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# Wound Care



The Official Publication of the Canadian Association of Wound Care  
La revue officielle de l'Association canadienne du soin des plaies

Soins  
des  
plaies



## Conference Highlights from the 17th Annual CAWC Conference

Principles of Acute Wounds  
Les plaies aiguës

Complex Wounds in the  
Emergency Department  
Les plaies complexes au service  
des urgences

Pilonidal Sinus Wounds  
Les sinus pilonidaux

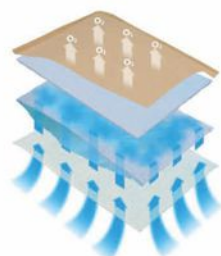
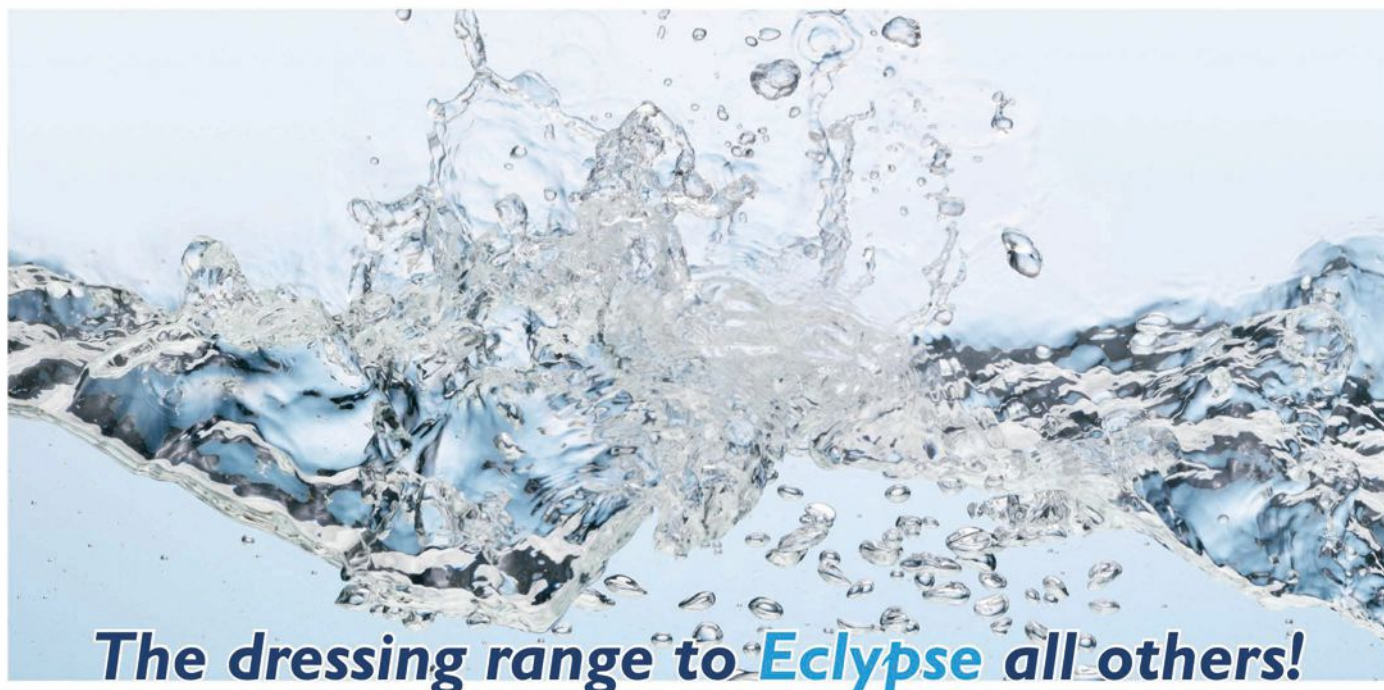
Biofilms: A Clinical Conundrum  
Les biofilms : une énigme clinique

## Supplement 1 Oral and Poster Abstracts

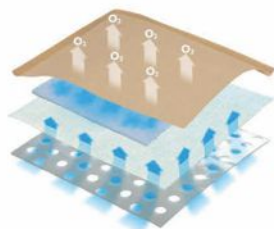
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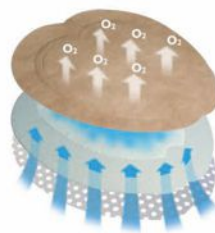
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## Features / Reportages

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Canadian Association  
of Wound Care  Association canadienne  
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The Canadian Association of Wound Care is a non-profit organization of health-care professionals, industry participants, patients and caregivers dedicated to the advancement of wound care in Canada.

The CAWC was formed in 1995, and its official meeting is the CAWC annual conference held in Canada each year. The association's efforts are focused on five key areas: public policy, clinical practice, education, research and connecting with the international wound-care community. The CAWC works to significantly improve patient care, clinical outcomes and the professional satisfaction of wound-care clinicians.

L'Association canadienne du soin des plaies est un organisme sans but lucratif regroupant des professionnels de la santé, des gens de l'industrie, des patients et des membres du personnel soignant fortement intéressés à l'avancement des connaissances pour le soin des plaies au Canada.

Fondée en 1995, l'ACSP organise, chaque année, au Canada, un congrès qui lui tient lieu de réunion officielle, le Congrès annuel de l'ACSP. L'association consacre ses efforts dans cinq domaines particuliers : les politiques gouvernementales, la pratique clinique, la formation, la recherche et la création de liens avec la communauté internationale directement impliquée dans le soin des plaies. L'Association canadienne du soin des plaies vise une amélioration significative du soin donné au patient, des résultats cliniques et de la satisfaction professionnelle des spécialistes en soin des plaies.



# 17th Annual CAWC Conference: A Tremendous Success!

## 17<sup>e</sup> conférence annuelle de l'ACSP Un franc succès!

2011  
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**T**he 17th annual Canadian Association of Wound Care conference was held November 3–6, 2011, at the Ottawa Convention Centre, Ottawa, Ontario, with more than 650 clinicians, healthcare policymakers and industry representatives in attendance. This year's theme, "Surgical Wounds, Burns, and Infections," addressed the wound care topics that are top of mind for many healthcare professionals.

The official welcome and introductions, emceed by Douglas Queen, set the tone for the conference by offering heartfelt congratulations to the wound care honorees and wound care heroes who were celebrated at this year's conference. Noted Conference Co-Chair Mariam Botros, "We are pleased to recognize those people who have been involved in bringing wound care to the forefront in Canada and around the world, as well as those healthcare professionals who quietly make a difference in their own communities." See page 6 for a list of the heroes and honorees.

The sessions were well-attended and offered a diverse program to attract wound care clinicians of all backgrounds. Some of the program highlights that you can read about in this issue include:

- Principles of acute wounds (page 12).
- Update on wound bed preparation (page 18).
- Complex wounds in the emergency room (page 24).
- Pilonidal sinus wounds (page 28).
- Biofilms: a clinical conundrum (page 37).
- CAWC research project: An update (page 43).
- CAWC around the world: An international leader (page 45).

The CAWC continued to partner with the Canadian wound care industry, and presented exciting and well-attended pre-conference satellite symposia day, power breakfasts, learning lunches and product theatres. As well, the spacious exhibit hall allowed for easy movement, and provided ample space for participants to meet and network between sessions. This year's exhibit hall offered the largest wound care

**L**a 17<sup>e</sup> conférence annuelle de l'Association canadienne du soin des plaies s'est tenue au Centre des congrès d'Ottawa (Ontario) du 3 au 6 novembre 2011 et a attiré plus de 650 cliniciens, décideurs du domaine des soins de santé et représentants de l'industrie. Au cours de la conférence, dont le thème était « Plaies chirurgicales, brûlures et infections », il a été question des sujets relatifs au soin des plaies qui intéressent le plus de nombreux professionnels de la santé.

Animée par Douglas Queen, la séance inaugurale (allocution de bienvenue et présentations officielles) a donné le ton de la conférence : on a sincèrement félicité les personnes honorées et héros du domaine du soin des plaies dont le travail a été souligné à la conférence de cette année. De dire madame Mariam Botros, co-présidente de la conférence, « Nous sommes heureux de souligner le travail des personnes qui ont contribué à mettre la question du soin des plaies à l'avant-plan au Canada et partout dans le monde, ainsi que des professionnels de la santé qui, l'air de rien, changent les choses dans leur communauté. » La liste des héros et des personnes honorées figure à la page 8.

Les séances, qui ont attiré un grand nombre de participants, ont porté sur des sujets divers afin de piquer l'intérêt de cliniciens de tous les domaines. Dans le présent numéro, vous trouverez des articles sur les faits saillants suivants de la conférence :

- principes de la prise en charge des plaies aiguës (page 14)
- mise à jour sur la préparation du lit de la plaie (page 18)
- les plaies complexes à la salle d'urgence (page 26)
- le sinus pilonidal (page 30)
- les biofilms : un problème clinique épineux (page 39)
- projet de recherche de l'ACSP : mise à jour (page 43).
- l'ACSP dans le monde : un leader international (page 45)

L'ACSP a continué de s'associer à l'industrie canadienne du soin des plaies pour présenter, avant la conférence, un symposium satellite d'un jour stimulant et



*The conference sessions were well-attended and offered a diverse program to attract wound care clinicians of all healthcare backgrounds.*

trade gathering in Canada (more than 30 exhibitors), and presented unparalleled educational opportunities and the chance to see the latest products and services.

The social events offered even more opportunities for attendees to network with peers and colleagues. The exhibit hall grand opening was a tremendous success, and the Saturday evening Annual President's Party offered attendees a chance to kick up their heels and dance the night away. The Fun Run/Walk allowed energetic participants to enjoy the balmy Ottawa morning air, and supported the CAWC's *Diabetes Healthy Feet and You* initiative with donations from pledges.

Overall, the conference was an enormous success. Attendees enjoyed the diversity of the program as well as the opportunity to network with colleagues and acquaintances. Thank you to all participants and to all those healthcare professionals who work so very hard to help people with acute and chronic wounds.

#### **Join us in London, Ontario, for the CAWC 2012 Conference**

Next year's conference will be held in London, Ontario, from November 8–11, 2012, where the theme will be "A Canadian Healthcare Crisis: Chronic Wounds." Session topics will include:

- The transition from institutional to home care
- Integrating the interdisciplinary team
- Dealing with the changing demographics
- Managing the complex and complicated wound

Join your wound care colleagues for 4 days of stimulating and thought-provoking discussions and strategies that you can take back to your practice. Look for further details after January 1, 2012, at [www.cawc.net](http://www.cawc.net).

#### **We want to hear from YOU!**

We welcome your feedback on this year's conference, and we'd also like to know what topics you'd like to see addressed at next year's conference, to be held in London, Ontario, from November 8–11, 2012. Please email [wcceditor@cawc.net](mailto:wcceditor@cawc.net) with your feedback, comments and suggestions. We hope to hear from you soon! ☺

qui a attiré un grand nombre de participants, tenir des petits-déjeuners-débats et des dîners-causeries et organiser des séances sur les produits. Par ailleurs, comme la salle des exposants était vaste, il était facile d'y circuler et les participants pouvaient s'y réunir et réseauter entre les séances. L'exposition de cette année était la plus importante du domaine du soin des plaies au Canada (plus de 30 exposants). Elle offrait aux participants des possibilités d'apprentissage sans précédent et leur donnait la chance de se familiariser avec les plus récents produits et services.

Les activités sociales tenues dans le cadre de la conférence étaient d'autres occasions pour les participants de réseauter avec leurs pairs et collègues. L'inauguration de la salle des exposants a été un grand succès et les participants ont pu danser toute la soirée à la fête annuelle du président tenue le samedi. Une marche/course a attiré des participants énergiques qui avaient recueilli des promesses de dons pour soutenir le projet *Le diabète : des pieds en santé et vous*. Le matin de l'événement, il faisait un temps superbe à Ottawa.

La conférence a dans l'ensemble été couronnée de succès. Les participants ont apprécié la diversité du programme ainsi que l'occasion de réseauter avec des collègues et connaissances. Nous remercions tous les participants et tous les professionnels de la santé qui mettent tout en œuvre pour venir en aide aux patients qui souffrent de plaies aiguës et chroniques.

#### **Conférence de 2012 de l'ACSP : soyez du nombre!**

En 2012, la conférence se tiendra à London, en Ontario, du 8 au 11 novembre sous le thème « Crise des soins de santé au Canada : les plaies chroniques ». Les séances porteront notamment sur les sujets suivants :

- transition des soins institutionnels aux soins à domicile
- intégration de l'équipe interdisciplinaire
- réalités des changements démographiques
- gestion de la plaie complexe et compliquée.

Joignez-vous à vos collègues du soin des plaies pour quatre jours consacrés à des discussions stimulantes et portant à réflexion et à l'élaboration de stratégies que vous pourrez appliquer dans votre exercice. Pour de plus amples renseignements, visitez le site [www.cawc.net](http://www.cawc.net) après le 1<sup>er</sup> janvier 2012. Nous espérons que vous serez des nôtres!

#### **Donnez-nous votre opinion!**

Il nous tarde de savoir ce que vous avez pensé de la conférence de cette année et d'avoir vos suggestions sur les sujets dont vous aimeriez qu'il soit question à la conférence qui se tiendra du 8 au 11 novembre 2012 à London, en Ontario. Envoyez vos commentaires et suggestions par courriel à l'adresse [wcceditor@cawc.net](mailto:wcceditor@cawc.net). Nous espérons avoir de vos nouvelles bientôt! ☺

## Wound Care Hero 2011

During the official welcome and introduction of the conference, the CAWC introduced a new award: the CAWC Wound Care Hero. This award recognizes the recipient's contribution as a community leader, wound care champion and educator. This year's Wound Care Hero is **Heather Morrow RN**.

As a front-line caregiver at Headwaters Health Care Centre in Orangeville, Ontario, Heather loves the hands-on aspects of nursing. Although Heather has worked at Headwaters for the past 27 years, she is always willing to expand her knowledge base. Five years ago she accepted the challenge of becoming the wound care champion for Headwaters Health Care Centre.

Since then, she has welcomed the opportunity to learn best practices for wound care. She enjoys educating others and is

always willing to share her knowledge and experience. Heather has also completed the CAWC Institute of Wound Management and Prevention Level 3 series.

The positive results achieved from applying this new knowledge have gained Heather the confidence of fellow staff members, who regularly consult with her to determine optimum choices for wound healing. Over the past few months, wound care awareness has become a focus at Headwaters, and Heather has been instrumental in the organization of an interdisciplinary wound care team. Her goal is to continue her own education in wound care and share that gained knowledge with fellow staff and patients.

The CAWC congratulates Heather for making a difference in her healthcare organization and in her community.



Heather Morrow: The Canadian Association of Wound Care's "Wound Care Hero."

## Wound Care Hero nominees 2011

A number of clinicians from across Canada were nominated by their peers for the Wound Care Hero award. We recognize them here for their continued efforts on behalf of their patients and their communities.

Darcie Anderson RN BScN IIWCC ET  
Muenster, SK

Jillian Brooke RN IIWCC CETN(C)  
Windsor, ON

Lynn Campbell RN  
Renfrew, ON

Heather Campsall RN  
Duncan, BC

Sunita Coelho RN IIWCC  
Toronto, ON

Lincoln D'Souza RN  
Montreal, QC

Eileen Emmott RN BScN IIWCC ET  
Calgary, AB

Ludwik Fedorko MD  
Toronto, ON

Peggie Gairy RN IIWCC CETN  
Toronto, ON

Stacey Gladue RN BScN  
Rapid View, SK

Lisa Hegler RN BScN  
Burnaby, BC

Michelle Heidel RN IIWCC  
North Battleford, SK

Karen Lagden RN ET  
Calgary, AB

Poh Lin Lim RN IIWCC  
Winnipeg, MB

Theresa MacNeil RB BScN IIWCC  
North Sydney, NS

Leah Macumber RN IIWCC  
Windsor, NS

Cindy Maxwell LPN  
Halifax, NS

Marguerite Paul MD  
North Bay, ON

Leanne Penney RN  
Fort Frances, ON

Zaynab Sheraly RN  
Toronto, ON

Susan Spears LPN  
Musquodoboit Harbour, NS

Ana Stanesic RN  
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Marlene Varga RN IIWCC  
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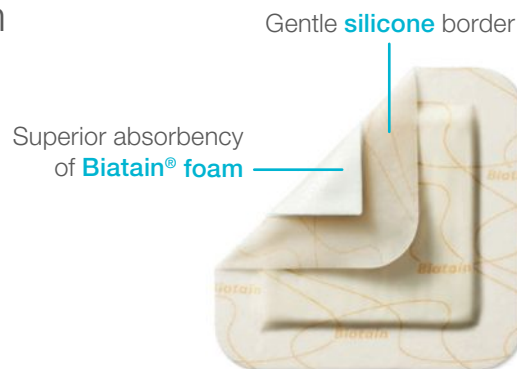
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## Why Attend the CAWC Conference? One Attendee's Story

By Tammy Fleck, Stettler Home Care, Stettler, Alberta

I am a licensed practical nurse in Stettler, Alberta, which is a small community approximately 50 km east of Red Deer. I have attended two CAWC conferences: I went to the Calgary meeting in 2010, and then to Ottawa this year.

### Sessions of interest

I think the most valuable session for me was the plenary session entitled Principles of Wound Care. It really set the stage for helping me to choose which other conference sessions I should attend – it made me think about what sessions would offer me the best information to take back and use in my practice. Speakers at that session also indicated that attendees should broaden their skills and attend sessions they might have felt were above their own level of understanding. That was great advice, as it made me think more broadly about the wound care topics I was interested in, and I didn't stress out about my level of understanding – I just listened and learned!

*"I'm going to continue making an extra effort to educate my clients on the importance of getting treatment quickly."*

Several other sessions were also particularly interesting:

- I found the session International Consensus on Skin Tears so important. I agree that skin tears are often classified as pressure ulcers, and I'd really like to help in some way to get more data in that regard.
- Diagnostic Dilemma: Infection vs. Inflammation was also very beneficial, as I believe many patients are being put on antibiotics who shouldn't be. It also increased my awareness, as a nurse, of the importance of physical assessment and critical appraisal of the signs and symptoms of various wounds.
- Social Networking and Healthcare was also quite interesting – it's the wave of the

future. People have been fighting it for so long, but why not use it to our advantage?

As an extra plus, the social events were fun and a great way to meet and network with other attendees.

### Takeaway messages

Now that I've returned from the conference, I plan to present some of what I've learned at our regular wound care meetings. I will pass information along to my team members, including enterostomal therapists, occupational therapists, registered nurses and other licensed practical nurses.

I'm also going to continue making an extra effort to educate my clients on the importance of getting treatment quickly. I work on educating my patients every single time I see them, to ensure they remember that if they see a wound developing, they should call the clinic immediately; that way, we can manage wounds when they are acute rather than when they have become chronic.

I must admit, I was at a crossroads when I attended the CAWC conference in Calgary... I wasn't sure what I wanted to do in wound care. Although I was overwhelmed by how little I knew – as I thought I knew a lot – I also realized how much more I could learn. So, this past year I took the CAWC Institute of Wound Management and Prevention L series as well as some courses from the Canadian Association of Enterostomal Therapists. This time, in Ottawa, I wasn't so overwhelmed because I had increased my knowledge base.

I'm saving my pennies to attend the CAWC conference in London, Ontario, in 2012 and am really looking forward to it!

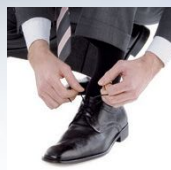
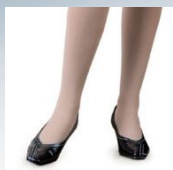
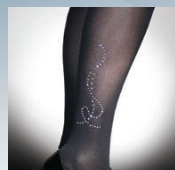
*Tammy Fleck was honoured to win a trip to the 17th annual CAWC conference. She shared her thoughts on her conference attendance with Wound Care Canada.*



Tammy Fleck: "Now that I've returned from the conference, I plan to present some of what I've learned at our regular wound care meetings."

## Register for the CAWC Institute of Wound Management and Prevention

The CAWC Institute of Wound Management and Prevention is offering educational sessions across Canada throughout 2012. For further information regarding dates and venues, and to register, please visit [www.cawc.net](http://www.cawc.net).



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## Canadian Wound Care Leaders

During the official welcome and introduction of the conference, the CAWC recognized Canadian Wound Care Leaders. The recipients of these awards have made exceptional efforts and innovations in furthering the development of wound care practice in the areas of bedside practice, educational programs, research and guideline/policy building.

### This year's Canadian Wound Care Leaders are:

Cathy Burrows RN BScN MScCh  
Halifax, NS

Karen Campbell RN PhD  
London, ON

Cathy Harley RN IIWCC EMBA  
Ottawa, ON

Connie Harris RN ET IIWCC MSc  
Waterloo, ON

Pamela Houghton PT PhD  
London, ON



The CAWC's 2011 Canadian Wound Care Leaders.

Shane Inlow MD  
Calgary, AB

David Keast BSc MSc Dip Ed MD  
CCFP FCFP  
London, ON

Louise Forest Lalande RN MED ET  
Montreal, QC

Heather Orsted RN BN ET MSc  
Calgary, AB

R. Gary Sibbald BSc MD FRCPC(Med)  
FRCPC(Derm)  
Mississauga, ON

Gail Woodbury PhD BScPT  
London, ON

## "You Make A Difference" Award



Peggy Ahearn: You make a difference!

Peggy Ahearn, executive director of the CAWC, was honoured with the "You Make a Difference" award, in recognition of her dedication to and leadership of the CAWC, and for making a difference in the lives of people with wounds.

