14 https://doi.org/10.1111/wrr.12727.
2. Dowsett C, *et al.* Use of PICO◊ to improve clinical and economic outcomes in hard-to-heal wounds. *Wounds International.* 2017;8, p53–58. *45 vs 22%; p=0.002; ITT population. † Single Use Negative Pressure Wound Therapy (sNPWT). ‡ Traditional Negative Pressure Wound Therapy (tNPWT).
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News from Our Industry Partners

3M

3M, with newly acquired KCI, focuses on providing better care through patient-centred science and helping transform patient outcomes by elevating the critical role skin plays in wound care. From solutions designed to protect and maintain the integrity of skin to a full portfolio of advanced and surgical wound care, our team is ready to partner with you to protect skin and reduce trauma for patients.

To learn more about 3M Skin and Wound solutions, please click **here**.

Coloplast

Coloplast develops products and services that make life easier for people with very personal and private medical conditions. Working closely with the people who use our products, we create solutions that are sensitive to their special needs. We call this intimate health care.

Our business includes wound and skin care, ostomy care, continence care and urology. We operate globally, employing about 11,000 people.

Integra® LifeSciences

Integra® LifeSciences is committed to its goal of delivering the highest quality medical technologies and services. We value excellence and possess an unwavering commitment to our customers and the patients we treat.

Wound dressings facilitate the body's natural healing process and provide an optimal healing environment. The choice of an appropriate dressing is influenced by many factors and will vary depending on the type of wound and objective (i.e., necrotic – debride, infected/odorous – reduce bacterial load/eliminate odour, sloughy – remove slough, granulating – promote granulation, epithelialization – maintain moist environment) and level of exudate (i.e., dry, light, moderate or heavy). Having a resource like the MEDIHONEY® Application Guide available can help make the decision easier. To request a copy, please con-

tact your local Integra® representative or email us at IntegraCanadaRSVP (integracanada.rsvp@integralife.com). To learn more about Integra's Advanced Wound Care Solutions, please visit us at www.integralife.com.

Medline Canada

At Medline Canada, we are driven to lead our industry with the most cost-effective products and valuable clinical solutions for care providers and those they serve. While improving quality and effectiveness in every area of our operation, innovation is at Medline's core and is fueled by continued investment in our brands.

We are proud to bring Puracol Plus, a collagen dressing, to the Canadian market. Venous ulcers, pressure injuries, diabetic ulcers and surgical incisions are all wounds that may stall. What can you do when this happens? One approach is adding collagen. As one of the body's primary natural resources and a significant component of the dermis, collagen plays a key role in each phase of wound healing. Puracol Plus's exclusive manufacturing process preserves the collagen's natural, triple helix structure. The result? Reach out to one of our skin health team members to find out more: canada@medline.com

Mölnlycke

World-Leading Medical Solutions Company with a Swedish Heritage

Around the world, health-care systems and professionals are under pressure to deliver better care to more people and at a better value. They need innovative solutions they can trust. That's where we come in. We're here to advance performance in health care. So, we're always on the lookout for new ways to improve. Our focus is providing effective solutions and offering better value for money.

We have one purpose: to advance performance in health care across the world so that health-care professionals have what they need to achieve the best clinical, patient and financial outcomes.

But different health-care professionals have different needs. So, we start by listening and making sure we understand them. Then, we create solutions that are right for them and for their patients, and that are supported by evidence.

We contribute to advancing performance in other ways, too, by sharing knowledge about our specialist clinical areas and by helping shape health-care policies and protocols to raise standards of care worldwide.

We have a strong commitment to health-care professionals, and we're proving it every day.

Although we're a global company, our headquarters are still in Gothenburg—just a short distance from the town of Mölnlycke (pronounced 'Mon-licka'). The is the place where the company was founded in 1849 and the origin of the Mölnlycke name.

Visit us at: www.molnlycke.ca/education

Perfuse Medtec

The geko™ device does one thing and just one thing. It significantly increases blood flow to about 60% of that achieved by continuous walking. (Nothing on the market can achieve parity.) As a wound care provider, you can appreciate how the lack of blood flow can be a root cause of wounds. Enhancing blood flow is central to the healing process. By improving blood flow, edema is managed, pain is often mitigated and even the toughest of wounds begin healing.

Perfuse Medtec is the exclusive Canadian distributor of the geko™ device. This 10g, self-contained wearable adheres to the side of the leg to activate the lower leg muscle pumps. Pain-free stimulation of the common peroneal nerve is the simple mechanism behind the performance. Contact info@perfusemedtec.com for more information.

Quart Medical

Following an appropriate vascular assessment, compression is a mainstay of managing lower extremity wounds with edema and lymphedema.

Traditional circumferential compression can be hot and uncomfortable for the patient, which may compromise adherence to low compression. EdemaWear provides a cool, novel approach using longitudinal compression.

Choosing the correct stockinet size is the most crucial factor in determining the effectiveness and comfort of EdemaWear.

Michael Quart was introduced to EdemaWear by Dr. Gary Sibbald. Both were among the early architects of what later became Wounds Canada. Quart Medical is the exclusive importer for EdemaWear. You can view the recent webinar by Dr. Sibbald and Pat Coutts discussing low compression vascular assessment and read a recent peer-reviewed study on EdemaWear in *Advances in Skin and Wound Care*.

EdemaWear is used widely across Canada, and Quart Medical has representation in Ontario, Quebec and Atlantic Canada.

Visit quartmedical.com

Links

- EdemaWear sizing guide English https://quartmedical.com/wp-content/uploads/EdemaWear-sizing-guide-ENG-QuartMedical-2020.pdf
- EdemaWear sizing guide French https://quartmedical.com/wp-content/uploads/EdemaWear-Guide-des-tailles-2019-Quart-Medical.pdf
- Low compression webinar with Dr. Sibbald & Pat Coutts https://youtu.be/CjXOLhPxlvo

Smith+Nephew

Smith+Nephew is motivated by care for the lives of the people who need our products and technologies. We believe that our bodies should never put a limit on what we can do, nor who we can be.

At Smith+Nephew, we believe that physical health is never just about the body. It's our mind, feelings and ambitions. When something holds it back, it's our whole life on hold. We're here to change that, to use technology to take the limits off living, and help other medical professionals do the same so that farmworkers, rugby players, grandmas and their grandkids stare down fear, see that anything's possible, then go on stronger. Inspired by a single promise; two words that bring together all we do: Life Unlimited.

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Urgo Medical Canada

Better healing—and living unhindered by wounds—is within reach for patients. Urgo Medical is bringing clinically proven products and protocols for the challenges health-care providers encounter in managing and healing acute, chronic and surgical wounds across the care continuum.

URGO MEDICAL
Healing people®

Vashe is a Hypochlorous Acid (HOCl) preserved wound cleanser formulated at a skin-friendly pH of 3.5–5.5, which evidence shows is ideal for a wound healing environment. The product is very effective in mechanically removing germs, yet it is cell friendly. Taking this particular issue of cytotoxicity into account, there is no need to compromise between safety and efficacy in choosing wound cleansers, whether you deal with non-healing or acute wounds.

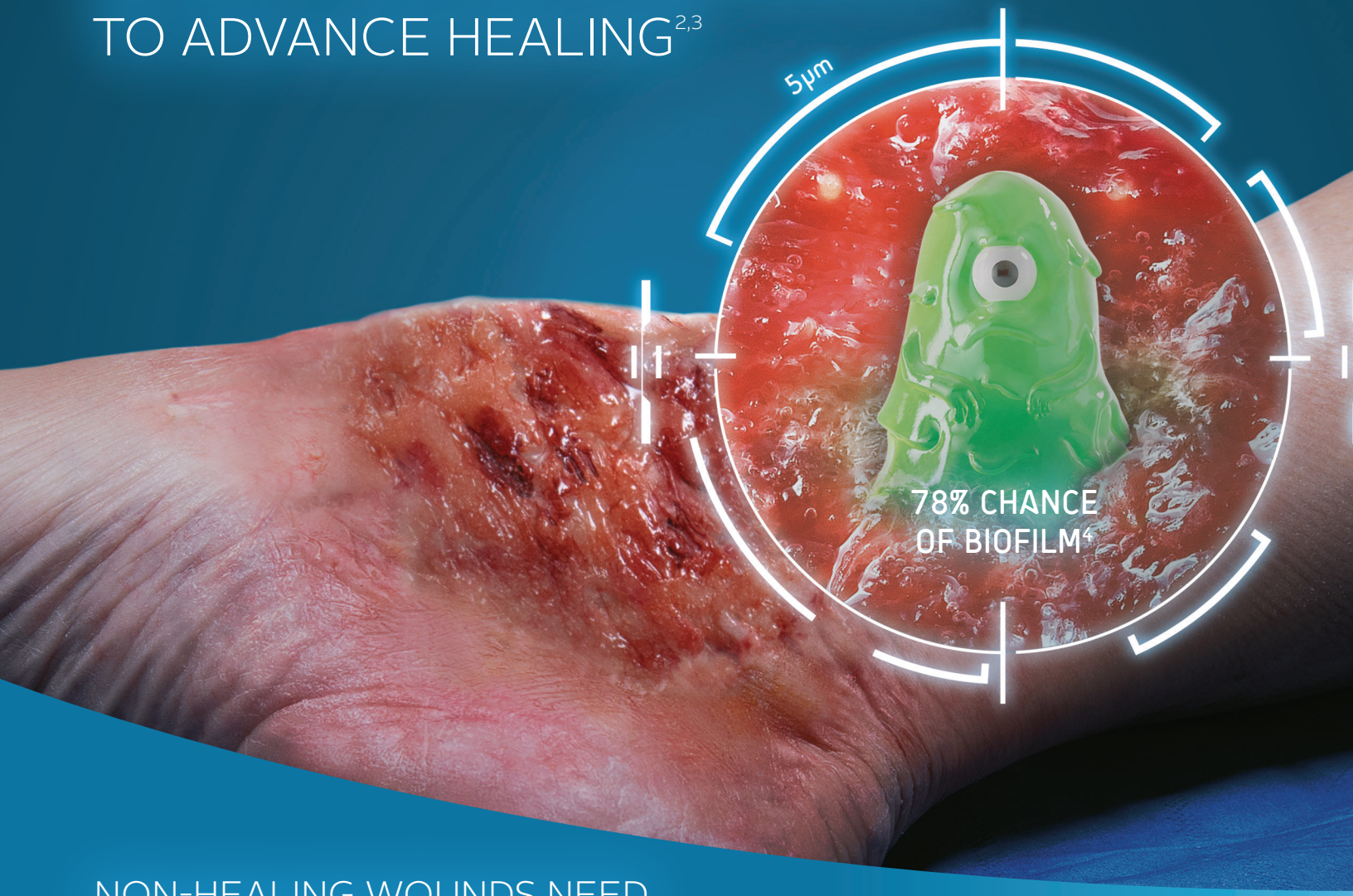
UrgoStart Plus is an interactive dressing range for non-healing wounds (LLUs, DFUs, PIs) that has a clinically proven ability to reduce healing time. It has been recommended by the NICE guidelines in the UK for the treatment of DFUs and VLUs. More recently, the International Working Group for Diabetic Foot (IWGDF) introduced TLC-NOSF as a local treatment in its 2019 recommendation.

The entire Urgo Medical Canada team is committed to support clinicians and patients in wound healing.

AQUACEL® Ag+ Dressings

ConvaTec

YOU HAVE THE POWER TO **DISRUPT AND DESTROY BIOFILM**[1] TO ADVANCE HEALING[2,3]



NON-HEALING WOUNDS NEED **MORE THAN SILVER™**

Specifically developed to win the battle against biofilm, **MORE THAN SILVER**™ technology harnesses the synergistic power of three key components; ionic silver, a surfactant and a metal chelating agent working together to deliver superior[1] performance.*

Hydrofiber® TECHNOLOGY + MORE THAN SILVER™ = AQUACEL® Ag+ Dressings

1. Bowler PG, et al. Parsons, Wound Medicine 14 (2016) 6–11. 2. Metcalf DG et al. J. Wound Care 2016; Vol25, No3. 3. Metcalf DG, et al. Int Wound J 2017; 14: 203-213. 4. Malone M et al. 2017. JWC; 20-25.
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* When compared to AQUACEL™ Ag Extra™ dressing and other silver-only competitor dressings: ACTICOAT™ 7 and SILVERCEL™ Non-Adherent dressings.

October 14–18, 2020

Wounds Canada 2020 Virtual Conference:

Moving the Dial on Patient Outcomes

Contributors: Eliot To, DCh MCISc (Wound Healing) HBSc and Heather Ibbetson, BN BA

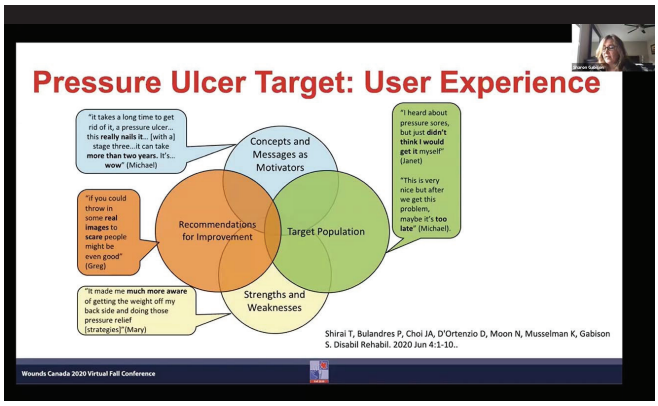
Session Summaries

Wounds Canada held its fall 2020 conference as a virtual event October 14 to 18. The event incorporated the Alberta regional conference that had originally been planned for April but was postponed due to the COVID-19 pandemic, the fall conference and the one-day Limb Preservation Symposium into a single mega event. The session summaries that follow include highlights and practice pearls from the fall conference sessions.

PRESSURE INJURIES: THE "SCARLET LETTER" OF PATIENT CARE

Session speakers: Joyce Black, PhD RN; Sharon Gabison, PhD MSc BScPT; Amit Gefen, PhD

Amit Gefen began the session with a brief introduction of the development of pressure injuries (PIs). PIs can be caused by body weight alone, as well as external forces, including medical devices. Regardless of the source of pressure, cells undergo distortion and deformation, eventually leading to loss of function. He compared the loss of cell integrity due to pressure to when a building loses its structure. When the cell membrane has pores or when the cytoskeleton loses its integrity, the cell collapses. The damage caused by cell deformation initiates and perpetuates a vicious cycle: constant pressure leads to cell deformation and cell death, which leads to inflammatory edema and increased interstitial pressure. This



further distorts the cell, leading to increased poration of the cell membrane and loss of cytoskeleton integrity. He concluded by outlining how COVID-19 increases the likelihood of PIs via the following mechanisms:

- Endothelial dysfunction, which leads to edema
- Increased clotting/thrombosis, which leads to decreased tissue perfusion and oxygenation
- A long list of medical devices used to manage patients with COVID-19 complications
- Use of prone positions for patients with COVID-19 complications
- A cytokine storm, which delays the body's normal response to tissue injury

Joyce Black focused on the need to educate care providers to prevent PIs as a result of COVID-19 management. She mentioned several strategies to prevent PIs when the patient is prone. She recommended that clinicians consider:

- Using support services designed for ICU patients
- Being mindful of ET tube placement
- Lubricating the eyes with eye ointment and taping closed
- Applying dressings around the face
- Applying dressings to high-risk areas, such as shins, hips and dorsum of the feet
- Placing the head on a pillow and turned sideways, and rotating sides every two hours
- Rotating side (of the body) every four hours
- Placing the patient in "swimmer's" position (one arm up, one arm down), without causing increased tension or extension on the patient's joints and tissues

She mentioned the National Pressure Injury Advisory Panel (NPIAP) position papers on COVID-19 and PIs, reminding attendees that not all COVID-19-related PIs are avoidable. Some wounds behave like PIs but are a result of COVID-19 and not necessarily a product of pressure. Black stated the importance of using artificial intelligence (AI) to predict and measure risk of developing PIs more objectively.

Sharon Gabison talked about different technology designed for education and management of pressure injuries. The SensiMAT is a pressure-sensitive mat designed to be placed under a wheelchair cushion. The associated application in conjunction with the mat gives real-time data on the pressure the patient is placing on the wheelchair cushion. This in turn prompts the patient to reposition. From the data collected, Gabison and her team realized the frequency of repositioning is sub-optimal, and hand-dominance plays a part in repositioning behaviours.

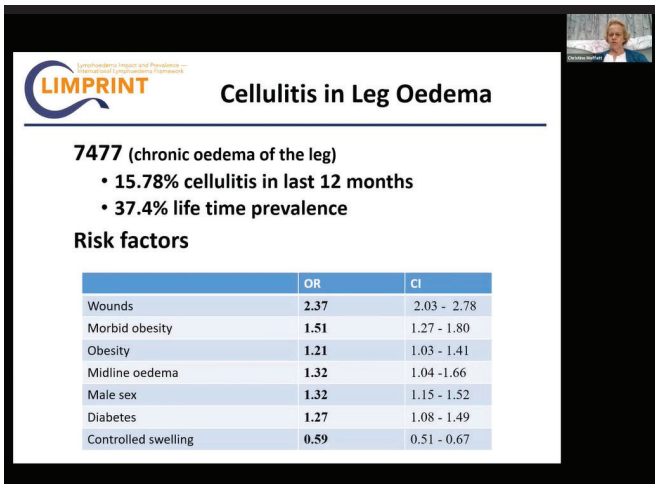
The second technology she discussed is the Pressure Ulcer Target (PUT). This application consists of six modules for PI information and education.

She also presented information about the Pressure Injury Management and Education (PrIME) technology and application. PrIME uses machine-learning to evaluate a patient's position in bed and can prompt the patient or care partner to reposition based on pressure data. A bedside computer prompts the care partner and patient. The program also includes education modules.

CHRONIC EDEMA MANAGEMENT ACROSS HEALTH-CARE SECTORS: STRATEGIES FOR SUCCESS

Session speakers: David Keast, MSc BSc(Hon) DipEd MD FCFP (LM) CCFP; Christine Moffatt, PhD RN CBE; Deirdre O'Sullivan-Drombolis, MCISc-WH BScPT; Martina Reddick, RN CLT

David Keast began the session by defining chronic edema and its relationship with lymphedema. Physiologically, lymphedema is defined



as accumulation of protein-rich fluid in the interstitial space. Clinically, lymphedema is chronic (lasting more than three months), responds minimally to elevation and/or diuretic therapies and is accompanied by one or more secondary skin changes. Traditionally, it was believed that all fluids filtered out of the capillaries are reabsorbed. Newer studies suggest that almost all of the excess tissue fluids are handled by the lymphatic system. Lymphedema can result when filtration is greater than absorption (e.g., in venous disease, chronic heart failure) or when filtration is less than absorption (e.g., when lymphatic obstruction or dysfunction is present). Lymphedema is associated with a multitude of comorbidities, including venous disease, trauma, obesity and infection. Management of lymphedema includes skin care, education, manual lymphatic drainage, exercise, compression garments and management of underlying etiologies.

The LIMPRINT Study

Christine Moffatt presented LIMPRINT, an international study of the epidemiology of lymphedema. LIMPRINT encompasses different types of practices (e.g., in-patient care, primary care) across several countries. The goal of the study was to develop and validate an international prevalence methodology with an electronic system to assess the prevalence of chronic edema and chronic wounds, and their impact on individuals and health services. Some of the key takeaways from the LIMPRINT study include:

- Chronic edema is a significant and largely unrecognized health problem that is costly to health systems
- In-patients can have chronic edema
- Chronic edema is common in primary care
- There is a high association of chronic edema with wounds
- Cellulitis, wounds and obesity are major risk factors
- Effective treatment to control chronic edema is a modifiable risk factor

Long-term Care

Martina Reddick spoke about the barriers and strategies of lymphedema management in long-term care (LTC) settings. Barriers of lymphedema management in LTC may include inactivity and muscle weakness, which add to the difficulty to manage, and social and safety impacts of certain treatment options. Other barriers and gaps include lack of knowledge in diagnosis and management of lymphedema as well as lack of clinical skills. There may also be limited numbers of and access to specialists and limited resources. The clinical complexity of LTC residents (e.g., in areas such as cognitive ability, mobility and obesity) is also a barrier to the management of lymphedema in the LTC setting. Some of the strategies to overcome these barriers include a broad-based education plan for practitioners, development of interprofessional teams with specialist availability, development and/or review of electronic plans to include chronic edema, and the need for clinical practice guidelines to address chronic edema and how to manage complex cases.

Adjunctive Therapies

Deirdre O'Sullivan-Drombolis discussed several strategies for the management of chronic edema in acute care settings. Compression is still a gold standard; however, intermittent pneumatic compression (IPC) and kinesiotaping may be effective adjunctive therapies for the management of chronic edema. Exercise is also important;

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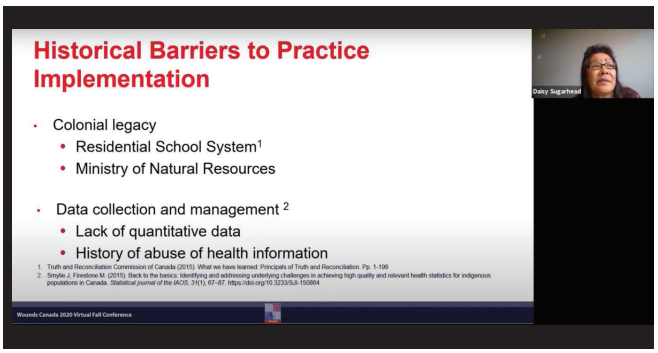
emerging studies show that breath work may also be beneficial. She reminded attendees that the patient is the "common denominator" between all of the health-care practitioners, so patient education, empowerment and collaboration are paramount to positive health outcomes.

WOUND CARE CHALLENGES IN INDIGENOUS COMMUNITIES

Session speakers: Daisy Sugarhead, RN BScN Anishnawbe Mushkiki Eqway; Heather Wright, MCISc-WH BScN NSWOC WOCC(C)

Daisy Sugarhead and Heather Wright are both registered nurses who work in remote First Nations communities. The objectives of this session were to discuss the wound care challenges in remote First Nations communities, explore options to overcome such challenges, and discuss and apply the principles of Truth and Reconciliation to wound care in remote First Nations communities.

Currently, in many remote First Nations communities, patient care is often outsourced to neighbouring urban centres. An example Wright gave was wound debridement, where patients from First Nations communities are transported by air to an urban centre to receive care. This pro-



cess may take up to three days, during which the patient is removed from their community. This is not only costly financially but can also be emotionally and physically exhausting for the patient.

Sugarhead and Wright described some of the wound care challenges of inaccessibility. Primary health care is delivered at nursing stations. Challenges and barriers to practice implementation include fluctuating provincial and national funding structures, transient/rotating nursing staff that lead to a lack of continuity of care, limited availability of wound care supplies, underutilized technology, limited access to clinical experts, and lack of use of validated assessment tools and consistent documentation.

Environmental barriers to care exist in these communities as well. Electricity, water and heating system interruptions can lead to disruption in care delivery. Water quality, food scarcity, transportation to/from clinic and housing/overcrowding are also challenging to community health and care delivery. For example, members of these communities are 10 times more likely to develop an invasive group A *Streptococcus* (iGAS) infection than the provincial and national averages.

Historical Barriers

Beyond the physical barriers to implementing care, the historical barriers are also challenging to overcome. Sugarhead shared powerful anecdotes from her own traumatic experiences as well as from the members of her community. Colonialism forced First Nations people to live in new types of communities and against their traditional way of living. The introduction of canned food versus fresh food led to health problems. Residential schools caused physical, mental and emotional trauma to First Nations communities. There is a continual process of forcing First Nations people to live a certain way, and to control their natural resources, even in the present day.