Peggy has a wealth of experience in health communications, education, sales and marketing, with a specialty in wound care. For more than 15 years she was president of The Medicine Group, a continuing health education agency; she is also a founding member of the Canadian Association of Continuing Healthcare Education and served as project leader for the third congress of the World Union of Wound Healing Societies, which was held in Toronto in June 2008. Peggy has been significantly involved with the CAWC, including being a founding member and, more recently, taking the helm as executive director.



### MEETING ANNOUNCEMENT

#### Euro-Mediterranean Council For Burns and Fire Disasters

The 17th annual meeting of the Euro-Mediterranean Council For Burns and Fire Disasters will be held in Palermo, Italy, from June 6–8, 2012. For further information, please visit <http://www.medbc.com> or contact the Council Secretariat via email ([mbcpa@medbc.com](mailto:mbcpa@medbc.com)).



## Announcement – CAWC Board of Directors

The Canadian Association of Wound Care is pleased to welcome the following new members to the Board of Directors:



Afsaneh Alavi MD FRCP  
Resident Dermatologist,  
University of Toronto  
& Sunnybrook Health  
Sciences Centre  
Toronto, Ontario

Wound Management and Prevention,  
Canadian Association of Wound Care  
Toronto, Ontario



Deirdre O'Sullivan-  
Drombolis BScPT MCISc  
(Wound Healing)  
Physical Therapist and  
Wound Care Resource,  
Riverside Health Care

Facilities, Fort Frances, Ontario  
Adjunct Faculty, University of Western  
Ontario MCISc (Wound Healing) Program



Anna Slivinski RD  
Registered Dietitian  
Home and  
Community Care,  
Vancouver Coastal Health  
Vancouver, British Columbia




Morty Eisenberg MD  
MScCH FCFP  
Hospitalist Division Head  
and Wound Consultant,  
St. John's Rehab Hospital  
Faculty Member, Institute of




Nicola Waters RN MSc  
Assistant Professor,  
Mount Royal University  
Calgary, Alberta

We thank those members who are leaving the board for their commitment and dedication to the Canadian Association of Wound Care: Cathy Burrows, Past President; Martine Albert; David Haligowski; and Maryse Beaumier.

Canadian Association  
of Wound Care



Association canadienne  
du soin des plaies



## Career Classifieds in *Wound Care Canada*

*Wound Care Canada* is launching a Career Classifieds section in the Spring 2012 issue (publication date May 1, 2012).

- Are you recruiting new employees for a position at your academic or healthcare institution?
- Are you a wound care specialist seeking employment or consulting opportunities within the wound care community?

Place an advertisement in *Wound Care Canada*'s Career Classifieds section, and you'll have immediate access to 7,500 readers from the wound care community across Canada who read each and every issue of the publication.

For information regarding Career Classifieds rates and deadlines, please contact David Stein, Business Manager, Canadian Association of Wound Care, via email at [david@cawc.net](mailto:david@cawc.net).

# Principles of Acute Wounds:

## Understanding the basic tenets of acute wounds and their management

### PRESENTERS:

CONNIE HARRIS  
RN ET IIWCC MSC

DAVID KEAST  
BSc MSc Dip Ed MD  
CCFP FCFP

LORNE WIESENFELD  
MDCM FRCPC

KIM LeBLANC  
RN BScN MN  
CETN(C)

STEPHAN LANDIS  
MD FRCPC

**Connie Harris** is a senior clinical specialist at the Wound & Ostomy Care Partners in Waterloo, Ontario.

**David Keast** is a clinical adjunct professor of family medicine at the University of Western Ontario in London, Ontario.

**Lorne Wiesenfeld** is assistant professor and part of the Attending Staff Department of Emergency Medicine at The University of Ottawa and The Ottawa Hospital in Ottawa, Ontario.

**Kim LeBlanc** works for KDS Professional Consulting in Ottawa, Ontario.

**Stephan Landis** works out of Guelph General Hospital in Guelph, Ontario.

**T**his plenary session of the CAWC conference set the stage by offering attendees basic principles of wound care in various settings. It also addressed the issue of how acute wounds impact the healthcare system globally.

### How are acute wounds different from chronic wounds?

David Keast began by outlining the 4 stages of healing of acute skin wounds: 1) hemostasis; 2) inflammation; 3) repair; and 4) remodelling. During this process the wound bioburden is controlled, which in turn limits inflammation. The problem, said Keast, is that "acute wounds can get 'stuck' in the chronic inflammation phase and fail to move into the repair phase." Furthermore, the products of inflammation – i.e. proteases (enzymes that help break down proteins and tissue) and reactive oxygen species – destroy the proteins that are essential for healing; this results in impaired healing.

Both planktonic and biofilm bacteria contribute to chronic inflammation – this remains one of the most common causes of non-healing wounds. Hence, biofilm-based wound care and wound bed preparation can help move chronic wounds into a healing status.

The stages of molecular and cellular events in skin wound healing are as follows: 1) clotting; 2) vascular response; 3) inflammation; 4) scar formation; 5) epithelial healing; 6) contraction; and 7) scar remodeling.<sup>1</sup> Hemostasis, inflammation and remodelling occur in conjunction with each other, but some stages start a little later and last longer. Thus, said Keast, "The process is not sequential; a wound can be in various stages simultaneously."

Keast finished his talk by noting that the hypothesis regarding chronic wound pathophysiology is that repeated tissue injury, ischemia and bacterial growth (planktonic and biofilm) result in a chronic, non-healing wound.

### The burden of open surgical wounds

Connie Harris, using data provided by Corrine McIsaac

of Health Outcomes Worldwide, said the most common types of wounds seen in community care in Canada are surgical. Indeed, in the province of Ontario, the most common reason for a surgical nursing visit in 2004 was postoperative cellulitis; however, surgical site infections accounted for 20% of home care visits.<sup>2</sup>

A study conducted in the UK found that the costs of treating surgical site infections amounted to £57 million in 2008 (CAN\$90 million). "Clearly, the consequences of surgical wounds present a huge financial burden to international healthcare systems," said Harris.

According to data from Health Outcomes Worldwide, dry gauze is the primary treatment used in the community for all wounds, with 24% of surgical wounds treated in this manner.<sup>2</sup> This is a problem, said Harris, as it is not considered the optimal therapy for such wounds. In the SouthWest Regional Wound Care Initiative, she said, nurses and surgeons have worked together to develop a dressing selection guide for surgical open wounds: the "Daily Visits as Exceptional Situation" document. This document is based on the principles of collaboration and is meant to improve:

- human resource utilization;
- capacity in a time of nursing shortage;
- medical supply utilization; and
- patient pain.

### Wound care in the emergency department

Lorne Wiesenfeld began by noting that emergency department clinicians strive to provide evidence-based care for patients who present with acute wounds and have an opportunity to positively impact wound care. However, he said, this is sometimes offset by lack of knowledge, insufficient resources and competing demands in the emergency department.

Common wounds seen in the emergency department include:

- diabetic foot ulcers;
- infected lacerations;
- acute lacerations;
- burns;

- chronic leg ulcers;
- pilonidal or perianal abscesses;
- subcutaneous abscesses;
- postoperative wounds; and
- infected pressure ulcers.

Dr. Wiesenfeld said that, in his healthcare institution, there is a true team approach between the emergency department staff and community staff (e.g. enterostomal nurses). Such an approach provides an optimal environment to ensure ongoing wound management and wound healing. "We need to work together as a multidisciplinary team," he said, "to ensure that all patients receive optimal care, and that the wound is addressed properly and heals in as timely a fashion as possible, given the wound and patient characteristics."

### Why are skin tears a problem?

Kim LeBlanc began by saying, "People often think skin tears aren't a problem...no one really thinks about acute wounds." However, she continued, if skin tears are not managed appropriately, they can become very complex chronic wounds and cause undue suffering to the patient.

A review of the literature on skin tears reveals the following key data:

- Malone and colleagues estimated there are 1.5 million skin tears per year in institutionalized adults in the US.<sup>3</sup>
- Everett and Powell reported a 41.5% prevalence of skin tears in a 347-bed facility in Western Australia.<sup>4</sup>
- Carville and Lewin reported a skin tear prevalence of approximately 5.5% in known wounds among all age groups in community settings.<sup>5</sup>
- Carville and Smith reported skin tears in 20% of known wounds in the war veteran population.<sup>6</sup>
- Carville and colleagues reported that skin tears are common wounds and occur more frequently than pressure ulcers.<sup>7</sup>

LeBlanc and Christensen conducted a prevalence study in a Canadian long-term care facility, and found a skin tear prevalence rate of 22%.<sup>8</sup> "This is much higher than the prevalence rate of pressure ulcers, which receive considerable attention in the clinical wound care field," said LeBlanc.

The online survey conducted by LeBlanc and Christensen was completed by 1,127 healthcare professionals from 16 countries.<sup>8</sup> The following responses were recorded:

- More than half (69.6%) of respondents reported a problem with current assessment and documentation of skin tears in their practice settings.
- The majority (89.5%) of respondents favoured a simplified method for documenting and assessing skin tears.

*Both planktonic and biofilm bacteria contribute to chronic inflammation status – this remains one of the most common causes of non-healing wounds.*

- 80.9% of respondents admitted to not using any tool or classification system for assessing and documenting skin tears.
- 68% of respondents felt there was a problem with skin tear assessment and documentation in their healthcare setting.
- 90% of respondents indicated that they would like a more simplistic method of documenting skin tears.
- 80% of respondents said their healthcare institution did not use any scale or classification system for documenting skin tears.

Although people generally think of skin tears as an issue confined to the elderly population, LeBlanc said they can occur in the very young and the very old. Because skin tears are not well-documented, their incidence and the healthcare costs associated with treating them are unknown. Skin tear prevention programs – particularly in the long-term care setting – are badly needed.

### Acute wound infection

Stephan Landis said infections are a major issue in the acute wound setting because of bacteria formation, which competes with the local wound environment.

"Bacteria seek niches to prosper," said Landis, "and they do a very good job of it!" An acute wound provides an optimal environment for bacteria to grow, persist and develop microbial resistance. Much of this sequence of events is predictable and some, but not all, is measurable.

Landis addressed microbial outcomes in acute wounds and noted that perioperative antibiotics, "clean" surgery, good surgical technique and measured postoperative care can result in a wound remaining uninfected. Conversely, if microbes can invade the host at the wound site, then they can cause infection. This is often the result of a pathovirulent organism, 'dirty' surgery, abscess formation, wound dehiscence, septicemia (in burns) or poor protoplasm.

If a biofilm is established, this can lead to wound chronicity and result in foreign body infection, osteomyelitis, devitalized tissue and, ultimately, poor healing capacity. However, Landis said, "In complex wounds at the bedside, the diagnostic capabilities of identifying biofilm are undergoing an evolution. In the future we'll know much more about this area of knowledge, based on research that is currently being conducted." ☹

*For references, please see page 17.*



# Les plaies aiguës

## Principes fondamentaux de la prise en charge des plaies aiguës

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**Lorne Wiesenfeld** est professeur adjoint et médecin traitant au Département de médecine d'urgence à l'Université d'Ottawa et à l'Hôpital d'Ottawa (Ontario).

**Kim LeBlanc** est employée de KDS Professional Consulting, à Ottawa (Ontario).

**Stephan Landis** travaille à l'Hôpital général de Guelph (Ontario).

**A**u cours de la séance plénière, qui a donné le ton de la conférence de l'ACSP, il a été question des principes fondamentaux du soin des plaies dans divers contextes, ainsi que des répercussions globales des plaies aiguës sur le système de soins de santé.

### Qu'est-ce qui distingue les plaies aiguës des plaies chroniques ?

Le Dr David Keast a commencé par exposer les quatre stades de la cicatrisation des plaies cutanées aiguës : 1) hémostase; 2) inflammation; 3) réparation; et 4) remodelage. Pendant le processus, le fardeau biologique de la plaie est maîtrisé, ce qui limite l'inflammation. Selon le Dr Keast, le problème vient du fait que « les plaies aiguës peuvent être "bloquées" dans la phase d'inflammation chronique plutôt que de passer à la phase de réparation ». De plus, les produits de l'inflammation – soit les protéases (des enzymes qui contribuent à la dégradation des protéines et des tissus) et la forme réactive de l'oxygène – détruisent les protéines qui sont essentielles à la cicatrisation, ce qui entrave donc la cicatrisation.

La contribution à l'inflammation chronique des bactéries planctoniques et des biofilms demeure une des causes les plus courantes de non-cicatrisation des plaies. Par conséquent, les soins des plaies visant les biofilms et la préparation du lit des plaies peuvent favoriser la cicatrisation des plaies chroniques.

Les stades des événements moléculaires et cellulaires de la cicatrisation des plaies cutanées sont les suivants : 1) coagulation; 2) réponse vasculaire; 3) inflammation; 4) formation d'une cicatrice; 5) guérison épithéliale; 6) contraction; et 7) remodelage de la cicatrice<sup>1</sup>. L'hémostase, l'inflammation et le remodelage sont des processus concomitants, mais certains stades commencent un peu plus tard et durent plus longtemps. Par conséquent, selon le Dr Keast, le processus n'est pas séquentiel et la plaie peut être à divers stades de cicatrisation en même temps.

Le Dr Keast a terminé sa présentation en faisant remarquer que selon l'hypothèse concernant la physiopathologie des plaies chroniques, les lésions tissu-

lares répétitives, l'ischémie et la multiplication des bactéries (planctoniques et de biofilms) produisent une plaie chronique qui ne cicatrise pas.

### Fardeau des plaies chirurgicales ouvertes

En s'appuyant sur les données de madame Corrine McIsaac, de Health Outcomes Worldwide, madame Connie Harris, a affirmé que dans le contexte des soins communautaires canadiens, les plaies chirurgicales sont les plaies les plus courantes. En effet, en Ontario, la cellulite post-opératoire était en 2004 la principale raison de la consultation d'une infirmière en chirurgie, tandis que les infections du site opératoire donnaient lieu à 20 % des visites de soins à domicile<sup>2</sup>.

Une étude menée au Royaume-Uni a révélé que le coût du traitement des infections du site opératoire était de 57 millions de livres en 2008 (soit 90 millions de dollars canadiens). De dire madame Harris, « Manifestement, les conséquences des plaies chirurgicales représentent un énorme fardeau financier pour les systèmes de soins de santé du monde entier. »

Les données de Health Outcomes Worldwide démontrent que l'application de pansements de gaze sèche est le principal traitement employé en milieu extra-hospitalier pour toutes les plaies, 24 % des plaies chirurgicales étant traitées ainsi<sup>2</sup>. Toutefois, selon madame Harris, l'application de tels pansements n'est pas considérée comme le traitement optimal de ces plaies. Elle a déclaré que dans le contexte du SouthWest Regional Wound Care Initiative, le personnel infirmier et les chirurgiens ont uni leurs efforts pour préparer un guide sur le choix des pansements pour les plaies chirurgicales ouvertes, intitulé *Daily Visits as Exceptional Situation*. Ce guide, fondé sur les principes de la collaboration, a pour objet d'améliorer :

- l'utilisation des ressources humaines
- la capacité dans le contexte du manque de personnel infirmier
- l'utilisation des fournitures médicales
- le soulagement de la douleur.

Suite page 16

# The Pressure's on!

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## *La contribution à l'inflammation chronique des bactéries planctoniques et des biofilms demeure une des causes les plus courantes de non-cicatrisation des plaies.*

### **Soin des plaies au service des urgences**

Le Dr Lorne Wiesenfeld a d'abord fait remarquer que les cliniciens des services des urgences cherchent à offrir des soins fondés sur des données probantes aux patients qui présentent une plaie aiguë et que leur intervention peut avoir un effet positif sur le soin des plaies. Cependant, il a affirmé qu'il arrive que les connaissances et les ressources soient insuffisantes et que les exigences du service des urgences soient contradictoires.

Les plaies suivantes sont couramment observées au service des urgences :

- ulcères du pied diabétique
- lacérations infectées
- lacérations aiguës
- brûlures
- ulcères chroniques de jambe
- abcès pilonidaux ou périanaux
- abcès sous-cutanés
- plaies post-opératoires
- plaies de pression infectées.

Selon le Dr Wiesenfeld, le personnel du service des urgences de son hôpital fait véritablement équipe avec le personnel en milieu communautaire (p. ex. les infirmières stomothérapeutes), ce qui produit des conditions optimales pour la prise en charge et la cicatrisation des plaies. « Il faut une équipe multidisciplinaire pour que tous les patients reçoivent des soins optimaux afin que les plaies soient bien prises en charge et cicatrisent le plus vite possible, compte tenu des caractéristiques de la plaie et du patient. »

### **Pourquoi les déchirures cutanées posent-elles des problèmes ?**

Madame Kim LeBlanc a d'abord dit que les gens croient souvent que les déchirures cutanées ne posent pas de problèmes et que personne ne s'inquiète vraiment des plaies aiguës, mais a ensuite fait remarquer que faute de prise en charge, une déchirure cutanée pouvait devenir une plaie chronique très complexe et causer des souffrances inutiles.

Une analyse de la littérature sur les déchirures cutanées a fait ressortir les données clés ci-dessous.

- Selon Malone et ses collaborateurs, il y aurait aux États-Unis 1,5 million de déchirures cutanées par année chez les adultes hospitalisés<sup>3</sup>.

- Everett et Powell ont signalé que la prévalence des déchirures cutanées était de 41,5 % dans un hôpital de 347 lits d'Australie-Occidentale<sup>4</sup>.
- Carville et Lewin ont signalé que 5,5 % des plaies connues étaient des déchirures cutanées dans tous les groupes d'âge du milieu communautaire<sup>5</sup>.
- Carville et Smith ont signalé que les déchirures cutanées représentaient 20 % des plaies connues chez les anciens combattants<sup>6</sup>.
- Carville et ses collaborateurs ont signalé que les déchirures cutanées étaient des plaies courantes, survenant plus souvent que les plaies de pression<sup>7</sup>.

Une étude menée par LeBlanc et Christensen a révélé que le taux de prévalence des déchirures cutanées dans les établissements de soins prolongés canadiens était de 22 %<sup>8</sup>. Selon madame LeBlanc, ce taux est beaucoup plus élevé que le taux de prévalence des plaies de pression, auxquelles on accorde beaucoup d'importance dans le domaine du soin clinique des plaies.

Le sondage en ligne mené par LeBlanc et Christensen a été rempli par 1127 professionnels de la santé de 16 pays<sup>8</sup>. Voici un sommaire des résultats.

- Plus de la moitié (69,6 %) des répondants ont signalé qu'il y avait actuellement un problème au chapitre de l'évaluation et de la documentation des déchirures cutanées dans leur milieu d'exercice.
- La majorité (89,5 %) des répondants étaient en faveur de la simplification de la méthode de documentation et d'évaluation des déchirures cutanées.
- 80,9 % des répondants ont admis n'utiliser ni outil ni système de classification pour l'évaluation et la documentation des déchirures cutanées.
- 68 % des répondants étaient d'avis qu'il y avait un problème au chapitre de l'évaluation et de la documentation des déchirures cutanées dans leur milieu de soins de santé.
- 90 % des répondants ont indiqué qu'ils aimeraient que la méthode de documentation des déchirures cutanées soit simplifiée.
- 80 % des répondants ont indiqué que leur établissement de soins de santé n'utilisait ni échelle ni système de classification pour la documentation des déchirures cutanées.

Les gens croient généralement que les déchirures cutanées sont uniquement le fait des personnes âgées, mais selon madame LeBlanc, elles peuvent aussi survenir chez des personnes très jeunes. Comme les déchirures cutanées sont mal documentées, leur incidence et les coûts de leur traitement sont inconnus. Il y a un urgent besoin de programmes de prévention des déchirures cutanées, surtout dans les établissements de soins prolongés.



## Infection des plaies aiguës

Le Dr Stephan Landis a dit que l'infection d'une plaie aiguë était un grave problème, car la multiplication des bactéries perturbe le milieu de la plaie.

« Les bactéries cherchent des milieux propices à la multiplication, a déclaré le Dr Landis, et elles y parviennent très bien! » Une plaie aiguë est un milieu optimal où les bactéries peuvent se multiplier, persister et acquérir une résistance aux antimicrobiens. Beaucoup des événements de cette séquence sont prévisibles, mais seuls certains peuvent être mesurés.

Le Dr Landis a parlé des conséquences de la présence de microbes dans les plaies aiguës et fait remarquer que l'administration périopératoire d'antibiotiques, la chirurgie « propre », une bonne technique chirurgicale et des soins post-opératoires convenables pouvaient prévenir l'infection de la plaie. Inversement, la présence de microbes au site de la plaie peut entraîner une infection, souvent attribuable à un microorganisme virulent, à une chirurgie « sale », à la formation d'un abcès, à la déhiscence de la plaie, à une septicémie (en cas de brûlures) ou à un protocole pauvre.

Si un biofilm se forme, la plaie peut devenir chronique, ce qui peut entraîner une infection causée par un corps étranger, une ostéomyélite, une dévitalisation des tissus et, finalement, une réduction de la capacité de cicatrisation. Toutefois, selon le Dr Landis, « Les capacités de cerner un biofilm au chevet d'un patient présentant une plaie complexe évoluent. Les recherches actuellement en cours feront beaucoup avancer les connaissances dans ce domaine. »

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## Institut de l'ACSP pour la prévention et la gestion des plaies



**SÉRIE L : NIVEAUX 1, 2 ET 3**

**Montréal, QC**

**3 – 6 mai 2012 • Lieu à déterminer**

(Session prononcée en français)

**L'Institut de l'ACSP qui se tiendra à Montréal inclut :**

### Niveau 1 : Apprentissage des connaissances

Connaissances de base sur la gestion des plaies pour favoriser une approche client basée sur des pratiques exemplaires, notamment : les principes de la cicatrisation des plaies; la préparation du lit de la plaie; les ulcères de pression, les ulcères veineux de la jambe et les ulcères du pied diabétique.

### Niveau 2 : Apprentissage de compétences

Un apprentissage interactif et la pratique de compétences en soins des plaies, notamment : soins de plaies locales; débridement, prévention des infections et choix de pansements; évaluation de la jambe inférieure et compressothérapie; les chaussures et les soins des pieds; gestion de la pression, de la friction et du cisaillement.

### Niveau 3 : Développement d'une attitude propice à l'apprentissage

Étapes et méthodes pour pratiquer au sein d'une équipe afin de développer et de maintenir des stratégies de prévention axées sur la sensibilisation et la prévention des ulcères de pression et des ulcères du pied diabétique.



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# Update on Wound Bed Preparation:

**A review of the principles of treating the root cause of wounds, pain and wound healing, and local wound care**

**PRESENTERS:**

**R. GARY SIBBALD**  
BSc MD FRCPC  
(MED) FRCPC  
(DERM)

**KEVIN WOO**  
RN MSc ACNP  
GNC(C)

**LAURIE GOODMAN**  
RN BA IIWCC

**A**ttendees at this session were introduced to the following concepts of wound bed preparation:

- treating the cause and addressing patient-centred concerns, including pain;
- understanding healable, non-healable and maintenance wounds in the context of wound bed preparation;
- optimization of local wound care (i.e. debridement, infection–inflammation and moisture balance); and
- understanding superficial critical colonization and deep infection.

**Treat the cause**

Dr. Sibbald began by showing the wound bed preparation paradigm in patients with chronic wounds (Figure 1). With respect to treating the cause, the following recommendation apply: determine the blood supply available to promote healing; identify and treat the cause (if possible) to determine healability; and review the cofactors and comorbidities to create an individualized plan of care. Table 1 outlines

TABLE 1

**Treatments for the causes of various wounds**

Wound type	Treatment of the cause
Venous ulcer	Bandages for healing. Stockings for maintenance.
Pressure ulcer	Relieve, reduce and redistribute pressure. Promote activity and decrease immobility. Manage incontinence and moisture. Reduce shear and friction. Enhance and optimize nutrition.
Diabetic foot ulcer	Ensure that the vascular supply is adequate. Control infection. Redistribute plantar pressure.

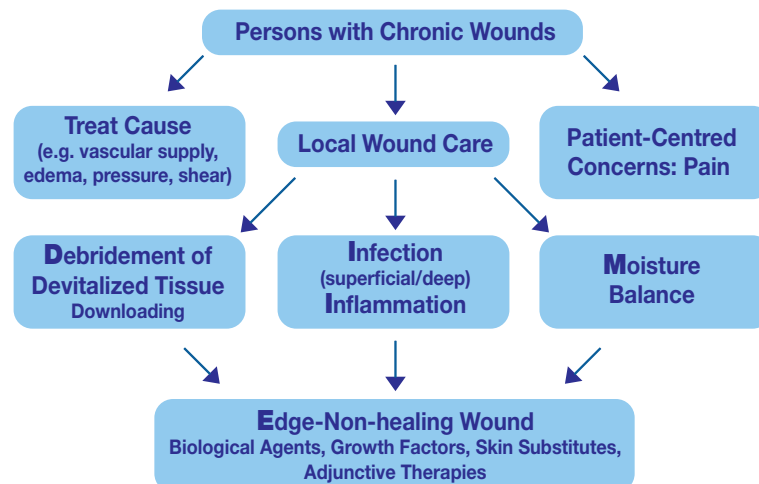
**R. Gary Sibbald** is a professor at the Dalla Lana School of Public Health at the University of Toronto and president of the World Union of Wound Healing Societies in Toronto, Ontario.

**Kevin Woo** is an assistant professor in the School of Nursing at Queen's University in Kingston, Ontario.

**Laurie Goodman** is a nurse clinician at the Skin & Wound Care Credit Valley Hospital in Mississauga, Ontario.

FIGURE 1

**Wound bed preparation paradigm**





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treatments for the causes of various wounds.

A maintenance wound is defined as a healable wound with healthcare system problems for delivery of services, or a non-healable chronic wound that is not deteriorating. In non-healable wounds, moisture balance and active debridement are contraindicated; however, the use of topical antiseptics has been shown to decrease local bacterial counts.

Antiseptic agents that can be used for non-healable

wounds (where cytotoxicity is less important than antimicrobial action) include chlorhexidine, povidone iodine, crystal violet/methylene blue and acetic acid.

### Pain and wound healing

Kevin Woo noted that chronic wounds are indeed quite painful. The following data have been compiled regarding chronic wounds and patient pain.

- Leg ulcers: 65–83% of patients with arterial ulcers reported pain.<sup>1</sup>
- Pressure ulcers: 84% of patients reported pain at rest; 88% reported pain with dressing changes.<sup>2</sup>
- Diabetic foot ulcers: 75% of patients reported painful symptoms.<sup>3</sup>

There are 2 main triggers of wound pain: wound-related triggers (e.g. underlying pathology, infection, inflammation) and procedure-related triggers (e.g. debridement, dressing removal, cleansing, repositioning).

Arterial ulcer pain can be classified in the following 3 ways:

- Nociceptive: inflammatory response, local infection, gangrene, claudication, vasospasm.
- Neuropathic: nerve damage, local ischemia, diabetes, trauma.
- Iatrogenic: dressing changes, debridement, retention bandages.

Venous ulcer pain can be classified in the following 3 ways:

- Nociceptive: edema, eczema, lipodermatosclerosis, phlebitis, atrophie blanche, local infection.
- Neuropathic: nerve damage, local ischemia.
- Iatrogenic: dressing changes, compression bandages.

Diabetic foot ulcer pain can be classified in the following 3 ways:

- Inflammatory response, local infection, local trauma (Charcot).
- Neuropathic: nerve damage, local ischemia, cramps, autonomic dysfunction.
- Iatrogenic: cast/shoe/footwear, dressing changes, debridement.

Pressure ulcer pain can be classified in the following 3 ways:

- Inflammatory response, local infection, local trauma (shear, friction), chemical irritation (incontinence), deep tissue injury.
- Neuropathic: nerve damage, local ischemia.
- Iatrogenic: patient positioning, dressing changes, debridement.

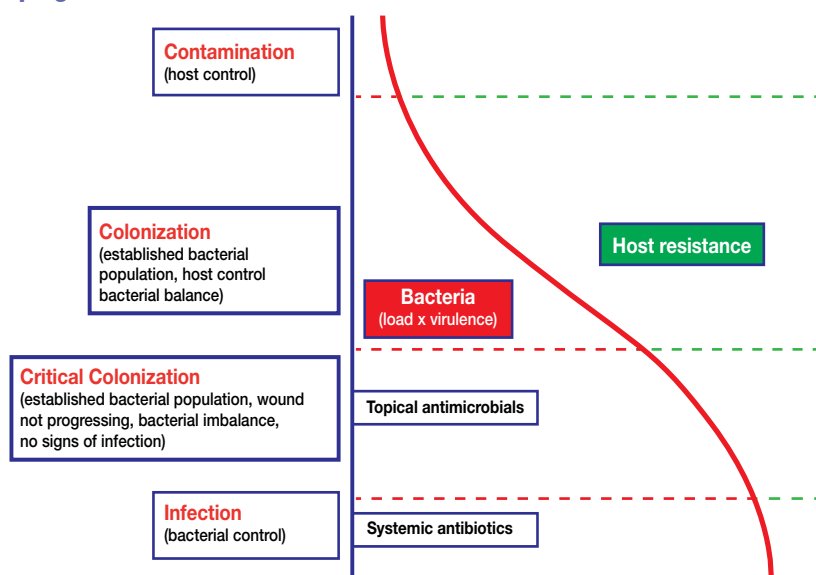
TABLE 2

### Strategies and objectives for pain management

Strategy	Objectives
Education	<p>Web-based learning</p> <p>Face-to-face education:</p> <ul style="list-style-type: none"> <li>• Explain mechanism of pain</li> <li>• Dispel misconceptions about pain</li> <li>• Address concerns about addiction</li> <li>• Emphasize the availability of multiple strategies</li> </ul>
Pharmacological	<p>Topical:</p> <ul style="list-style-type: none"> <li>• Ibuprofen (dressing)</li> <li>• Morphine</li> <li>• Lidocaine</li> </ul> <p>Systemic:</p> <ul style="list-style-type: none"> <li>• Nociceptive pain: ASA, NSAIDs, acetaminophen for mild to moderate pain</li> <li>• Opioids for moderate to intense pain</li> <li>• Neuropathic pain: SNRIs, anticonvulsants</li> </ul>
Local wound care	<p>Atraumatic interface (silicone)</p> <p>Sequester: remove inflammatory mediators</p> <p>Protect periwound skin</p> <p>Treat infections</p>
Anxiety reduction	<p>Relaxation</p> <p>Imagery</p> <p>Distraction</p> <p>Education</p> <p>Music therapy</p> <p>Support groups</p>
Cognitive therapy	<p>Cognitive behavioural therapy</p> <p>Problem-solving skills</p> <p>Positive thinking</p>
Therapeutic alliance	<p>Communication techniques (e.g. reflective listening)</p> <p>Goal-setting</p> <p>Align expectations</p> <p>Demonstrate sympathy</p>
Empowerment	<p>Allow the individual to call “time out”</p> <p>Respect an individual's choices</p> <p>Maximize autonomy: active participation</p> <p>Functional focused therapy</p>

ASA, acetylsalicylic acid; NSAID, non-steroidal anti-inflammatory drug; SNRI, serotonin–norepinephrine reuptake inhibitor

FIGURE 2

**Microbial progression in wounds**

With respect to pain and trauma, it has been demonstrated that patients find dressing cleaning most painful, followed by dressing removal and dressing reapplication. A number of approaches can be taken for evaluating, managing and preventing pain (Table 2). Psychological stress regarding pain is an under-addressed issue in wound care, Woo said. "It's important to understand how stress can suppress the immune system, and how it may affect wound healing." Clearly, he added, this is a subject that requires further study.

**Local wound care**

Laurie Goodman said that wounds should be cleansed and their characteristics assessed, and they should also be monitored. The provision of local wound care follows the mnemonic DIM+E:

- **D**ebride healable wounds (conservative for non-healable, maintenance wounds).
- Treat critical colonization: **I**nfection, persistent inflammation.
- Achieve **M**oisture balance.
- Consider advanced therapies (**E**dge) for healable but stalled chronic wounds.

Debridement options for healable wounds are listed in Table 3. A review published in 2009 found that sharp debridement is the most clinically and cost-effective way of physically removing and suppressing biofilms.<sup>4</sup> A retrospective review by Cardinal and colleagues of 366 venous leg ulcers and 310 diabetic foot ulcers over the course of 12 weeks found that venous leg ulcers had a significantly higher median wound sur-

face area reduction with surgical debridement vs. no surgical debridement (34%,  $p=0.019$ ).<sup>5</sup>

The importance of moist, interactive wound healing cannot be stressed enough, said Goodman. Dressing choices include foams, Hydrofiber, calcium alginate, acrylic dressings, hydrocolloids, films and hydrogels.

**Antimicrobial dressings**

Sibbald noted that the microbial progression of wounds progresses along the following course (Figure 2): contamination, colonization, critical colonization and infection.

TABLE 3

**Debridement options for healable wounds**

Wound type	Debridement options
Surgical	Sharp Conservative Hydro-Jet
Autolytic	Hydrogels Hydrocolloids Alginates
Biological	Maggots Larvae
Mechanical	Wet to dry Whirlpool Ultrasound Water stream
Chemical/enzymatic	Collagenase

## *Sharp debridement is the most clinically and cost-effective way of physically removing and suppressing biofilms.*

There are 4 categories of antimicrobial dressings: honey, slow-release iodine, silver and polyhexamethylene biguanide (PHMB).

### **Honey**

A Cochrane review regarding the use of honey indicated that, with respect to venous leg ulcers, honey as an adjuvant to compression does not significantly increase leg ulcer healing at 12 weeks. With respect to superficial and partial thickness burns, honey may improve healing times in mild to moderate superficial and partial thickness burns, compared with conventional dressings.<sup>6</sup>

### **Slow-release iodine**

Ten trials have been conducted regarding the use of cadexomer iodine for the treatment of venous leg ulcers. In one study, ulcer healing at 6 weeks was better with cadexomer than with standard care (not involving compression). A second study involving compression plus cadexomer vs. standard care showed similar results. Indeed, daily and weekly healing rates in these trials favoured cadexomer iodine.<sup>7</sup>

### **Silver**

Silver remains an effective agent in the treatment of non-healing wounds. In a meta-analysis of the effectiveness of silver-releasing dressings in the management of non-healing chronic wounds, compared with alternatives, silver dressings significantly<sup>8</sup>:

- improved wound healing;
- reduced odour;
- decreased pain-related symptoms; and
- decreased wound exudate.

In addition, silver dressings demonstrated a prolonged dressing wear time, compared with alternative wound management approaches.

### **PHMB**

PHMB foam vs. foam alone has been shown to improve wound healing and provide enhanced pain control.

### **Integration of evidence-based wound care**

Goodman said the 3 tenets of evidence-based wound care are as follows:

1. Provide adequate wound assessment and client assessment.

2. Treat the cause of the wound.
3. Provide local wound healing (i.e. dressings).

She further noted that with the use of evidence-informed practice, interprofessional teams and health-care system support, the costs of providing optimal therapy within the community could be much lowered. Moreover, healing rates would improve and the number of nursing visits, infection rates and incidence of amputation would decrease.<sup>9</sup>

### **Conclusions**

The following key points were addressed during this interesting and informative session. With respect to wounds and wound bed preparation, clinicians should:

- Treat the primary cause of the wound and address patient-centred concerns, including pain.
- Understand the differences between healable, non-healable and maintenance wounds as part of wound bed preparation.
- Optimize local wound care (i.e. know when to debride, differentiate between infection and inflammation, and ensure moisture balance).
- Once a diagnosis is made, understand the difference between superficial critical colonization and deep infection, and treat with appropriate antimicrobials. ☞

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# Complex Wounds in the Emergency Department:

## Multidisciplinary management strategies for wound care in the emergency setting

### PRESENTERS:

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**A**ttendees at this session learned about the challenges of managing complex wounds in the emergency department (ED). In addition, the various roles played and aspects of care provided by ED team members were discussed.

Christine Murphy began by defining the role of the enterostomal therapist (ET) in the ED, and noted that the involvement of ETs in ED care supports faster healing, with lowered costs.<sup>1</sup>

Moreover, ET support is associated with shorter stays in acute care facilities and lower readmission rates. In many facilities, Murphy said, "ETs are the 'go-to' person for best practice recommendations for wound care." Common ET consults in the ED are shown in Table 1.

Wound care in the ED is a priority. A recent National Health Statistics report stated that 1 in 10 patients reporting to the ED require some form of wound care, and 1 in 20 patients present to the ED with a wound-related issue as the primary reason.<sup>2</sup> Furthermore, ED staff may be unfamiliar with best practice recommendations.

ETs can offer the ED team the following knowledge and support:

- photography and care plan on e-chart (with measurements and Photographic Wound Assessment Tool [PWAT] score);
- nursing and resident education (including plastics, dermatology, vascular, infectious diseases);

- evidence related to practice;
- basic wound supplies;
- inter-facility care plans and options; and
- expedited discharge of patients.

### Barriers to evidence-based wound care in the ED

Lorne Wiesenfeld began by noting that ED clinicians strive to provide evidence-based care for patients who present with acute wounds, and have the opportunity to positively impact wound care. However, this is sometimes offset by lack of knowledge, insufficient resources and competing demands in the ED. Table 2 lists common complex wounds seen in the ED.

A major challenge regarding wound care in the ED, said Wiesenfeld, is that the current medical school curricula are deficient in wound care. In one 3rd-year medical school there are 1,232 core objectives, only 15 of which pertain to wound care. Furthermore, there are few continuing medical education sessions pertaining to wounds at ED physician conferences.

The main challenges regarding evidence-based practice in the ED are competing demands (i.e. "sicker" patients, time allotment), human resources (i.e. availability of staff) and product knowledge and availability. Barriers to follow-up include "orphan" patients without family physicians or health coverage, unavailability of specialty follow-up and community care overload.

TABLE 1

### Common enterostomal therapist consults in the emergency department

Dehiscence surgical wounds for non-surgical closure

Infected wounds (local antimicrobial assessment)

Venous leg ulcers (dressings, compression)

Diabetic foot ulcers (dressings, vascular supply, infection, pressure redistribution)

Pressure ulcers (dressings and surface assessment)

## Complex abdominal wounds

Donna McRitchie outlined the general principles of complex abdominal wound management in the ED: 1) make the diagnosis; 2) determine the appropriate intervention; and 3) optimize healing.

Appropriate interventions – depending on the abdominal wound – include: drainage, debridement and irrigation, surgery, pressure relief, positioning and diversion of the gastrointestinal tract. Systemic issues include tetanus, dealing with comorbidities, vascularity, oxygenation, temperature and shock states. Whatever the wound, said McRitchie, the basic management principles are as follows:

- Provide nutritional support.
- Prevent infection.
- Consider prophylactic antibiotics.
- Consider functional aspects (e.g. joints).
- Prevent regression (e.g. desiccation, trauma, infection, stabilization).
- Promote cosmesis and closure.
- Provide exudate/transudate management.

In conclusion, McRitchie said, complex abdominal wounds are almost always the result of trauma or infection. Early identification of the goals of treatment will help to determine the overall therapeutic strategy. A

TABLE 2

### Common complex wounds seen in the emergency department

Acute lacerations
Subcutaneous abscesses (pilonidal, perianal)
Burns (chemical, thermal)
Infected lacerations
Infected pressure ulcers
Postoperative wounds
Chronic leg ulcers
Arterial ulcers
Diabetic foot ulcers

multidisciplinary team approach is critical to success; key players include the nutrition, wound care, allied health, surgical and community nursing teams. ☺

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# Les plaies complexes au service des urgences

## Stratégies pluridisciplinaires de prise en charge des plaies

### PRÉSENTATEURS :

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**L**a séance a porté sur les défis de la prise en charge des plaies complexes au service des urgences (SU) ainsi que sur les divers rôles des membres du personnel et sur les aspects des soins dont ils s'occupent.

Madame Christine Murphy a commencé par définir le rôle du stomothérapeute au SU et fait remarquer que la participation du stomothérapeute aux soins prodigués au SU accélère la cicatrisation des plaies et réduit les coûts<sup>1</sup>.

De plus, l'intervention du stomothérapeute est associée à une réduction de la durée du séjour en établissement de soins de courte durée et à une baisse des taux de réadmission. Madame Murphy a déclaré que dans de nombreux établissements, le stomothérapeute est la personne qu'on consulte pour connaître les recommandations sur les pratiques exemplaires en matière de soin des plaies. Le tableau 1 présente les principales raisons de la consultation d'un stomothérapeute au SU.

Au SU, le soin des plaies est une priorité. Selon un récent *National Health Statistics Report*, une forme quelconque de soin des plaies est nécessaire chez un patient sur dix qui se présente au SU et, dans un cas sur 20, c'est une plaie qui est la principale raison de la consultation<sup>2</sup>. Par ailleurs, le personnel du SU peut ne pas connaître les recommandations sur les pratiques exemplaires.

Le stomothérapeute peut appuyer le personnel du SU de divers points de vue :

- photographie et plan de soin dans un dossier électronique (avec mesures et score de l'échelle PWAT [*Photographic Wound Assessment Tool*])
- éducation du personnel infirmier et des résidents (dont matières plastiques, dermatologie et maladies vasculaires et infectieuses)
- données probantes liées à la pratique
- fournitures de base pour le soin des plaies
- plans et options de soins inter-établissements et
- réduction de la durée du séjour à l'hôpital.

### Obstacles au soin des plaies fondé sur des données probantes au SU

Le Dr Lorne Wiesenfeld a d'abord fait remarquer que les cliniciens du SU cherchent à offrir des soins fondés sur des données probantes aux patients qui présentent une plaie aiguë et que leur intervention peut avoir un effet positif sur le soin des plaies. Cependant, il a affirmé qu'il arrive que les connaissances et les ressources soient insuffisantes et que les exigences du SU soient contradictoires. Le tableau 2 donne les plaies complexes les plus couramment observées au SU.

Selon le Dr Wiesenfeld, un des grands défis du soin des plaies au SU est que les programmes actuels des écoles de médecine comportent des lacunes en ce qui concerne le soin des plaies. Par exemple, des 1232

TABEAU 1

#### Raisons courantes de la consultation d'un stomothérapeute au service des urgences

Plaies chirurgicales déhiscentes pour fermeture non chirurgicale

Plaies infectées (évaluation du traitement antimicrobien local)

Ulcères veineux de jambe (pansements, compression)

Ulcères du pied diabétique (pansements, apport vasculaire, infection, redistribution de la pression)

Plaies de pression (pansements et évaluation de la surface)

objectifs fondamentaux du programme de troisième année d'une école de médecine, seuls 15 ont trait au soin des plaies. De plus, peu de séances de formation médicale continue sont offertes au cours des conférences qui s'adressent aux médecins des SU.