In addition, there is a history of abuse of health information, which included unethical experimentation on First Nations people (e.g., sending untrained/under-trained practitioners to these communities to provide care) and selling health information to pharmaceutical companies. Also, there is a lack of quantitative data.

Solutions

Solutions to practice implementation barriers include:

- The use of validated assessment tools, such as Inlow's 60-second Diabetic Foot Screen, to inform care
- Education for personal support workers and home care staff in the areas of wound management and prevention delivered at a community level and via virtual platforms
- The delivery of health care that is reconciliation-focused, recognizing the truths of the past and moving forward in a respectful and healthy manner. This includes "supporting Aboriginal peoples' cultural revitalization and integrating Indigenous knowledge systems, oral histories, laws, protocols and connections to the land into the reconciliation process" (Truth and Reconciliation Principle #7), as well as "respecting and taking into account the perspectives and understandings of Aboriginal Elders and Traditional Knowledge Keepers of ethics, concepts and practices" (Truth and Reconciliation Principle #8).

THE MANAGEMENT OF COMPLEX WOUNDS: BURNS AND BEYOND

Session speaker: Shahriar Shahrokhi, MD FRCSC FACS

The objectives of this session were to identify management strategies for complex wounds in multi-trauma patients and to discuss the importance of interprofessional teams and pain management when managing these patients.

Traumatic wounds include abrasions/friction injuries, degloving injuries (open vs. closed), open fractures, eviscerations and pressure necroses. Traumatic wounds can be complicated by infections, such as necrotizing soft tissue infections and periwound cellulitis. The approach to com-

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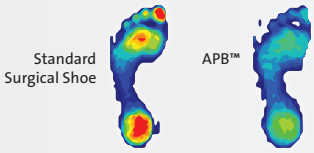

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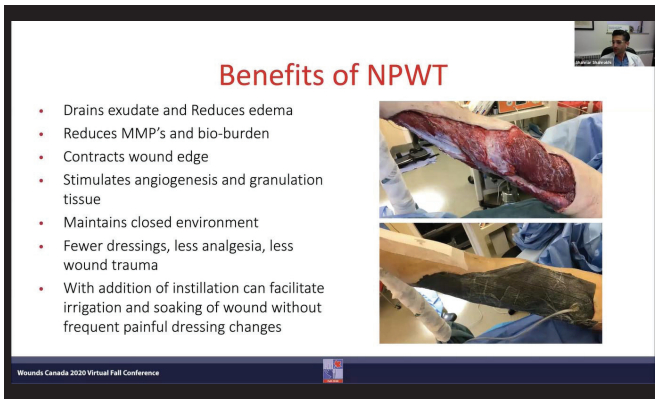

plex wounds in multi-trauma patients should be as follows:

- Consider patient's clinical priorities
- Temporize wound until more pressing issues have been addressed
- Life or limb preservation supersedes most wounds, unless wounds are connected to life or limb preservation
- Large wounds have significant metabolic demands; nutritional support is crucial
- Complex and large wounds are significant risks for systemic infection

There are systemic and local barriers to wound healing and treatment. Systemic barriers include age, malnutrition, immune suppression and comorbidities. Local barriers include bleeding, tissue hypoperfusion, wound soilage (through fecal matter) and wound infection. Topical solutions and dressings may be useful in reducing bioburden; however, long-term use of these agents may delay wound healing. Negative pressure wound therapy (NPWT) is a helpful adjunct and alternative. NPWT helps to reduce edema, bioburden and matrix metalloproteases (MMPs); contract the wound edge; stimulate angiogenesis and granulation; and reduce the amount of dressing changes. The addition of instillation with polyhexamethylene biguanide (PHMB)-based or hypochlorous acid-based solutions to NPWT can facilitate irrigation and soaking of the wound.

Shahrohki compared biofilm on a wound to a "shield around a starship," where topical and systemic antimicrobials cannot penetrate the wound. Biofilms can form as early as eight hours on a wound and increase oxidative and inflammatory stress on the wound, delaying healing. Biofilms can be disrupted by mechanical means (e.g., surgical and ultrasonic debridement, hydro-dissection) or irrigation solutions (e.g., PHMB- or hypochlorous acid-based solutions). Early reduction or disruption of bioburden and biofilm is therefore important for optimal wound healing.

Shahrokhi provided several examples of multi-trauma patients with complex wounds. The common management plan includes early debridement of necrotic tissues to improve granulation, fecal diversion via tubing or ostomies, and temporizing wounds with NPWT with instillation until further operations. NPWT with instillation decreases bacterial load and disrupts biofilm, and also "buys time" to optimize the wound bed. Once the wound bed is free of necrotic tissue, wound closure may be achieved via skin flaps and grafts. It is important to remember that wounds may be temporized while other pressing issues (e.g., metabolic, systemic) are being addressed.

Patients may experience different types of pain: background, breakthrough, procedural and postoperative. Practitioners must recognize the cause and nature of pain. Pain control is paramount to optimal management for multi-trauma patients, as this influences their adherence to the treatment plan and trust in the interprofessional team. Unresolved pain may lead to chronic pain, depression, post-traumatic disorders and suicidal thoughts. Pain is universal to all trauma patients, and therefore must be addressed adequately.

TEST YOUR KNOWLEDGE ON NUTRITION AND WOUNDS: PRACTICAL TIPS FROM THE EXPERTS

Session speakers: Christin Barber, RD; Lindsey Zwicker, RD

Malnutrition is a nutritional imbalance of energy, proteins and nutrients. Christin Barber noted that approximately 45% of patients hospitalized in Canada experience malnutrition. The goal of

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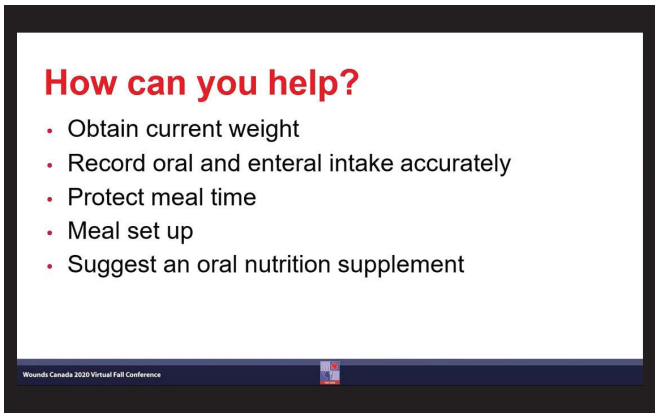


treatment should include optimizing nutritional status, preventing further decline and addressing the root cause of malnutrition.

The use of validated screening tools is important in identifying patients who experience malnutrition. The Canadian Nutrition Screening Tool (CNST) and Malnutrition Screening Tool (MST) are two examples of validated screening tools for malnutrition.

Energy is something everyone needs. Normal caloric intake is 25–35 calories/kg. High-calorie foods include whole milk, soy products, full fat cheese, nuts and seeds, sweets and desserts, added fats (e.g., butter, oils), many frozen dinners and smoothies. Practitioners must consider the patient's nutritional instrumental activity daily living (IADLs) and activity of daily living (ADLs).

Normal protein intake is 1.25–1.5 g/kg/day. Protein requirements increase in malnourished patients and those living with a wound. High-protein foods include meat and fish, legumes and lentils, nuts and seeds, eggs and soy products.

Practitioners need to investigate if dentition is an issue if there is a change in appetite or food intake. Another factor to consider is cost of groceries and food, which may increase with decrease in supply and/or increase in demand.

Adequate fluid intake is also very important because fluids are the "body's transportation system." A minimum of 1500 mL/day of fluid intake is recommended. Fluids may include water, milk, juice, broth/soups, coffee and tea. Practitioners and patients can use visual cues or technology to encourage fluid intake. Barber also suggested carrying a water bottle everywhere and having a beverage with every meal.

There is not clear evidence to suggest that adding vitamins and minerals is beneficial. However, if a lab-diagnosed deficiency exists, supplementation with multivitamins and minerals can be initiated. Vitamin A, C and zinc are important nutrients to support wound healing.

They concluded the session by going through two case studies with attendees. Some of the strategies employed in both cases included the use of a screening tool for malnutrition, use of grocery delivery, smaller meals timed with TV programming, oral nutrient supplementation taken with medications, adequate protein intake, and multivitamin and mineral supplementation when deficiencies are identified. Barber and Zwicker encouraged attendees to be educated about malnutrition via Canadian Malnutrition Task Force resources and to use validated screening tools for malnutrition. A competency checklist can also be helpful.

THE TREATMENT OF ACUTE AND CHRONIC OSTEOMYELITIS IN FOOT ULCERS: WHAT'S NEW?

Session speakers: Lawrence Lavery, MPH DPM; Edgar Peters, MD PhD

Edgar Peters began the session by presenting the epidemiology of foot infection in diabetes. According to research, the lifetime risk of a diabetic foot infection is 4%, and 50% of diabetic foot ulcers (DFUs) are infected at presentation. The EURODIALE study indicated that 18% of diabetic foot ulcers present with osteomyelitis (OM). Infected foot ulcers often lead to amputations.

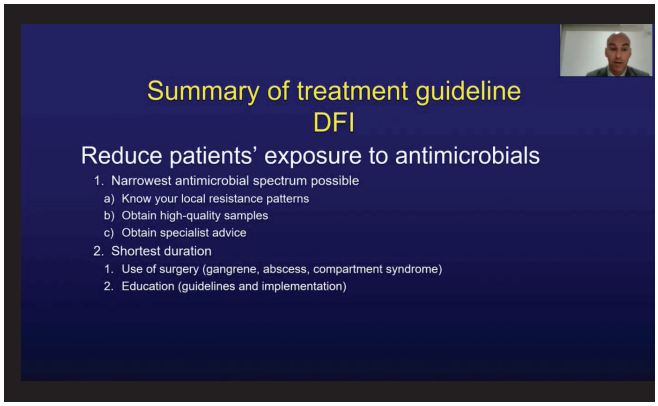
Peters presented the PEDIS assessment tool for assessing DFUs. PEDIS stands for perfusion, extent, depth, infection and sensibility (i.e., presence of neuropathy). He then elaborated on the "infection" aspect of the tool, which correlates with the Infectious Diseases Society of America (IDSA) Diabetic Foot Infection classifications.

Grade 1 = no signs and no infection. Grade 2 = mild infection, where the patient presents with two or more signs of infection. Grade 3 = moderate infection, where periwound erythema extends to and beyond 2 cm or when there is a deep infection present. Grade 4 = severe infection, where the patient experiences systemic inflammatory reaction syndrome (SIRS) with signs and symptoms such as tachycardia, fever or hypothermia, tachypnea, and leukocytosis or leukopenia. Grades 3 and 4 can be categorized with or without co-existing OM.

He reminded attendees repeatedly that infection is a clinical diagnosis. Wound swab cultures may not be useful, as most long-standing wounds are heavily colonized. Lab diagnostics such as inflammatory parameters are often normal, even in patients with a foot abscess. Signs and symptoms of infection may also be mild despite a serious infection, especially in patients with peripheral arterial disease.

Peters presented research evidence on the efficacy of different diagnostic tools for OM.

- A positive probe-to-bone (PTB) test may be helpful to rule in OM in high-risk patients; a negative test may be helpful to rule out OM in low-risk patients.
- Plain X-rays are only marginally predictive if positive (e.g., bone destruction/osteolysis). Negative results are even less predictive.
- MRIs have a higher diagnostic odds ratio than a PTB test, where bone edema may be visualized.
- PET-CT scans have an even higher diagnostic odds-ratio than MRI (95 vs. 42).



- A bone biopsy can provide histological evidence of infection.

Wound culture swabs are easy to employ; however, wound cleansing and debridement must be performed first. Additionally, wound culture swabs may not identify anaerobes or possibly gram-negative rods bacteria. Peters presented a study where the concordance between a superficial wound swab culture and bone biopsy was 22%. If the treatment was based on the superficial wound swab culture, there was only a 1-in-5 chance of targeting the microbes accurately.

Evidence shows that there is no difference among antibiotic regimens except tigecycline isn't as effective as ertapenem and ertapenem isn't as effective as piperacillin/tazobactam. He stated that when selecting an antimicrobial, practitioners should take into account the local resistance profile and, importantly, aim to reduce a patient's exposure to antimicrobials. This can be achieved by narrowing the antimicrobial spectrum when possible—based on knowing the local resistance profile, obtaining high-quality tissue samples and seeking specialist advice—and a shorter treatment duration (in combination with surgery and education). One to two weeks of antimicrobial treatment is usually adequate for soft tissue infection; less than six weeks of treatment is adequate for bone infections (5–7 days if complete resection surgery was performed). Ultimately, there is no "silver bullet" when selecting an antimicrobial agent. For a detailed list of suggestions based on evidence, Peters encouraged attendees to consult the International Working Group on the Diabetic Foot (IWGDF) Guidelines.

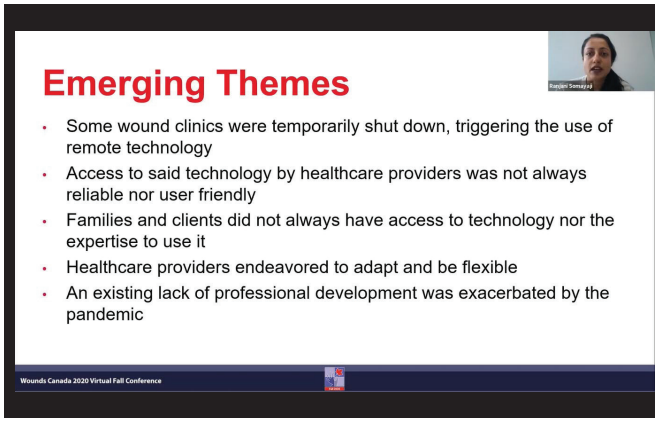
Lawrence Lavery continued the session by discussing standard and new approaches to identifying and managing acute and chronic OM in patients with diabetes. The question arises: Which is more effective—surgical treatment or medical treatment of OM? Surgery allows practitioners to remove the infected bone, correct bony deformities and biomechanics, identify pathogens via bone biopsies and shorten antibiotic exposure along with its side effects. Medical treatment allows patients to avoid surgery and anesthesia

risk and maintains foot structure and biomechanics. The cost of surgery is beyond financial. Amputations and bone resections change the bony structure and biomechanics. This can cause new deformities, increase plantar pressure and the risk of ulcerations and transfer lesions. Surgery can increase the risk of deformity and ulcerations; therefore, it is imperative for surgeons to aim to preserve function. Success and remission of surgery and medical treatment are similar—this is also dependent on whether a clear margin of bone can be achieved via surgery.

THE IMPACT OF COVID-19 ON PATIENTS WITH WOUNDS: A NATIONAL PERSPECTIVE

Session speakers: Maureen Charlebois, Bsc MD FRCPC(Med, Derm) MACP FAAD Med FAPWCA DSc(Hons); Crystal McCallum, MCISc-WH BScN RN; Ranjani Somayaji, MPH BScPT MD FRCPC

Janet Kuhnke et al. conducted a qualitative study that aimed to capture the experience of wound care clinicians during the early days of COVID-19 in Canada.[1] The goal was to understand how COVID-19 has impacted the delivery of skin and wound care. In collaboration with Cape Breton University, Wounds Canada worked to create an online qualitative survey, which was followed up with surveys at three, six, nine and 12 months. A majority of respondents were frontline clinicians (89%). Ontario was the most geographically represented province, where more than 50% of respondents were located.



The study's preliminary findings showed a reduced satisfaction with the availability of generalist staff, virtual care and specialist staff members' ability to perform wound or skin care. Additionally, the availability of and satisfaction with generalist staff was assessed. 84% of organizations had a generalist staff member who performed wound care as part of their daily activities. 83% of respondents were either very satisfied or satisfied with the availably of generalist staff to perform this care. However, this number dropped to 60% during the pandemic.

Respondents were also asked to reflect on their experience with virtual care. Virtual care was defined as care occurring remotely using any type of technology. Prior to the pandemic, 75% of respondents indicated that generalist staff used virtual care as a part of wound care. 59% of respondents were either very satisfied or satisfied with the availability and effectiveness of virtual care used in wound care. However, during the pandemic, the number of respondents who were very satisfied or satisfied dropped to 44%.

Prior to the pandemic, 69% of organizations had internal specialists on contract who performed wound care with patients. 79% of respondents reported being very satisfied or satisfied with the availability of the specialist to perform the care. Again, this satisfaction dropped to 58% during the pandemic. When asked to reflect on the use of virtual care by specialist staff, 48% indicated that specialist staff used virtual care to facilitate wound care before the pandemic. Prior to the pandemic, 51% of respondents were either very satisfied or satisfied with the availability and effectiveness of virtual care used by specialist staff to facilitate wound care. During the pandemic, the satisfaction dropped to 49%.

A number of other observations were recorded during the preliminary research phase:

- Some wound clinics were temporarily shut down. This forced providers to engage in virtual technology from a remote setting.

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- Access to remote technology can be challenging. It is not always readily available nor was it guaranteed to be user friendly.
- Families and patients did not always have access to or expertise with the technology required to receive virtual care.
- As a result of the above, health-care providers had to adapt and be flexible in their care.
- An already existing lack of professional development was made worse by the pandemic.
- Several themes emerged from the preliminary data, including patient safety, availability of PPE and use of virtual care.

In her own facility, Charlebois and her team developed and implemented a PPE program for home-care staff. To address the fears of patients and families, regular communications were initiated through email and phone. This proved to be beneficial, as families and patients felt safer allowing staff in the home. There has been an increased focus on cleaning and infection control practices for staff. This ongoing education has provided staff, patients and families relief from fear.

Health-care workers need support for dealing with these additional protocols and stressors. Somayaji highlighted the challenge of adapting to constant change in various settings. In wound care, one focus has been to help patients become more autonomous quickly. In Calgary, a hybrid model allows in-person consultations when safe, while offering virtual care to those at high risk. There has also been a push to see vulnerable patients who have not had contact with the team.

McCallum noted a shift in emphasis toward empowering patients to perform their own activities of daily living, such as dressing changes, in long-term care. However, in acute care, patients are necessarily more dependent on staff.

It was essential to create PPE guidelines from the outset for patients and staff, such as guidelines for any household that had a positive case or was in isolation and additional information for staff about wound care and how to address patient and family fears. Throughout the pandemic there has been an increased burden on health-care providers to educate staff, patients and families on safety protocols.

Virtual Care

When discussing treatment modalities that can create self-care and be managed virtually, Somayaji suggested that creating a foundation is important. Charlebois shared her experience with virtual care. Bayshore has a care path program that supports cancer patients after hours. Patients can also call for a review of their medication or care plan. Through virtual care, a patient has an interdisciplinary consultation. Nurses can also virtually contact the wound care specialist if they need support with in-home care. McCallum noted that additional successes are patients who are now able to apply negative pressure wound therapy or electrical stimulation at home. However, budgetary concerns will likely be at the forefront in a post-COVID world. Patient autonomy and leveraging technologies should be a focus.

1. Kuhnke J, Jack-Malik S, Botros M, Rosenthal S, McCallum C, Bassett K. Early COVID-19 and the experiences of Canadian wound care clinicians: Preliminary findings. Wounds International. 2021;12(2):14–19.

RAPID-FIRE DIAGNOSIS: DERMATOLOGY FOR WOUND CARE CLINICIANS

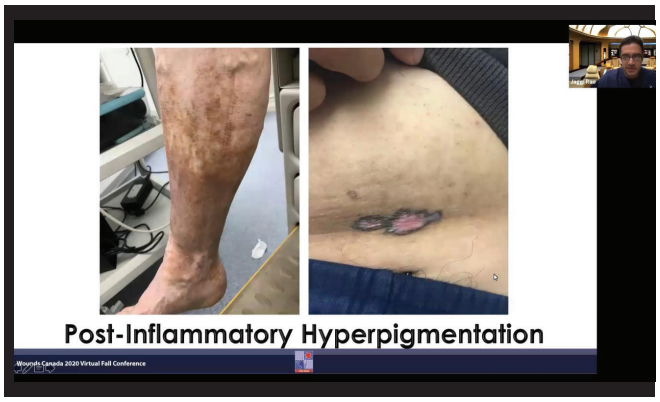
Session speakers: Jaggi Rao, MD FRCPC; Pat Coutts, RN

Clinical signs associated with wounds include:

Slough, or avascular devitalized tissue, is typically seen during the healing process or when in stage 3 or higher pressure injuries.

Eschar or **necrotic tissue** is dead tissue. It is usually present with full-thickness burns and necrotizing fasciitis. In most cases, best practice is to leave the necrotic tissue to ensure that the wound bed underneath is protected and bacteria do not get in.

Scabs are dried blood and serum. Scabs form as part of the healing process due to ruptured blood vessels that release clotting and other substances.



Granulation tissue is a deep, beefy red. It can be healthy and pink and red, but duskier red could be concerning and a sign of ischemia. Healthy granulation tissue should not bleed.

Epithelialization is a pink colour and is typically a good sign. It normally signifies the final stage of healing.

Prolonged moisture can appear as a doughy pink or can be white discolouration in the feet and palms and can be causative of an ulcer.

Undermined borders can be defined when a finger can be circulated around and under the borders. This is a sign of a severe and difficult to treat condition called **Pyoderma gangrenosum** (see below).

Atrophie blanche is a porcelain or ivory white and sclerotic or hard condition. This occurs when the skin contracts from scarring or fibrin deposits. It may signal venous insufficiency or a possible start of skin breakdown.

Brown pigmentation of the skin is caused by hemosiderin deposition, which occurs when iron oxide from the breakdown of red blood cells deposits in the skin. It appears as splotchy red and brown on the skin. Laser procedures can assist in removing the pigmentation and trigger the immune system to take care of the hemosiderin.

Post-inflammatory hyperpigmentation is associated with melanin. It is not splotchy but more dispersed around an area. This condition occurs when the dermal and epidermal junction is disturbed, and the melanin is released.

Lipodermatosclerosis occurs in areas with little fatty tissue, such as in the lower calf. Hardening, thickening and tightening with sclerotic tissue is seen. It is believed to be related to venous insufficiency. Treatments related to improving venous circulation can help.

Pitting edema can occur due to inflammatory events, injury and decreased osmotic pressure (nephrotic syndrome).

Stasis dermatitis can be caused by venous stasis and is treated by topical steroids (ointments are preferred).

Pyoderma gangrenosum is a neutrophilic dermatosis. It can deteriorate quickly and should be treated right away. In the early phase this presents as a pustule with some swelling.

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Treatment should involve neutrophilic agents such as steroids and other heavy-duty treatments.

Erysipelas is similar to cellulitis (see below) and is a surface infection. It is fairly well demarcated.

Cellulitis is deeper than erysipelas (see above) and is found below the epidermis, in the dermis and subcutaneous tissue. It is less demarcated and more widespread.

Medium-vessel vasculitis appears as red blanching and later permanent erythema. It should be addressed with high-potency topical anti-inflammatories and a systemic treatment.

Calciphylaxis is a dermatology emergency as it can progress to necrosis. It may start as erythema then move to continuous erythema, excruciating pain, ischemia and necrotic lesions over days. It is often seen in end-stage renal disease.

Bullous pemphigoid is an autoimmune condition that results in blisters that can progress to a wound. It is typically seen in elderly patients.

Factitial ulceration results from an external ulceration, such as scratching.

Each of these conditions can present in a variety of health-care settings, and early treatment is crucial.