Les principaux obstacles à l'application des pratiques exemplaires au SU sont les exigences contradictoires (p. ex. attention exigée par les cas plus graves que d'autres, temps accordé), les ressources humaines (soit le personnel disponible), la connaissance des produits et les produits dont le personnel dispose. Les obstacles au suivi sont le fait pour un patient de ne pas avoir de médecin de famille ou de régime de santé, l'absence de spécialiste pour assurer le suivi et le surcroît de travail du personnel des soins de santé communautaires.

TABEAU 2

### **Plaies complexes couramment observées au service des urgences**

Lacérations aiguës

Abcès sous-cutanés (pilonidaux ou périanaux)

Brûlures (chimiques, thermiques)

Lacérations infectées

Plaies de pression infectées

Plaies post-opératoires

Ulcères chroniques de jambe

Ulcères artériels

Ulcères du pied diabétique

### **Plaies abdominales complexes**

La D<sup>re</sup> Donna McRitchie a présenté les principes généraux de la prise en charge des plaies abdominales complexes au SU : 1) diagnostic; 2) choix de l'intervention convenable; et 3) optimisation de la cicatrisation.

Les interventions convenables, qui dépendent de la plaie abdominale, sont les suivantes : drainage,

*...les cliniciens du SU cherchent à offrir des soins fondés sur des données probantes aux patients qui présentent une plaie aiguë et leur intervention peut avoir un effet positif sur le soin des plaies.*

parage et irrigation, chirurgie, réduction de la pression, mise en position et dérivation gastro-intestinale. Les troubles généraux comprennent le tétanos, les troubles comorbides dont il faut tenir compte, la vascularité, l'oxygénation, la température et les états de choc. Quelle que soit la plaie, a déclaré la D<sup>re</sup> McRitchie, les principes fondamentaux de la prise en charge sont comme suit :

- assurer un soutien nutritionnel
- prévenir l'infection
- envisager l'administration d'antibiotiques prophylactiques
- envisager les aspects fonctionnels (p. ex. articulations)
- prévenir la régression (p. ex. dessiccation, traumatisme, infection, stabilisation)
- favoriser la cosmésie et la fermeture
- assurer la gestion de l'exsudat/du transsudat.

La D<sup>re</sup> McRitchie a conclu en disant que les plaies abdominales complexes résultaient presque toujours d'un traumatisme ou d'une infection. La détermination rapide des objectifs thérapeutiques contribue à l'élaboration de la stratégie globale. Pour assurer la réussite du traitement, il faut absolument mettre à contribution une équipe pluridisciplinaire composée notamment de chirurgiens, de professionnels de la nutrition, du soin des plaies et paramédicaux et de personnel infirmier communautaire. ☺

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# Pilonidal Sinus Wounds:

## Etiology and evidence-based management

### PRESENTERS:

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**R. Gary Sibbald** is a professor at the Dalla Lana School of Public Health at the University of Toronto and the president of the World Union of Wound Healing Societies in Toronto, Ontario.

### Introduction

**D**uring this session, attendees learned about what these experts believe are the leading causes of why pilonidal sinus wounds fail to heal, as well as treatment considerations and evidence-based protocols in the clinic setting.

### Etiology of pilonidal sinus disease

Connie Harris began by stating that pilonidal sinus disease occurs most often in young adults – predominantly males between the ages of 18 and 25 years. Table 1 depicts the components of pilonidal sinus and etiology,<sup>1</sup> while Table 2 shows various treatment methods and wound recurrence rates.

Harris, whose MSc thesis on wound healing and tissue repair at Cardiff University examined the evidence regarding healing of these wounds, reported that she thought the most common reason why pilonidal sinus wounds fail to heal is lack of shaving of the affected area in an effective manner. Harris noted that regular shaving will:<sup>2-4</sup>

- reduce inflammation from trapping of fecal material and moisture;
- help to visualize retained hairs in ruptured follicles or the wound bed; and
- prevent chronic wound margin inflammation from hairs causing constant irritation to the tissue cells.

Other leading causes of failure to heal include the presence of red friable granulation tissue (which is edematous, bleeds easily and readily pulls apart) and “bridging,” whereby strands of friable hypergranulation tissue mesh together from side to side, or the epithelium bridges without durable stable tissue beneath it. In these cases, application of silver nitrate by a nurse is an optimal treatment in a clinic or home setting, whereas a physician may be able to use a curette or electrodesiccation to debride this tissue.

Pilonidal sinus wounds sometimes fail to heal due to external contamination:

- The dressing does not meet the contours of natal cleft, allowing migration of hairs, clothing debris and feces to enter the wound, and also creating friction.

TABLE 1

### Components and etiology of pilonidal sinus<sup>1</sup>

Component	Etiology
Body hairs	Enter hair follicles in the natal cleft Cause a foreign-body reaction
Body hair tips/debris	Penetrate the dermis in existing midline pits or site of previous excision
Hair follicle keratin plugs	Folliculitis Subcutaneous abscesses (holes or pits)

- Fluff from underwear contaminates the area.
  - Frequent fecal contamination occurs due to the close proximity to the anus.
  - Perianal hairs are colonized with *Staphylococcus aureus* (another good reason to shave frequently).
- Antimicrobial dressings are indicated if signs of localized infection are present. Secondary dressings (or primary dressings, if no antimicrobial dressing is being used) that fold neatly into the natal cleft should always be used to prevent external contamination. To treat external contamination, the periwound area should be cleansed with chlorhexidine 0.5% or povidone iodine 10%. Harris will be publishing her thesis work in this area in 2012; a literature review has been published online.<sup>5</sup>

### Evidence-based protocol in the clinic setting

Harris is currently running a case-study series to collect charts from 50 clients with pilonidal sinus disease who have been treated with her thesis protocol. The Calea clinics in Mississauga, Ontario, are participating in this endeavour, and Karen Laforet spoke to the challenges of rolling out such a protocol in her clinics.

Laforet commented that the psychosocial aspects of pilonidal sinus disease are massive. She said, “It takes a lot of work to develop a relationship with



these patients, and much education needs to be imparted to them...you have to tell them every single time they visit the clinic what they need to be doing to provide care."

She noted that patients should be educated routinely about self-care and should equip themselves with a client care kit that includes the following:

- razor for hair removal;
- hand-held shower to flush out bacteria;
- moist towelettes;
- Spectro Jel/Cetaphil soap substitutes;
- loose pants;
- daytime incontinence briefs or panty liners to hold dressings in place; and
- emergency dressing supplies.

Furthermore, the following client self-care instructions should be imparted:

- Wear loose trousers.
- Refrain from picking up heavy objects for at least the first week following surgery.
- Sit for only short periods.
- Do not drive a motor vehicle for 5–7 days post-surgery.
- Eat foods with good sources of protein and fibre, and drink plenty of fluids, to avoid constipation.
- Post-bowel movement care should take into consideration the following:
  - shower afterwards, if possible;
  - use moist towelettes and non-woven gauze, pat dry; and
  - change the dressing, if soiled.
- Consider stool softeners if taking pain medication that might cause constipation.
- Keep the wound clean and dry.
- Use a hand-held shower sprayer to gently flush out the inside of the wound and direct soap, shampoo and loose hair away from the open area.
- Keep the area dry throughout the day.

TABLE 2

### Treatments and recurrence rates for pilonidal sinus wounds

Method	Recurrence rate (%)
Surgical: incision and drainage, curette	40–60
Natal cleft excision with primary closure	37
Healing secondary intention (longer healing time, i.e. 2–6 months)	8–43

*Pilonidal sinus disease occurs most often in young adults, predominantly males between the ages of 18 and 25 years.*

### Treatment options for pilonidal sinus wounds

R. Gary Sibbald addressed treatment options. There are 4 main local wound therapies: iodine, polyhexamethylene biguanide (PHMB), silver and honey.

#### Iodine

Iodine is a powerful antimicrobial, and provides the best penetration of biofilms. Furthermore, it is easy to apply and has no reported resistance. It should, however, be used with caution in patients with thyroid disease and should not be used on large areas for long periods of time.

#### PHMB

Topical PHMB (chlorhexidine) is less toxic than other antiseptics. However, it is not water-soluble unless combined with chloride molecules, which can limit diffusion.

#### Silver

Silver is easy to use as a solution, cream or dressing, and offers a good margin of safety. However, it may induce apoptosis of keratinocytes, and may be inactivated by chloride and proteins.

#### Honey

Honey is a powerful antimicrobial. It has multiple modes of action and can decrease resistance. However, as it dilutes it can provide a medium for bacterial growth. In addition, it can be odiferous and messy. ☹

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# Les sinus pilonidaux

## Étiologie et prise en charge fondée sur des données probantes

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**Connie Harris** est spécialiste clinique principale chez Wound & Ostomy Care Partners, à Waterloo (Ontario). Elle est aussi chef de projet du South West Regional Wound Care Framework Project au LHIN 2 et professeure auxiliaire à l'École de physiothérapie de l'Université Western Ontario, à London (Ontario).

**Karen Laforet** est directrice des soins infirmiers chez Calea Home Care et professeure auxiliaire à l'École de physiothérapie de l'Université Western Ontario, à London (Ontario).

**R. Gary Sibbald** est professeur à l'École de santé publique Dalla Lana de l'Université de Toronto et président de la World Union of Wound Healing Societies, à Toronto (Ontario).

### Introduction



u cours de la séance, des experts ont donné leur opinion sur les principales raisons de la non-cicatrisation des sinus pilonidaux et parlé des considérations thérapeutiques et des protocoles fondés sur des données probantes en milieu clinique.

### Étiologie du sinus pilonidal

Madame Connie Harris a commencé en déclarant que le sinus pilonidal survient surtout chez les jeunes adultes, la plupart du temps chez des hommes de 18 à 25 ans. Le tableau 1 présente les éléments et l'étiologie du sinus pilonidal<sup>1</sup> et le tableau 2, les diverses méthodes de traitement et les taux de récurrence des plaies.

Madame Harris – dont le mémoire de maîtrise ès sciences sur la cicatrisation des plaies et la réparation des tissus à l'Université de Cardiff a porté sur les données probantes sur la cicatrisation des sinus pilonidaux – a signalé qu'elle croyait que la principale raison de la non-cicatrisation d'un sinus pilonidal était le défaut de rasage efficace de la région touchée. Elle a fait remarquer que le rasage régulier<sup>2-4</sup> :

- réduisait l'inflammation que produisent les matières fécales et l'humidité piégées
- permettait de voir les poils présents dans les follicules rompus ou le lit de la plaie
- prévenait l'inflammation chronique des bords de la plaie par les poils, qui cause une irritation constante des cellules tissulaires.

Les autres importantes causes de la non-cicatrisation comprennent la présence de tissu de granulation rouge et friable (qui est œdémateux, saigne facilement et se rompt aisément) et la formation de ponts, soit l'entremêlement de fibres de tissu d'hypergranulation friable de part et d'autre ou les ponts épithéliaux qui se forment sans qu'il y ait de tissus sous-jacents stables. Dans ces cas, l'application de nitrate d'argent par une infirmière est un traitement optimal en milieu clinique ou à domicile, tandis qu'un médecin peut utiliser une curette ou l'électrodessiccation pour le parage du tissu.

Il arrive parfois que les sinus pilonidaux ne cicatrisent pas en raison d'une contamination externe.

- Le pansement ne rejoint pas les contours du sillon interfessier, ce qui permet à des poils rompus, à des débris de vêtements et à des matières fécales de pénétrer dans la plaie et crée aussi une friction.
- Des fibres provenant des sous-vêtements contaminent la région.
- La contamination fécale est fréquente en raison de la proximité de l'anus.
- Les poils périanaux sont colonisés par *Staphylococcus aureus* (ce qui renforce la nécessité du rasage fréquent). Un pansement antimicrobien est indiqué en présence de signes d'infection localisée. Il faut toujours utiliser des pansements secondaires (ou des pansements primaires si on n'utilise pas de pansement antimicrobien) qui peuvent être repliés parfaitement dans le sillon interfessier pour prévenir la contamination externe. Pour le traitement de la contamination externe, il faut nettoyer le contour de la plaie à la chlorhexidine à 0,5 % ou à la polyvidone iodée à 10 %. Madame Harris publiera en 2012 les résultats de ses travaux de mémoire de maîtrise dans le domaine; les résultats d'une analyse documentaire ont été publiés en ligne<sup>5</sup>.

TABLEAU 1

### Éléments et étiologie du sinus pilonidal<sup>1</sup>

Éléments	Étiologie
Poils	Pénètrent dans les follicules pileux du sillon interfessier. Déclenchent une réaction à un corps étranger.
Bouts/débris de poils	Pénètrent dans le derme par les cavités présentes le long de la ligne médiane du sillon interfessier ou au site d'un parage antérieur
Bouchons de kératine obstruant les follicules pileux	Folliculite Abscess sous-cutané (trous ou cavités)

Suite page 32

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*Le sinus pilonidal survient surtout chez les jeunes adultes, la plupart du temps chez des hommes de 18 à 25 ans.*

### Protocole fondé sur des données probantes en milieu clinique

Madame Harris travaille actuellement à une série d'études de cas sur le dossier de 50 clients atteints de la maladie pilonidale qui ont été traités conformément au protocole exposé dans son mémoire. Les cliniques Calea de Mississauga, en Ontario, participent au projet et madame Karen Laforet a parlé des défis relatifs à l'application du protocole dans ses cliniques.

Madame Laforet a fait valoir que les aspects psychologiques de la maladie pilonidale sont énormes. « Il faut faire beaucoup de travail pour développer des relations avec ces patients et il y a beaucoup à leur apprendre [...] vous devez leur rappeler à chaque consultation ce qu'ils doivent faire pour se soigner », a-t-elle déclaré.

Elle a fait remarquer que les patients doivent être systématiquement éduqués sur les soins auto-administrés et avoir à leur disposition tout ce dont ils auront besoin :

- un rasoir
- une douche-téléphone pour déloger les bactéries
- des lingettes humides
- un nettoyant sans savon (Spectro Jel/Cetaphil)
- des pantalons amples
- des culottes de jour pour incontinents ou des protège culottes pour tenir le pansement en place
- de quoi faire un pansement d'urgence.

Il faut aussi donner les directives suivantes aux clients :

- porter des pantalons amples
- ne pas soulever d'objets lourds au moins pendant la première semaine après la chirurgie
- ne pas demeurer longtemps assis
- ne pas prendre le volant au cours des cinq à sept jours suivant la chirurgie
- manger des aliments qui sont de bonnes sources de protéines et de fibres et boire beaucoup de liquides pour prévenir la constipation
- prendre les précautions suivantes après la selle :
  - prendre si possible une douche
  - utiliser des lingettes humides et une gaze non tissée et sécher en tapotant
  - changer le pansement s'il est souillé
- envisager la prise d'un laxatif ramollissant les selles en cas de prise d'un analgésique pouvant causer une constipation.
- garder la région de la plaie propre et sèche

- avec une douche téléphone, nettoyer à basse pression l'intérieur de la plaie et s'assurer que le savon, le shampooing et les poils ne pénètrent pas dans la plaie.
- s'assurer que la région de la plaie demeure sèche toute la journée.

TABLEAU 2

### Traitements et taux de récurrence du sinus pilonidal

Méthode	Taux de récurrence (%)
Chirurgie : incision et drainage, emploi d'une curette	40 à 60
Parage du sillon interfessier avec fermeture primaire	37
Cicatrisation de seconde intention (plus long délai de cicatrisation, soit de 2 à 6 mois)	8 à 43

### Options thérapeutiques contre le sinus pilonidal

Le D<sup>r</sup> R. Gary Sibbald a parlé des options thérapeutiques. Les quatre principales substances utilisées pour le traitement local des plaies sont l'iode, le polyhexa-méthylène biguanide (PHMB), l'argent et le miel.

#### Iode

L'iode est un puissant antimicrobien et est la substance qui pénètre le mieux dans les biofilms. Il est facile à appliquer et aucune résistance n'a été signalée. Il doit toutefois être utilisé avec prudence chez les patients qui présentent une maladie thyroïdienne et ne doit pas être utilisé pendant longtemps sur une région étendue.

#### PHMB

Le PHMB topique (chlorhexidine) est moins toxique que d'autres antiseptiques. Il n'est toutefois hydrosoluble qu'en association avec des molécules de chlorure, ce qui peut limiter la diffusion.

#### Argent

L'argent est facile à utiliser (solution, crème ou pansement à l'argent) et a une bonne marge d'innocuité. Il peut toutefois déclencher l'apoptose des kératinocytes et être inactivé par le chlorure et les protéines.

#### Miel

Le miel est un puissant antimicrobien. Il a de multiples modes d'action et peut réduire la résistance. Toutefois, en se diluant, il peut devenir un milieu de croissance des bactéries. Il peut en outre dégager une odeur et être salissant. ☹

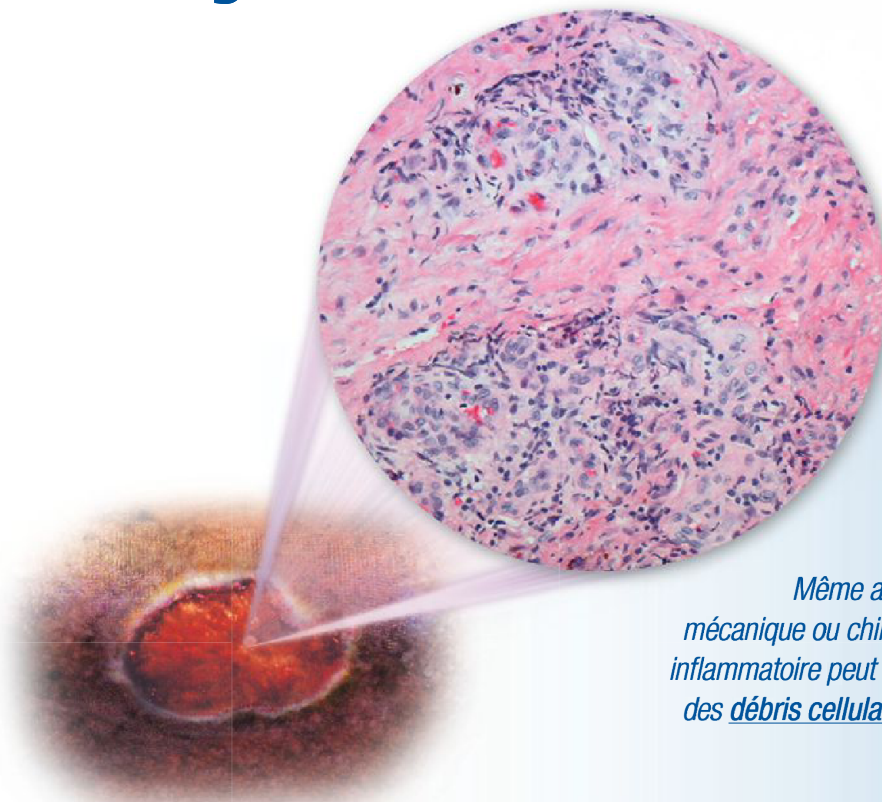
*Références (voir page 29)*

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Occasional slight transient erythema has been noted in surrounding tissue when applied outside the wound. One case of systemic hypersensitivity has been reported after 1 year of treatment with collagenase and cortisone.

Use of Collagenase SANTYL® Ointment should be terminated when debridement is complete and granulation tissue is well established.

Please see complete Prescribing Information on adjacent page.

On a noté un érythème occasionnel et léger sur les tissus environnants lorsque l'application de l'onguent dépasse le pourtour de la plaie. Un cas d'hypersensibilité systémique a été rapporté après un an de traitement à la collagénase et à la cortisone.

L'utilisation de l'onguent SANTYL® avec collagénase devrait être cessée lorsque le débridement est complété et que la granulation est bien entamée.

Veillez consulter l'information posologique complète sur la page adjacente.

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**Collagénase**  
**Santyl**  
Onguent 250 unités/g

**L'agent de microdébridement actif continu**

# Collagenase<sup>®</sup> Santyl<sup>®</sup>

Ointment 250 units/g

*Supports natural healing*

**DESCRIPTION:** Santyl<sup>®</sup> (collagenase) ointment is a sterile topical enzymatic debriding agent that contains 250 units of collagenase per gram of white petrolatum USP. The enzyme collagenase is derived from the fermentation of *Clostridium histolyticum*. It possesses the unique ability to selectively digest denatured and undenatured collagen that binds necrotic debris to the wound surface.

**CLINICAL PHARMACOLOGY:** Santyl<sup>®</sup> (collagenase) possesses the ability to digest insoluble collagen, undenatured and denatured, by peptide bond cleavage, under physiological conditions of pH and temperature. This ability makes it particularly effective in the removal of detritus from dermal lesions, contributing towards the more rapid formation of granulation tissue and subsequent epithelization of dermal ulcers and severely burned areas. Collagen in healthy tissue or in newly formed granulation tissue is not digested.

**INDICATIONS:** Santyl<sup>®</sup> (collagenase) is a sterile ointment indicated for the debridement of dermal ulcers or severely burned areas.

**CONTRAINDICATIONS:** Application is contraindicated in patients who have shown local or systemic hypersensitivity to collagenase.

**WARNINGS:** Debilitated patients should be closely monitored for systemic bacterial infections because of the theoretical possibility that debriding enzymes may increase the risk of bacteremia.

**PRECAUTIONS:** The enzyme's optimal pH range is 6 to 8. Significantly lower pH conditions have a definitive adverse effect on the enzyme's activity, and appropriate precautions should be carefully taken. The enzymatic activity is also adversely affected by detergents, hexachlorophene and heavy metal ions such as mercury and silver that are used in some antiseptics and by cobalt, magnesium and manganese. When it is suspected such materials have been used, the site should be carefully cleansed by repeated washings with normal saline before Santyl<sup>®</sup> (collagenase) ointment is applied. Soaks containing metal ions or acidic solutions such as Burow's solution should be avoided because of the metal ion and low pH. Cleansing materials such as hydrogen peroxide or Dakin's solution followed by sterile normal saline do not interfere with the activity of the enzyme. The ointment should be confined to the area of the lesion in order to avoid the possible risk of irritation or maceration of normal skin; however, the enzyme does not damage newly forming granulation tissue. A slight erythema has been noted occasionally in the surrounding tissue particularly when the enzyme ointment was not confined to the lesion. This can be readily controlled by protecting the healthy skin with a material such as zinc oxide paste. Since the enzyme is a protein, sensitization may develop with prolonged use.

**ADVERSE REACTIONS:** Although no allergic sensitivity or toxic reactions have been noted in the recorded clinical investigations to date, one case of systemic manifestations of hypersensitivity has been reported in a patient treated for more than one year with a combination of collagenase and cortisone. Irritation, maceration or erythema has been noted where prolonged contact of normal skin with Santyl<sup>®</sup> (collagenase) ointment has been allowed, either by application of the ointment to areas of normal skin or by excessive application of ointment to the wound crater with subsequent spread to normal skin when dressings are applied. The reported incidence for this type of reaction was 1.8%.

**SYMPTOMS AND TREATMENT OF OVERDOSE:** **Symptoms:** To date, the irritation, maceration or erythema reported on prolonged contact of normal skin with Santyl<sup>®</sup> (collagenase) ointment constitute the only symptoms of overdose reported. **Treatment:** Santyl<sup>®</sup> (collagenase) ointment can be rendered inert by the application of Burow's solution USP (pH 3.6 - 4.4) to the treatment site. If this should be necessary, reapplication should be made only with caution.

**DOSAGE AND ADMINISTRATION:** For external use only. Santyl<sup>®</sup> (collagenase) ointment should be applied once daily, or more frequently if the dressing becomes soiled (as from incontinence) in the following manner: **(1)** Prior to application the lesions should be gently cleansed with a gauze pad saturated with sterile normal saline, to remove any film and digested material. If a stronger cleansing solution is required, hydrogen peroxide or Dakin's solution may be used, followed by sterile normal saline. **(2)** Whenever infection is present, as evidenced by positive cultures, pus, inflammation or odor, it is desirable to use an appropriate antibacterial agent. Should the infection not respond, therapy with Santyl<sup>®</sup> (collagenase) ointment should be discontinued until remission of the infection. **(3)** Santyl<sup>®</sup> (collagenase) ointment should be applied (using a tongue depressor or spatula) directly to deep wounds, or when dealing with shallow wounds, to a non-adherent dressing or film dressing which is then applied to the wound. The wound is covered with an appropriate dressing such as a sterile gauze pad and properly secured. **(4)** Use of an occlusive or semi-occlusive dressing may promote softening of eschar, if present. Alternatively, crosshatching thick eschar with a #11 blade is helpful in speeding up debridement then cleanse with sterile saline. It is also desirable to remove as much loosened detritus as can be done readily with forceps and scissors. **(5)** All excess ointment should be removed each time the dressing is changed. **(6)** Use of Santyl<sup>®</sup> (collagenase) ointment should be terminated when debridement of necrotic tissue is complete and granulation is well under way.

**HOW SUPPLIED:** Available in 30 gram tubes of ointment. Sterile until opened. Contains no preservative. Do not store above 25°C.

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**DESCRIPTION:** Santyl<sup>®</sup> (collagénase) onguent est un agent de débridement topique stérile enzymatique qui renferme 250 unités de collagénase par gramme de pétrolatum blanc U.S.P. L'enzyme collagénase est dérivée de la fermentation de *Clostridium histolyticum* possédant le pouvoir unique de digérer de manière sélective le collagène aussi bien naturel que dénaturé qui lie les fibres nécrosées à la surface de la plaie.

**PHARMACOLOGIE CLINIQUE:** Santyl<sup>®</sup> (collagénase) a la capacité de digérer le collagène insoluble, non dénaturé et dénaturé, par clivage de la liaison peptidique à un pH et à une température physiologiques. Cette caractéristique le rend particulièrement efficace dans l'élimination des déchets des lésions dermiques favorisant ainsi la formation du tissu de granulation et l'épithélialisation ultérieure des zones dermiques ulcérées et gravement brûlées. Le collagène des tissus sains ou du nouveau tissu de granulation n'est pas digéré.

**INDICATIONS:** Santyl<sup>®</sup> (collagénase) est un onguent stérile indiqué pour le débridement des zones dermiques ulcérées ou gravement brûlées.

**CONTRE-INDICATIONS:** L'application est contre-indiquée chez les patients ayant présenté une hypersensibilité locale ou systémique à la collagénase.

**MISE EN GARDE:** Les patients atteints de conditions débilantes doivent être surveillés étroitement pour éviter la généralisation des infections bactériennes. Les enzymes de débridement augmenteraient le risque de bactériémie.

**PRÉCAUTIONS:** Le pH optimal de l'enzyme est de 6 à 8. Un pH nettement inférieur à un effet nettement adverse sur l'action de l'enzyme et des précautions appropriées doivent alors être prises. L'action de l'enzyme est également contrariée par les détergents, l'hexachlorophène et les ions de métaux lourds, comme le mercure et l'argent, présents dans certains antiseptiques, et par le cobalt, le magnésium et le manganèse. Quand on soupçonne l'utilisation de ces produits, la zone affectée doit être soigneusement nettoyée par des lavages répétés avec une solution saline avant l'application de l'onguent Santyl<sup>®</sup> (collagénase). Les bains contenant des ions de métaux ou des solutions acides comme la solution de Burow doivent être évités en raison de l'ion métal et du faible pH. Les solutions nettoyantes comme l'eau oxygénée ou la solution de Dakin suivie d'une solution stérile saline n'entravent pas l'action de l'enzyme. L'application de l'onguent doit se limiter à la zone affectée pour éviter le risque possible d'irritation ou de macération de la peau saine. Cependant, l'enzyme n'altère pas le nouveau tissu de granulation. Un érythème bénin dans le tissu avoisinant pourrait se produire. Cela peut facilement être évité en protégeant la peau saine avec un produit comme de la pâte d'oxyde de zinc. Compte tenu de la nature protéique de l'enzyme présent dans le médicament, son emploi prolongé pourrait amener une sensibilisation.

**EFFETS SECONDAIRES:** Bien qu'aucune sensibilité allergique ni réaction toxique n'aient été notées à ce jour dans les compte rendus d'études, on a signalé un cas de manifestations systémiques d'hypersensibilité chez un patient traité pendant plus d'un an avec une association de collagénase et de cortisone. On a noté de l'irritation, de la macération ou de l'érythème dans le cas de contact prolongé de la peau normale avec l'onguent Santyl<sup>®</sup> (collagénase), soit par application de l'onguent sur les régions normales de la peau, soit par application excessive de l'onguent dans le cratère de la plaie, permettant à celui-ci de s'étendre à la peau normale lors de l'application des pansements. L'incidence signalée de ce type de réaction était de 1,8%.

**SYMPTÔMES ET TRAITEMENT DU SURDOSAGE:** **Symptômes:** Jusqu'ici, l'irritation, la macération ou l'érythème signalés en cas de contact prolongé de la peau saine avec l'onguent Santyl<sup>®</sup> (collagénase) représentent les seuls symptômes signalés de surdosage. **Traitement:** On peut rendre l'onguent Santyl<sup>®</sup> (collagénase) inerte en appliquant la solution de Burow U.S.P. (pH 3.6-4.4) sur la plaie. La réapplication du produit, si elle est considérée nécessaire, ne se fera qu'avec prudence.

**POSOLOGIE ET ADMINISTRATION:** Pour usage externe seulement. L'onguent Santyl<sup>®</sup> (collagénase) doit être appliqué une fois par jour ou plus fréquemment si le pansement se souille (à cause d'incontinence par exemple) de la façon suivante: **(1)** Avant application, les lésions doivent être nettoyées doucement avec une gaze saturée d'une solution stérile saline normale pour enlever toute pellicule et toute matière digérée. Si l'on a besoin d'une solution nettoyante plus puissante, on peut utiliser de l'eau oxygénée ou de la solution de Dakin suivie de solution stérile saline normale. **(2)** En cas d'infection, révélée par la présence de cultures positives, de pus, d'une inflammation ou d'une odeur, il serait souhaitable d'employer un agent antibactérien approprié. Il faut interrompre le traitement au Santyl<sup>®</sup> (collagénase) jusqu'à rémission de l'infection, si l'infection ne se résorbe pas. **(3)** Appliquer Santyl<sup>®</sup> (collagénase) directement sur les blessures profondes à l'aide d'un abaisse-langue ou d'une spatule. Pour les plaies superficielles, appliquer l'onguent sur une compresse non adhérente ou un pansement transparent à être déposée sur la plaie; puis recouvrir d'un pansement approprié tel une compresse de gaze stérile adéquatement retenue. **(4)** L'utilisation d'un pansement occlusif ou semi-occlusif peut favoriser le ramollissement de l'escarre, le cas échéant. Ou, si l'on hachure une escarre épaisse à l'aide d'une lame numéro 11, on peut accélérer le débridement. Nettoyer alors avec une solution saline stérile. Il est également souhaitable d'enlever autant de débris lâches que possible à l'aide de pinces et de ciseaux. **(5)** Enlever tout excès d'onguent à chaque renouvellement du pansement. **(6)** Arrêter les applications de l'onguent Santyl<sup>®</sup> (collagénase) dès que le tissu nécrosé est suffisamment débridé et que le bourgeonnement est bien entamé.

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# Inflammation vs. Infection:

## Challenges of and approaches to differentiating persistent inflammation from infection in chronic wounds

### PRESENTERS:

KAREN LAFORET  
MCLSc-WH  
RN BA IIWCC

GREGORY SCHULTZ  
PhD



Attendees of this session learned about the following:

- Pathophysiology of inflammation and infection in chronic wounds.
- Challenges in assessing and differentiating persistent inflammation or infection (i.e. planktonic vs. biofilm bacteria).
- Diagnostic testing and clinical treatment options to assist in early detection and management of inflammation and infection.

### Factors leading to infection and inflammation

Karen Laforet began by noting that the factors that lead to increased risk of infection include

- pathology;
- comorbidities (e.g. diabetes, autoimmune diseases);
- obesity;
- cachexia/malnutrition;
- decreased perfusion;
- host resistance;
- polypharmacy;
- age; and

- the presence of foreign bodies (e.g. necrotic debris, retained packing material, small fragments of gauze dressings).

Host issues and factors that lead to protracted inflammation and delayed healing in chronic wounds include (Figure 1):<sup>1-4</sup>

- recurrent physical trauma;
- older age;
- diabetes;
- contamination with foreign material;
- ischemia–reperfusion injury; and
- subclinical bacterial contamination of wound tissues.

“Critical colonization” is an important concept in wound healing, and a number of definitions have been suggested. In 2008, the World Union of Wound Healing Societies proposed that critical colonization is: “A potentially important concept that is widely applied to chronic wounds but lacks clarity. It arose to differentiate problems caused by bacteria that are not always accompanied by the classical signs of infection, e.g. delayed (or stalled) healing, from more obvious infection. However, the concept and a clear under-

FIGURE 1

### The vicious circle of inflammation, high protease activity levels and delayed wound healing<sup>7</sup>



**Karen Laforet** is the director of nursing at Calea Home Care and an adjunct professor at the School of Physical Therapy, University of Western Ontario in London, Ontario.

**Gregory Schultz** is a professor of biochemistry and molecular biology at the University of Florida in Gainesville, Florida.

*A critically colonized wound state is one that has the presence of polymicrobial biofilm not detected by standard clinical microbiology assays.*

standing of its meaning and implications are not universally accepted.”

Simply put, however, a critically colonized wound state is one that has the presence of polymicrobial biofilm not detected by standard clinical microbiology assays.<sup>5</sup> Indeed, it has been demonstrated that 60% of chronic wounds contain biofilm vs. 5% of acute healing wounds.<sup>6</sup>

#### Assessment tools for determining infection vs. inflammation

Signs of infection include the following:<sup>7</sup>

- failure of the wound to heal;
- stalling after making progress, i.e. atrophy or deterioration of what was healthy granulation tissue;

discoloration of granulation tissue (i.e. pale, gray, reddish-purple); or

- unhealthy granulation tissue (i.e. friable, excessive watery exudate that is purulent).

Laforet offered the following practice pearls for the assessment and treatment of protracted inflammation in chronic wounds:

- Use consistent assessment tools for determining infection vs. inflammation.
- Early intervention is critical: if a wound has not decreased by approximately 30% in size by week 4, then reassess the care plan and consult with a wound specialist.
- Be persistent!
- As biofilms recover from debridement and reform mature biofilm, sometimes as soon as 24 hours after the procedure, serial wound debridement is therefore recommended, as well as antimicrobial use post-debridement.

#### Distinguishing between infection and inflammation

Gregory Schultz offered the following tips for distinguishing between infection and inflammation in wounds:

- Obtain complete information regarding the bacterial and fungal species present in chronic wounds: use polymerase chain reaction (PCR)-based detection of microbes.
- Detect and measure biofilm bacteria, using modifications of standard clinical microbiology laboratory techniques for planktonic bacteria. ☞

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# Biofilms: A Clinical Conundrum

## Recognition and management of wounds affected by biofilms

PRESENTERS:



GREGORY W. ROSE  
BSc MSc (Epi) MD  
FRCPC



GREGORY SCHULTZ  
PHD

**Gregory W. Rose** is an assistant professor of medicine at the University of Ottawa and an infectious diseases and infection control consultant at Queensway Carleton Hospital and The Ottawa Hospital in Ottawa, Ontario.

**Gregory Schultz** is a professor of biochemistry and molecular biology at the University of Florida in Gainesville, Florida.

Attendees of this session learned about the following:

- the sequential phases of normal wound healing and the beneficial effects of controlled inflammation and protease activities;
- the detrimental effects on healing of chronic inflammation caused by planktonic and biofilm bacteria, which lead to elevated protease and reactive oxygen species (ROS) in wounds;
- the unique properties of bacteria in biofilm communities that provide increased tolerance; and
- the concepts of biofilm-based wound care, including effective debridement, prevention of planktonic bacteria from reforming biofilms and treatments that reduce biofilms (e.g. dressings, negative-pressure wound therapy).

### Biofilm formation

There are 4 stages of wound healing, said Gregory Schultz: 1) hemostasis; 2) inflammation; 3) repair; and 4) remodelling. He noted that "chronic wounds often get 'stuck' in the inflammatory phase of wound healing," which can result in the development of biofilms. Indeed, a study published in 2008 identified biofilms in 60% of biopsies of chronic wounds and only 6% of acute wounds.<sup>1</sup>

Schultz indicated that bacteria in biofilms are difficult to kill due to the following factors.

- Biofilms have an exopolymeric composition (i.e. they are composed of a dense matrix that impairs diffusion of large antibodies).
- Bacteria synergistically secrete antibiotic resistance proteins and enzymes (e.g. catalase).
- Oxygen diffusion is limited, which promotes the growth of anaerobic bacteria.
- "Persister" bacteria have low metabolic activity, and all antibiotics require metabolic activity to kill bacteria.

Thus, if bacteria in biofilms are extremely hard to kill with topical or systemic antibiotics, antimicrobials or antiseptics, how can we treat biofilms? The answer, said Schultz, is to locate and remove biofilms with effective debridement techniques, and then prevent their reformation by applying effective dressings,

antibiotics, antimicrobials or antiseptics.<sup>2</sup>

In summary, Schultz noted the following:

- Chronic wounds frequently have bacterial biofilms that are very tolerant to inflammatory cells and antibodies, as well as to antibiotics, antiseptics and disinfectants.
- Biofilms cause elevated levels of proinflammatory cytokines, leading to chronic inflammation and elevated levels of proteases and ROS.
- Proteases and ROS destroy proteins that are essential for healing.
- The 2 principles of optimal biofilm-based wound care are: 1) debride; and 2) prevent planktonic bacteria from reforming biofilm colonies by using bacterial barrier dressings.

Dr. Gregory Rose noted that biofilms are a familiar problem in the wound care milieu: 60–80% of clinical infections are complicated by biofilms, particularly in the presence of artificial materials and devitalized tissues. The common approach to infection is to: 1) establish diagnosis; 2) attempt to identify the etiologic pathogen; 3) initiate appropriate antimicrobial coverage; and 4) arrange for source control.

Rose asked, when establishing a diagnosis, do biofilms always signal an infection? In acute infections, he said, there is a rapidly evolving process of tissue invasion and host response, which is caused by motile, planktonic, bacteria that deploy endotoxins, enzymes and response-evading virulence factors. The host tissue then undergoes cell lysis and digestion, resulting in classic inflammation (i.e. redness, swelling, heat, pain and loss of function).

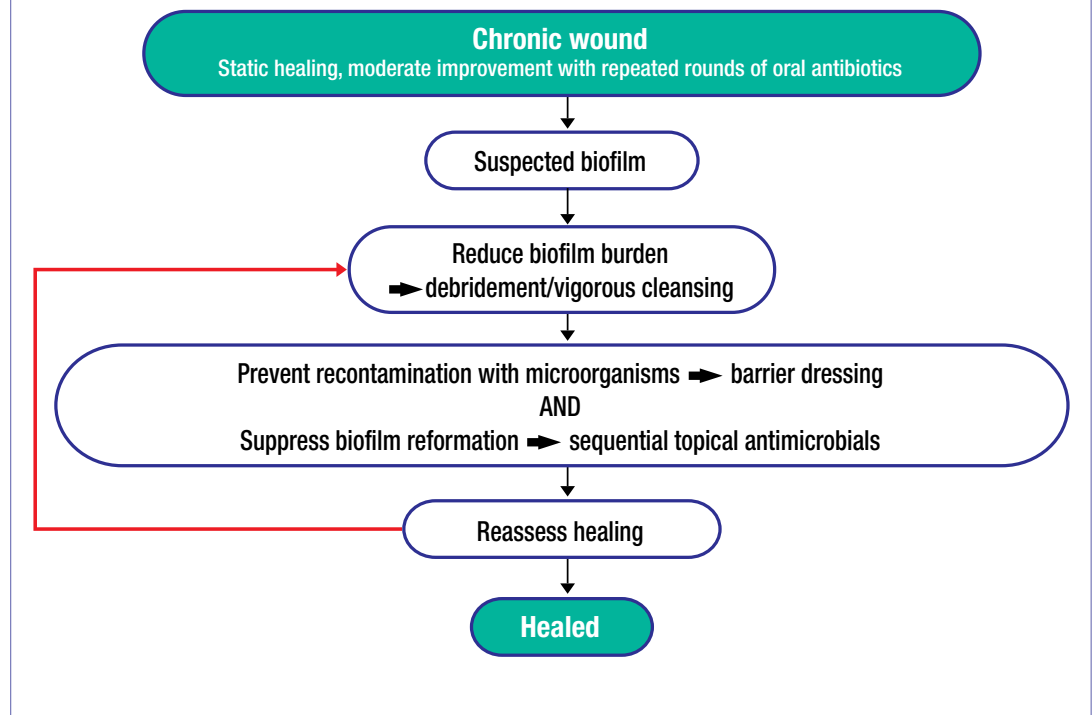
However, biofilms can form in a wound during colonization. Bacterial extracellular polymeric substance functions as an extracellular digestive organ, and its chief nutrient source is host exudate (e.g. plasma). It delays wound epithelialisation and prolongs the nutrient source.

### Resistance vs. persistence in biofilms

Resistance is related to genetic characteristics, leading to antimicrobial failure. The presence of biofilm can promote this, due to the hypermutability of embedded



FIGURE 1

**Principles of wound biofilm management<sup>3</sup>**

*Chronic wounds frequently have bacterial biofilms that are very tolerant to inflammatory cells and antibodies, as well as to antibiotics, antiseptics and disinfectants.*

bacteria and increased horizontal gene transmission. Persistence is the failure of antimicrobial therapy despite lack of genetic resistance mechanisms.

**Treatment**

Physical removal remains the mainstay of biofilm therapy, and this includes removal of prosthetic material and debridement of wounds. The first principle of the application of antimicrobials is to limit their use and duration. "Biofilm-active" agents that are currently used include: rifampicin and colistin, to penetrate the biofilm; and azithromycin and daptomycin, to reduce the biofilm. Combination therapy is sometimes used. Debridement should be performed concurrently (Figure 1).<sup>3</sup>

Novel approaches to source control include inhibition (chelating agents [lactoferrin, EDTA], xylitol) and dispersal (enzymes [cellulose, alginates, DNase, proteases], species-specific QS analogues, inhibitors).

**Conclusions**

Shultz and Rose offered the following key conclusions:

- Biofilms are highly associated with chronic wounds: they are polymicrobial collections of monomicrobial islands, and culturing may be insufficient for diagnosis.
- Biofilms decrease antimicrobial efficacy through resistance and persistence mechanisms, and current susceptibility testing does not address this issue.
- Physical disruption is key to biofilm removal. 🖐

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# Les biofilms : une énigme clinique

## Reconnaissance et prise en charge des plaies recouvertes d'un biofilm

PRÉSENTATEURS



GREGORY W. ROSE,  
BSc MSc (Epi) MD  
FRCP



GREGORY SCHULTZ,  
PHD

**Gregory W. Rose** est professeur adjoint de médecine à l'Université d'Ottawa et consultant en maladies infectieuses et en lutte contre les infections à l'Hôpital Queensway Carleton et à l'Hôpital d'Ottawa (Ontario).