NEW PERSPECTIVES IN WOUND PAIN MANAGEMENT: CANNABIS, VIRTUAL REALITY AND BEYOND

Session speakers: Jaclyn Hughes, BMR(PT); Vincent Maida, BMR(PT)

The aim of this presentation was to encourage the readers to think about alternative pain relief mechanisms.

Virtual Reality

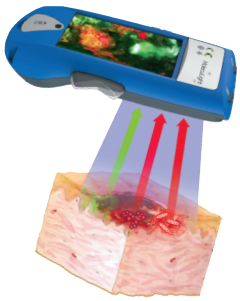
Jeffrey Spiegel found that the use of virtual reality in patients hospitalized at Cedars-Sinai Hospital in California reduced pain when compared with a control distraction condition. The results of a study indicated that virtual reality (VR) was an

effective and safe adjunctive therapy for pain management in the acute patient setting. Senior management was supportive of using virtual reality in Rockyview Hospital in Calgary based on the results from the U.S. described above.

Rockyview Hospital was the first to help patients use virtual reality to manage pain and anxiety in wound care. The cost of setting up and using the VR machine was $400. The cost included the machine, special cover, wipes, patient bonnet and applications. Patients with high pain levels, anxiety or those who did not want to observe the dressing changes were included. Informed consent was obtained. Patients had to be able to sit in a high semi-Fowler's position to ensure equilibrium. Patients with active delirium, poor vision, open head or neck wounds, body parasites or eye infections, or in droplet or airborne isolation, were excluded. One patient, who required bilateral fasciotomies of his legs, called the virtual reality a godsend. He required both debridement and vacuum dressings. Once the virtual reality was added to analgesic intervention, the patient's pain went from a 10/10 to a 3–4/10. The patient also reported decreased anxiety.

One VR application offers different experiences that alternate to keep the patient engaged. It is called "Happy Place" or relaxation. It is the favourite of patients and the health-care team because it prolongs engagement. Another application tells a story and offers higher-level engagement. Interactive applications are also an option, where the patient can use a remote to connect stars or engage in similar experiences. The final application offers an experience, such as a circus. One important issue to note is that different VR experi-

New Dimensions in Wound Diagnosis and Management



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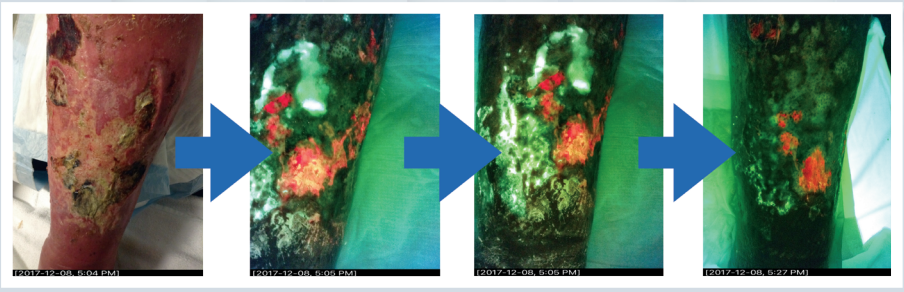

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"Shifting Focus: Implications of Periwound Bacterial Load on Wound Hygiene"
By Rosemary Hill BSN CWOCN WOCC (C) and Joshua Douglas MD, FRCPC, ABIM
Infectious Disease and Critical Care Internal Medicine, Vancouver Coastal Health

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[1] DaCosta RS et al. Point-of-Care Auto-Fluorescence Imaging for Real-Time Sampling and Treatment Guidance of Bioburden in Chronic Wounds: First-in-Human Results, PLoS ONE, 2015.

[2] Ottolino-Perry et al. Improved detection of wound bacteria using autofluorescence image-guided wound sampling in diabetic foot ulcers. International Wound Journal, 2017

[3] Rennie MY et al. Point-of-care fluorescence imaging positively predicts the presence of pathogenic bacteria in wounds at loads ≥ 10^4 CFU/g: a clinical study. J Would Care (submitted).

[4] Hill-Douglas et al. Shifting focus: implications of periwound bacterial load on wound hygiene. Infectious Disease and Critical Care Internal Medicine, Vancouver Coastal Health.

ences may not be suited to all patients. A bonfire experience, for example, may not be suitable for a patient who is undergoing a dressing change on a burn injury.

Following the first wound treatment, patients were identified as possibly benefiting from VR based on the inclusion criteria defined above. The health-care team mentioned the VR option to the patient and assessed interest. The patient then completed a pre-test, rating their pain, nausea and anxiety during wound care, and describing how they felt about returning for care and their overall experience. The next time the patient returned, they received VR during wound care. Following the care, the patient was asked to complete a post-test, which asked similar questions to the pre-test, with the added question about whether VR was helpful.

The early results were collated from 2017 to 2018 and included a total of 18 patients. The patient surveys demonstrated that there was a 68% reduction in patient discomfort and a 25% improvement in overall patient experience. 100% of patients found VR helpful. Since this study, VR has been used with other patients. Subsequently, not everyone has found it helpful, but a majority have. In addition, wound care staff also described lower levels of distress when delivering treatment to a patient who received VR. The staff attributed this to increased patient comfort during the procedure.

Challenges included funding, staff orientation, technical glitches, time, and infection prevention and control. Time has been the biggest challenge. The machines need time to charge, staff need time to clean the machines and applications can take time to load. Highlights include VR being used with more than 40 patients, its use during skin grafting procedures, an additional 10 units exploring the use of VR and interest in deploying VR in three other Calgary hospitals.

Cannabis

Vincent Maida introduced cannabis-based therapies. His objectives included challenging the status quo of wound and pain management and introducing cannabis-based medicines as a frontier for wound management.

Between 17 and 65% of patients with non-healing wounds report pain, and pain intensity is associated with multiplicity of wounds. Females report higher pain scores. Malignant and perineal/genital wounds are the most painful. Associated symptoms include sleep disturbance, reduced quality of life and negative impact on emotional health.

Pain is located within wound beds and peri-wound tissues. Pain in wounds is the result of many factors such as necrosis, ischemia, infection and inflammation. Chronic pain drivers include sensitization, NMDA activation, hyperalgesia, allodynia and neuroplasticity.

Baseline pain refers to the average amount of pain that occurs over 24 hours. Breakthrough pain is a transitory episode that occurs with the background or baseline pain. Higher breakthrough pain is associated with higher baseline pain, anxiety and distress. Breakthrough pain can be broken down into idiopathic, incidental and end of dose. In incidental breakthrough pain, either volitional or non-volitional causes can be identified. In wound care, volitional pain results from debridement, injections or other procedures. Non-volitional pain can result from the patient moving or coughing.

The current paradigm for treating wound-related pain includes opioids, NSAIDs, gabapentinoids and SSRIs/SNRIs/TCAs. However, many of these medications can have harmful side effects, including addiction. Further, these medications do not often address breakthrough pain. Opioids and NSAIDs also inhibit the wound-healing process.

Recently, there has been exponential growth in cannabinoid research. The endocannabinoid system in the body has both extracellular and intercellular binding sites and has survived over 500 million years of evolution. Various types of receptors have been discovered in recent years. A recent systematic review by Abrams (2018) found conclusive and substantial evidence that cannabinoids are effective for pain. A double-blind case study involving a 35-year-old man with caustic chemical burns to both legs further

demonstrated the effectiveness of cannabinoids. The right leg had a THC/CBD ratio of 1:13 of medical cannabis oil applied, while the left leg had a ratio of 7:9. The patient experienced pain relief within 10 minutes that lasted for approximately six hours. The balanced THC/CBD oil had a longer-lasting effect. A small case study involving malignancy, epidermolysis bullosa, herpes zoster and pyoderma gangrenosum demonstrated the effectiveness of cannabinoids.

Cannabis agents can be administered through a range of modalities. Smoking is not recommended because it can be harmful for patients and bystanders. Vaporizing cannabis through a health-care approved device can provide an onset within five minutes and lasts up to six hours. Orals and edibles have a longer onset time but can last longer.

Adding cannabinoids to the pain management toolbox can help reduce reliance on adjuncts and opioids. Topical and vaporized cannabinoids can be used for breakthrough pain while orals and edibles can be used for baseline pain. Rapid release oral and nasal sprays are also being investigated.

DIABETIC FOOT AMPUTATION PREVENTION: PATHWAYS FROM ACROSS THE WORLD

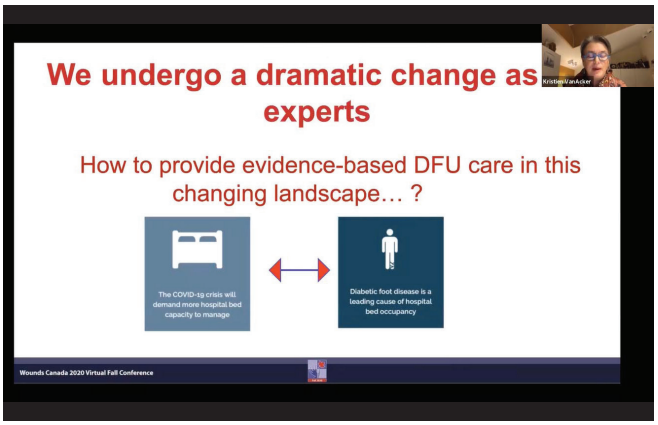
Session speakers: Karim Manji, DPM FACFAS; Harikrishna Nair, MD FRCPI FCWCS CMIA; Lee Rogers, DPM FFPM RCPS(Glas.); Gulnaz Tariq, RN BSN PGDip(Pak) IIWCC-UAE; Kristien Van Acker, MD PhD

Alberta, Canada

Karim Manji discussed the foot care pathway used in Alberta. Alberta has a public health-care system administered by the Alberta Health Services (AHS), which allows for interdisciplinary collaboration. With partners across the system, AHS has developed a screening tool, triage reform and improved knowledge.

The pathway has five main steps:

1. Screening the patient's feet



2. Documenting risk using an infographic created by the foot-care team
3. Referring the patient to a specialist if needed
4. Treatment
5. Follow-up screening

There are several findings that indicate the risk; these are listed on the assessment screening form. For instance, a red, hot, painful joint or Charcot foot is an urgent issue that should be addressed immediately. A callus or fissure is classified as moderate risk. The referral form combines findings and recommendations to best support patient care.

For the pathway to be effective there must be team members available at every level of care, and as the diversity of health-care teams increases, capacity also advances. This helps to support continuity of patient care, which is also important, particularly with high-risk patients, whose conditions can easily become urgent.

Barriers to practice change include few champions for the pathway across the province, variable screening and surveillance, and a lack of communication across the spectrum of care. Solutions to the barriers include a collaborative approach with strong communication.

Asia-Pacific Region

Harikrishna Nair discussed diabetic foot care in the Asia-Pacific region. In Malaysia, the prevalence of diabetes should be around 2.48 million people; however, during COVID-19, it is at 5 million people. A study conducted in Kuala Lumpur Hospital found many cases of plantar ulcers, with

41.5% having infection present. This demonstrates that foot care, blood glucose and blood pressure control are important, especially during the pandemic.

The Triangle of Wound Assessment is an effective tool for patient care. The triangle represents the three points of assessment: the wound bed, wound edge and periwound skin. Triage is an important step to ensure that care is provided appropriately. Wound clinics separate from the hospital can maintain most wound cases, excluding those that are critical. It is important to remember that those who are elderly or with diabetes may have diminished symptoms of sepsis.

Common complaints related to foot concerns include pain, erythema, swelling and the presence of an ulcer, and providers must have a high index of suspicion. Any patient presenting with breathlessness, fever or tachycardia (not from possible COVID-19) should be referred to a hospital ICU. Pain is a fifth vital sign and should be defined as neuropathic or ischemic and then treated accordingly.

Erythema should also be investigated for infection or inflammatory causes. Swelling can be identified as active Charcot foot or cellulitis. Patients with moderate to severe cellulitis should be admitted to hospital for systemic antibiotics.

The wounds can be classified as Infectious Diseases Society of America (IDSA) class one, two or three/four.

- A classification of one, no infection, should result in foot care advice and recommendations provided to the patient.
- Class two, or mild infection, requires oral antibiotics and foot care advice.
- Classes three and four require a consultation with a diabetic foot care specialist, and ICU admission if sepsis is suspected.

During the pandemic, all elective cases in Malaysia were postponed. Therefore, only moderate to severe cases requiring surgery were being treated. All of the care provided involves teamwork. Maggots, bioelectrical, mangosteen-based spray, lower-level laser therapy and ointment-based treatments have also been initiated and maintained during the pandemic, despite inhibited resources. Key points: triage and treat early and refer when necessary.

Persian Gulf

Gulnaz Tariq discussed non-traumatic lower limb prevention pathways and the impact of COVID-19 on these pathways in the Gulf region. Wound care has changed significantly due to COVID-19. She stressed that the post-pandemic model of wound care may look different as well. COVID-19 caused restrictions, coverage issues and lack of community services for wound care. A team approach was also complicated by the pandemic, as staff members were recirculated to meet demands.

She discussed how her health-care team identified improper footwear and a lack of disease knowledge as the root causes of foot ulcers. A solution was developed to address this. It included patient education, staff and caregiver training, and a diabetic foot link nurse program in the facility. The challenges included a large percentage of undiagnosed or newly diagnosed patients, a huge portion of diabetic patients who were not screened for foot care and a general lack of awareness among health-care professionals. She and her team proposed early diabetes testing for overweight patients or those with prediabetic metabolic disorder, use of a 60-second foot screening tool and having every health-care provider treating patients with diabetes ask about foot care.

After utilizing the foot screening tool for one year, the results indicated that every patient was wearing improper footwear and a majority had callus formation. After four years, there was a reduction in improper footwear. Link nurses adapted patient information into different languages and ensured that all patients with diabetes were screened with Inlow's 60-second Diabetic Foot Screening Tool. There was also a significant reduction in amputations, from 13 to four annually. This demonstrates the importance of diabetic foot care screening tools.

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Europe

Kristien Van Acker discussed the European context of the pandemic and diabetic foot care and the importance of interdisciplinary teams because of the complexity of diabetic wounds. She and her team recognized that, although there were many interdisciplinary teams, there was a delay in referrals. The Fast-Track Pathway for Diabetic Foot Ulceration was distributed to general physicians, first in the United Kingdom and then across Europe. The tool has three pathways, which include improving healing time, salvaging limbs and reducing mortality rates. Unfortunately, pandemic impacts led to a rise in amputation rates. COVID-19 patients required hospital beds usually used for patients with diabetes.

The comorbidities of COVID-19 and diabetes have also become a concern. To address the possible domino effect from COVID-19, there needs to be a change to early detection. This will prevent additional hospitalizations on overburdened health-care systems. Three initiatives have been effective in France, the UK and the Netherlands.

- In France, there was a communication network for open centres and available health-care workers. France also outlined what pathologies should be referred to which specialists.
- The United Kingdom has focused on continuity in transmural care. This initiative ensures that every patient with diabetes knows where to go to access foot care at all times, and also highlighted the importance of having podiatrists and nurse specialists in proximity to patients.
- In the Netherlands, an app was created with a learning program for foot care. It had an alarm to remind patients to check their feet and offered the appropriate resources to support patient and family empowerment and self-care.

United States

Lee Rogers discussed the impact of COVID-19 on diabetic foot pathways and how to triage diabetic foot patients based on frameworks in the U.S.,

where, like elsewhere, the pandemic has caused a disruption of care. In the U.S., wound care centres were closed despite being an essential service.

Pandemic-related Research

Three studies demonstrated how to convey the importance of wound care to policy makers and other important stakeholders.

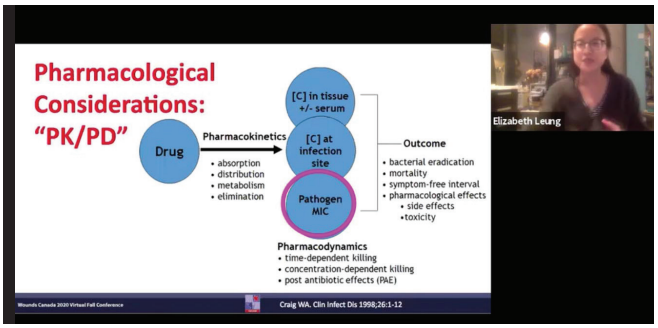
- In Italy, researchers suggested that the sudden disruption in executing diabetic foot care pathways delayed diagnosis and treatment, resulting in rapid patient decline.
- In the Netherlands, there were more severe presentations of vascular disease during lockdown than there were in previous years. Additionally, one hospital reported the rate of amputations tripling in 2020 compared with 2019. The researchers concluded that the switch to phone or video consultations left patients living with wounds and PAD without sufficient care. Patients in the Netherlands reported avoiding hospital and provider visits to not overburden the system during the pandemic. These factors led to a delay in diagnosis and care.
- In the U.S., one study found that the number of major limb amputations tripled, more severe presentation of patients occurred and the high-low amputation rate more than doubled. Team-based care was also noted as being disrupted and may have impacted the surveillance systems and clinic visits and increased patient reluctance to interact with the health-care system. This had the overall effect of delaying the presentation of problems.

THE MANY FACETS OF INFECTION

Session speakers: Chris Kandel, MD FRCPC; Elizabeth Leung, PharmD MSCI BCPS AQ-ID

Diagnosis and Treatment

Chris Kandel discussed when to culture a wound and when to be concerned about seeding a prosthetic joint. Bacteria on wounds are largely predictable. The context and location of the wound, in combination with the prior history of antibiotic use, can assist in determining the likely organisms that populate the wound. The Infectious Disease Union encourages the culturing of wounds when there is a plan to treat. Further, the Union recommends collecting pus without a swab. However, these recommendations are likely of limited value as the organisms cultured cannot be identified as pathogenic. Physicians can identify the antimicrobials to use without culturing by examining the wound and circumstance. Kandel noted that using amoxicillin and clavulanic acid or cephalexin and metronidazole can cover a broad range of anaerobes and pathogens.



There is very little evidence to indicate how long to treat, with a general range between five and seven days. However, cellulitis presents a special situation. If no purulence is present, the pathogen is likely *Streptococci*. Cephalexin or amoxicillin should be given for seven days. If there is purulence, the pathogen is more likely to be *Staphylococci* than *Streptococci*. Incision and culture, followed by trimethoprim and sulfamethoxazole for seven days, should be initiated. When the leg is red and difficult to diagnose, the clinician can raise the leg above the heart; if the erythema reduces, there is unlikely to be cellulitis. Antibiotics should be initiated if rubor, calor, dolor or tumor is present. Further, antibiotics should be used in the case of an abscess or when supportive management fails and the bioburden needs to be reduced. In these cases, therapy is more of an art than a science.

Pharmacology

Elizabeth Leung discussed the pharmacological considerations and challenges of managing wounds in complex patients. Some cases require antimicrobial intervention, such as when wound healing has stalled.

When selecting antibiotics, it is important to consider both the mechanism of action and the mechanisms of resistance. *Mechanism of action* refers to how the antimicrobial works. When pairing, the antimicrobials should have different mechanisms of action. *Mechanisms of resistance* refers to pathogenic resistance to antimicrobials. For instance, quinolone resistance can be as high as 50% in *E. coli;* therefore, using that antibiotic alone is not recommended. In complex patients, it is important to consider the interactions between the antibiotics and other prescribed medications.

Leung also highlighted the difference between pharmacokinetics and pharmacodynamics. *Pharmacokinetics* is described as what the body does with the drug. This would include how fast it is absorbed or how it is distributed. *Pharmacodynamics* refers to what the drug does to the body. For example, the minimum dose that kills the pathogen is measured in the lab with the culture taken. This helps determine how much of the antibiotic is needed and for how long. Pharmacodynamics can be best understood as the relationship between pharmacokinetics (such as the drug concentration in the body) and the drug effect.

Leung outlined the difference in relation to drug interactions. Pharmacokinetic interactions occur when Drug A affects the pharmacokinetics of Drug B, such as through absorption, distribution, metabolism or elimination. Pharmacodynamic interactions occur when the effect of Drug A is influenced by the effect of Drug B. This effect can be additive, antagonistic or synergistic. Additive effects can be seen between mycophenolate and amoxicillin or clindamycin, where non-infectious diarrhea can result. An antagonistic relationship can be seen between warfarin and vitamin K.

Both renal and hepatic function should be taken into consideration. Upwards of 90% of drugs are cleared renally. Diabetes, hypertension and age can all reduce renal function. The liver produces albumin, which is what many antimicrobials attach to. Therefore, liver dysfunction can reduce the efficacy of the medication. Quinolones are discouraged for simple infections where better tolerated medications can be used. Oral beta-lactams have less bioavailability but have fewer drug interactions and are tolerated better. Topical preparations have been used since Socrates' time. These preparations may foster antibiotic resistance but have theoretical benefits such as higher local concentrations. Overall, these preparations are unlikely to reach the goal.

Kandel then highlighted that prosthetic joint infections are relatively rare, around 1–2%. These infections are not subtle, as there is usually a combination of symptoms, biochemical investigations, radiography and arthrocentesis. It is important to always look for a sinus tract and refer to a surgeon if concerned.

There is no uniform diagnosis of wound infection. There is also a lack of evidence for the optimal use of antibiotic in the setting of non-healing wounds. There need to be more studies in addition to home care creativity to ensure antimicrobials, if necessary, are given at the right time.

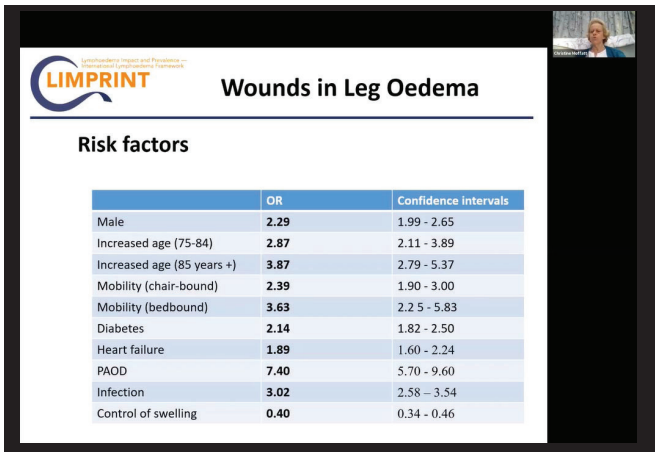
BARRIERS AND OPPORTUNITIES FOR VIRTUAL WOUND CARE: FUNDING, POLICY, TECHNOLOGY AND CLINICAL PRACTICE ISSUES

Session speakers: Trevor Champagne, MD FRCPC DABD; Christine Murphy, PhD RN WOCC(C); Laurie Parsons, MD FRCPC IIWCC

In this panel discussion, the first question asked was what barriers to care each panelist has encountered.

Trevor Champagne discussed several barriers to virtual care, including the quality of photographs, availability of virtual options and challenges with patient confidentiality and engagement. He noted that nothing can replace face-to-face care.

Laurie Parsons indicated that institution processes limit the ability to communicate with



	OR	Confidence intervals
Male	**2.29**	1.99 - 2.65
Increased age (75-84)	**2.87**	2.11 - 3.89
Increased age (85 years +)	**3.87**	2.79 - 5.37
Mobility (chair-bound)	**2.39**	1.90 - 3.00
Mobility (bedbound)	**3.63**	2.2 5 - 5.83
Diabetes	**2.14**	1.82 - 2.50
Heart failure	**1.89**	1.60 - 2.24
PAOD	**7.40**	5.70 - 9.60
Infection	**3.02**	2.58 – 3.54
Control of swelling	**0.40**	0.34 - 0.46

patients. She stressed that it has been important to explain to patients that information and photographs are not entirely secure. She directed patients and staff to do procedures virtually.

Christine Murphy's facility had already been piloting a virtual care model. She said that institutional barriers, such as the inability to accept photos from patients, limited the care staff could provide. One of the upsides, however, is that that patients appreciate being able to stay at home and receive care. Murphy's facility has found virtual care to be effective during the COVID-19 pandemic, especially since her facility was already prepared from the pilot project.

The second topic addressed was how to provide patient care through a virtual platform. Facilities vary on whether they accept photographs and secure transmission of patient information through virtual means. There are both asynchronous visits, in which patients submit a message or video and a physician responds at a later time, and synchronous visits, which involve both the patient and a health-care provider meeting together in the present time. The general guideline provided by Murphy is to read a script to the patient that outlines the potential risks and limitations.

Moderator Douglas Queen then asked which aspects of virtual care are preferable to in-person care. Laurie Parsons stated that the first visit should be in person and the follow-up can often be done at a distance, when home-care nurses can assist. Murphy also prefers to have an in-person assessment. Virtual follow-ups can save the patient money that would be spent on travel, parking and accommodation. It is also valuable to include the home-care nurse, as they often know the patient well and can complete the necessary care. Champagne explained that there are several different applications that can be used for virtual care.

The panelists concluded by sharing advice for those wishing to use some type of proprietary system. Champagne advised those wishing to use such systems to first use a demo to understand the barriers and strengths of the application. Parsons would first ensure that each person uses an institutional or provincially approved application. Murphy encouraged the use of applications that are integrated with other systems. For instance, consider whether the application includes the necessary data and can be connected to other systems needed either in the present or future.

COMPLEX SURGICAL WOUNDS AND WOUND COMPLICATIONS: CASE DISCUSSIONS WITH THE EXPERTS

Session speakers: John Hwang, MD FRCSC; Alan Rogers, MBChB FC Plast Surg MMed FRCSI MSc; Kylie Sandy-Hodgetts, PhD MBA BSc(Hons); Kimberly LeBlanc, PhD MN BscN RN NSWOC WOCC(C)

Kylie Sandy-Hodgetts discussed the International Surgical Wound Complications Advisory Panel

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(ISWCAP), surgical wounds and complications, and how to recognize risk factors for surgical wound complications. ISWCAP is a group of individuals who want to raise awareness of surgical wound complications. Such complications are a global issue that occur in all health-care settings. A surgical wound complication is a disruption to the normal wound healing process. The most commonly reported time frame for complications is between day 7 and 9 postoperatively but can be up to 90 days. Complications often occur after the patient has been discharged, highlighting the importance of community care. There are a number of factors that can be mitigated to prevent surgical wound complications, especially infection. The patient-centric model is especially important when considering ways to reduce risk.

Both preoperative and intraoperative settings have a diverse amount of published research indicating best practices for mitigating complications; however, there is yet to be a gold standard for the postoperative setting. Post-discharge surveillance is needed for complication detection. With a panel of experts, Sandy-Hodgetts created a surgical wound dehiscence grading tool. This tool can be found on ISWCAP's website.

John Hwang discussed an approach to wounds from the perspective of general surgery. An initial wound assessment is important. This assessment should include a focused history and physical, thorough wound assessment, discussion of patient priorities and review of previous surgical reports. Following the assessment, local factors that might impair wound healing should be considered. These factors include foreign bodies, infection, ischemia and edema or elevated tissue pressure. Systemic factors that impair wound healing should also be considered. These factors can include older age, diabetes, obesity, hypothyroidism, immunosuppression and nutritional deficiencies, among many others.

Hwang then introduced the first case study. A 43-year-old male presented with a persistent draining sinus over 12 months from a prior inguinal hernia surgery that was complicated by infection. The patient had had the sinus incised and drained twice with recurrence. Hwang and his team considered a repeat incision and drainage, negative pressure dressing, bovine submucosal plug, surgery and long-term antibiotics. The team chose surgery, as the infection was most likely due to an infected mesh. The mesh was completely removed.

The second case involved a 65-year-old male with stage 3 rectal adenocarcinoma. The patient was on neoadjuvant chemorads and had a perineal wound dehiscence after the staples were removed. The wound had drainage, with no odour, fever or erythema. In this case, Hwang and his team chose to refer to the plastic surgeon because the area was likely to be difficult to heal. The surgeon used a gracilis flap to enclose the wound surgically, and the patient was able to heal.

The third case featured a 35-year-old female who had a laparotomy for a bowel obstruction. A resection of the TI was completed for a discrete Crohn's stricture. A chronic draining sinus resulted and was confirmed by sinogram to be a fistula. The team chose to apply local wound care because it was an uncomplicated fistula that would likely close on its own.

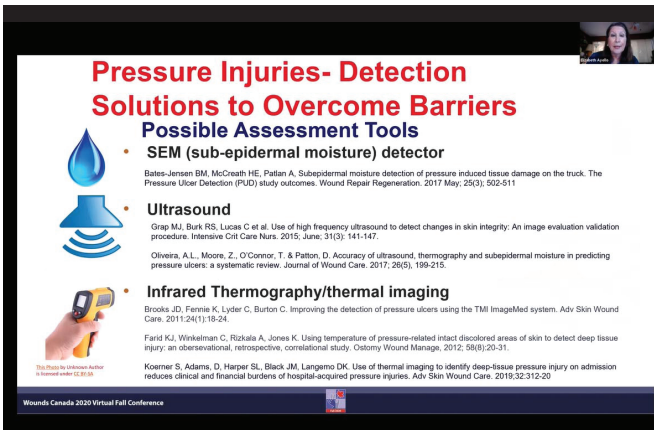
The fourth case involved a 92-year-old female who had an emergency laparotomy for a bowel obstruction. The patient had a wound dehiscence after staples were removed. The patient had no signs of infection. The team chose a combination of interventions. A dietitian was consulted to ensure adequate nutrition. Geriatrics was consulted, and the wound was closed surgically.

The final case involved a 55-year-old female who underwent a coronary bypass for heart disease. She had a history of diabetes, Grave's disease and a prior neuroendocrine tumor. The patient's left leg saphenous vein harvest site opened when the staples were removed. The team chose to apply local wound care and a negative pressure dressing. There were no signs of infection. Hwang highlighted throughout these cases that it is important to take both a local and systematic outlook to cases.

Alan Rogers discussed the advantages of negative pressure wound therapy both in his own practice and broadly. In his own practice, Rogers

has used negative pressure therapy in combination with other interventions to heal vascular surgery wounds, dehiscence, a laparotomy wound with a fistula, an orthopedic wound resulting from an infected hematoma, and a stage 4 pressure ulcer with osteomyelitis. Negative pressure therapy drains exudate, reduces edema, contracts the wound edges and maintains a closed, warm and moist environment while reducing the bacterial load.

Barriers to practice change can include differing institutional and surgeon priorities, referring surgeon involvement and patient engagement. The solutions to overcoming these barriers include engagement with the team to develop a plan, creation of surgical teams who are ready to take ownership, having a plan B, commitment to the plan and perseverance through setbacks.



DIVERSE SKIN TONES: DIAGNOSTIC CHALLENGES AND TIPS FROM THE EXPERTS

Session speakers: Elizabeth Ayello, PhD MS ETN RN CWON FAAN; Joyce Black, PhD RN; Gary Sibbald, BSc MD PRCPC(Med, Derm) MACP FAAD Med FAPWCA DSc(Hons)

This session reviewed the signs of melanoma and aimed to introduce practical strategies and tools to diagnose skin lesions and impaired skin integrity across the spectrum of skin tones.

Elizabeth Ayello noted that melanocytes produce the melanin, which is transferred to epidermal cells. The accumulation of melanocytes results in the darkening of the skin. The relative colouration of the skin is determined by the melanin produced by the basal cells.

Gary Sibbald explained that the Fitzpatrick Scale is used for classifying skin. In the scale, there are six types of skin. Type one always burns and is very fair. Type two usually burns, is fair, and tans with difficulty. Type three is medium and can sometimes burn and tan. Type four is olive, rarely burns and easily tans. Type five is brown, very rarely burns and tans very easily. Type six is black, never burns and always tans. This scale is not absolute, as someone with darker skin who lives in Canada could visit the Caribbean and burn on their first day there.

Risk reduction and secondary prevention are important. Primary prevention involves identifying those most at risk. The incidence of skin lesions rapidly increases with age in women over 40 years old and is three times more likely in men over the age of 75. Exposure to ultraviolet light that results in a blistering burn doubles the risk. Blue eyes and red hair, types one to three on the Fitzpatrick Scale, are at the highest risk. Additionally, the number of nevi, history of dysplastic nevi and a history of melanoma are risk factors that can be identified.

Secondary prevention, or early detection, occurs when a suspicious lesion is identified. A dermascope can be used to examine the abnormalities and pigment of the lesion. Additionally, the early complete excision with wide margins and a full thickness biopsy can be used. It is important to use the **ABCD** abbreviation when assessing possible melanoma

A = asymmetry of the lesion
B = border irregularity
C = colour; black is melanin, red is inflammation and white is regression
D = diameter

Melanomas can also be found in nails, where Hutchinson's sign (when the pigment advances either above or below the nail plate) can be present.

Ayello highlighted that it is important to differentiate incontinence-associated dermatitis and pressure injuries. It can be difficult to see erythema in darker skin tones so clinicians need other measures for detection. Possible tools in the literature include the sub-epidermal moisture detector, ultrasound and infrared thermography.

Joyce Black discussed how to stage pressure injuries, especially in Fitzpatrick types five and six. Stage one assesses for erythema. However, it is not always easy to identify in darker skin tones. Physical exam techniques can include moistening the skin to aid in visualization, palpating and asking about pain, and comparing colour to surrounding skin. Do not use racial or ethnic descriptors. Research has found that temperature assessment can also be helpful. Patients with a cooler centre and warmer borders had a higher risk of developing a deep tissue injury. Black stressed that assessment in patients with darker skin involves a deeper investigation.

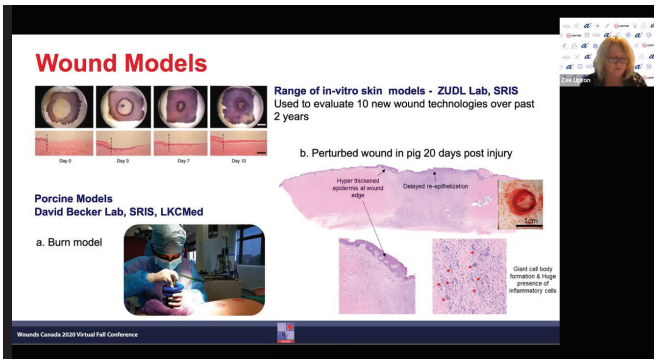
She also discussed the skin changes in patients with COVID-19. There is accelerated clotting associated with COVID-19, which can hasten the risk of ischemia. An early sign of COVID-19 are "COVID toes," in which there is an embolic or ischemic presence in the toes. Once again, it is important to note the techniques that can be used to identify discolouration in diverse skin tones.

ADVANCES IN WOUND PREVENTION AND CARE: A GLOBAL SNAPSHOT

Session speakers: Douglas Queen, PhD MBA; Zee Upton, PhD

Douglas Queen highlighted the global influence in wound care, where advances in wound care have occurred gradually.

Gary Sibbald is seen as the grandfather of Canadian wound care. There are various information influences such as Wounds Canada, Diabetic Foot Canada and NSWOCC. Canada has strong local and global influence.



In the United States, many groups led the way and introduced publications such as *Wound Repair and Regeneration* and *Advances in Skin and Wound Care*. Industry also plays a role in the United States through research and product development.

In the rest of the Americas, José Contreras-Ruiz and Manuel Gonzalez have contributed to advances in Mexico, where wound care is now fairly well developed, with support from a wound care association. In Brazil, Hermelinda Pedrosa and Vera Santos have been at the forefront of wound care. Brazil also has its own wound care societies embedded within other organizations.

South Africa has a fairly advanced wound care climate, led by Hiske Smart, Greg Weir and Frans Cronje. South Africa also has a wound healing association.

Australia has many wound care leaders, including Geoff Sussman, Zee Upton and Mike Woodward, along with several strong wound care organizations.

In India, wound care developments are mainly led by surgeons, including doctors Shukla and Pandey.

In the United Arab Emirates (UAE), doctors Tariq, Hamed and Hassan have contributed to wound care. The UAE also has a corporate wound care organization.

China has developed a research focus on wound care, especially in tissue regeneration and repair.

In Japan, an advanced clinical wound research focus has contributed significantly to data.

South Korea contributes much regionally and globally in the clinical practice setting.

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European countries have also contributed significantly over the years. Wound care is well advanced in Spain, which has multiple societies dedicated to wounds. Italy also has several associations and held the World Union (WUWHS) meeting in 2016. In Austria, Hugo Partsch is considered the grandfather of compression. Austria has both a wound association and journal. Germany has its own wound initiatives and a society. Denmark and Sweden also have both societies and a journal with a clinical focus. France and Ireland are similarly well advanced. George Winter and Keith Harding are both pioneers of wound care in the United Kingdom and globally. There are many journals and associations in the United Kingdom (UK), along with regional players. Europe in general has societies, associations and journals across the continent.

Focus on New Projects

Zee Upton highlighted wound care initiatives in Singapore, novel technological approaches being investigated and the benefits of collaborative interdisciplinary approaches to wound research. Through the creation of the Cooperative Research Centre (CRC) in Australia, in collaboration with other team members, Upton was able to convince the Australian government to take wounds seriously. The CRC also created many projects and publications and training for next generation wound researchers.

Upton joined the Skin Research Institute of Singapore. She and her team received funding for a project aimed at making Singapore a go-to hub for wound innovation. The project included partners from multiple disciplines and focused on enabling and evaluating technologies for wound healing and creating a large collection of wound data.

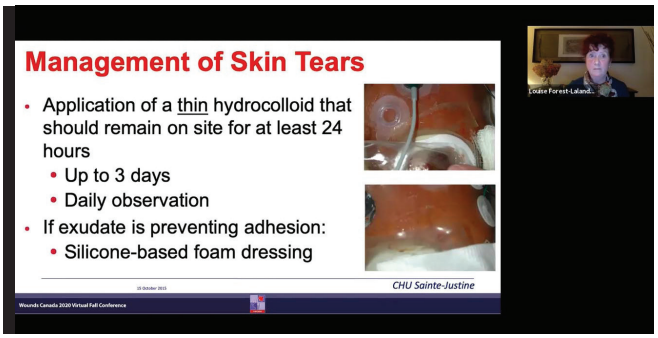
Another project focuses on the identification of wound biomarkers. Samples were taken from patients with diabetic foot ulcers and venous leg ulcers. This work builds on a dataset, where five biomarkers were identified in Australia. By the end of the year, there will be more than 250 samples from patients. Thus far, the team has found that there are 143 longitudinally significant proteins between healing and non-healing wounds. Between five and nine of these proteins may be predictive biomarkers for wounds. Pathway analysis has also found that wound healing processes such as neutrophil degranulation and antimicrobial peptides are associated with the identified biomarkers.

In addition, novel diagnostic technologies to enhance healing for use in a range of clinical settings with a focus on primary care were investigated. A new 3D printing technology, keratin dressings made from hair, and microneedles for scars were some of the technologies researched. Clinically, Upton and her team have established a Singapore-wide multivariable wound registry and assessment of new imaging and diagnostic tools; they have also initiated trials of novel interventions.

SKIN FRAILTY: STRATEGIES TO PROMOTE SKIN HEALTH AND INJURY PREVENTION

Session speakers: Louise Forest-Lalande, RN Med NSWOC; Samantha Holloway, RN; Maja Williams, MScFN RD

The three speakers focused on interrelated areas of skin health and injury prevention. Louise Forest-Lalande spoke on skin health and injury prevention in the neonatal context. Samantha Holloway highlighted how both intrinsic and extrinsic factors can affect skin frailty, especially in older populations. Maja Williams discussed how nutrition and hydration play an important role in skin health and injury prevention.



Neonatal Skin

Forest-Lalande discussed current and emerging strategies to promote neonatal skin health and prevent skin injury. In neonates, the skin has the same layers as adults; however, the thickness is only 60% of that of adults. Preterm neonates have fewer skin layers, depending on age. Skin is considered mature at 34 weeks of gestation, and the permeability will continue to decrease with age and will have good barrier function by 37 weeks. Preterm neonates' skin is more permeable and vulnerable to skin injury. Additionally, full-term neonate skin has an alkaline pH that will become acidic within the first four days of life. However, if the pH remains alkaline, the skin will be increasingly susceptible to micro-organisms.

Nursing care should aim to prevent disruption to the skin's acid mantle by using liquid cleansers that are neutral or mildly acidic. Forest-Lalande recommended avoiding products with alcohol or toxic substances and products that increase dressing adherence. Lukewarm water should be used instead of solvents. Adherent dressings should be left on for a minimum of 24 hours. More than 50% of pressure injuries in newborns are related to medical devices. Hydrocolloid strips can be applied when massaging the neonatal foot for a blood draw to prevent shearing of the skin. Chemical burns can be addressed with a silicone contact layer dressing and sterile gauze. Knowledge and education are the best means to prevent injuries to neonatal skin.

Elderly Skin

Holloway highlighted the importance of appropriate levels of nutrition and hydration in promoting skin health and preventing skin injury in older populations. Skin frailty can be triggered by several factors. As a person ages, skin becomes thinner, loses elasticity, has a reduced blood supply, loses subcutaneous fat and is less hydrated, and the dermo-epidermal junction changes. Additionally, radiation exposure, medications, dressings and repeated cleansing can impact skin frailty.

Both intrinsic and extrinsic factors contribute to skin damage. Extrinsic factors include environmental hazards like sun exposure, cleansing or smoking. Intrinsic factors include aging and the effects of skin conditions.

Skin frailty can change, and individuals should be reassessed frequently. A comprehensive assessment should be completed when the patient first presents to the medical or clinical setting and then be integrated into a daily routine and documented. There is also evidence of a synergistic relationship between conditions, such as between pressure injuries and skin tears.

Moisturizing is also an important preventive mechanism for skin damage prevention. Moisturizing should be a part of a daily care routine for those at risk of damage. Other preventative mechanisms, such as reducing sun exposure, ensuring water temperatures are not too hot, patting the skin dry and managing continence, can help to reduce the risk of skin injuries.

It is important to take a holistic approach to skin care. The patient should be involved, and other areas of health, such as nutrition and hydration, should be considered. Barriers to the assessment and management of skin frailty should also be identified early to better understand and develop solutions.

Dietary Considerations

Williams highlighted the importance of nutrition and hydration in skin injury prevention. There are several risk factors for skin injury related to nutrition and hydration. Unintentional weight loss or low BMI, low protein and food intake, dehydration and iron deficiency anemia are some of the risk factors. It is important to assess the patient's nutritional and hydration status when they first present to the clinical setting. There are many screening tools health-care providers can use, such as Mini Nutritional Assessment (MNA), Malnutrition Universal Screening Tool (MUST) and Simplified Nutritional Appetite Questionnaire (SNAQ). The assessment should consider the patient's weight history, anthropometric measurements, biochemical data, physical assessment, adequacy for food and ability to eat independently. Medical management in conjunction with diet is ideal for skin health and fast recovery.

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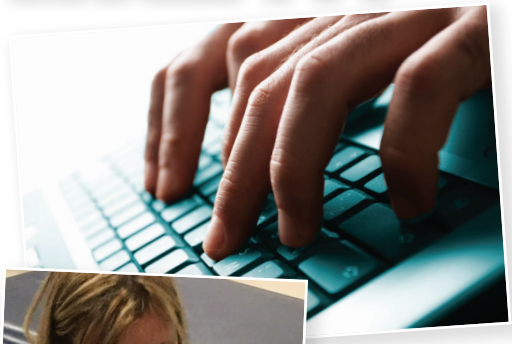

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Wound Data in Canada: Finding Solutions to a Long-standing Problem

Commentary by Michael Stacey, MBBS, FRACS, Doctor of Surgery, Professor, McMaster University, Surgeon in Chief Hamilton Health Sciences

Planning for the appropriate level of health-care funding for any disease process is very dependent on accurate data that identify the burden of the disease in the population. Canadian Institute for Health Information (CIHI) data have been identified by many researchers to be an underestimate of the extent of chronic wounds that exist within the Canadian population. The reasons for this underestimation include:

- these data come from coded databases and not from direct patient observation
- there is a lack of consistent criteria for assessing and diagnosing wounds and for how the data are collected and documented

Ideally, we need consistent definitions of the different types of wounds and consistent methods of data collection of wounds in all care settings.

Knowing that those data are collected in a consistent manner from direct patient observation and assessment would then enable the prevalence across the entire Canadian population to be extrapolated. This would also provide an accurate understanding of how much the CIHI data underestimate the extent of wounds in Canada and a better understanding of the burden of wounds in our different care settings, as well as in the community.

With accurate data, governments would be better informed of the extent of chronic wounds in Canada, and patient and professional wound care bodies could advocate for the appropriate level of funding to treat these patients. Wounds could then be funded in a manner that relates to their true extent, as is the case for other diseases such as cancer, heart disease and most other disease processes.

Two complementary articles in this issue of *Wound Care Canada* investigate the issues about which Michael Stacey has commented—through two different lenses but with much overlap—and offer achievable solutions. **Wound Prevalence in Canada: Reflection After 20 Years** by Pamela Houghton (p. 46) and **Accessibility of Wound Data in Canada: The Current Situation for Non-healing Wounds** by Virginie Blanchette and Janet Kuhnke (p. 60) look to the past, present an overview of the current situation in Canada and provide ways forward to improve the collection and use of data for all wound types and in all care settings.

Wound Prevalence in Canada: Reflection After 20 Years

By Pamela E. Houghton, PT PhD

Introduction

Prevalence and incidence are well-established epidemiological measures that estimate the frequency of a condition. In all areas of research, it is important to ensure similar language and a common understanding of the clinical implications of the data are being used.

While determining the frequency of wounds in health care can be very informative, care must be taken when conducting and interpreting the data. Estimating the prevalence and/or incidence of wounds is made more challenging because wounds are not identified diseases, but rather common secondary complications of many diseases such as spinal cord injury, diabetes and cardiovascular disease.

It is important to know whether prevalence or incidence should be determined. Often these measures are confused, and the different frequency measures are not fully appreciated (see box on page 47).[1–5] Another common misconception relates to how these prevalence and incidence data are reported and interpreted. It is important that wound care practitioners can link the right methods and calculations to the correct intended use of the data. For example, prevalence data may not be the best indicator of quality of care or effectiveness of prevention strategies, since values will change with the number of people admitted who have a wound.

Sometimes prevalence surveys are made more resource intensive because data are collected to answer questions beyond those which are needed to determine the proportion of people with wounds. Wound care practitioners want to know if their efforts to implement certain prevention strategies are effective. Researchers and clinicians need to resist the temptation to make comparisons and inferences across sites, between countries and over time. These comparisons and interpretations should only occur if similar methods

are employed and people with similar risk levels are surveyed.

The overall objective of this article is to help wound care practitioners contribute to our knowledge about the number, severity and type of various wound etiologies and to use these measures to raise awareness about the personal and economic burden that non-healing or complex wounds pose. This article will focus on more commonly occurring types of wounds, including pressure ulcers/injuries (PIs), diabetic foot ulcers (DFUs), mixed venous arterial lower leg ulcers (LLUs), skin tears and surgical site infections (SSIs).