**Gregory Schultz** est professeur de biochimie et de biologie moléculaire à l'Université de la Floride, à Gainesville (Floride).

**L**a séance a porté sur les sujets suivants :

- les phases séquentielles de la cicatrisation normale des plaies et les effets salutaires de la maîtrise de l'inflammation et de l'activité des protéases
- les effets néfastes sur la cicatrisation de l'inflammation chronique causée par les bactéries planctoniques et des biofilms, qui entraînent une augmentation de la production de protéases et d'espèces réactives de l'oxygène dans les plaies;
- les propriétés uniques des bactéries des communautés de biofilms qui produisent une augmentation de la tolérance; et
- les concepts du soin des plaies axé sur les biofilms, dont parage efficace, prévention de la reformation du biofilm par les bactéries planctoniques et traitements qui réduisent la formation de biofilms (p. ex. pansements et traitement des plaies par pression négative).

### Formation de biofilms

Selon monsieur Gregory Schultz, la cicatrisation comporte quatre stades : 1) hémostasie; 2) inflammation; 3) réparation; et 4) remodelage. Il a fait remarquer que « les plaies chroniques demeurent souvent "bloquées" dans la phase d'inflammation de la cicatrisation, ce qui peut entraîner la formation de biofilms ». En effet, selon une étude publiée en 2008, des biofilms étaient présents dans 60 % des prélèvements biopsiques de plaies chroniques, mais dans seulement 6 % de ceux de plaies aiguës<sup>1</sup>.

Monsieur Schultz a déclaré que les bactéries des biofilms étaient difficiles à éliminer en raison des facteurs ci-dessous.

- Les biofilms ont une composition exopolymérique (c'est-à-dire qu'ils sont composés d'une matrice dense qui entrave la diffusion des anticorps de grande taille).
- Les bactéries sécrètent de façon synergique des protéines et des enzymes (p. ex. la catalase) qui

confèrent une résistance aux antibiotiques.

- La diffusion d'oxygène est limitée, ce qui favorise la multiplication des bactéries anaérobies.
- L'activité métabolique des bactéries persistantes est faible et avec tous les antibiotiques, l'élimination des bactéries est tributaire de leur activité métabolique.

Par conséquent, s'il est extrêmement difficile d'éliminer les bactéries des biofilms au moyen d'antibiotiques, d'antimicrobiens ou d'antiseptiques topiques ou systémiques, que peut-on faire contre les biofilms? Selon monsieur Schultz, il faut localiser et retirer les biofilms par des techniques de parage efficaces, puis en prévenir la reformation en utilisant des pansements, des antibiotiques, des antimicrobiens et des antiseptiques efficaces<sup>2</sup>.

En résumé, monsieur Schultz a fait les observations ci-dessous.

- Les plaies chroniques sont souvent recouvertes de biofilms bactériens qui tolèrent très bien les cellules inflammatoires et les anticorps, ainsi que les antibiotiques, les antiseptiques et les désinfectants.
- Les biofilms augmentent la production de cytokines proinflammatoires, ce qui entraîne une inflammation chronique et une augmentation de la production de protéases et d'espèces réactives de l'oxygène.
- Les protéases et les espèces réactives de l'oxygène détruisent les protéines qui sont essentielles à la cicatrisation.
- Les deux principes du soin des plaies axé sur les biofilms sont 1) le parage; et 2) la prévention de la reformation des colonies constituant les biofilms au moyen de pansements offrant une barrière bactérienne.

Le Dr Gregory Rose a affirmé que les biofilms causent souvent un problème dans le domaine du soin des plaies. En effet, des biofilms compliquent entre 60 et 80 % des infections cliniques, surtout en présence de matériaux artificiels et de tissus dévitali-

*Les plaies chroniques sont souvent recouvertes de biofilms bactériens qui tolèrent très bien les cellules inflammatoires et les anticorps, ainsi que les antibiotiques, les antiseptiques et les désinfectants.*

sés. En cas d'infection, la démarche courante est la suivante : 1) poser un diagnostic; 2) essayer de cerner l'agent pathogène à l'origine de l'infection; 3) amorcer le traitement antimicrobien voulu; et 4) prendre des mesures pour éliminer la source.

Le Dr Rose s'est ensuite penché sur la question diagnostique suivante : les biofilms sont-ils toujours associés à une infection? Pour y répondre, il a déclaré qu'en présence d'une infection aiguë, il y a un processus rapide d'envahissement des tissus et de réponse de l'hôte qui est causé par la libération, par des bactéries planctoniques mobiles, d'endotoxines, d'enzymes et d'agressines qui neutralisent la réponse de l'hôte. Il y a ensuite dans les tissus de l'hôte une lyse et une digestion des cellules, ce qui produit une inflammation classique (soit rougeur, enflure, chaleur, douleur et perte de fonction).

Des biofilms peuvent toutefois se former dans une plaie pendant la colonisation. Une substance polymérique extracellulaire d'origine bactérienne agit comme un organe digestif extracellulaire et sa principale source de nutriments est l'exsudat de l'hôte (p. ex. le plasma). Elle retarde l'épithélialisation de la plaie et prolonge la présence de la source de nutriments.

## Résistance et persistance des bactéries des biofilms

La résistance est liée aux caractéristiques génétiques et entraîne l'échec du traitement antimicrobien. La présence d'un biofilm peut favoriser la résistance, en raison de l'hypermutable des bactéries qui y sont enfouies et de l'augmentation de la transmission horizontale de gènes. La persistance désigne l'échec du traitement antimicrobien malgré l'absence de mécanismes génétiques de résistance.

## Traitement

Le retrait physique demeure la pierre d'assise du traitement des biofilms et comprend l'élimination du matériel prothétique et le parage des plaies. Le premier principe de l'application des antimicrobiens est de limiter la fréquence et la durée de leur utilisation. Les médicaments agissant sur les biofilms qui sont actuellement utilisés sont la rifampicine et la colistine, qui pénètrent dans le biofilm, et l'azithromycine et la daptomycine, qui réduisent la croissance du biofilm. Ces médicaments sont parfois utilisés en association. Le parage doit accompagner le traitement antimicrobien (figure 1)<sup>3</sup>.

Les démarches novatrices d'élimination de la source comprennent l'inhibition (agents chélateurs [lactoferrine, EDTA], xylitol) et la dispersion (enzymes [cellulose, alginates, ADN-ase, protéases], analogues du QS spécifiques d'espèces, inhibiteurs).

## Conclusions

Pour conclure, monsieur Shultz et le Dr Rose ont fait les observations ci-dessous.

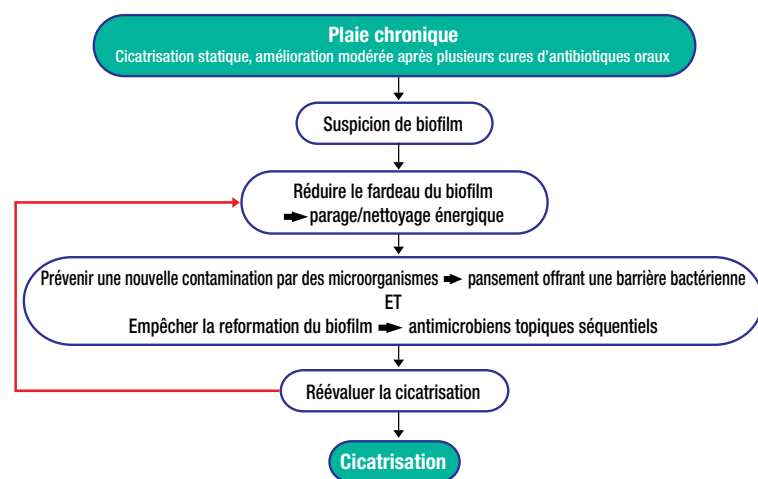
- Les biofilms sont très étroitement liés aux plaies chroniques. Ce sont des assemblages polymicrobiens d'îlots monomicrobiens et la culture peut ne pas permettre de poser un diagnostic.
- Les biofilms réduisent l'efficacité des antimicrobiens par des mécanismes de résistance et de persistance et les tests de sensibilité actuels ne permettent pas de surmonter cette difficulté.
- La perturbation physique est la clé de l'élimination du biofilm. ☹

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FIGURE 1

### Principes de la prise en charge des biofilms<sup>3</sup>





# Social Networking and Healthcare:

## What does it mean for your practice?

PRESENTERS:  
MARK BASTIN  
JACKIE HICKEY  
RN CCP

**M**ark Bastin and Jackie Hickey gave a lively presentation on social media as it pertains to healthcare generally and wound care specifically. Bastin began his presentation by quoting the following:

"Healthcare is an incredibly collaborative sector. As such, use of social networking to foster information exchange – both inside and outside an organization – presents enormous opportunities to improve global health."

*Jim Haughwout, Managing Partner,  
Oulixus Ltd.*

Specifically, social media enables healthcare practitioners to take communication to a whole new level, where participants can engage in an interactive dialogue. This is because social networking encompasses tools that allow collaboration, two-way interaction and the sharing of text, images, audio and video. Some of the more popular tools that facilitate this collaboration include blogs, Twitter and Facebook.

With respect to social media and healthcare, software is available to help healthcare professionals connect with widespread audiences, broadcast peer-to-peer clinical recommendations, collaborate and disseminate useful patient information. One benefit of social media includes enabling organizations to support best practice in real time through living documents that can be disseminated and augmented via the internet, thereby enhancing the quality of care provided.

**Mark Bastin** is president and co-founder of Incite Performance Management.

**Jackie Hickey** is the community health advisor for Bayshore Home Health.



"Social media can provide you with new skills and resources that assist in your day-to-day practice."



"Social networking websites offer a means of spreading information incredibly quickly."

- patient and caregiver support through the use of point-of-care tools (e.g. applications) that can help healthcare providers guide a patient through a process and provide peace of mind at your fingertips;
- reduced administrative hassles; and
- data-gathering for research and enhanced clinical care.

Fitting social media into the lives of healthcare professionals – specifically wound care clinicians – can be



### Questions and answers

Three questions pertain, however:

1. Where do we start?
2. How do we use social media most productively, to meet day-to-day requirements?
3. To that end, how do we produce the content that both healthcare practitioners and patients need and want?

The motivator for social media's impact on health-

care will be the substance and relevance of the content provided. Social media should, first and foremost, link the consumer (the patient) with healthcare professionals, government, the pharmaceutical industry, the medical community and the broader patient community. This will then accomplish the following:

- peer-to-peer self-service learning;
- real-time collaboration;

*Social media can provide clinicians with new skills and resources to assist them in their day-to-day practice.*

accomplished through the following, said Bastin: "Commit to the process; develop a strategy to create a wound-care-specific social media framework. As wound care crosses so many other chronic disease states, there is a great potential to develop your own specialized knowledge base." As a result, he added, "You can create a culture of continuous quality by connecting and creating organizational 'knowledge reservoirs' and champions for specific disease states, thereby expanding knowledge to everyone while maintaining professional standards."

The long-term goal, concluded Bastin, is that social media can provide you with new skills and resources that assist in your day-to-day practice. Social media applications are the tools that can take you through the process and procedures, and provide you with the confidence and knowledge to do so.

#### **Social media factoids**

- Facebook tops Google for weekly web traffic in the United States.
- Social media has overtaken pornography as the number 1 activity on the internet.
- 1 in 8 couples in the US met via social media.
- To reach 50 million users:
  - it took radio 38 years;
  - it took television 13 years; and
  - it took the internet 4 years.
- Facebook added 200 million users in less than 1 year.
- A US Department of Education study found that online students outperformed those receiving face-to-face instruction.
- Around 80% of companies use social media in employee recruitment.
- YouTube is the second largest search engine in the world.
- Wikipedia has more than 15 million articles; studies have shown it to be as accurate as the Encyclopaedia Britannica.
- There are more than 200 million blogs on the internet.

Source: Social Media Revolution Socialnomics, 2011.  
Available at: [www.youtube.com/watch?v=QzZyUaQvpc](http://www.youtube.com/watch?v=QzZyUaQvpc).

#### **The professional aspect of "social" media**

Hickey said, "There is a 'social' aspect to social media, but there is a strong professional aspect to it as well." Currently, the 5 major social outlets are:

- Twitter (started in 2006);
- YouTube (started in 2005);
- Facebook (started in 2004);
- LinkedIn (started in 2003); and
- Blogger (started in 1997).

Although all of these social networking websites were launched fairly recently, all have incredible power to communicate globally to a widespread audience. "With Facebook and Twitter specifically," Hickey noted, "I have the ability to communicate and connect with individuals and find out what they need, and what extra help they need."

Facebook has a variety of pages that can be created. These include personal pages to connect with family and friends, but also professional and business pages that organizations can set up to share information. "Engaging, communicating and connecting with patients, caregivers and allied healthcare professionals are the key components of these pages," Hickey said.

Social networking websites also offer a means of spreading information incredibly quickly – much quicker, she noted, than traditional media sources such as television, radio and newspapers or magazines.

In closing, Hickey offered the following practical takeaways for attendees:

- Plan to integrate social media strategically, to meet communications goals.
- Learn from others (e.g. what has and hasn't worked) and don't be afraid to ask questions.
- Build an online community and engage with others.
- Review privacy issues up front to ensure that everyone's privacy is respected.
- Jump on board and have fun! 🎉



# CAWC Research Project: An Update

## PRESENTERS:

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The CAWC held a research consultation at its 2010 annual conference in Calgary, Alberta, to appraise priorities for wound care research in Canada and reflect on research needs in practice environments. Funding was provided by the Canadian Institutes of Health Research; co-principal investigators were Gail Woodbury and David Keast, and administrative support was provided by Donna Lillie.

The objectives of this consultation were to:

- gain input from stakeholders to identify priorities for wound care research, including identifying barriers, facilitators and strategies for research development, promotion and dissemination;
- build networks, collaborations and communication systems among research areas (e.g. with people working in diabetes); and
- identify the role of the CAWC and other organizations in building partnerships to advance wound care research in Canada.

*The CAWC felt that it was important to bring research and clinical stakeholders together to learn from one another and forge collaborations.*

## Stakeholders and sessions

Fifty national and international healthcare professionals from the areas of medicine, nursing, rehabilitation science, engineering, government, non-profit organizations and academia attended the meeting. Participants were from Canada, the US, Mexico, Australia and the UK. Plenary sessions at the meeting included "Regional or Country-specific Views across the 4 Research Pillars" and "The Role of Partnerships."

Working groups addressed the following issues and challenges:

- Information, databases and assessment diagnostics.
- Education, best practices and knowledge translation.
- Healthcare delivery models, systems and policy issues.
- Wound therapeutics, from basic science to clinical delivery.

## Group tasks

Working groups were tasked with addressing the following issues:

- Identify the key themes that require work within this area and make the case for this as a top priority.
- What strategies would move this agenda forward?
- What partners and stakeholders are required for this priority to succeed?
- What are the challenges and opportunities for collaboration within your research priority?
- What are the strategies to overcome defined barriers?
- Who are the facilitators for maximizing opportunities?
- What is the role of the CAWC in this research agenda?

The consultation meeting generated discussion among Canadian and international wound researchers and people working in other specialty areas who might not otherwise have had the opportunity for discussions. The CAWC felt it was important to bring research and clinical stakeholders together to learn from one another and forge collaborations. The meeting also illustrated the diversity of opinions about the nature, importance and definitions of different types of research in wound care.

## Recommendations

Participants encouraged the CAWC to address research-related agendas within the realm of realities for the association, and become a facilitator and catalyst for relevant research needs, while actively pursuing activities in support of a research environment.

Short-term recommendations for the CAWC identified by the task force included the following:

- Provide small grant funding for seed projects that may be applied for by researchers.
- Provide scholarships for student projects and programs with a research focus.
- Serve as a clearinghouse for research – both in Canada and internationally – and provide that information as a resource. This would in turn encourage a collaborative approach to research and information-sharing. In addition, it could help to bring established and new researchers together to provide role models and research mentorship.

**Gail Woodbury**  
is based in  
Toronto, Ontario.

**David Keast** is  
a clinical adjunct  
professor of family  
medicine at  
the University of  
Western Ontario in  
London, Ontario.



- Support a task force meeting to review the current literature related to wound therapeutics – from basic science to clinical delivery – and collate current knowledge. Such a task force should include clinicians, partners, content and enablers.  
Longer-term recommendations included the following:
- Support a task force for education to examine what work has been done and identify knowledge gaps, outcome measurements, barriers to education, best practices and knowledge translation.
- Support a working group that would develop collaborations with other non-governmental organization partners such as the Canadian Medical Association, Canadian Diabetes Association, Registered Nurses' Association of Ontario, Canadian Public Health Association, Royal College of Physicians and Surgeons of Canada, MEDEC and others to prepare a position statement that develops a framework for a delivery care model that is inclusive of all stakeholders both within the wound care world and those associated with it (e.g. hospitals, long-term care associations).
- Organize a forum at the CAWC's annual conference to stimulate interest in research and encourage a research environment. This event would also serve to inform participants about current research findings. This could be accomplished through a call for research abstracts and identifying researchers who would present their latest research findings.

Going forward, plans for the next CAWC conference (to be held in London, Ontario, in November 2012) include:

- Bringing 2010 task force participants – and additional members – together to address specific research topics and to determine the state of the topic and future directions. Questions that could be addressed include:
  - How does one effectively evaluate wound care delivery models?
  - How does one evaluate the outcomes of educational programs?
  - Are there key questions in the basic science of wound care that Canadians should address?
- Supporting a working group to investigate the development of a national database and set the standard for the items required and their measurement parameters for the identified purposes.
- Supporting a working group to review what we know and what we don't know, and build plans for future research. This group's mandate would be to develop a research framework that recognizes the interconnectivity of the issues.
- Developing a standard glossary of terms: attention must be paid to ensuring that all written and verbal communications regarding wound care use a common language and understanding. ☺





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Kelowna, October 11-14

For detailed information turn to page 23

## CAWC Around the World: An International Leader



Canadian Association of Wound Care volunteers have had the pleasure and privilege of sharing their knowledge in international wound care initiatives. The 3 speakers at this session described their experiences.

### PRESENTERS:

DAVID KEAST  
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CCFP FCFP

HEATHER ORSTED  
RN BN ET MSC

R. GARY SIBBALD  
BSc MD  
FRCPC(MED)  
FRCPC(DERM)

**David Keast** is a clinical adjunct professor of family medicine at the University of Western Ontario in London, Ontario.

**Heather Orsted** is a clinical and educational consultant from Calgary, Alberta.

**R. Gary Sibbald** is a professor at the Dalla Lana School of Public Health at the University of Toronto and president of the World Union of Wound Healing Societies in Toronto, Ontario.

**David Keast** discussed the mission and objectives of the World Alliance for Wound and Lymphedema Care (WAWLC), its history and activities to date, and the CAWC's involvement with WAWLC and other initiatives.

### Development of a World Health Organization white paper

In July 2007, a lymphatic filariasis workshop on disability prevention for field managers was held in Accra, Ghana. The workshop was sponsored by Handicap International and the Neglected Tropical Diseases Unit of the World Health Organization (WHO).

A follow-up meeting was held in September 2007 in Geneva, Switzerland, at the WHO international headquarters. A working group was established to investigate the integration of wound and lymphedema management across diseases in resource-poor settings. In this context, integration was interpreted to mean coordinated activity by multiple organizations, alignment of current activities, and identification of common services and processes. Funding sources were also established during this meeting.

In March and October 2008, follow-up meetings were held once again in Geneva. These meetings were attended by authors of a proposed Wound and Lymphoedema Management white paper, as well as representatives from various international healthcare organizations. Review and finalization of the white paper took place during these meetings.

In October 2009, a further follow-up session was held in Geneva. This was attended by more than 50 participants from 43 countries, including WHO representatives, 11 medical societies, 4 non-governmental organizations and 2 industry observers. It was at this point that the WAWLC was formed and its mission, objectives, structure and deliverables agreed upon by all.

### World Alliance for Wound and Lymphedema Care

WAWLC's mission, Keast said, is: "To work in partnership with communities worldwide to advance sustainable prevention and care of wounds and lymphedema in settings with limited resources."

WAWLC's objectives are to:

- raise awareness of the importance of chronic wounds and lymphedema as it relates to their economic and social impacts;
- develop a global policy on principles of wound care and lymphedema management;
- support countries in developing their capacities to use current knowledge and technologies in wound and lymphedema care to treat affected populations;
- contribute to strengthening health systems in affected countries at all levels in order to achieve these objectives; and
- support research aimed at improving the management of chronic wounds and lymphedema.

The *Wound and Lymphoedema Management* white paper was published in March 2010 (Figure 1); further funding is currently being sought for translation.

**R. Gary Sibbald** offered an international perspective on the joint CAWC and World Union of Wound Healing Societies (WUWHS) International Interprofessional Wound Care Course (IIWCC), offered jointly by the University of Toronto and Stellenbosch University, Cape Town, South Africa. He displayed the pyramid of educational continuing professional development (Figure 2) and noted its importance in international wound care educational initiatives.

### International Interprofessional Wound Care Course

Sibbald is an organizer of annual IIWCC sessions in South Africa. These incorporate the following longitudinal design:

FIGURE 2

### Pyramid of educational continuing professional development



- 2 residential 4-day sessions;
- 9 self-study modules (5 compulsory, 4 elective); and
- a selective that relates course material to everyday activities.