This article will specifically:

- Define different frequency estimates (prevalence and incidence) and explain how each measure can be used to inform decisions
- Summarize Canadian prevalence and incidence studies and review the different methods used to derive estimates
- Explain key methodological features that improve accuracy and factors that determine wound prevalence

Definitions

Prevalence is the proportion of a defined population who have the condition (a wound) at the particular point or period in time.[5] Prevalence studies involve determining the total number of people who have a particular type of wound and includes both those who were admitted with the condition and those who develop the condition while on service. Procedures used to estimate the prevalence of a condition usually involve a cross-sectional design, which provide a "snapshot in time."

There are different types of prevalence, depending on the period of time over which data are collected. *Point prevalence* is a commonly reported measure that involves identifying the number of cases that exist in a defined population over a short period—usually one or fewer days. This type of prevalence usually involves "the blitz approach," where a team of assessors evaluates patients in an entire facility/organization over a few hours or one day. *Period prevalence* involves recruiting people who meet inclusion criteria over several weeks or months: for example, using sequential recruitment of all patients who are admitted to the service or those who undergo a procedure or surgery.

Incidence is the number of new occurrences who develop the condition (wound) over the observation period.[5] This longitudinal study design requires following eligible people for several weeks or months to identify those who develop the condition (wound). While this type of frequency estimate is generally more difficult to perform, it can provide valuable information about who, when and where in relation to wound development. Patient- and procedure-related risks can be determined, prevention interventions can be evaluated and quality of care can be assessed.

A more popular measure used to evaluate prevention programs and quality of care is determining *facility-acquired* or *nosocomial* wounds. This involves determining the number of people who develop a wound(s) between the time of admission and discharge. This hybrid study design requires having processes in place to ensure all patients are assessed on admission to identify those starting without a wound and that all those patients included in the study are assessed regularly while on service to ensure no new wound occurrences are missed.

Prevalence and Incidence Defined[5]

Prevalence is the proportion of a defined population who have the condition (a wound) at the particular point or period in time.

Incidence is the number of new occurrences who develop the condition (wound) over the observation period.

Why Prevalence Studies Are Important

While all three of these frequency measures can provide valuable information, how the data are interpreted and used depends on what measure is

estimated and the methods and calculations used to make the estimate (see Figure 1). Many groups and organizations have used prevalence studies to raise awareness about how often wounds occur as a secondary complication of different disease conditions. Knowing how many people have the condition in a health-care setting helps decision makers know what resources are needed to prevent or treat the condition (e.g., number of pressure redistribution surfaces). Wound prevalence has been used to estimate the burden of illness to the facility/organization and when performing economic analyses and budget planning. Since the number of nosocomial PIs has been associated with quality of care and sometimes termed "never events," many facilities conduct PI prevalence surveys as part of quality improvement programs. In addition, recording the prevalence of wounds before and after interventions that address risk factors known to predispose patients to wounds has been used to evaluate the effectiveness of prevention programs. Several reports have shown that sharing prevalence and incidence estimates within a health-care organization can motivate staff and patients to change practices and complete prevention activities.[6–8] Most clinicians appreciate that preventing this devastating and costly condition from occurring in the first place has the greatest potential to make an impact for both patients and health-care systems.

Studies that estimate wound prevalence are more plentiful than those estimating incidence, perhaps because it is more challenging to obtain accurate estimates of wound incidence. More controversy exists in the literature regarding the best way to obtain an accurate value for wound incidence. Some feel only patients who initially do not have a wound should be included when determining incidence.[1,5] However, others feel it is still possible to develop a second wound, and therefore these patients should not be excluded. Additionally, many feel wound incidence estimates are only helpful when people at risk of wounds are included;[4] however, the best method to objectively determine who is and isn't at risk is debatable.

Studies that estimate wound prevalence are more plentiful than those estimating incidence, perhaps because it is more challenging to obtain accurate estimates of wound incidence.

National survey tools and processes have been created to identify the number and severity of PIs in other countries. The European Pressure Ulcer Advisory Panel (EPUAP) convened a panel

Figure 1: Calculations to Estimate Prevalence and Incidence

$$\textbf{Prevalence} = \frac{\text{Number of people with wound}}{\text{Total number of people assessed at that time}} \times 100$$

$$\textbf{Facility-acquired prevalence} = \frac{\text{Number of people who developed a new wound since admission to facility}}{\text{Total number of people admitted to facility over same time frame}} \times 100$$

$$\textbf{Incidence} = \frac{\text{Number of people who develop a new wound over the time followed}}{\text{Total number of people followed over the same time period}} \times 100$$

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to agree upon a standardized method for prevalence of PIs.[9] This initiative resulted in a standardized survey tool to determine PI prevalence that includes information about PI risk (the Braden Scale for Predicting Pressure Sore Risk) and documentation of prevention strategies for each patient assessed.[10] This prevalence tool was then used by several countries, including India,[11] Jordan,[12] Sweden,[13] Norway[14] and Ireland/UK,[15] to raise awareness about the high prevalence of PIs across health-care systems. Similar national prevalence surveys have been conducted annually over multiple sites throughout the U.S.[16] The advantage of these national initiatives is that annual prevalence data were collected similarly across all sites. Therefore, values could be combined and compared between geographical locations and before and after prevention strategies were implemented.

Review of Canadian Prevalence Studies

Woodbury and Houghton conducted a systematic review of research literature that reported the prevalence of PIs in Canadian health-care settings between 1992 and 2001.[17] This exhaustive review of Canadian data revealed that only seven studies were published between 1992 and 2001 and involved a total of just over 18,000 people. Most of these Canadian-based publications determined point prevalence using clinical exams of greater than 90% of patients admitted to the facilities. However, many of these published studies included relatively small sample sizes (fewer than 200 people) and focused on specific patient groups or specific hospitals or homes. Results showed pressure injury prevalence estimates derived from earlier Canadian studies varied widely, between 2.8 and 36.8%.[17] This is not surprising, since methods and target populations surveyed were so different across the studies. Houghton and Woodbury also identified gaps in data about the prevalence of other types of wounds, including DFUs and LLUs.[5]

Table 1 summarizes prevalence data available from Canadian sites since the Woodbury and Houghton review in 2003.[17] In addition to the Woodbury and Houghton report, there were nine published reports[18–26] from Canadian sites that provided prevalence estimates (see Table 1). There were three additional Canadian studies available, but it was not possible to extract prevalence values from them.[27–29] A systematic search of multiple databases was not conducted for this review; however, other systematic reviews of prevalence studies that have been published recently did not identify any additional Canadian studies.[30–33]

Woodbury and Houghton provided the first report that pooled estimates of point prevalence from unpublished data collected via clinical exam of most patients in 39 health-care sites (n > 45,0000) located in different provinces in Canada between 1990 and 2003.[17] Careful appraisal of methods allowed authors to select data that estimated point prevalence of PIs using similar high-quality methods. Using the data that existed, the prevalence of PIs was found to range between 15.1 and 29.9%, depending on health-care setting.[17] The precision of these prevalence estimates is good, since 95% confidence intervals were tight, and pooled sample sizes were over 4,000 for each of the four health-care settings reported. This study produced the first national estimate of the prevalence of PI across health-care settings in Canada = 26.0% (95% CI = 25.2–26.8%).

Since 2003 there have been five Canadian studies published that reported the prevalence of PIs.[18–21,23] Three of these appeared to have employed similar definitions and assessment tools and employed a direct clinical exam to identify PIs, including stage 1 (NPIAP), in acute care hospitals.[18,19,23] However, a wide range of values for the point prevalence of PIs was found—between 12.8%[19] and 29.2%.[18] While two of the studies that examined the prevalence of PIs in Canadian acute care facilities found over 20% of patients were affected,[18,23] Vanderkopf and colleagues found 12.9% of acute care patients in 2008 had stage 1–4 PIs.[19] Furthermore, repeated prevalence studies conducted each year from 1994 to 2008 consistently reported prevalence rates below 13% in these hospitals located in eastern Ontario.[19] Maida and colleagues focused on people who

Table 1: Canadian Prevalence Studies, 2003 to 2020

Authors	Population Assessed	Health Setting	Wound Type	Design/Method	Data Source	Prevalence
Woodbury & Houghton, 2003	AC (11); N = 4831	AC	PIs	Retrospective data collected from point prevalence, cross-sectional studies that used the same methods involving head-to-toe skin assessments by trained and independent assessors of >90% of all patients in the facility/organization over 1-day period. A standardized tool was used to evaluate data collection methods = average methodological score was over 6/9. Most point prevalence surveys were organized/resourced by wound care industries that provide pressure redistribution equipment or supplies, therefore bias to overestimate prevalence estimates cannot be eliminated.	Data previously collected using clinical exam and similar methodology to derive an aggregate estimate of point prevalence in 4 different health-care settings	AC = 25.1% (23.8–26.3%)
	LTC (18) N = 3390	LTC	PIs			LTC = 29.9% (28.3–31.4%)
	Home (4) N = 1681	Home	PIs			Home = 22.1% (20.9–23.4%)
	Mixed (6) N = 4180	Mixed	PIs			Mixed = 15.1% (13.4–16.7%)
	Total (39) N = 14082		PIs			Overall = 26.0% (25.2–26.8%)
Groeneveld et al., 2004	N = 513; 416 adults; 97 children	2 AC and TC facilities Ontario	PIs	Prospective cross-sectional determination of point prevalence. All inpatients were assessed over an 8-hour period by 3-member trained multi-disciplinary assessment team (inter-rater reliability confirmed). NPUAP staging system to categorize based on wound severity. Pressure injuries were identified by head-to-toe skin assessment (including stage 1 PI = 48%). "Point prevalence rate" assumed to be reported per patient (not wound). Study supported by industry.	Clinical exam (head-to-toe skin assessment) by 3 multidisciplinary staff members over 8-hour period	All PIs = 26.3% PIs Adults = 29.2% PIs Children = 13.1%
Vandenkerkhof et al., 2011	N = 12,787 over 15 yrs (853/yr)	2 AC in Ontario	PIs	Prospective cross-sectional determination of point prevalence. Annual 1-day point prevalence census in two acute care facilities (amalgamated) in Ontario over a 12-hour period. Dedicated assessors were trained in a head-to-toe assessment procedure, wound staging (NPUAP, 2009) and risk assessment for pressure injuries (Braden). Data collected each year between 1994 and 2008. Stage I+ = at least one pressure injury Stage I–IV or unstageable. Stage II+ = proportion of patients who had Stage II P^ or higher.	Clinical exam (head-to-toe) by specially trained team	Stage I+ (2007) = 12.8% Stage II+ (2006) = 7.9%
Woo et al., 2015	N = 203,035 unique patients	All sites in Ontario	PIs	Retrospective data from Institute for Clinical Evaluative Sciences (ICES) available from publicly funded health-care services including admitted to acute, home, long-term and continuing care in Ontario. Annual prevalence = number of individuals with PIs within the time period (year) over the total number of individual data available within ICES in the same year.	Administrative database Annual prevalence	2013 All setting = 8.6% Acute = 10.2% Home = 3.7% LTC = 8.4% CCC = 22.6%
Maida et al., 2008	N = 664 cancer (70% pts) 593 followed	Consultative palliative care program (hospital and community) Ontario	All wounds	Prospective longitudinal observational study. Sequential referrals to specialized service May 2005 to June 2006. Initial assessment within 24 hours of referral and followed q24–48 hrs until death or end of study. PI risk assessed using Braden. PI classified by NPUAP. DFU classified using Wagner. Palliative Performance Scale (PPSv2) assessed. "Period prevalence" = Prevalence at baseline (referrals over 24-month period). Most data reported as frequency of wounds. *Calculation of prevalence required.	Clinical exam by specialist wound management team Prevalence (initial Ax) Incidence over 24 months until death.	*All wounds = 84% *Malignant = 14.5% *Pressure = 39.4% *DFU = 5.5% *VLU+Art = 17.3%

cont'd. . . .

AC = acute care
LTC = long-term care
TC = tertiary care
CCC = complex continuing care

Authors	Population Assessed	Health Setting	Wound Type	Design/Method	Data Source	Prevalence
Denny, 2011	2,625,991	AC, LTC+CCC home all Canada 2011–2012	"Compromised Wounds"	Retrospective data extracted from 3 administrative databases over 1 year period 1) Discharge Abstract Database (DAD) (AC – not Quebec); 2) Long-term care and hospital-based CCC Continuing care reporting system (CCRS) NL, NS, MB, SA, BC, ON, YU 3) Home care reporting system (HCRS) ON, BC, YU. Included several wound etiologies including PIs, LLUs, "any chronic wound," skin barrier breaches. All compromised wounds reported for each health-care setting. 90% patients included were in acute care database	Data extraction from large national administrative database	Acute Care = 3.7% Home Care = 7.3% CCC = 28.2% LTC = 9.6%
Hurd et al., 2009	N = 3099	Acute care 13 sites Canada	All wounds	Data were collected over a 1–2-day period using software loaded on to a handheld computer and head-to-toe assessments; audits were carried out in each hospital by the same independent team of advanced practice nurses using standard data collection forms; members were trained in the clinical assessment of wounds and use of a standardized data collection tool; PIs were staged using NPUAP classification system. *Calculation of prevalence required Study supported by industry	Skin assessment point prevalence (1–3 days) audit team	All = 41.2% (30–68%) PI = 22.9% SSI = 6.3% *DFU = 1% *LLU = 1%
LeBlanc et al., 2020	N = 380 aged 65 yrs or older	4 LTC facilities in Ontario	Skin tears	Prospective cross-sectional point prevalence determined over 1 day at each of 4 facilities. 4 trained researchers performed all assessments. ISTAP classification used to categorize skin tear severity. 410 subjects recruited from 1160 residents of 4 LTCs = 40% of population.	Skin assessment point prevalence (1 day)	Skin tear = 20.8% 95% CI (16.9–25.3)
Reid et al., 2006	169 of 322 residents with diabetes	Northern Indigenous community of 5597	DFUs	Cross-sectional cohort study July to August 2000 where people known to have diabetes and living in the community were invited to undergo a foot exam. Demographic, foot and ulcer characteristics were recorded.	Standardized foot exam	DFU = 5% had present ulcer
Hopkins et al., 2015	16,883 admissions in 2011	AC, LTC, home and clinics in Canada	DFUs	Annual prevalence Retrospective economic analysis linked 4 mandatory national health administrative databases and used codes to identify cases of DFU. Acute care (DAD) – most responsible diagnosis ICD-10 codes OP clinic and ER visits (NACRS) – Ontario Home and LTC (HCRS & CCRS): InterRai MDS Prevalence: total number of unique cases by year and rates per 100,000 population	Administrative databases	DFU = 75.1 per 100,000 general population (0.75%)

attended a specialized oncology service and found a very high proportion of this specialized high-risk population were troubled with wounds in general (84%), including malignant wounds (14.5%) and PIs specifically (39.4%).[21] Woo and colleagues produced the only study that derived PI prevalence from a large administrative database for Ontario health-care institutions (ICES) and reported the lowest value for PI prevalence (8.6%).[20] Surprisingly, this analysis of the Ontario databases also revealed a relatively low proportion of people with PIs in Ontario LTC facilities (8.4%)[20] compared with previous reports that reported PI prevalence detected between 20% and 29%.[17]

Prevalence data for other wound types such as skin tears,[24] leg wounds of mixed arterial/venous etiology[21] and DFUs[25–26] are sparser. Four reports examined DFU prevalence;[21,23,25,26] however, the target populations surveyed for the presence of DFUs were vastly different, including Indigenous

communities,[25] cancer survivors,[21] acute care patients[23] and the general population.[26] As a result, the prevalence of patients with DFUs receiving care from Canadian health-care systems remains to be determined.

In 2011, Denny and colleagues at the Canadian Institute for Health Information (CIHI) estimated the prevalence of "compromised wounds" in patients located in various health service environments in Canada using three large administrative sources of data (discharge data DAD, CCRS and HCRS).[22] These "compromised wounds" included PIs, arterial-venous wounds, skin barrier breaches such as cellulitis, and other chronic wounds. Analysis of CIHI data produced prevalence estimates that ranged between 3.7% in acute care to 28.2% in complex continuing care beds.[22] Because over 95% of the 2.3 million people included in the data were in acute care hospitals, the overall prevalence of compromised wounds was less than 4%. The authors recognized that current data collected in Canadian health-care systems do not capture all wounds and therefore drastically underestimate the true extent of the problem.[22] While diabetes was identified as a risk factor for those who had wounds, researchers were unable to determine the prevalence of DFUs in the Canadian health system.

Ho and colleagues compared cases with PIs that were identified via nursing consult reports (considered gold standard) to those recorded in Discharge Abstract Databases (DADs) in a large tertiary acute care hospital in Alberta.[34] Using two different sets of ICD 10 codes in the DAD database, the highest sensitivity for detecting PI prevalence was only 39%. They concluded that the biggest source of health-care data (CIHI) may not be accurate for determining PI prevalence.[34] This Canadian study, which questioned the utility of health-care databases for accurate prevalence estimates, is consistent with results from Sweden. Gunningberg and Ehrenberg compared prevalence estimates derived from chart review versus direct skin assessment when the same patients were assessed at the same time in the same facility.[35] They found PIs identified from chart review resulted in prevalence values that were less than half those identified in head-to-toe skin assessments.[35] Thus, relying on current coding and data collection systems in Canadian health-care facilities/organizations will be unlikely to help illustrate how many people are affected by wounds and will not help us show how great the burden of non-healing wounds are to Canada's health-care systems.

Discussion

This review of Canadian literature reveals the lack of information regarding the true prevalence of common wound types in Canada. While many groups have tried to tackle this question, the variation of approaches and/or methods used leave us no closer to estimating the extent of the problem in Canada's health-care systems. Many international organizations, researchers and epidemiologists have written guidance documents about how best to determine the number of people affected by wounds.[1,3,9] This has resulted in several different ways of estimating wound prevalence. However, what is consistent is that all researchers working in this field agree that a standardized method must be used if the goal is to derive a national wound prevalence estimate.

PIs identified from chart review resulted in prevalence values that were less than half those identified in head-to-toe skin assessments.

First, it must be decided what type of prevalence is being estimated. Point prevalence is most commonly collected. This involves a defined data collection event (a blitz) so that wound prevalence data are collected over hours or, at most, one day.

This has been done in other countries on an annual basis for national pressure injury surveys.[10,12,14,15] Perhaps we could do this in Canada not just PIs, but also other common types of wounds such as LLUs, DFUs and surgical site infections.

Other key questions to ask when conducting prevalence studies are summarized in the box below. The content of this list was taken from Loney and colleagues[36] and adapted for wound prevalence by Woodbury and Houghton in 2003.[17] These methods include using a team of qualified and unbiased assessors who conduct a direct clinical exam and apply predefined criteria to distinguish and document wounds of different etiologies. Providing very clear definitions to be applied during the prevalence survey and specific criteria that describe the patient group and type of wounds that will be estimated (i.e., the denominator of prevalence equation) is equally important. A mechanism is needed to ensure either all (> 90%) or an appropriate random sampling method is used to correctly identify eligible patients. By clearly defining inclusion criteria, smaller facilities with similar case mixes can be combined so that an adequate sample size of at least 300 people is obtained and the precision of prevalence estimates is maintained.

How prevalence data are reported is also important. First and foremost, it is critical that all prevalence estimates are based on the number of people with wounds. Since patients often have multiple wounds, it is important to have a system in place to decide which wounds will be counted and that all prevalence data including subgroup analysis are expressed by number of people assessed, not number of wounds identified. A 95% confidence interval around each prevalence estimate is the most accepted statistic to show the precision of the overall wound prevalence value.

Finally, when interpreting prevalence values, it is critical to fully consider the setting or wound

Key Methodological Considerations for Prevalence Studies

- Is point prevalence the type of estimate that is collected (i.e., data were collected over a short time period [1–3 days])?
- Were definitions and criteria clearly laid out prior to commencing the study?
- Was prevalence determined for a defined population of people receiving care from a health-care organization/facility (i.e., patients rather than general population or entire community)?
- Were prevalence estimates calculated based on the number of patients with wounds (not the number of wounds identified)? Is there a system established to select which wounds will be counted in people with multiple wounds?
- Was a direct clinical exam such as head-to-toe skin assessment used to identify and classify wounds (rather than a chart review or administrative database)?
- Did the project involve trained assessors who are known to be able to reliably identify and categorize the particular wound type? Were these assessors independent and unbiased from the results of the prevalence survey (i.e., preferably not clinicians who are responsible for the care of the wounds they are counting)?
- Was a sample size of at least 300 eligible patients examined included in the estimate?
- Were at least 90% of a clearly defined target population sampled? Alternatively, was an acceptable random sampling method used to identify and recruit the majority of eligible patients?
- Do all prevalence estimates include the mean value expressed as a percentage of those examined as well as 95% confidence internals?
- Were the results accompanied by clear description of the patient characteristics and health-care settings so that the data can be applied/combined with similar settings/populations?

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care service where the estimate came from, as this will ultimately determine characteristics and risk of the patients included in the survey.

Summary and Next Steps

A review of current literature that has been published about the prevalence of wounds in Canada turned up limited research. What has been done shows the wide variation in methods used to calculate these prevalence estimates. The discussion of current literature was meant to help those involved in prevalence studies in their facility/region to consider key concerns in terms of data collection, analysis and reporting that are known to influence prevalence values.

Many groups are involved in determining wound prevalence of different wound etiologies. Hopefully, we can move toward a standardized approach to managing wound prevalence data that leaders in wound care can use in many health-care sites across Canada. To this end, a group of researchers and students in the master's in Wound Healing program at Western University are involved in developing and delivering a national survey. This survey will identify researchers/leaders and health-care facilities/organizations who are currently, or could potentially, collect wound prevalence data in a standardized way. We also need to determine those that can share aggregate prevalence data in an anonymized fashion so that it can be pooled for many different health-care facilities/centres right across Canada. If you are interested, please contact Pamela Houghton at phoughto@uwo.ca.

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Wounds Canada Limb Preservation Symposium, May 2021

Multidisciplinary Perspectives in Peri-Amputation Limb Management

Presenters: Paul Kim, Christine Murphy, Gustavo Azoubel

Paul Kim is Medical Director of the Wound Program at University of Texas Southwestern Clements University Hospital, Dallas, Texas, where he is a professor in the Department of Plastic Surgery and Orthopedic Surgery. He is also a fellow of the American College of Foot and Ankle Surgeons. He has received both intramural and extramural research grants and has over 125 publications with a focused interest in the diabetic limb.

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Gustavo Azoubel completed his medical education in 2001 at the University of Pernambuco in Brazil and then trained as a general surgeon in Brazil. In 2006, he enrolled in the critical care medicine fellowship at Sunnybrook Health Sciences Centre/University of Toronto, graduating in 2007, when he was accepted to the general surgery program at the University of Toronto. He completed residency training in general and vascular surgery at the University of Toronto and holds Royal College of Physicians and Surgeons Certification in both disciplines. He is actively engaged in teaching undergraduate and postgraduate trainees and is a member of the residency committee of the vascular surgery residency program at the University of Toronto.

A Team Approach

Wound care is complicated and nuanced (Figure 1). Many patients with wounds, especially if caught early, can be managed in a primary care office when clinicians have enough knowledge of the condition. If wounds become non-healing, patients should be referred to wound clinics that have the resources, knowledge and experience necessary to identify and treat risk factors, comorbidities and other underlying etiologies. If wound healing still does not progress, referral to a tertiary wound clinic, often found in academic hospitals, should be made. These tertiary wound clinics often combine care from numerous specialists, including vascular surgeons, plastic surgeons, podiatric/orthopedic surgeons, infectious disease specialists, rheumatologists, hyperbaric medicine specialists, physical therapists, nurse practitioners, wound nurses and more.