The IIWCC South Africa class of 2010 was composed of 28 students, while the class of 2011–2012 has 36 students. The students hailed from Cameroon, Kenya, Malawi, Nigeria, Tanzania, Uganda and South Africa.

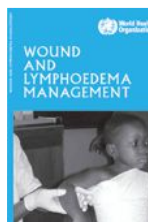
Overseas IIWCC faculty members were R. Gary Sibbald MD, Brian Ostrow MD, Kevin Y. Woo RN and Elizabeth A. Ayello RN PhD. Local IIWCC faculty members were Hiske Smart RN MA, Jack Meintjes MD, Petra Kahl RN PhD, Alan Widgerow MD Mmed, Cecilia Roberts MD and Gregory Weir MD.

Here are some participant comments regarding the value of the course:

- “The tremendous volume of knowledge has humbled me and improved my research and wound care practice.”
- “The IIWCC was an ambitious undertaking I have never regretted. It has offered answers in my life as a surgical trainee and it promises many more opportunities.”
- “This course has empowered me to be a national opinion leader in wound care in Kenya. I am a seed, not a need.”
- “It has given me a better understanding of educational principles and preparing educational materials and also the need for evidence-based medicine in clinical practice.”

FIGURE 1

### The Wound and Lymphoedema Management white paper



- “This course has changed my attitude, approach to patients with wounds, quality of service and the way I reason and handle issues in my everyday life.”

### World Union of Wound Healing Societies

The WUWHS holds meetings every 4 years. In 2008, the third annual congress – with a theme of “One Problem, One Voice” – was held in Toronto, Ontario. The fourth annual congress, to be held in Yokohama, Japan, is scheduled to take place on September 26, 2012. The CAWC, as a body, remains very active in WUWHS initiatives.

Sibbald’s other international activities have included visits to the Middle East to attend the first and second annual Abu Dhabi Wound Care Conferences. The third such conference is scheduled for March 2012, and a number of CAWC representatives will be in attendance.

TABLE 1

### The Guyana Diabetic Foot Project Model: Developmental and clinical principles

Developmental principles	Clinical principles
Collaboration	Evidence informed
Sustainability	Interprofessional
Capacity building	Patient centred
Gender equity	Holistic practice
Educational strategies linked to outcomes	

### Guyana initiatives

Diabetic foot ulcers are a major problem, particularly in underdeveloped countries. Sibbald said that diabetic foot ulcers precede amputation in 85% of cases, and the average healing time is 11–14 weeks. The costs to healthcare systems are profound.

In March 2008, Sibbald and colleagues undertook the first phase of an international collaboration to reduce amputations in persons with diabetes in Georgetown, Guyana, at the Georgetown Public Hospital Corporation. The project was funded in large part by the Canadian International Development Agency.

The principles of conservative debridement, plantar pressure redistribution and pressure offloading were all shared with clinicians at the Georgetown Public Hospital. This comprehensive diabetic foot care program has resulted in a 48% reduction in the rate of major amputations. Table 1 depicts the developmental and clinical principles of the program.

Sibbald noted that such a program is successful when:



- multi-faceted educational strategies are used;
- evidence-informed diabetic foot care practices are adopted; and
- a sustainable, comprehensive diabetes foot care system is created.

This model is being applied and expanded throughout Guyana in the next phase of the project. Sibbald concluded that such a program may be relevant for other resource-poor countries in the management of the type 2 diabetes pandemic.

**Heather Orsted** travelled in November 2007 with colleagues to Tehran, Iran, for 10 days under the auspices of the IIWCC to teach wound care to nursing students. She offered the following observations on her time there.

"I was struck by how male-dominated the country was," she noted. "However, I was very cognizant of respecting the customs of Iran, which meant covering my head, and also ensuring that my arms and body were covered, head to toe." Although she felt very safe, she knew it was crucial to respect the country's culture and customs.

The classroom setting, she recalled, "was fantastic." Dr. Sibbald and other clinicians provided excellent leadership, and the doctors and nurses mingled well.

Orsted was struck by the equipment and tech-

nology at the hospital in Tehran, which, she said, "were the same as we have here in Canada. The clinicians there were doing full assessments, and proper measures." In the clinical setting, she said, "we were neither Canadians nor Iranians...we were just people trying to help each other."

### Lessons learned

Orsted shared some of the "dos" and don'ts" of international travel, particularly when spending time in a country with a vastly different culture to that of the Western world.

#### Do:

- Be aware of your surroundings and limitations.
- Learn about other cultures. Be respectful and honour them.
- Learn at least a few words in the language of the country in which you're travelling.
- Enjoy the people...and the food!

#### Don't:

- Lose sight of where you are.
- Put yourself in an environment that you cannot control.
- Go off with a stranger who offers to show you the sites.
- Become opinionated. ☹

## Wound CARE Instrument Available Now!

The Canadian Association of Wound Care and the Canadian Association for Enterostomal Therapy collaborated to produce the Wound CARE (Collaborative Appraisal and Recommendations for Education) Instrument.

The Wound CARE Instrument provides a set of standards that support healthcare providers, organizations and health authorities to undertake a comprehensive and collaborative evidence-informed appraisal process before launching a wound management educational event or program.

The Wound CARE Instrument can be used to evaluate existing wound care programs, as well as to develop new programs.

Visit <http://cawc.net/index.php/resources/wound-care-instrument/> to download a copy.



# Implementation of Total Contact Casting as Standard of Care for Diabetic Foot Ulcers

A summary of a satellite symposium held at the 17th annual conference of the Canadian Association of Wound Care – November 3, 2011

Diabetic foot ulcers are a common complication of diabetes, and present a complex management issue. Noted Dr. Garceau, “An oversimplified approach to management will surely lead to failure. To be worthwhile, any new therapy must be implemented using a systematic, rigorous and cost-effective approach.”

First, a well-trained healthcare team dedicated to the treatment of diabetic foot ulcers is required for optimal management. Second, the principles of pressure relief must be applied. Indeed, a recent meta-analysis noted that, for the management of diabetic foot ulcers, total contact casts are most effective in ulcer healing, while standard therapeutic footwear is less effective.<sup>1</sup>

## Pressure offloading options

In patients with diabetic foot ulcers, removable device options for pressure relief include wider footwear, an Arco boot or an air cast. However, these types of removable devices are often ineffective; the literature notes that they are unsuccessful in relieving pressure and resolving wounds in approximately 50% of patients.<sup>1</sup> This is in large part due to the fact that many patients do not adhere to the foot care regimen prescribed. In a study of activity patterns in patients with diabetic foot ulcers, Armstrong and colleagues noted that “subjects with diabetic foot ulcerations appear to wear their offloading devices for only a minority of steps taken each day.” The authors concluded that control of this important aspect of care with less easily removable devices may increase the prevalence of healing.<sup>2</sup>

Indeed, a recent study demonstrated that modification of a standard removable cast walker to increase patient adherence to pressure offloading may increase both the proportion of ulcers that heal and the rate of healing of diabetic neuropathic wounds.<sup>3</sup> Thus, noted Dr. Garceau, “if you have patients with removable devices that are not working, you may consider an irremovable device, but be cautioned that they are still not as effective.”

When footwear and removable devices are ineffective, noted Dr. Garceau, a viable option for pressure relief is total contact casting.



Figure 1. Application of the BSN Medical total contact cast

Caravaggi and colleagues conducted a study of 50 patients with diabetic foot ulcers who were assigned to non-removable fiberglass off-bearing casts or a cloth shoe with a rigid sole.<sup>4</sup> At 30 days, the number of ulcers completely healed was 13 (50%) in the cast group and 5 (20.8%) in the shoe group ( $p=0.03$ ). The authors concluded that the use of off-bearing casts offers a viable treatment option for diabetic foot ulcers.<sup>4</sup>

## Practice Points

- ▶ Total contact casting offers a viable option for the treatment of diabetic foot ulcers.
- ▶ It is a cost-effective and practical therapy in the wound care clinic setting.

Unfortunately, said Dr. Garceau, total contact casting is rarely used in patients who may benefit from it. “While it is recognized as the gold standard for offloading, it may be considered time-consuming, costly and complex to apply.”

However, BSN Medical recently introduced a complete total contact casting kit that can be applied with ease in fewer than 20 minutes by either a trained nurse or assistant (Figure 1). The kit costs \$110 and includes all items required to do the casting: cast tape, padding, stockinette, plaster of Paris, adhesive felt and adhesive foam.

While the BSN Medical cast is replaced weekly to allow for proper wound care – vs. traditional total contact casts, which stay in place for weeks – Dr. Garceau indicated that the BSN Medical kit offers an optimal solution for patients who do not adhere to other traditional therapies. With respect to cost-effectiveness, although more cast changes are required, ulcers heal more quickly with the total contact casting kit, resulting in increased financial savings.

## Debridement

Dr. Garceau stressed that debridement is crucial to the optimal care of diabetic foot ulcers: “Clinicians must debride and probe every single wound ... otherwise they might neglect a crucial ulcer component.” A landmark study by Piaggese and colleagues compared usual care with aggressive debridement in patients with diabetes and neuropathic foot ulcers.<sup>5</sup> Surgical treatment of neuropathic foot ulcers in diabetic patients – including surgical excision, eventual debridement or removal of bone segments underlying the lesion and surgical closure – proved to be an effective approach, compared with conventional treatment, with respect to healing time, complications and relapses, and can be safely done in an outpatient setting.<sup>5</sup>

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## Benefits of the

# Antimicrobial Dressing PHMB

A summary of a power breakfast held at the 17th annual conference of the Canadian Association of Wound Care – November 5, 2011

### What is PHMB?

Polyhexamethylene biguanide (PHMB) is a high-performance biocide with a broad spectrum of activity against a wide range of organisms, particularly gram negative pathogens. It is non-volatile and stable at elevated temperatures, and has broad pH compatibility (i.e. it is effective over a pH range 1.0–9.0). It has no odor and is bio-eliminated by absorption when discharged to effluent.

PHMB should be considered whenever there is a need for the safe and effective treatment of infected or critically colonized wounds, and when chronic wounds have stopped healing or are enlarging. PHMB dressings can be used in slightly or moderately exuding wounds, both in deep and superficial wounds. If combined with an advanced wound healing dressing, PHMB can also manage exudate to optimize the wound healing environment. In some cases, the PHMB molecule has been chemically bound to the base material, providing it with antiseptic/antimicrobial properties when in contact with wound moisture. Therefore, the product protects against the development of wound infection by decreasing the bacterial load in the dressing and bacterial penetration through the dressing. Wound types that can be considered for treatment with PHMB are outlined in Table 1.

In vitro and in vivo studies regarding the effectiveness of PHMB in wound care have demonstrated that it may also have other benefits in wound management. Daeschlein and colleagues reported that the product may reduce pain and malodor, while Mueller and Krebsbach found that its use reduced fibrin slough and prevented the build-up of necrotic tissue and so promoted connective tissue regeneration.<sup>1,2</sup>

Specifically, PHMB should be used to reduce bacterial burden in critically colonized wounds and may be indicated for prophylaxis in immunocompromised individuals. Therapy with PHMB should also be considered as an adjunct to systemic treatment when treating serious wound sepsis.

Table 1

### Wound types that can be considered for treatment with PHMB

- Second-degree burns
- Postsurgical wounds
- Traumatic wounds
- Donor/recipient sites
- Leg ulcers
- Pressure ulcers
- Epidermolysis bullosa wounds
- Scleroderma wounds

### Benefits of PHMB

PHMB is an effective sanitizer in recreational water, such as swimming pools and hot tubs, and is sold through retail stores to pool and spa owners for this use. It is not affected by sunlight, water temperature or pH fluctuations.

A number of foam, gauze and

## Practice Points

- ▶ PHMB antimicrobial dressings are an effective option for various wound types.
- ▶ They are cost-effective, easy to use and confer many patient benefits.

non-adherent dressings impregnated with 0.2% and 0.5% PHMB are available from Covidien. They remain efficacious on wounds for up to 3 days (gauze products containing 0.2% PHMB) and 7 days (foam products containing 0.5% PHMB), but should always be changed when the dressing has reached its absorbency capacity.

PHMB binds to bacteria's outer membrane. It disrupts this membrane, causing cytoplasm to leak out and the cell's protective layer to disintegrate; cell death then occurs, leaving no bacteria to mutate or replicate. There is no known resistance to PHMB at this time. Further PHMB antimicrobial dressing benefits include:

- Broad-spectrum effectiveness, providing protection against gram negative, gram positive and yeast/fungi microorganisms, including methicillin-resistant staphylococcus aureus, vancomycin-resistant enterococci, pseudomonas and acinetobacter baumannii.
- Resists bacterial colonization within the dressing.
- Reduces bacterial penetration through the dressing.
- Limits cross-contamination to and from patients, clinicians and the environment.
- Lower cost than most antimicrobial treatments and silver dressings.

A current protocol is in place at the Montreal Neurological Hospital for patients with an external ventricular drain. Patients who have an external ventricular drain have an AMD Excilon dressing applied at the drain site. The dressing is treated as a central line, and is changed every 72 hours. Since the start of this protocol, ventricular drain infections or ventriculitis events post drain insertion have been reduced significantly.

A current protocol is in place at the Royal Victoria Hospital in Montreal for patients with a Ventricular Assist Device (mechanical heart). Prior to 2009, a high post-op infection rate was observed. Since 2009, an Excilon dressing is placed around the drive line entry site. While in hospital, the dressing is changed daily; upon discharge home, patients or their caregivers continue daily dressing changes. It has been noted that some patients develop a pocket infection around 8 months post-op; this phenomenon is not as yet explained.

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# Efficacy and Cost Effectiveness of Collagenase vs. Hydrogel for Chronic Wound Debridement

A summary of a satellite symposium held at the 17th annual conference of the Canadian Association of Wound Care – November 3, 2011

The goal of wound debridement is to remove necrotic tissue. Various methods can be used: surgical excision; sharp debridement; autolytic; mechanical; biologic; enzymatic; and synergistic use of one or more of the above. The method chosen depends on the skill of the clinician, assessment of the wound, time required to achieve debridement, patient comorbidities and available resources (i.e. supplies, staff).

Collagenase is a metalloproteinase made from the bacteria *Clostridium histolyticum*. It cleaves type 1 collagen bonds that anchor eschar in the base of a pressure ulcer.<sup>1,2</sup>

In a systematic review of the literature regarding collagenase, Ramundo and colleagues demonstrated that collagenase is superior to placebo ointment, silver sulfadiazine and wet-to-dry dressings.<sup>3</sup> Mosher and colleagues showed the superiority of collagenase to hydrogel in a computer-based predictive model, with subsequent Delphi consensus.<sup>4</sup>

Hydrogels are hydrophilic polymers with moisture content to facilitate the body's own natural enzymes to selectively degrade denatured protein.<sup>1</sup> They are passive, slow and are also associated with anaerobic bacteria.<sup>5,6</sup>

## Head-to-head study: Hydrogel vs. collagenase

Milne and colleagues<sup>7</sup> compared hydrogel and collagenase in initial debridement and promotion of microdebridement in patients with pressure ulcers in a long-term care setting; 27 patients were enrolled (13 patients: collagenase; 14 patients: hydrogel) (Figure 1). There were no statistical differences ( $p < 0.03$ ) between the 2 groups regarding age, gender, age of wound, or percentage of non-viable tissue at time of enrollment. Randomization occurred after consent was given. Patients' wounds were evaluated weekly by 1 investigator; wounds were also evaluated by planimetry by 2 different investigators, who were blinded to treatment regimens. Dressings were applied daily after 4–15 psi non-saline irrigation of the wound. No sharp debridement was allowed during the study. To measure wound healing, both the PUSH Tool Score and the Wound Bed Score were used.<sup>8,9</sup>

A chi-square analysis showed that collagenase ( $p < 0.003$ ) achieved statistical significance in complete debridement by day 42, compared with hydrogel. Complete debridement was achieved in 11/13 (85%)

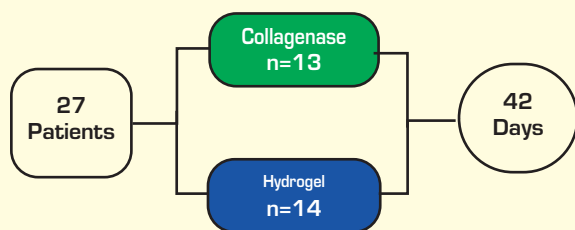


Figure 1. Study design: Collagenase vs. hydrogel

## Practice Points

- ▶ Collagenase resulted in a larger proportion of patients achieving a debrided, viable wound bed at 42 days, compared with hydrogel.
- ▶ Although collagenase acquisition costs were 18% higher compared with hydrogel, collagenase's rapid debridement rate offset the cost difference over the 42-day episode of care.
- ▶ Moreover, the cost per unit of clinical benefit for collagenase was one-third that of hydrogel (\$37 vs. \$111 per granulation day).

collagenase subjects, vs. 4/14 (29%) hydrogel subjects. Milne noted that this study adds to the evidence base that collagenase enzymatic debridement has greater efficacy in the debridement of non-viable tissue in pressure ulcers, compared with hydrogel: "We now have evidence that collagenase is better for pressure ulcers than hydrogel," she said. "In future, if we apply the drug in concert with sharp debridement, our results should be even better."

## Cost-effectiveness analysis

Curtis Waycaster described a cost-effectiveness analysis that was conducted using data from the study described above.<sup>7</sup> The objective was to determine the cost-effectiveness of collagenase enzymatic debridement relative to autolytic debridement with a hydrogel for the treatment of pressure ulcers in a long-term care setting.

The health economic design was a 2-state Markov decision process model, which evaluated the cohort transitions from a necrotic non-viable wound bed to viable granulated bed using data from the study.<sup>7</sup> This model estimated the expected cost per patient and number of granulated wound bed days across 42 days of pressure ulcer care.

Although collagenase treatment costs were approximately 18% higher than hydrogel, collagenase demonstrated a significant clinical benefit vs. autolytic debridement with a hydrogel. Indeed, more patients in the collagenase group achieved a debrided, viable wound bed compared to the hydrogel group. Furthermore, the increased cost of collagenase was offset by its greater effectiveness (the estimated cost per granulation day [debrided, viable wound bed day] was 3 times higher for hydrogel than for collagenase [\$111 vs. \$37, respectively]).

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# Is the Evidence Really What it Seems?

A summary of a learning lunch held at the 17th annual conference of the Canadian Association of Wound Care – November 5, 2011

Woo and Woodbury began by noting that: “Evidence-based medicine is the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients ... which implies integrating individual clinical expertise with the best available external clinical evidence from systematic research.”<sup>1</sup> Patient values and circumstances are also considered and are central to care planning.

Study designs can be either descriptive or analytic,<sup>2</sup> and the appropriate design depends on the research question being asked. In quantitative research, the goal is to avoid bias, while in qualitative research the goal is to add meaning.

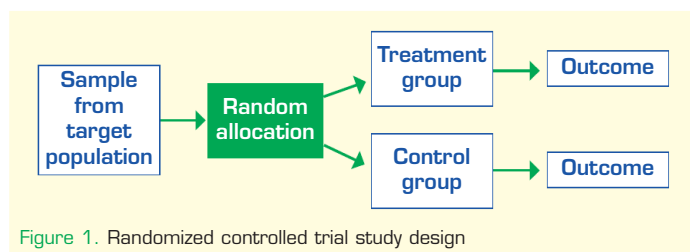
Woo asked, Why do healthcare professionals require evidence to inform their decision-making in clinical practice? He noted that evidence-based practice should always be the gold standard for providing the best patient care. While expert opinion is useful, it may be biased. Similarly, product information may be biased toward a manufacturer; thus, potential conflict of interest must always be considered.

Bias can also be present in clinical trials. Potential sources of bias in clinical trials include: patient selection, method of assignment to treatment groups, unaccounted for study dropouts, lack of blinding, lack of group equivalent at baseline, study groups treated unequally and investigator conflict of interest. For evaluating therapeutic interventions, the study design most likely to *minimize* bias is a randomized controlled trial (RCT) (Figure 1). Indeed, the highest level of evidence is found in systematic reviews of RCTs. However, RCTs can be both time-consuming and costly.

A cohort study can also help identify uncommon or adverse effects of treatments, or assess approaches or changes to service delivery, although the lack of random allocation is a drawback. However, cohort studies are useful in situations where an RCT would be unethical, i.e. withholding treatment from one study arm, while providing it to another.

Case control studies are those in which 2 groups of people – those with the condition under study and a very similar group of people who do not have the condition – are observed. Potential biases include subject selection and data quality; however, such studies are useful as a measure of retrospectively determining a presumed beneficial treatment.

A case series can be retrospective or prospective, and tracks patients with a known exposure who are given similar treatment, or examines their medical records for exposure and outcome. Because there is no control or comparison group, an association, but not a causal relationship, between the treatment exposure and outcome can be detected.



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## Practice Points

- ▶ Clinicians should learn to review research papers critically to determine their validity and to determine whether there are biases.
- ▶ Every research study has the potential for bias.
- ▶ Randomized controlled trials are the gold standard for evidence about therapy, but other types of trials (e.g. *in vitro* studies, case series) have merit in the research milieu to answer different types of questions.