While treating and making referrals to other facilities, health-care providers need to consider the integrity of continuity of care when patients are transferred among emergency rooms, wound clinics, community care and home care. If not managed proactively, these patients can be lost to follow-up.

Healing potential varies based on wound bacteria, blood perfusion and tissue mechanics, but is also affected by the host (patient). Host factors, such as socioeconomic status, nutritional status and access to health care, can be more difficult to identify and address, and can often contribute to a wound that does not heal in a timely manner.

Figure 1. The ARRT of Wound Care

Acknowledge	A single specialty is incapable of managing a chronic wound
Recognize	Lack of wound progression
Refer	Involve other specialists in the care of the wound
Transfer	Timely transfer of care to a secondary or tertiary centre

Vascular Surgery

Vascular surgeons have many roles in managing patients with ischemic wounds, including diagnostic evaluation, staging and imaging of patients with suspected chronic limb-threatening ischemia; wound and tissue loss classification; vascular anatomy imaging; non-invasive surgeries; digital subtraction angiography (DSA) (especially in tibial disease); and evidence-based revascularization.

According to Centers for Disease Control and Prevention (2011), comprehensive foot care programs reduce amputation rates by 45–85%. Rather than focusing on salvaging a limb, clinicians must prioritize limb function preservation. This must take into account wound factors, but also the patient's expectations and realistic functional capacity. When preservation cannot be achieved, amputation is an option that must not be considered a failure.

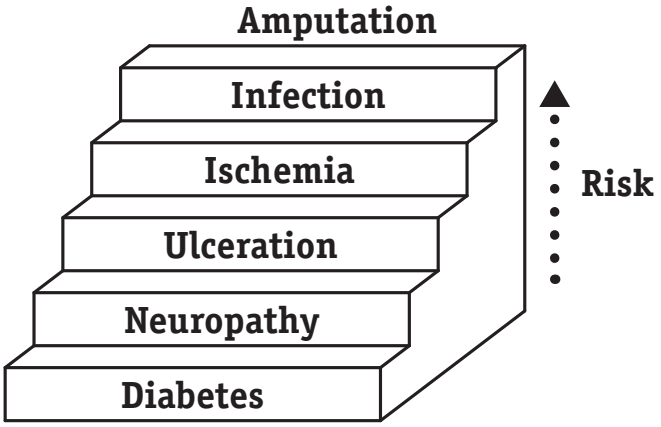
Chronic Limb-threating Ischemia (CLTI) and Amputation

The presence of ischemia often delays wound healing and increases amputation risk. A multidisciplinary approach is fundamental in managing patients with CLTI and preventing major tissue loss. No single specialist possesses the skills to manage these patients alone. Diagnostic evaluation, staging and imaging of patients with suspected CLTI, leading to evidence-based revascularization, are integral parts of successful treatment.

Protocol-driven Care

It is important to use tools and systems that have proven effective in the management of these complicated patients and wounds and the prevention of amputation (Figure 2). The WIfI (wound, ischemia, foot infection) system stratifies amputation risk according to wound extent, degree of ischemia, and presence and severity of foot infection. Once a WIfI classification is made, the Global Limb Anatomic Staging System (GLASS) can be used to stage infrainguinal disease pattern in chronic limb-threatening ischemia and define the optimal strategy for revascularization. Clinicians can use these patient risk–estimation tools to determine candidacy for limb preservation, periprocedural risk and life expectancy, keeping in mind the need to reassess if wound healing stalls, or the wound deteriorates or recurs.

Figure 2. Stairway to Amputation



Adapted from Rogers LC, Armstrong DG. Podiatry care. In: Cronenwett JL, Johnston KW, editors. Rutherford's Vascular Surgery. 7th ed. Philadelphia: Saunders Elsevier; 2010. p. 1747–1760.

Advanced Therapies

Vascular disease can cause specific impairments, including in collagen linking (scaffold rebuilding), growth factor and cell availability, biofilm clearance, bacterial environment, nutrient and oxygen availability, waste clearance, neuropathy and edema. When treating these complex wounds, time is tissue; early, proactive, aggressive wound planning is essential for optimal care. Advanced therapies are a critical component of a clinician's toolkit for success for managing wounds, especially in patients with vascular challenges.

Negative pressure wound therapy (NPWT) can be used for vascular incision support. This technology is a real-time pressure feedback system that adjusts pump output to compensate for wound distance, wound position, exudate characteristics and patient movement. 3M™ V.A.C.® Therapy applies negative pressure to uniformly draw the wound closed (wound contraction), and may help reduce localized edema, promote perfusion, promote granulation tissue, reduce wound size and provide an external barrier to contamination.

Limb loss is associated with high mortality and morbidity. Every effort to preserve the limb should be pursued, but delaying amputation when one is obviously needed has negative implications.

3M™ V.A.C. Veraflo Cleanse Choice™ Dressing, used in conjunction with 3M™ Veraflo™ Therapy, can be used to initiate immediate wound cleansing therapy. The dressing's three-layer design facilitates removal of thick exudate material, such as fibrin, thick wet exudate and other infectious material, providing an option for clinicians when surgical debridement must be delayed or is not possible or appropriate.

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Accessibility of Wound Data in Canada: The Current Situation for Non-healing Wounds

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Introduction

While even healing wounds require significant health-care resources, ultimately the majority of the resources used are for wounds that are non-healing.[1,2] Non-healing wounds, which originate from different etiologies such as arterial and venous insufficiency, pressure and diabetic foot complications, are a serious public health problem that have devastating consequences for patients and result in high costs to health-care systems.[2,3]

Patients with non-healing wounds have poor health-related quality of life when evaluated in eight different dimensions (see Table 1).[4,5] Particularly, non-healing wounds limit quality of life in the physical dimension (role limitation and functioning), and this is worsened by a concomitant amputation, which is also related to more severe body pain.[2]

Wound-related costs are substantial, especially when amputations and hospitalization for infection are needed, but the cost of wound burdens remains difficult to estimate properly.[2,6,7] Global prevalence estimates of non-healing wounds vary. It is difficult to provide comparisons when vastly different methods are used to collect data from different locations, care settings and types of wounds. However, robust data (e.g., prevalence estimates, time to heal, healing rate, related complications) support organizations like Wounds Canada and the World Union of Wound Healing Societies (WUWHS) in creating awareness of the challenges that individuals with wounds face in health-care systems, in providing solutions and in

Table 1: Dimensions of Health-related Quality of Life According to SF-36 Questionnaire (adapted from Brazier et al.,1992[4])

Area	Dimension
Functional status	• Physical functioning • Social functioning • Role limitations: physical problems • Role limitations: emotional problems
Wellbeing	• Mental health • Vitality • Pain
Overall evaluation of health	• General health perception

advocating to governments to ensure they make wounds a priority.[8,9] A picture of the real situation will help optimize prevention and management in Canada and worldwide.[5] Evidence-based data are a powerful way to mobilize stakeholders for the benefit of patients that live with wounds.

The State of Wound Data in Canada

In 2013, The Canadian Institute for Health Information (CIHI) released data on the prevalence of compromised wounds in Canada in different settings and acknowledged wound management, especially in diabetic patients and in seniors, as a priority for Canadian health-care organizations.[10] The barriers to accessing different wound data (e.g., prevalence estimates related to wound types and settings, wound-related complications like hospitalization and infection) in Canada were fully exposed.

A previous paper by Woodbury and Houghton (2005) discussed the difficulties of retrieving credible data about the prevalence of non-healing wounds.[11] The authors also identified several gaps in our knowledge about the extent of non-healing wounds in Canada, including the prevalence of diabetic foot ulcers and leg ulcers due to mixed arterial/venous disease. The scarcity of prevalence data that existed in 2003 was attributed to difficulties in retrieving credible data about the prevalence of non-healing wounds. This problem is still relevant today. Pamela Houghton has revisited the issue in her article "Wound Prevalence in Canada: Reflection After 20 Years," on page 46.

For a long time, many researchers have requested better health data accessibility and direct measured health data and national databases.[12-14] The 2013 CIHI report highlighted many information gaps and made several wound-specific recommendations, such as the need for standardized and high-quality reporting of wound data, especially in acute care; better coding and data collection for non-healing wounds across all health-care settings, including cellulitis reporting in home care; the need for improved education and understanding of the etiology and types of wounds; the factors that contribute to wound development and their importance to overall health and care; and the need for improved recording and reporting of wound development, progression, treatment and outcomes.[10] Although

CIHI did report relevant data, the principal limit with using administrative databases is the underestimation of the true extent of the problem vasued by how data are collected.

This paper will review the current state of available wound data (e.g., estimated prevalence) in Canada—specifically for non-healing wounds—since the CIHI recommendations. This is not a systematic review of the literature, and some data may not have been discussed, but we have attempted to address the following questions: What wound data literature is available in Canada? Where can we get data easily? Are the data that are available accurate? What are the barriers for obtaining the proper figures and recommendations for improving wound data?

Wounds: The True Burden Is Not Known

Little is known about the true burden of non-healing wounds due to the disparities in data availability worldwide.[15] Retrieving wound data with systematic methods is challenging because of variability in study design, reporting data estimates and measurement methods used.[15-17] The burden is also unclear because of underreporting in self-treated cases, varying definitions of *non-healing wound*, and inaccurate diagnostic coding for wound care and type of wounds. The common definition of *non-healing wounds* is "wounds that fail to proceed through an orderly and timely process to produce anatomic and functional integrity,"[18] which does not specify any timeframe for the healing or at what point the wound becomes non-healing. The absence of systematic classification that bridges the clinic and the research introduces difficulties that challenge the accuracy of the data. Differing definitions of wound etiology of non-healing wounds also introduce variability in reporting and data. Addressing all of the above should be the first step for the creation of better wound data. Establishing clear definitions will improve research data consistency, and health-care coding systems need to be part of the change. For example, the International Working Group on the Diabetic Foot (IWGDF, 2019) published definitions related to diabetic foot disease that help in retrieval of similar data about diabetic foot,[15,19] and the National Pressure Injury Advisory Panel (NPIAP) changed the terminology from pressure ulcer to pressure injury in relation to international guidelines.[20]

How many Canadians live with a non-healing wound?

Without precise information, it can be difficult to address important wound management issues and to receive adequate support from governments because they rely on the information to set health-care priorities and develop policies.

While CIHI prevalence data are commonly used as reference, these results are derived from databases that underestimate wound type occurrence and do not differentiate wound etiology.

Considering this, a recent systematic review of 11 observational studies looked at the prevalence of non-healing wounds, but the results have demonstrated a high heterogeneity of included studies (see box on p. 63), which limits the significance of the results produced. However, results have shown a pooled prevalence of 2.21 per 1000 population in wounds of mixed etiologies and 1.51 per 1000 population in non-healing leg ulcers.[15] Only one of the included studies is from Canada; it reported prevalence of 1.4% for non-healing wounds in the Quebec home-care population.[23] Authors also highlighted the need

Heterogeneity

In meta-analysis, the heterogeneity measurement of included studies is a statistical method that demonstrates the capacities to merge results from similar studies to estimate a global result. Heterogeneity is calculated from clinical or methodological diversity, or both, among studies. For example, variability of the participants, interventions and outcomes are clinical diversity, and variability in study design and risk of bias are methodological diversity.[21,22]

Different databases were used in the 2013 CIHI wounds report:[10]

1. Hospital Morbidity Database (HMDB)*:* for acute inpatient setting and day surgery (all Canadian hospitals except Quebec, which had another type of data collection)
2. Continuing Care Reporting System (CCRS) and long-term care: for complex continuing care and long-term care such as residential care and hospital continuing care in Ontario (partial coverage of long-term care residents in Newfoundland, Nova Scotia, Manitoba, Saskatchewan and British Columbia; full coverage in Ontario and Yukon)
3. Home Care Reporting System (HCRS)*:* for community care and home care (full coverage from Ontario, Yukon and British Columbia)

for better data collection in Quebec and for prevention-based patient care protocols to help health agencies provide optimal patient care.[23]

CIHI reported non-healing wounds broken down by health-care settings and found that almost 4% of patients in acute care, more than 7% of patients in home care, almost 10% of patients in long-term care and almost 30% of hospital-based continuing care patients are affected.[10] However, while CIHI prevalence data are commonly used as reference, these results are derived from databases that underestimate wound type occurrence and do not differentiate wound etiology.[10]

Canadian wound data looking at specific wound types are scarce. A systematic or scoping review could be a relevant way to retrieve all the available data (e.g., prevalence, healing rate, related complications such as infection, hospitalization and death) related to the Canadian wound burdens. However, we are able to report some prevalence data (below) related to pressure injuries, diabetic foot ulcers and venous ulcers in Canada. Overall, the trends demonstrate that CIHI may have underestimated wound prevalence in Canada and their results are a conservative view of the situation.[10]

Pressure injuries

Pressure injuries (PIs) are present in all care settings (e.g., acute, long-term and community care) while venous ulcers and diabetic foot ulcers are mostly present in the community, with smaller numbers in the other settings. A study of PIs in Ontario estimated prevalence as 30%, 25% and 15% in long-term care, acute care and community care settings respectively, with a mean prevalence estimated at 26% across all health-care settings.[24] Another study from Ontario estimated prevalence at 13% overall.[25] In addition, in large wound audits carried out in 13 acute care hospitals, the dominant type of wound reported was PI, with a prevalence of 22.9%.[26] An older prevalence study (2001) reported PIs for hospitals in the United States and Canada ranged from 4.7% to 29.7%. The range for community settings was 19.2% to 29% and that for nursing homes was 15.3% to 20.7%. The highest reported prevalence was 33% for patients with spinal cord injuries cared for in community settings.[27] Finally, a small study in two long-term care facilities estimated the prevalence of PIs between 36 and 53%.[28] All these findings suggest higher prevalence than gleaned from international data from a systematic review, which have estimated the prevalence of PIs in acute care settings at between 6% and 18.5%.[29]

Diabetic foot ulcers

The prevalence of diabetic foot ulcers (DFUs) in Canada was estimated at 75 per 100,000 people in a large cohort that represents 60% of the total population of Canadians with diabetes.[30] This study did not include data from Quebec and British Columbia, and prevalence was calculated using standardized mandatory national health administrative databases for hospital admissions and available provincial data for emergency room and clinic visits, home care and long-term care facilities.[30] DFUs are more prevalent in Indigenous communities of Canada and are estimated at 14.8%.[31]

Venous ulcers

In one Ontario region, a new community leg ulcer service reported venous leg ulcer prevalence at 2 per 1000 people over 25 years of age.[32]

Global prevalence estimates

It has been suggested to avoid comparing prevalence estimates across studies from Canada or with other countries.[15] There is no place for combining "apples and oranges" in this area of research because of the studies' high heterogeneity. However, as an informational study, the prevalence of PIs in long-term care facilities is estimated to be between 11.8 and 13.7%, depending on the country,[33] and 14.8% in public hospitals.[34] The global prevalence of DFUs is estimated at 6.3% in a recent systematic review.[35] Venous ulcers affect up to 3 per 1000 people, and are more common in older people.[32]

Current Data Accessibility in Canada

We listed sources of Canadian wound data by province and territory, regardless of the type of data; this is summarized in Table 2. We found that limited wound-related data are available for clinicians and researchers. According to our preliminary research, based on keywords, most public databases from provincial health-care authorities do not provide information. The lack of accessibility can limit our understanding of the current situation. In this context, society remains unaware of the true impact of wounds on patients and on health-care systems.

The two most accessible organizations that share information are CIHI and the Quebec government, through the Régie de l'assurance maladie du Québec (RAMQ) or the Institut nationale de santé publique (INSPQ). In all cases, formal requests for information have to be completed. The Discharge Abstract Database (DAD) contains acute care discharge data from most Canadian hospitals, except those in Quebec, and is very relevant for wound data.[36,37] Databases are available by year and jurisdictional coverage.[38] Canadian Coding Standards are used, and this coding system is similar across the country.[39]

Society remains unaware of the true impact of wounds on patients and on health-care systems

There are major limitations in accessing these databases. First, researchers must wait a minimum of 30 days for access to CIHI and a minimum of a year for the Quebec database. Second, access to these databases is expensive. This impacts researchers and health-care leaders considerably because they need research funding to provide new data in wound research and to improve the quality of wound care practice. Finally, researchers must have the skills required to manage and use metadata to come to any conclusions.

However, there is also limited value for this kind of data. A recent validation study in Alberta for the prevalence of PIs using DAD demonstrated the data's low sensitivity. The authors suggest that this data source may not be accurate for determining overall PI prevalence, and results should be cautiously compared with other prevalence studies. Overall, their findings highlight the underestimation of the real prevalence.[40] We have to keep in mind that one of the primary

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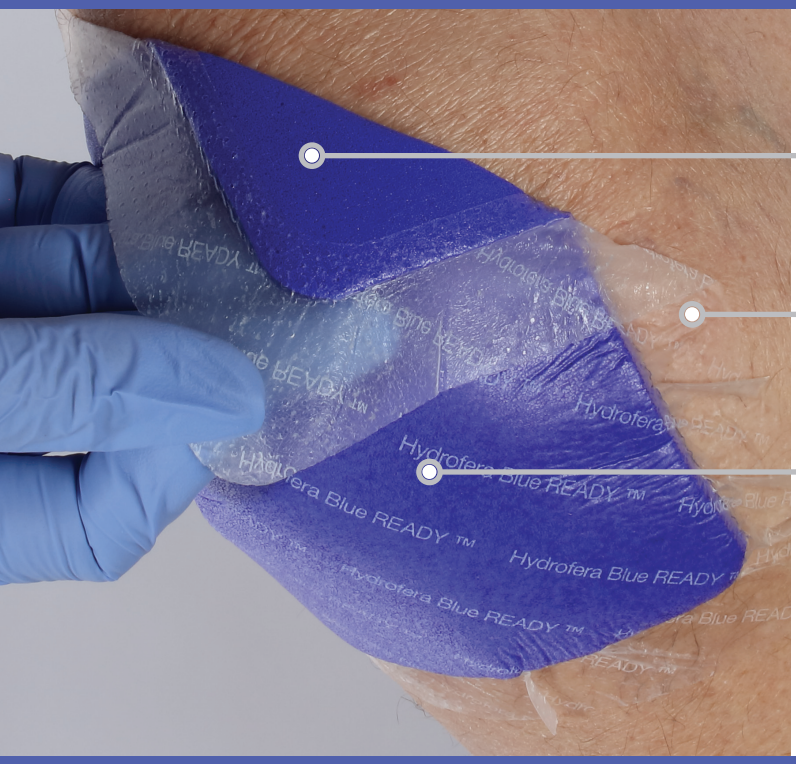

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purposes of collecting administrative health data is to inform resource utilization and surveillance. Database administrators in Canada use predefined classification codes to register conditions, and this may not be precise enough for the wound types or stages.[41] A wound remains a wound, and the etiology is then less important in a billing code system. This is why it is also important to conduct data-quality studies to remain informed about the strengths and limitations of the data in order to produce unbiased results.[41]

Done correctly, administrative data analysis may serve to identify the magnitude of prevalence and monitor annual trends to inform quality-of-care evaluations. To evaluate data within the same institution or to make comparisons between institutions, data must be sufficiently standardized and their quality needs to be comparable across jurisdictions. The concept of data quality is then both relative and multidimensional.[41] The CIHI data quality framework encompasses concepts of accuracy, timeliness, comparability, usability and relevance,[42] but other organizations such as the Public Health Agency of Canada or Statistics Canada are using different data quality frameworks.[41]

Another relevant way to access wound data is by working closely with teams in specialty wound clinics. In Ontario, an analysis of non-healing wound management outlined 49 teams that dealt with wounds in a population sample size estimated at 12,028,905 and provided many relevant data for wound management.[43] It estimated that teams see an average of 579 patients per year, and their results have shown that the majority of wounds treated are non-healing: 45% diabetic foot ulcers, 15% pressure injuries and 13% venous ulcers.[43] A study that put forward a multi-disciplinary approach to non-healing wounds in Newfoundland and Labrador demonstrated that venous leg ulcers and pressure injuries were the dominant wound etiology.[44] Moreover, some clinics may have internal registries that code wound

Table 2: Canadian Provincial and Territorial Data Accessibility

Provinces and territories	Data accessibility	References
British Columbia	• Ministry of Health • Discharge Abstract Database (DAD) • Community Health Database	• www2.gov.bc.ca/gov/content/governments/organizational-structure/ministries-organizations/ministries/health * • www.popdata.bc.ca/data/health/dad • http://communityhealth.phsa.ca/ ** • www.cihi.ca/en/discharge-abstract-database-metadata-dad *
Alberta	• Alberta Health Services: Wounds Clinic and data request to Health System Access for Research (AHS) • Discharge Abstract Database (DAD) • Alberta Health Services Wound Clinic site	• www.albertahealthservices.ca/findhealth/service.aspx?Id=1026473* • www.albertahealthservices.ca/research/Page16074.aspx* • www.alberta.ca/health-research.aspx • www.cihi.ca/en/discharge-abstract-database-metadata-dad *
Saskatchewan	• eHealth Saskatchewan: data portal with a request • Discharge Abstract Database (DAD) • Support website/group	• www.ehealthsask.ca/health-data * • www.cihi.ca/en/discharge-abstract-database-metadata-dad * • https://skinandwound.org/
Manitoba	• Health Care Statistics page • Annual statistics for Health, Seniors and Active Living • Discharge Abstract Database (DAD)	• www.gov.mb.ca/health/statistics/index.html • www.gov.mb.ca/health/annstats/index.html • www.cihi.ca/en/discharge-abstract-database-metadata-dad *
Ontario	• Open data, Public Health Ontario • Health Data Branch Web portal • Discharge Abstracts Database (DAD) • Ontario Woundcare Interest Group	• www.publichealthontario.ca/en/data-and-analysis/using-data/open-data ** • www.cihi.ca/en/discharge-abstract-database-metadata-dad * • https://data.ontario.ca/dataset/discharge-abstract-database-dad-ontario-hospitals * • https://chapters-igs.rnao.ca/interestgroup/45/about
Quebec	• Régie de l'assurance maladie du Québec data and stats • Support website/group	• www.ramq.gouv.qc.ca/en/data-statistics * • www.msss.gouv.qc.ca/professionnels/documentation-sources-de-donnees-et-indicateurs/sources-de-donnees-et-metadonnees/med-echo/ * • www.rqsp.ca/
New Brunswick	• Health Data page • Discharge Abstract Database (DAD) • List of non-healing wound care clinics (may have data)	• https://nbhc.ca/ ** • www.cihi.ca/en/discharge-abstract-database-metadata-dad * • www.horizonnb.ca/home/facilities-and-services/services/clinics/chronic-wound-clinic.aspx

cont'd. . . .

Provinces and territories	Data accessibility	References
Nova Scotia	• Government data portal: nothing wound-specific • Discharge Abstract Database (DAD) • Provincial wound care site	• https://data.novascotia.ca/ ** • www.cihi.ca/en/discharge-abstract-database-metadata-dad * • www.cdha.nshealth.ca/provincial-wound-prevention-and-management-program
Prince Edward Island	• Open Data portal • Discharge Abstract Database (DAD)	• https://data.princeedwardisland.ca/ ** • www.cihi.ca/en/discharge-abstract-database-metadata-dad *
Newfoundland and Labrador	• Health Open Data • Discharge Abstract Database (DAD)	• https://opendata.gov.nl.ca/public/opendata/page/?page-id=datasets-tag&id=35 ** • www.cihi.ca/en/discharge-abstract-database-metadata-dad *
Yukon	• Open Data Yukon • Discharge Abstract Database (DAD) • Skin and Wound community of practice Yukon	• https://open.yukon.ca/data/ ** • www.cihi.ca/en/discharge-abstract-database-metadata-dad * • https://yukonwoundcarerehab.com/services/wound-care/
Northwest Territories	• NWT Bureau of Statistics • Discharge Abstract Database (DAD)	• www.statsnwt.ca/health/health-conditions ** • www.cihi.ca/en/discharge-abstract-database-metadata-dad *
Nunavut	• Open Data Nunavut • Health statistics • Discharge Abstract Database (DAD)	• www.gov.nu.ca/health ** • www.gov.nu.ca/health/information/health-statistics ** • www.cihi.ca/en/discharge-abstract-database-metadata-dad *

** A request must be made to access data.*
*** No wound-specific data are available.*

type and are linked to electronic medical records over time. These systems can facilitate research.

Perspectives for Wound Data

Metadata are necessary to help enhance wound prevention and management in Canada. Easier access to metadata would allow researchers to look at what is working and what is not. This may also help to identify how we can increase data quality related to wound care and what can be done to allow comparison and pooled estimated prevalence. National funding organizations need to support researchers in this area, along with universities, provincial/terrirotial health authorities and relevant professional associations. Even if small, local efforts are made to access local wound data, large, multicentric prospective studies across Canada are needed to answer the important question of how many Canadians live with wounds and with non-healing wounds. Enhancing wound coding systems and enabling better wound identification and etiologies in clinical practice can help clinicians collect relevant wound data to contribute to a national database. CIHI wound data analysis is likely the tip of the iceberg of a large health problem that needs to be addressed as soon as possible. Wound clinicians are aware of the problem and must rally patients with wounds, researchers and stakeholders to work together for better data and more efficient actions to change this situation.

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Wounds Canada Limb Preservation Symposium, May 28, 2021

Leading Through Clinical Evidence to Face the Current & Rising Challenges of DFU Management, in Pandemic Times and After

Presenters: Michael Edmonds, José Luis Lázaro-Martínez, Perry Mayer

Michael Edmonds is a professor of diabetology and consultant physician at King's College Hospital in London with a special interest in care of the diabetic foot. He developed one of the first multi-disciplinary diabetic foot clinics in 1981. He is a past chairman of the Diabetic Foot Study Group of the European Association of the Study of Diabetes.

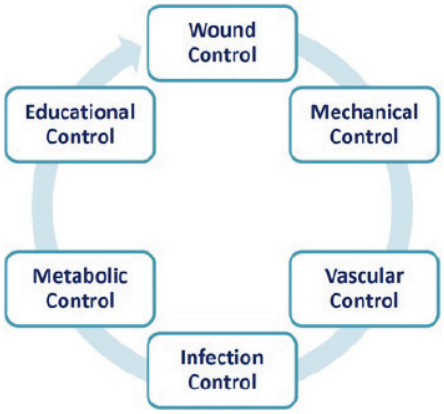
José Lázaro-Martínez is a professor at the University of the Complutense, University of Madrid (UCM). He is head of the diabetic foot unit at UCM and director of research groups in diabetic foot at UCM and the Institute of Health Investigation of the Hospital Clínico San Carlos in Madrid. He was co-ordinator of the Diabetic Foot Working Group of the Spanish Diabetes Society and is Scientific Secretary of the Diabetic Foot Study Group (DFSG) belonging to the European Association of the Study of Diabetes. He is President-elect of Diabetic Foot International and a member of the editorial committee of the journal Diabetic Foot & Ankle.

Perry Mayer is Medical Director of The Mayer Institute (TMI), a centre of excellence in the treatment of the diabetic foot. He received his undergraduate degree from Queen's University, Kingston, ON, and medical degree from the Royal College of Surgeons in Ireland. In 2003, he moved to Hamilton, ON, to concentrate his practice solely on the treatment of the diabetic foot. He formed TMI in early 2006. At present, TMI has over 16,000 patient visits per year, with over 12,000 visits for diabetic foot wound care.

Current and Rising Challenges in DFU Management

Optimal diabetic foot ulcer management requires an understanding of the pathogenesis of ulceration (primary: neuropathy, ischemia; secondary: infection) and basic classification and staging of the foot (e.g., normal, high risk, ulcerated, infected, necrotic). It is important to achieve fast healing of uncomplicated ulcers. Patients with complicated ulcers should be referred to specialists as soon as possible. In order to optimize healing, control over several factors must be achieved (Figure 1).

Figure 1. Restoring Control to Avoid Amputation



The Multidisciplinary Team

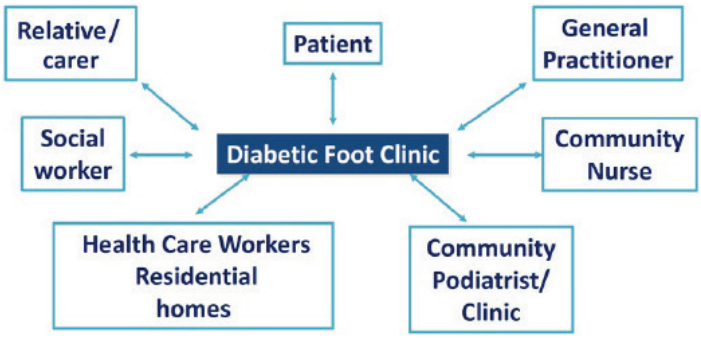
Multidisciplinary foot care teams have several key roles, including:

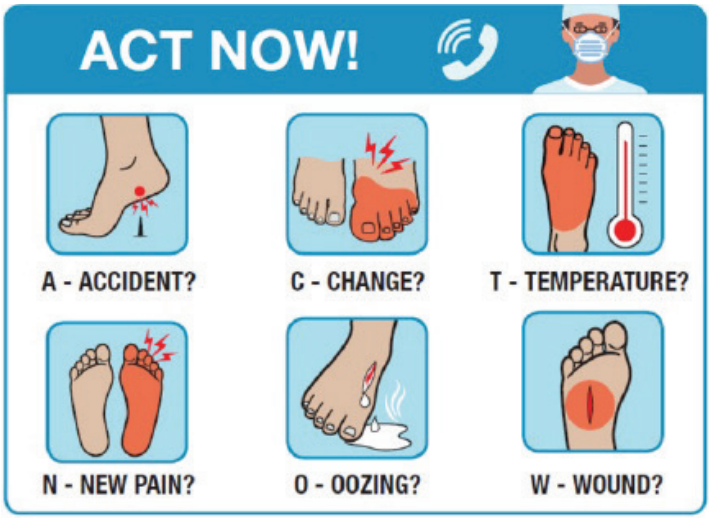
- Co-ordinating primary and secondary care
- Healing ulcers
- Accepting emergency referrals
- Providing outpatient antibiotic service
- Performing debridement and minor surgery
- Performing post-operative follow-up
- Providing education and participating in research

A multidisciplinary foot care team should include a podiatrist, nurse, surgeon (vascular, orthopedic, plastic), interventional radiologist, orthotist and diabetologist. Achieving control through a multidisciplinary diabetic foot care team requires co-ordination of therapy through integrated services, focused care at a diabetic foot clinic and rapid access to care through a patient-friendly care pathway.

Multidisciplinary foot care teams must link with the community to ensure smooth transition of care (Figure 2). Patients, community care providers and clinicians alike must be able to identify symptoms and signs that might lead to amputations and ACT quickly to treat them (see box, ACT NOW).

Figure 2. Diabetic Foot Clinic Links with Community





Outcomes of TLC-NOSF (Sucrose-octasulfate) Dressings in the Management of Diabetic Foot

Standard care of DFUs includes pressure offloading and ulcer protection, restoration of tissue perfusion, treatment of infection, metabolic control, treatment of comorbidities and local ulcer care. The presence of ischemia not only reduces the probability of healing but also increases level and activity of MMPs (Matrix Metalloproteinases).

TLC-NOSF Dressing: Mechanism of Action

TLC-NOSF dressings such as UrgoStart reduce MMP levels in non-healing wounds, thus limiting degradation of extra cellular matrix (ECM) components like collagen or growth factors. Clinical efficacy has been documented especially in wounds with vascular etiology, as reported in DFU patients with an ischemic component and venous or mixed leg ulcers.

The EXPLORER RCT

The EXPLORER study was a large European randomized, double-blind, controlled trial comparing two groups of patients presenting with DFU with neuropathy and ischemia. Findings indicated that 60% more DFUs healed by 20 weeks in patients treated with TLC-NOSF (48% vs 30% of patients healed) when compared with the group that received an advanced neutral dressing. Furthermore, use of a TLC-NOSF dressing shortened the mean time to closure by 60 days. It is important to note that the earlier the TLC-NOSF dressing is initiated in DFU treatment, the greater the benefits (e.g., in DFUs lasting for less than two months, 71% wound closure rate was reached versus 41% in the control group).

Further Research

A 2020 study by Lázaro-Martínez et al. aimed to evaluate the improvement in the microcirculatory status in patients with a neuroischemic DFU through the use of a TLC-NOSF dressing. TcP02 values after treatment with sucrose octasulfate dressing showed a significant increase between day 0 and wound closure ($p<0.016$), which occurred in all the treated patients after a median time of eight weeks. Results were concordant with those of the EXPLORER RCT and large observational studies performed in real life on thousands of patients (e.g., REALITY study and German Observational Study GOS 1 [Dissemond, 2020]).

Recommendations for Use of TLC-NOSF

In 2019, the IWGDF guidelines recommended TLC-NOSF dressings for local treatment of neuroischemic diabetic foot ulcers; this was the first time that a specific dressing was recommended by the IWGDF for the local treatment of DFUs. Also, the National Institute for Health and Care Excellence (NICE) in the UK issued a recommendation supporting the use of UrgoStart dressings to treat patients with diabetic foot ulcers "because they are associated with increased wound healing compared with non-interactive dressings, in addition to an improvement of the quality of life of the treated patients."

A Canadian Experience: Love in the Time of COVID

The Mayer Institute, a specialized diabetic wound care clinic, created virtual foot care teams to treat patients during the COVID-19 pandemic. Teams included vascular surgeons, infectious disease specialists, endocrinologists, orthopedic surgeons, dermatologists and plastic surgeons combined with TMI's highly skilled wound nurses. The open-concept clinic had six treatment bays to ensure efficient workflow and to allow physicians to see all patients and give them the time required for optimal care.

Despite the numerous challenges brought about by the COVID-19 pandemic, the ability of the Mayer Institute to be nimble allowed for scaling of procedures that clinicians could not have envisioned prior to this time. The pandemic also allowed clinicians to tighten up protocols, ensure adherence to guidelines and become hyper efficient.

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Xerostomia

It's a Desert in There!

By Heather Woodbeck, RN HBScN MHSA; Patricia Greenhorn, BSc (Hon) DDS; Lynda McKeown, RDH HBA MA; Carolyn Weiss, RDH; Tonia Peachman-Faust, RRDH MA

Dry, cracked hands from repeated washing are a familiar problem for health-care providers. With the protective layer of sebum removed, the stratum corneum layers of the skin get damaged. These open areas become reddened and sore as secondary infections take hold. Just like the outside skin, the tissues in the mouth break down when they dry out and become desert-like.

Dry mouth, or xerostomia, can be very distressing for patients. Foods don't taste right, dry foods are hard to eat, dentures fit poorly, cavities form, teeth break and gums thin. Like so many other things in life, one doesn't know how important spit/saliva is until one doesn't have any. This article discusses the importance of saliva in preventing and healing oral wounds, how dry mouth (or xerostomia) occurs and what can be done to prevent or minimize it. Ways to promote optimal oral outcomes, oral assessments and individualized comprehensive oral care plans are described.

Saliva and Its Importance

Saliva is a fluid that keeps the epithelial tissues lining the inside of the mouth from sticking together. A healthy mouth is continuously bathed in saliva. According to Mandel, "Spit is the underdog of body fluids"; saliva or oral fluid "lacks the drama of blood, the sincerity of sweat and the emotional appeal of tears."[1] Saliva may not be as exciting as blood, but it is essential for healthy living. It aids in flushing away food debris, dead tissue and biofilm in the mouth.

Saliva is mostly water along with a complex mixture of protein, enzymes, antimicrobial peptides, mucins and lubricants. The major and minor

salivary glands produce an astounding 0.5–1.5 L of saliva per day.[2] The basic secretory units of salivary glands are acini, which are clusters of specialized epithelial cells. Secretions accumulate within the glands and flow into the mouth through special ducts.[2] The saliva from each major salivary gland has its own composition. Saliva is made on demand. Chewing food stimulates saliva production, while less saliva is produced during sleep.

The main salivary glands are the paired parotids, submandibular and sublingual. The fluid from the parotid glands comes through the Stensen's duct located on the buccal mucosa next to the second upper molars. The Wharton's duct from the submandibular gland comes out at the anterior of the mouth under the tongue behind the lower front teeth. These three glands generate about 95% of all salivary fluids. More saliva is produced in the minor glands, distributed throughout the mouth.[3]

Saliva has many functions, including:

- Lubricating and moistening the oral cavity. This protects the tissues from trauma and enables swallowing and speech. Continuous lubrication of the teeth and mucous membranes promotes comfort and prevents infection.[4]
- Promoting microbial homeostasis to support a healthy, balanced microbiome within the mouth. Antimicrobial proteins prevent entry of bacteria and other exogenous pathogens into cells. Mucins in saliva also help to prevent micro-organisms from physically attaching to oral tissues.[4]
- Starting digestion, and promoting food bolus formation and clearance out of the oral cavity. Salivary enzymes begin the digestion process by breaking down starches, sugars and fats. When saliva is mixed with food through chewing, it creates a soft mass that enables swallowing and reduces the risk of aspirating food.[2]
- Enabling tasting and smelling of food. Saliva dissolves the taste components in the food and diffuses them to the taste bud receptor sites.[4]
- Maintaining the acid levels in the mouth at a constant pH level between 6.5 and 7. This buffering system decreases acid levels in foods, and protects the teeth from decay and the soft tissues from damage. Saliva has the capacity to

Figure 1: Martin's Story

Photos courtesy of Lynda McKeown. Used with permission.

Martin's story illustrates the challenges of dry mouth. He is a 50-year-old male with multiple sclerosis and a brain injury who lives in a long-term-care home. He is non-communicative, tube fed and fully dependent on care. He receives weekly professional dental hygiene care.

Martin suffers from dry mouth. On the outside, his lips appear shiny and taut, with cracking and fissuring. When his mouth is examined, it is dry and painful for him to open. His lips stick to his teeth and to the examiner's gloves. Inside Martin's mouth, there is a thick crust of debris stuck to his palate, tongue and teeth. No saliva is visible.

Martin gets minimal oral care. Staff have repeatedly expressed concerns about the aspiration risk from toothpaste and fear of tissue bleeding. Some staff don't think Martin needs oral care because he doesn't eat anything. So, the dried mucous and bacteria accumulate in large crusts, requiring regular debridement, just like a wound.

Weekly oral care from a registered dental hygienist helps to keep Martin's mouth more comfortable. The hygienist uses moistened gauze to gently remove the caked debris from his fragile mouth tissue. This process can be uncomfortable, and appropriate technique is needed. Sadly, Martin's experience represents a large population of residents of long-term care homes who don't receive adequate oral care. Martin's situation is preventable with daily oral care and help from oral health professionals.

buffer bicarbonate, phosphate and protein systems.[4]

- Remineralizing and repairing tooth enamel. Proteins and peptides in saliva help to use calcium and phosphate in the diet to strengthen and repair tooth enamel. Fluoride speeds up the process of tooth remineralization and decreases demineralization.[5]
- Healing wounds. Cytokines and growth factors in saliva promote healing of mouth wounds. These factors in saliva aid in healing by causing re-epithelialization and regulation of the extracellular matrix.[6]

What is dry mouth/xerostomia and why is it important?

When there is insufficient saliva to bathe the mouth, dry mouth—or xerostomia—occurs. *Dry mouth* is a broad, overarching term that encompasses the perspectives of both the patient and the health-care provider. Dry mouth has several components in its meaning. Xerostomia is clin-

ically defined as the subjective perception of dry mouth related to mucosal dehydration and reduced oral lubrication.[7] Salivary gland hypofunction is a condition in which salivary flow is significantly reduced. Oddly, this condition may not be recognized by the patient as a problem. Xerostomia is a subjective condition that can only be assessed by direct questioning of the patient.[7,8]

Oral wounds are slow to heal when there is xerostomia. The link between optimal moisture and wound healing is well-established. The importance of moisture was first recognized in the 1960s, when research showed that moist wounds healed faster than dry ones.[9]

Dry mouth/xerostomia can be disabling. It can have significant negative effects on a person's quality of life:

- Dry oral tissues are easily torn by hard and/or dried food, dentures, etc. The dry mucosa is more susceptible to trauma and infection. Patients can suffer from painful mucositis.[10]
- Rapid onset of dental caries along with more oral wounds may occur. Pockets of infection can develop between the teeth.
- Candidiasis and other secondary infections can occur in oral wounds. In the mouth, erythematous candidiasis predominates, along with angular cheilitis and pseudomembranous candidiasis (thrush), and can cause tissue breakdown in skin folds and wreak havoc in the mouth.
- Higher rates of upper respiratory infections occur in people with xerostomia.[11]
- Xerostomia can cause difficulty in wearing dentures. Saliva is important for adhesion and retention of dentures. Denture wearers often report pain and discomfort due to dry mouth.[10] Poorly fitting dentures can cause dry mouth by physically blocking the ducts of the salivary glands in the floor of the mouth. Dentures can also cause pressure injuries and/or frictional reactive hyperplasia in a dry mouth. These pressure injuries are just like those on the outer skin. Frictional reactive hyperplasia, or an epulis, occurs when there is an overgrowth of mucosal tissue around a foreign object such as a partial plate or denture (see Figure 2).[12] If an epulis or ulcer is noted, an oral professional must be involved to adjust the denture in order to promote healing.
- Swallowing difficulties may be present, particularly for stroke and Parkinson's patients who are at risk for dysphagia.
- Xerostomia can result in speech problems and decreased ability to make sounds.
- Food that sticks to the buccal mucosa can pocket in the cheek. Removing the food can cause tissue abrasions.

Figure 2: Epulis in lower jaw caused by denture

Photo credit: David Banting. Used with permission.

Causes of Xerostomia/Dry Mouth

Xerostomia in the elderly is not a natural part of aging. However, seniors are predisposed to xerostomia due to underlying systemic diseases, multiple medications and decreased sensation of thirst.[13] Intracellular fluid volume is regulated by osmoreceptors in the hypothalamus. With aging, there can be a decrease in sensitivity of these receptors that results in a loss of the thirst sensation.[14]

As life expectancy increases, people are more likely to develop systemic diseases. Xerostomia may be directly caused by diseases and/or the use of xerogenic drugs to treat them. Having more systemic diseases means that elderly people are often prescribed more medications than people in other age groups. Residents living in Canadian long-term care facilities take an average of 9.9

classes of drugs versus seniors at home getting 6.7 drug classes.[15]

Patients with dry mouths should be screened for polypharmacy. The risk for xerostomia increases with the number of medications, even if the individual drugs are not xerogenic. But the question arises: Is the xerogenic effect due to the medication, or is the dry mouth a side effect of underlying medical conditions? An example would be bronchodilators for emphysema-mouth breathing due to effort to breathe.[12]

Although dry mouth is a possible side effect of dozens of medications, information on which medications cause xerostomia is limited. Xerogenic medications may decrease the saliva volume produced and/or alter the perception of mouth dryness.[16] Antihypertensives, antiulcer agents, anticholinergics and antidepressants, all very commonly prescribed in the elderly, pose a high risk of causing dry mouth.[17]

Medication delivery systems can contribute to xerostomia. Tube feeding, masks, inhalers and respiratory therapy medications tend to dry out mucous membranes. Oxygen administration in particular causes dry mouth. Continuous positive airway pressure (CPAP) masks for sleep apnea can be drying for oral tissues. Cancer chemotherapy, radiation therapy and surgery to the head and neck are all risk factors for xerostomia and salivary gland hypofunction. Alcohol use, including alcohol in mouthwashes, increases the risk for xerostomia.[12]

Many systemic diseases are associated with xerostomia, including autoimmune disorders such as Sjögren's syndrome, diabetes mellitus, HIV/AIDS, sarcoidosis, connective tissue disease, graft-vs-host disease, cystic fibrosis, end-stage renal disease (ESRD), Alzheimer's disease, and anxiety or depression. The prevalence of xerostomia related to systemic diseases varies greatly: HIV/AIDS 1.2–40%, systemic lupus erythematosus (SLE) 75%, sarcoidosis 6%, graft-vs-host disease 16–59%, ESRD 28–59%, and diabetes 14–62%.[18] Smoking also dries the mouth.

Xerostomia may directly be caused by diseases and/or the use of xerogenic drugs to treat them.

A dry mouth can be evidence of dehydration. Clinically, *dehydration* is defined as "the rapid decrease of >3% of body weight."[19] Total body dehydration is directly linked to dry mouth. Even moderate dehydration can decrease salivary flow rate by 60–70% as the body tries to maintain its fluid balance.[11] This amount of fluid can be easily be lost by athletes during prolonged exercise.

Dehydration has been identified as a major factor relating to many clinical issues. It has a huge impact on quality of life for older adults. Many chronic health problems in older adults, such as falls, fractures, confusion, heat stress, constipation,

urinary tract infections, kidney stones, renal failure, drug toxicity, malnutrition, stroke and poor wound healing, are exacerbated by dehydration.[20] Even minimal dehydration of only 1–2% of total body fluid volume is associated with impaired cognition, psychomotor and memory skills.[21]

Moderate dehydration can trigger the classic symptoms of headaches, dizziness on standing, dry mouth, diarrhea and weight loss.[20] Dehydration is commonly seen in long-term care homes and among elderly people in general. It is estimated that up to one-third of long-term care residents are dehydrated.[14] It is important to monitor long-term care residents for signs of dehydration by recording intake and output. Screening residents with a tool that looks at headaches, orthostatic hypotension and dry mouth can be helpful.[20]

Table 1: Xerogenic Medications (Adapted from Wolff et al.[16])

Medications with strong or moderate evidence according to site of action
• alimentary tract and metabolism • cardiovascular system • genitourinary system • sex hormones • systemic anti-infectives • antineoplastics • immunomodulating agents • musculoskeletal system • nervous system • respiratory system • sensory organs
Medications with strong or moderate evidence based on therapeutic action
• gastrointestinal drugs • antiemetics • anti-nauseants • anti-obesity preparations • anti-hypertensives • diuretics • beta-blocking agents • calcium channel blockers • urologicals • muscle relaxants • drugs for bone diseases • analgesics • anti-epileptics • anti-Parkinson's drugs • psycholeptics • psychoanaleptics • other nervous system drugs • antimuscarinic drugs for obstructive airway diseases • antihistamines for systemic use • ophthalmologicals

Xerostomia Assessment: What to Look For and How to Recognize it Clinically

The Wound Prevention and Management Cycle can be applied to the assessment of xerostomia. Clinicians need to both assess the mouth for xerostomia and ask the person if they are experiencing a feeling of dryness in the mouth. It is important to carefully consider each case—listen to the patient, gain insight into their experience and observe their signs and symptoms.

It is estimated that up to one-third of long-term care residents are dehydrated.

Regularly assessing residents can uncover xerostomia. The Oral Health Assessment Tool (OHAT) is a standardized assessment tool in which the tongue and saliva are assessed.[22] In long-term care, quarterly oral assessments are mandated.

Clinicians using an oral assessment tool such as the Subjective Evaluation of Xerostomia should consider adding specific questions on dry mouth to their oral assessment tool, such as:[23]

- Do you have difficulties swallowing any foods?
- Does your mouth feel dry while eating a meal?
- Do you sip liquids to aid in swallowing dry foods?
- Does the amount of saliva in your mouth seem to be too little?

- Does the amount of saliva in your mouth seem to be too much?

Clinicians should begin their objective observations by looking at the face, hands and outside the mouth. Table 2 provides a systematic approach to oral assessment.

Evidence-based resources on oral assessment can be found in the Oral Care Section of the RNAO's Long-Term Care Best Practices Toolkit, 2nd edition. There is a three-part YouTube series on how to do an oral assessment with informative pictures of oral conditions. The Oral Health Assessment Toolkit for Older People from South Australia Health is another nicely illustrated resource. The Ontario Dental Association has a simple oral assessment fact sheet with pictures. Reach out to your local oral health professional for hands-on help with assessments.

Treating Xerostomia and Dry Mouth

Assemble an integrated oral care team that includes nurses, physicians, personal support workers, dietitians, dental hygienists, dentists and/or denturists, respiratory therapists and, most importantly, patients and their families.

Assess your organization's oral care program using the Registered Nurses' Association of Ontario's best practice guideline, *Oral Health: Supporting Adults Who Require Assistance Second Edition.*[22] A gap analysis can both find areas for improvement and help to set program goals. Develop a plan to address priority issues.

Address dehydration. Monitor fluid intake in patients at risk for dehydration. Ensure staff know who has not been taking in adequate fluids. Some long-term care homes have found that adding residents at risk for dehydration to the daily bowel record helps alert staff to offer more fluids. The sip-and-go approach has been successfully used in many long-term care homes. The idea with this program is to provide fluids at the bedside. Everyone who comes into a resident's room offers fluids, including housekeeping and other team members. Brightly coloured water jugs have been shown to be helpful as fluid reminders to

Table 2: Assessment for Xerostomia/Dry Mouth

Assessment steps: How to do it	Look for these clinical signs	Look for these symptoms
Extra oral: • Watch for breathing with mouth open—investigate if transient or habitual. • Check for dry skin on face and hands and other signs of dehydration. • Check for dry, cracked lips. • Check for angular cheilitis (see Figure 3). **Intra oral:** • Use a tongue depressor to examine the mouth. If it sticks to buccal mucosa, this indicates a lack of saliva. • Gloves sticking to buccal tissues is another sign of low salivary flow. • Palpate the parotid papilla. • Milking the gland and duct can reveal if there is little or no saliva output. • Check for food debris sticking to teeth, tongue, cheeks and palate. • Check for pooling of saliva in floor of mouth—absence is a cause for concern	**Intra oral:** • Oral mucosa may appear dry and shiny • Tongue has cracks, bare patches or heavy coating • Mucus accumulation • Saliva is thick and ropey • Food debris retained in teeth, cheeks and under tongue • Plaque accumulation • Tissue trauma/ulcers • Teeth are broken, cracked, decayed • Oropharyngeal infections – Candida patches (plaques) • White patches of candidiasis on the tongue and mucosa (see Figure 4)	**Difficulties in oral function** • Dysphagia • Altered speech • Nocturnal oral discomfort • Difficulties wearing dentures • Oropharyngeal burning • Taste disturbances

staff and residents. Red jugs alert staff that the patient is at risk of dehydration and the jugs should be filled at every opportunity. The bright red is also easy for patients to see, as vision can decline with age or dehydration, and lightly coloured cups are not easily visible.[24]

Figure 3: Angular cheilitis

Photo credit: David Banting. Used with permission.

Figure 4: White patches of candidiasis on the tongue and mucosa

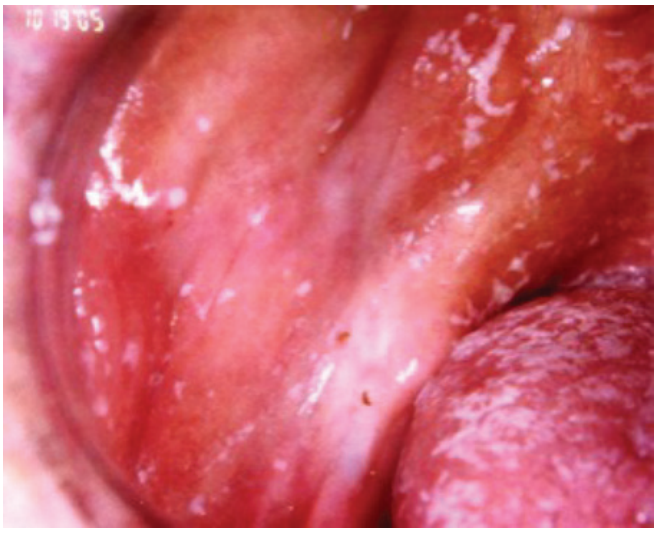

Photo credit: Pat Greenhorn. Used with permission.

Work with dietitians and direct care staff to optimize fluid intake. Limit caffeine and alcohol intake for patients with xerostomia. Offer water or milk rather than juice, pop or other sweetened fluids. Milk is especially helpful for dry mouth and dehydration.[25] Food supplement drinks high in sugar should be avoided, if possible, as these supplements cause imbalances in the oral ecosystem that promote rapid tooth decay and oral wounds in a dry mouth. The diabetic versions of supplement drinks are a better choice.

Cheese and milk help to reduce acidity in the mouth after eating. They can change the pH balance in the mouth in about 10 minutes rather than the usual 40 minutes. Provide water to all patients at the end of a meal and after a snack to help cleanse the palate. At a minimum, rinse or wipe the mouth with water after eating to clear food debris.

Avoid strong flavourings such as mint, lemon and cinnamon in chewing gum or breath mints. For residents who are capable of using chewing gum, chewing sugarless gum with xylitol every four hours can stimulate salivary flow and help alleviate the discomfort of dry mouth. It also reduces the risk of tooth decay.[26]

Work with physicians, nurse practitioners and pharmacists to address polypharmacy. Identify medications that contribute to xerostomia and consider alternatives where possible. For patients with dry mouth, sialagogues and other salivary stimulants can be prescribed, if appropriate.

Over-the-counter oral moisturizing products and/or saliva substitutes are useful for xerostomia. Gels and sprays are designed to protect the oral mucosa, promote comfort and replace some components of the saliva. Moisturizing sprays used after meals can have a good effect. Overnight, gels work well.

Residents and families should be instructed to purchase mouthwashes that contain fluoride but no alcohol. For residents with dry mouth who have natural teeth remaining, consult with an oral health professional about the use of specialized oral care products, such as chlorhexidine, to

reduce the risk of periodontal infection and tooth decay.

Assess for the overgrowth of yeast in the mouth due to antibiotics, chemotherapy and even denture use. If candidiasis is present, treat both the mouth and the dentures. Adding a thin layer of nystatin ointment inside the denture before inserting into the mouth can treat both the tissues and the denture effectively. A diluted nystatin solution can also be used to soak dentures overnight.

When using respiratory therapy, assess for xerostomia in the oral and nasal mucosa. Ensure that patients stay hydrated. Use water-based moisturizers to relieve dryness in the nose and mouth. Avoid oil-based preparations such as petroleum jelly.[27]

For cognitively well people, oil pulling is an ancient Ayurvedic technique that can help xerostomia. Researchers have concluded that oil-pulling with virgin coconut oil offers the xerostomic patient a more pleasant oral condition and a somewhat protective effect against xerostomia-related demineralization.[28]

Develop an individualized oral care plan focused on xerostomia. Involve the resident and their family in the oral care plan. Family members can offer fluids and be trained to properly assist with oral care.

Conclusion

Saliva matters! A healthy mouth contributes to and reflects total body health. Saliva has a clear link to wound prevention. Understanding normal salivary composition, flow and function is extremely important when caring for patients. Without adequate salivary function, an individual may endure unnecessary and preventable oral issues.

Embrace the magic of saliva. Call upon oral health professionals to evaluate if you suspect an oral abnormality. Establish and incorporate tools to help assess for signs and symptoms of dry mouth and offer solutions. Recognize saliva's contributions to oral and systemic health. Watch for evidence of a "desert" in patients' mouths to prevent tooth decay and oral wounds.

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Wounds Canada Limb Preservation Symposium, May 2021

The V.I.P. of Diabetic & Peripheral Wounds: Preserving the Limb

Presenters: Kevin Lee, Alison Garten, Amanda Loney

Kevin Lee is a vascular surgeon and medical lead of Royal Columbian Hospital (RCH) Limb Preservation Clinic & Vascular Lab in New Westminster, BC. He is involved in medical education, supporting faculty development, at the University of British Columbia (UBC), Vancouver Fraser Medical Program. He graduated from UBC's medical program before completing his vascular surgery residency through Western University in London, ON. He then went on to complete Advanced Aortic and Peripheral Endovascular Training in Nuremburg and Leipzig, Germany.

Alison Garten is a board-certified podiatric surgeon and a certified pedorthist. She received her BSc in biology at East Carolina University and then went on to complete her Doctorate of Podiatric Medicine at Temple University School of Podiatric Medicine in Philadelphia, PA. Dr. She completed her residency at Washington Hospital Center/Georgetown University in Washington, DC. She currently lives in Charlotte, NC, and is a wound care panel physician at a Tenet Hospital at Piedmont Medical Center. She is immediate past president of the American Association for Women Podiatrists and serves on the American Podiatric Medical Education Task Force for the National Board of Podiatric Medical Examiners. She was recently named one of the most influential podiatrists by Podiatry Management *magazine.*

Amanda Loney earned a BScN from the University of Western Ontario, acquired her WOCN designation from Albany Medical Center in New York and has completed the IIWCC at the University of Toronto. As a community-based nurse and educator for 26 years, she has spent the last 21 of those as a Certified Nurse Specialized in Wound, Ostomy and Continence. In her role with Bayshore Home Care Solutions, as well as in her private practice, she is known as a passionate educator and consultant, and for her extensive clinical knowledge in the areas of wound, ostomy and continence. Most recently, she has keynoted at national conferences, published in International Wound Journal, *and participates on local and national advisory panels.*

Overview

Assessment of a person with a diabetic foot ulcer (DFU) includes recognition of confounding factors to minimize complications that can lead to amputation (Figure 1). The person with a DFU is a very important person, and "V.I.P." is also a helpful approach to remember the three key components of DFU assessment and management: vascular, infection and pressure.

End-Stage Renal Disease and Diabetes

The highest risk for amputation is present among patients with diabetic foot ulcers and end-stage renal disease (ESRD). This population has a risk of amputation that is 10 times higher than non-diabetic patients with ESRD. Furthermore, patients with ESRD have four times the risk of mortality following an amputation than those without ESRD.[2]

Advanced Therapies

The complexity and chronicity of diabetic and lower leg wounds may require the use of innovative therapies at different stages to prevent complications and promote wound healing in hard-to-heal wounds. Options for clinicians to consider (see figures 2 and 3) include:

- Enzymatic debridement, through the use of SANTYL®, selectively removes necrotic tissue and prevents re-accumulation of wound debris, plus works faster and more predictably than autolytic debridement.[3–5]
- OASIS®, a natural extracellular matrix, acts as a scaffold to support migration and cellular ingrowth,[6] promoting improved epithelization and wound closure.[7,8]
- PICO®, a single-use negative pressure wound therapy, can be used both as a preventative measure for closed incisions, including amputations, and on open wounds. Earlier intervention with the PICO® system in hard-to heal wounds has been shown to improve the proportion of closed wounds or wounds on a healing trajectory.[9] In a study of patients with venous leg ulcers and DFUs, the PICO® system has also shown a greater reduction in wound depth compared with traditional NPWT at 12 weeks.[10]

Figure 1. Factors Leading to Diabetic Foot Ulcers[1]

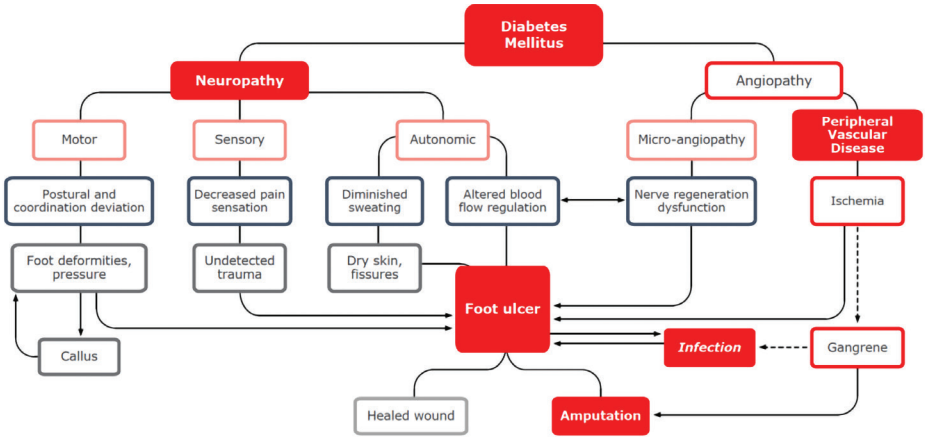

Figure 2. Case Study: Non-healing Lower-extremity Wound

SANTYL◇ daily dressing changes at home in combination with aggressive manual compression therapy along with compression stocking at lymphedema clinic

OASIS◇ Matrix for wound management used weekly for a total of 10 applications; continued with lymphedema wraps and manual compression

PICO◇ sNPWT applied until closure

Figure 3. Case Study: Non-healing Diabetic Foot Ulcer

Wounds > 2 years old

PICO◇ sNPWT applied

Would closed after four weeks of PICO◇ plus offloading

Conclusion

In limb preservation efforts, time is of the essence and must consider assessment of vascular status, infection and pressure (V.I.P.). Management of diabetic and peripheral ulcers by a multidisciplinary team requires the use of the appropriate products, for the appropriate patients at the right time.

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Smith+Nephew

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Creating a Community of Practice for Wound Care Leadership

By Heather Ibbetson, BN BA; Mariam Botros, DCh, CDE, IIWCC-CAN; Heather Orsted, BN ET MSc; Janet L. Kuhnke, RN BA BScN MSc ET; Cathy Burrows, RN, BScN, MScCH and Darren Levine, EdD

Wounds Canada is excited to announce the Wound Care Leadership Initiative. This initiative is actively engaging wound care leaders across the country to join a collaborative community of practice (CoP). The goal of this leadership initiative is threefold:

1. *Identify key wound care leaders in the areas of clinical practice, education, policy, research and advocacy*
2. *Assist these leaders, as agents of change, to improve the lives of people at risk or living with wounds*
3. *Engage leaders in Wounds Canada initiatives to meet the evolving needs of Canadians*

To achieve these goals, Wounds Canada has undertaken several steps. Leaders were recruited and invited to join the CoP leadership initiative. Strategies were designed to assist in the cultivation of wound care leadership in a CoP. Leaders will be supported and mentored during their interactions with the CoP and will gain valuable insight and opportunities through Wounds Canada. This article will briefly expand on how Wounds Canada is implementing a CoP for wound care leadership.

A Community of Practice

Human beings are social and relational learners and can benefit from engaging in a community built around a common topic or shared passion. By sharing experiences, knowledge and challenges, leaders in the field of wound care can learn from each other how to understand issues and implement effective change. Wounds Canada observed that wound care experts often expressed feeling a disconnect from the broader community. Many wound care experts individually demonstrated leadership qualities but had limited means to build other skills within wound care. Additionally, many wound care experts received little support from the disconnected community and were often faced with both professional and institutional barriers.

Creating a CoP provides a space for connection, learning and knowledge generation.[1,2] Each community creates a purpose and goals that are specific to a particular cause. The field of wound care offers a unique community beneath the healthcare umbrella, encompassing geographical and professional diversity.

Smith, Kempster and Wenger-Trayner highlight that a CoP is an important factor in both knowledge evolution and leadership development.[3] For instance, sharing experiences within the CoP may lead to the exploration of common themes in the leaders' practices. This dissemination of knowledge leads to further CoP development through collective understanding and growth. Through this interconnectedness, each member of the CoP gains leadership skills that they can bring into their personal practice. Each member can then simultaneously refine their personal practice and continue to share with the CoP, creating a continuous and interconnected cycle of development and growth.[3]

The Wound Care Leadership CoP will provide participants with an opportunity to share and explore the unique experiences—both successes and barriers—surrounding the prevention and management of wounds. Participants will do this through their collective and frequent discussions to explore the themes and strategies within wound care leadership. Leaders can build relationships that enable them to learn from each other and grow as they share resources, experiences, stories, tools and ways of addressing recurring problems.[2] Additionally, during the sessions and networking, participants will have an opportunity to:

- Solve challenges surrounding practice change or barriers to best practice
- Request information or resources to guide or improve leadership practice
- Seek insight from peers and mentors

- Grow their confidence in wound care leadership
- Discuss new developments in their personal leadership or practice
- Collectively identify opportunities and gaps in both personal and institutional environments

Methodology

Planning the Leadership CoP

Cambridge, Kaplan and Suter describe CoPs as "dynamic social structures that require 'cultivation' so that they can emerge and grow."[4] Wounds Canada partnered with Darren Levine, a consultant and associate faculty member at Royal Roads University, to design a wound care leadership initiative that would provide the necessary elements to create a CoP (Table 1). Cathy Burrows, a consultant and past president of the Wounds Canada board with extensive expertise in the field, is collaborating with Levine to provide clinical guidance along with the mentors.

According to Heather Orsted, one of the initiators of the program, "The most successful leaders don't have a job; they have a passion. I have that passion, and if I've learned anything in my career, it is that you require support from people who share your passion, your experience. My vision for this initiative is to enable support and collaboration for wound care leaders, whether they be health-care professionals, patients or caregivers. We all need support to follow our passion, we are all part of the same team and by collaborating together, we can build a better future!" (see Figure 1).

Table 1: Key Elements of a CoP[4]

CoP Recommendations	Wounds Canada's Action
Connect people who might not otherwise have the opportunity to interact and provide a shared context for people to communicate in a way that builds understanding and insight.	Recruited and connected leaders from a diverse geographical and professional range of backgrounds, as well as patients and caregivers.
Enable dialogue between people who come together to explore new possibilities, solve challenging problems and create new, mutually beneficial opportunities.	Created an interactive platform for dialogue to occur that includes various methods of leader engagement.
Stimulate learning and leadership growth by serving as a vehicle for authentic communication, mentoring and self-reflection.	Created a virtual platform (meetings and forum) to act as the vehicle for authentic engagement. The initiative team and mentors continue to solicit feedback to ensure authentic dialogue.
Help people improve their practice by providing a forum to identify solutions to common problems and a process to collect and evaluate best practices.	Structured to allow the exploration of current leadership practices, barriers and solutions.
Introduce collaborative processes to groups and organizations to encourage the free flow of ideas and exchange of information.	Structured to allow for participants to share ideas and information both in virtual meetings and on a forum.
Help people organize around purposeful actions that deliver tangible results.	Virtual meetings and forum discussions will assist leaders to organize around areas of learning and practice change.
Generate new knowledge to assist in transforming practice to accommodate change in needs and technologies.	Leaders assigned to one of two groups based on expertise. These groups will each work to create dialogue and generate practice change in their areas of expertise.

Figure 1: Heather Orsted's Vision

To authentically create a vibrant and inclusive CoP, all stakeholders, from patients to professionals, must be included.

Recruiting Leaders

Wounds Canada sent out a call for leaders in a March 2021 e-blast newsletter. The call provided a brief description of the Wound Care Leadership Initiative. In order to create an integrated CoP, health-care providers, patients, and families or support persons were encouraged to apply. Professional applicants were asked to provide a statement of interest and two references. Referees were emailed a questionnaire exploring the applicant's leadership and wound care experience. Patients, families and support persons were asked to elaborate on their experiences with wounds and share their vision for wound care leadership. Participants were selected based on exceptional practice or personal experiences, along with strong references.

The first cohort of 27 successful applicants is representative of the range of professions and experiences that co-exist within the wound care community. Members include chiropodists/podiatrists, occupational therapists, patients and care partners, physicians, physiotherapists, registered nurses, physicians and surgeons. Regional diversity is represented, with participants from six provinces and one from outside Canada. Leaders were asked to select a clinical area that best suited their experience and strengths. To provide the leaders with the opportunity to build trusting relationships within the CoP, a non-disclosure agreement was circulated and signed by all individuals participating in the initiative.

An integrated team operates as a collective, focusing on a specific purpose. These teams do not rely on a hierarchical model, but instead are founded on the inclusion of all voices and relevant experiences regardless of status outside of the group.[5]

Engaging Leaders

Wounds Canada held a virtual initial orientation meeting on June 1, 2021. The goal of this meeting was to introduce the Wounds Canada team, share the initiative purpose and goals, and allow participants to become familiar with their peers. The initiative is set to launch in September 2021 and will consist of four quarterly meetings. To ensure that each person could participate to the fullest potential, we utilized participant feedback and scheduled each meeting to last no more than 90 minutes. Meetings are recorded and available online; however, leaders are encouraged to attend the meetings live to gain the most benefit through active participation.

Engagement within a CoP must be multidirectional and dynamic. The initiative has been structured to provide participants with a variety of opportunities for leadership empowerment and growth.[4] The virtual meetings include smaller breakout groups,

interactive polls and stimulating conversation topics. For example, leaders were asked to share one of their challenges in order to better determine everyone's perspective and the common themes for future meetings. A discussion forum allows participants to continue their leadership journey between meetings by providing a confidential space to share and problem-solve around successes and barriers to practice change. Participants are also encouraged to engage in opportunities within Wounds Canada to contribute to important projects, including educational and advocacy-based initiatives. These opportunities offer participants the ability to grow their leadership skills while giving back to the wound care community.

Mentorship

Mentorship is an essential component of creating a CoP.[3] Mentors can contribute to the CoP by utilizing their own experience to become enablers of social learning who provide support and direction. Wounds Canada selected mentors based on their previous experience in the field of wound care and demonstrated leadership in Wounds Canada initiatives. Additionally, mentors were selected from a pan-Canadian and interprofessional perspective. Mentors will be present during both meetings and forum interactions. Currently, the mentors include the following distinguished experts: Joel Alleyne, Sunita Coelho, Pat Coutts, Janet Kuhnke, Andrew Springer and Marlene Varga.

Evaluation

The Wound Care Leadership Initiative is a pilot program and will be evaluated both qualitatively and quantitatively on its ability to meet its goals.

Leadership Growth and Development

To date, feedback from the participants has been overwhelmingly positive. Wounds Canada, through online surveys and virtual discussions, will be gathering data on the impact of the initiative on their personal leadership growth. Their feedback has and will continue to be used to plan future meetings and other forms of participant engagement.

Integration into Wounds Canada

Wounds Canada encouraged participants to take an active role within the organization by offering opportunities for engagement. Thus far, participants have engaged in a symposium and have submitted their names to be included in future activities. Participant engagement will continue to be identified and recognized for the impact of contributions.

Sustainability

Wounds Canada is actively soliciting feedback from both the Wounds Canada team and participants through online surveys and virtual discussions to ensure the initiative is meeting its objectives. The evaluation of the initiative will be ongoing and multifaceted to ensure sustainability into the future.

Conclusion

Wounds Canada has created a Community of Practice in Wound Care Leadership. This will enable wound care leaders to engage in dialogue, further develop their leadership skills, contribute to Wounds Canada and, ultimately, influence the national wound care community.

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