## Putting the evidence into perspective

Although bias may be present in all studies – whatever the design – there is generally less bias with a higher level of evidence, i.e. an RCT vs. a case series. The Centre for Evidence-based Medicine, in Oxford, UK, provides a web-based tool that allows users to critically appraise data from published studies to determine bias.<sup>3</sup> Questions that can be asked to determine internal and external validity using the tool include: Was the study valid? What were the study results (i.e. treatment effect)? Will the study results help me in caring for my patients?<sup>3</sup> Using the CEBM tool, Woodbury analyzed a number of RCTs, and noted some questions regarding methodological issues that the tool can answer:

- Was the randomization process adequate?
- Were the blinding measures sufficient?
- Was the sample size adequate?
- Were the results objective, not subjective?
- Were data points and measures presented uniformly in the paper?

Woo noted that *in vitro* and *in vivo* studies can also provide valuable information to wound care clinicians regarding the proof of concepts or theories, testing of dressings or biomaterials, or the identification of underlying physiological mechanisms in how a dressing/device functions. It was noted, however, that one must ensure that the study design will demonstrate outcomes which have validity in actual clinical practice. He discussed several pitfalls in studies that evaluated antimicrobial dressing materials:

- The products tested are not always comparable: categories of dressing (alginate vs. foam), vapour transmission rate (high vapour transmission may create a hostile environment for bacterial growth but is not ideal for wound healing), conformability of the dressing, release of active ingredients (not all dressings have the ability to release active agents into wounds) and mechanism to activate antimicrobial agents (usually moisture is needed).
- Wound models do not emulate an actual wound environment. Artificial wounds using agar plates do not produce exudate, protein that can inactivate active antimicrobial agents and other inflammatory mediators.

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## Today and Tomorrow:

# Proteases & Wounds

A summary of a learning lunch held at the 17th annual conference of the Canadian Association of Wound Care – November 4, 2011

Breda Cullen PhD and R. Gary Sibbald MD noted that proteases are protein-degrading enzymes, which fall into two categories: 1) serine proteases e.g. elastase; and 2) matrix metalloproteases (MMPs). They each function optimally under physiological conditions, and are required for wound healing. Collectively, they can degrade all soft tissue components of the extracellular matrix, and are normally controlled at the tissue level by natural inhibitors. However, when tissue or blood cells are compromised, protease levels can become elevated. **Protease activity is an essential part of wound healing; however, if left unchecked, elevated protease activity may cause sufficient damage to impair healing and destroy normal tissue.**<sup>1</sup>

Protease activity could therefore be a predictive marker in wound healing: **In chronic wounds with elevated protease activity (EPA), there is a 90% chance that the wound will not heal.**<sup>2</sup> Numerous clinical trials have demonstrated that protease-modulating therapies can reduce protease activity, and thus promote wound healing. The protease-modulating dressing collagen/ORC (+silver) rebalances the chronic wound environment and helps wounds heal by: binding and inactivating proteases (both MMPs and elastase); protecting growth factors from proteolytic degradation; stimulating cell growth (i.e. fibroblasts, endothelial cells and keratinocytes); and controlling bacterial bioburden.

In a retrospective study of 974 patients regarding the cost benefits of collagen/ORC and collagen/ORC/silver dressings used sequentially vs. standard care, more wounds (95% vs. 7.2%) reached complete healing and the total cost of therapy was reduced.<sup>3</sup>

Recently, an interdisciplinary group of Canadian wound care clinicians developed a Canadian evidence-informed consensus on use of a protease activity point-of-care diagnostic test. These experts agreed that as clinical expertise alone is unable to visually identify protease

activity levels, an objective test is needed.<sup>1</sup> Therefore, a protease point-of-care test would guide clinicians to an appropriate, targeted therapeutic pathway. They further agreed that protease activity testing should be used as part of the assessment of complex, stalled, healable wounds. Protease activity testing results can then be integrated into optimal local and systemic management of wounds (Figure 1).<sup>1</sup>

### Improving clinical efficacy

The current understanding of proteases as predictive markers is as follows:

- Protease activity at appropriate levels is important for wound healing, and protease activities are reduced when wounds are in a healing trajectory.
- Most wounds with elevated protease activity (EPA) are non-healing and require intervention.
- Protease-modulating therapies can help to rebalance high protease activities.

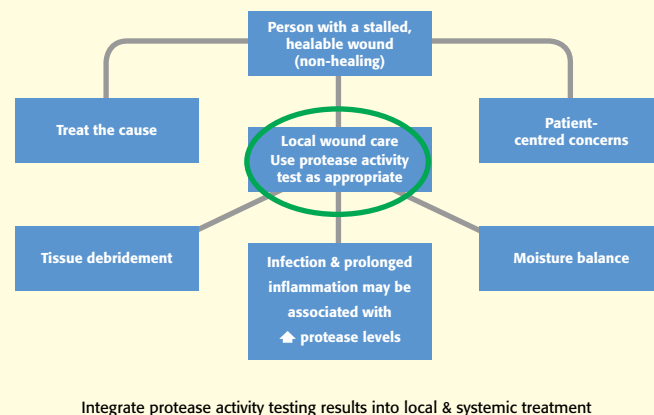
## Practice Points

- ▶ Awareness of wound microenvironment is crucial to support earlier appropriate intervention, faster healing times and more cost-effective treatment.
- ▶ The availability of a protease activity test could facilitate early selection of targeted therapies and revolutionize the current management of stalled, complex wounds.

The following wounds could benefit from testing for EPA:

- Wounds in patients with underlying comorbidities such as diabetes, peripheral arterial disease, or venous stasis.
- A stalled wound, after the cause of the wound has been addressed.
- Dehiscenced surgical wounds, to prevent complications that may result in readmission.
- Pressure ulcers in at-risk patient populations, such as the elderly or patients with diabetes.
- Wounds in which skin grafting, tissue-engineered products, or scaffolds will be used, as matrix degradation is likely to occur in an environment with high protease activity.
- Wounds in which negative pressure wound therapy will be initiated.

Figure 1. Wound bed preparation paradigm for holistic patient care: The role of protease activity testing



The Protease Status Test, developed by Systagenix, will be the world's first point of care wound diagnostic, and will identify which chronic wounds have EPA.

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# ORAL AND POSTER ABSTRACTS

## 17TH ANNUAL CANADIAN ASSOCIATION OF WOUND CARE CONFERENCE

Ottawa, Ontario, Canada

November 3–6, 2011

A Supplement to *Wound Care Canada*

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### ORAL ABSTRACTS

#### Public Policy

##### #A. Skin Tears, State of the Science: Consensus Statements for the Prevention, Prediction, Assessment and Treatment of Skin Tears

Kim LeBlanc RN BScN MN CETN (C), KDS Professional Consulting, Ottawa, Ontario

The appropriate management of patients with skin tears is an ongoing challenge for healthcare professionals. Skin tears are often painful, acute wounds resulting from trauma to the skin and are largely preventable. Healthcare professionals must be able to identify individuals at risk for skin tears, and aid in the prevention of these wounds and in their treatment when they occur. Despite preliminary studies that suggest skin tears may be more prevalent than pressure ulcers, there remains a paucity of literature to guide prevention, assessment and treatment of skin tears. As a result, these wounds are often mismanaged and misdiagnosed, leading to complications, including pain, infection and delayed wound healing. In addition, skin tears increase caregiver time and facility costs, cause anxiety for patients and families, and may reflect poorly on the quality of care delivered in a facility. In an effort to shift awareness toward this largely unheeded healthcare issue, a consensus panel of 13 internationally recognized key opinion leaders convened to establish consensus statements on the prevention, prediction, assessment and treatment of skin tears. The initial consensus panel meeting was held in January 2011, and was made possible by an unrestricted educational grant from Hollister Wound Care Inc. This poster details the consensus definition and statements, as well as recommendations for future research and steps toward establishing a validated, comprehensive program for managing skin tears.

#### Professional Education

##### #B. Development of an Education Booklet for Burn Survivors

Natasha Lowe BN RN IIWCC, Eastern Health, Torbay, Newfoundland

Burn injury survivors and their family members have a lot of questions and concerns when they are in the hospital and after they go home.

Until recently, our burn unit had an education booklet available to burn patients that included information about what to expect after a patient with a burn injury is discharged home from the hospital. I decided to develop an education booklet for our burn unit that could be given to patients and their families that would address important aspects of their hospitalization and care, as well as include information needed when they are discharged home. I availed myself of various sources of burn care information to develop this educational booklet. I reviewed literature sources, such as our skin and wound care manual, guidelines for developing written patient education from the Patient Education Committee, patient education booklets from other provinces and information obtained from websites related to burn injuries. I consulted with the wound care consultant, dietician, physiotherapist, occupational therapist, plastic surgeons and clinical educator of our hospital. I sent a survey to 18 former burn survivors, asking them to evaluate the current booklet and gave them an opportunity to tell me what they felt was important to include in a revised booklet. I received 10 completed surveys. Many burn survivors commented that they would have liked to have known more about the treatments they were receiving in hospital. They also commented that they felt they weren't prepared for the reaction of other people in their life and how to deal with it. This booklet is presently in the process of being printed once reviewed by the Director of the Patient and Family Education Committee for the surgery program. Recent burn survivors have already received this booklet, with positive response. A second survey has been sent to the participants of the first survey who requested a copy. I am presently awaiting their completed evaluations of the booklet.

#### Research

##### #C. Étude comparative sur leur efficacité et les coûts de surfaces d'appui utilisés dans la prévention des ulcères de pression

Sophie Vermette Inf., BSc.Inf., CSSS ODJ, Hôpital général du Lakeshore, Pointe-Claire (Québec)

INTRODUCTION : Les ulcères de pression occasionnent une hausse des taux de morbidité, de mortalité et des coûts. Il existe plusieurs surfaces d'appui sur le marché. Certaines sont très dispendieuses et les preuves de leur efficacité manquent de force. Buts : Établir le profil de location de deux surfaces d'appui habituellement utilisées pour prévenir les ulcères de pression et comparer l'efficacité ainsi

que les coûts par rapport à l'achat d'une surface statique gonflable (SSG) utilisée à usage unique. **MÉTHODOLOGIE** : Étude prospective randomisée et contrôlée avec 110 patients d'un centre hospitalier de soins aigus. Les sujets de risque modéré à très élevé ont été assignés soit au groupe contrôle des surfaces louées (surface préventive statique, n = 50, ou surface dynamique à faible perte d'air avec pulsation, n = 5) ou soit au groupe expérimental de surfaces achetées (SSG 3, n = 55). **RÉSULTATS** : Les analyses comparatives des résultats ont démontré aucune différence significative dans l'incidence des ulcères de pression entre le groupe contrôle (n = 6; 11 %) et le groupe expérimental (n = 2; 3 %) (p = 0,2706). Il n'y avait également pas de différence dans le confort des patients (p = 0,7129). Cependant, une différence significative fut constatée dans les coûts de location versus d'achat (16 086,00 \$ vs 3 364,00 \$) (p < 0,0001), la SSG3 étant nettement moins dispendieuse pour le même type d'épisode de soins. **CONCLUSION** : La SSG 3 est aussi efficace à prévenir les ulcères de pression des patients (ayant un risque de modéré à très élevé) que les surfaces louées tout en réduisant les coûts de manière significative.

#### #D. A Retrospective Study on the Incidence and Risk Factor Complications at Saphenous Vein Grafting Harvest Sites Following Aorto-coronary Bypass Surgery Procedure

Hu Jiayi HBSc, Plastic Surgery, St. Michael's Hospital, Toronto, Ontario

Incidence and risk factors for lower extremity complications (LEC) following saphenous vein graft harvest for aorto-coronary bypass surgery (ACB) are poorly documented in the literature. **PURPOSE**: This retrospective review aims to estimate the incidence of and identify risk factors for in-hospital postoperative LEC related to open vein harvesting (OVH) and endoscopic vein harvesting (EVH) following ACB. **METHODS**: 1,379 consecutive patient records were reviewed from one tertiary hospital for a 2-year period (2008–2010). Demographic information, comorbidities, method of vein harvesting (OVH versus EVH), and intraoperative and postoperative complications were recorded. Univariate analyses were performed to evaluate the association between patient-related factors and incidence of complications using chi-square or Fisher's exact tests. Multivariate logistic regression estimated odds ratios and 95% confidence intervals. **RESULTS**: The most common LEC was hematoma (2.83% of patients), followed by cellulitis (0.80%), incisional dehiscence (0.36%) and tissue necrosis (0.07%). The overall LEC rate was 3.92%. In univariate analyses, risk factors for LEC included postoperative leg edema (P=0.0058), old age (P < 0.0001), female gender (P=0.0302), EVH (P=0.0045), and delirium (P=0.0486). Patient comorbidities (e.g. anemia) tended to associate with LEC, but these findings were not statistically significant. Patients with LEC tended to stay in hospital for >6 days (P=0.0021). In multivariate analysis, postoperative leg edema, EVH, and age >60 remained statistically significant. **CONCLUSION**: The incidence of LEC among ACB patients is significant. Strategies to mitigate modifiable risk factors, in particular edema control, may improve patient outcomes and quality of life.

## POSTER ABSTRACTS

### Professional Education

#### #1. DELCK Team: Development of a Wound Care Resource for Clinical Nurses

Christine Ferguson BScN, Renfrew Victoria Hospital, Renfrew, Ontario

**PURPOSE**: In order to improve wound care protocols at the Renfrew Victoria Hospital, a team of interested clinical nurses was assembled and given the task of creating a work plan to achieve the objective of developing clear, consistent plans and guidelines to ensure

quality skin and wound care for patients. The team consisted of five frontline nurses with a passion for high-quality care and an interest in becoming the hospital's first best practice champions for wound care. **OBJECTIVES**: 1) To improve wound care protocols at the Renfrew Victoria Hospital; create a work plan to achieve this objective; develop clear, consistent plans and guidelines to ensure quality skin and wound care for our patients. 2) To develop a complete wound care program consisting of new policies, procedures and protocols, as well as a wound care resource manual. 3) Provide ongoing mentoring and support on a peer-to-peer basis to enhance frontline nurses' accountability and responsibility. **METHOD**: Under the guidance of the Vice President of Patient Care Services and a frontline nurse manager, the clinical nurses selected the Registered Nurses' of Ontario Best Practice Guidelines for risk assessment in the prevention of pressure ulcers to form the foundation of their evidence-based program. A literature review was also conducted to gain an understanding of the evidence behind the recommendations. Education was provided to the DELCK team to enhance their learning and expertise in wound care. Over a six-month period, the team developed a complete wound care program consisting of: new policies, procedures and protocols; a wound care resource manual; and ongoing mentoring and support on a peer-to-peer basis. **CONCLUSION**: The unique approach to the development of this program enhanced the frontline nurses' accountability and responsibility. The successful implementation of evidence-based practices has provided a systemic and consistent approach to quality care for our patients. The nurses continue to be a resource for their peers and audit compliance with this new program. A pressure ulcer prevalence survey was conducted pre-implementation in February 2010. The post-implementation survey was completed in February 2011 and results will be available soon. Chart audits reveal that the new tools are used consistently on all units.

#### #2. Raising Awareness: Fraser Health's Commitment to Pressure Ulcer Prevention

Marine Chan RN BSN MSN IIWCC GNC(C), Fraser Health, Vancouver, British Columbia

Fraser Health provides acute, out-patient, residential, home health, mental health and public health services to the largest geographical area/population (1.5 million) in BC. The performance indicators from acute, residential and home care (InterRAI Data & PixaLere Report, 2010) from two recent gap analysis reports and the latest community-based P & I study (2011), identified the need to implement a regional pressure ulcer awareness and prevention (PUAP) program. The Skin/Wound Steering Committee endorsed a novel approach to PUAP with five principles: 1) All patients can be at risk for PU. 2) The majority of PUs are preventable. 3) Good healthcare requires PUAP. 4) All healthcare providers play a role in PUAP. 5) PUAP requires a person-centred, team approach. A new 1-hour orientation program to raise the direct staff's awareness is the core of PUAP, by providing an overview of: how PUs develop; how PUs can be prevented; risk assessment with Braden Scale Assessment Tool; individualized care planning; and P & I study. **TEAM APPROACH**: To meet the learning needs of the anticipated large number of new employees from a variety of disciplines, this orientation program can be delivered in a group setting or via online learning. In addition to PowerPoint presentations, video clips are played at the beginning and end of the program to illustrate two patient care scenarios with different outcomes. Feasibility of the program will be evaluated by: the number of participants attending/accessing group/on-line orientation sessions; participants' level of learning via a questionnaire; and participants' level of satisfaction with content and delivery via a questionnaire.

#### #3. Implementation of Complex Therapy Concepts in Treatment of Venous Leg Ulcers

Katrin Will PhD, BSN Medical GmbH, Hamburg, Germany



In the case of chronic leg ulcers, successful healing cannot be achieved without a carefully designed concept of therapy, consisting of compression therapy and moist wound treatment. In order to gain further practical experience in the implementation of complex therapy concepts for treatment of leg ulcers in medical practice, 29 patients with chronic leg ulcers of venous and mixed etiology were treated with compression therapy and moist wound dressings under conditions of routine medical care. In 72.4% of all cases, the wound size reduced from 43.8% to 92.4%. In 51.7% of all cases, the wound healed completely. As the majority of patients had not experienced any progress in healing for extended periods of time due to their complicated health situation (e.g. underlying disease, adiposity, signs of infection, pronounced redness of the wound edges) and inadequate treatments, the healing results were rated very positively by both physicians and patients. In fact, the therapy could be implemented successfully without the use of any antibiotics by using an antimicrobial wound dressing. Patients who had worn compression stockings before perceived the compression system as a great relief, and superior to traditional standard stockings. The patients' well-being was substantially improved, which led to a high degree of patient compliance. This clearly shows that successful implementation of complex therapy concepts in daily medical practice is indeed possible and practically feasible. Furthermore, this approach to treatment of venous leg ulcers ensures a successful progression of wound healing and increased patient satisfaction.

#### **#4. Practice Improvements Related to the Use of Antimicrobial/Antiseptic Products**

*Karen Witkowski RegN BScN ET, Trillium Health Centre, Mississauga, Ontario*

The Advanced Wound Care Program at a large community healthcare facility is constantly addressing ways to improve the way care is provided to patients with wounds. The ultimate long-term goals of the Advanced Wound Care Program are to deliver consistent, sustainable, evidence-based wound care, thereby improving patient outcomes and demonstrating cost effectiveness. One problem that was identified early in the process of developing the program was the use and potential overuse/misuse of povidone/iodine antimicrobial solutions. Concerns raised around the use of the solution were infection control, questions about iodine uptake, practice questions, added steps, "messiness" of its use, the use of additional products with dressing changes and overall cost effectiveness. This poster will describe the process that the Skin and Wound Committee took to address the identified concerns through a detailed description of the evaluation and implementation processes of a new povidone/iodine antimicrobial product. The poster will also visually depict the educational tool that was developed to show correct application. A series of case studies will demonstrate the clinical effectiveness of the product. Through this experience, the problems related to the use of povidone/iodine solutions were addressed and the goals of the Advanced Wound Care Program have been attained with the introduction of a new povidone/iodine antimicrobial product.

#### **#5. Building Capacity in Pressure Ulcer Prevention: One Unit at a Time**

*Peggie Gairy BHSN IIWCC ETN CRN(C), Toronto Rehabilitation Institute, Toronto, Ontario*

**INTRODUCTION:** Pressure ulcers are an ongoing challenge in healthcare and are physical evidence of multiple causative factors, including immobility. Five years of intermittent classroom and "just-in-time" education on pressure ulcer prevention (PUP) in a complex continuing care hospital yielded no consistency or sustainability in practice. Lack of knowledge in risk assessment, prevention strategies and "no time" were identified as the main reasons for inconsistencies. A 14-week, single-unit-based theory and practicum on PUP resulted in sustainable practice change on that unit over a 10-month period.

**METHOD:** The problem was discussed with the unit manager and staff; educational support that included the following was provided: reviewed hospital policy on PUP; assessed risk factors, completed the Braden Scale (BS) and elaborated on meaning of score, and updated Kardex with interventions; basic skin assessment; impact of advanced age on pressure ulcer development; interprofessional role/collaboration in PUP; best practice guidelines for positioning; patient/family education; revised shift report form to include skin condition; and Braden scale routine reassessment dates. **RESULT:** Increased number of nurses independently completing risk assessment; unit champions to support PUP; one new stage IV pressure ulcer developed on pilot unit since the educational support; updated risk reassessment for all patients on pilot unit; two other units have since received educational/clinical support in PUP; all nurses being taught to check the therapeutic effect of chair cushions; monthly mattress checks for bottoming out and therapeutic effect of mattress covering currently happening on all units.

#### **#6. Prevalence and Incidence of Pressure Ulcers in a Non-acute Setting**

*Lilibeth C. Jones-Lim RN MN GNC(C), Baycrest, Toronto, Ontario*

Pressure ulcers (PU) negatively impact quality of life and result in significant health system expenditures. Woodbury & Houghton (2004) reported that the overall prevalence rate was high in Canada across all healthcare institutions (26%), with higher rates (29.9%) in non-acute settings. Thus, we aimed to conduct a prevalence and incidence study of pressure ulcers to provide benchmarking data to help the organization monitor trends, process improvement results and sustain quality improvement initiatives related to pressure ulcer prevention. The prospective study was conducted in a Canadian urban non-acute care geriatric facility. Teams led by trained surveyors performed a skin assessment of 577 inpatients. Patients who did not have a PU were subsequently examined after a time period to calculate the rate at which new PUs were occurring (i.e. incidence). The dates were chosen, as this was prior to the implementation of an organization-wide strategy that focused on PU prevention, including a new policy and educational sessions. As a result, the overall prevalence was found to be 21.84% for Stage I or greater and 12.65% for Stage 2 or greater. Incidence rates are reported by patient area. Also, patient profiles – including mean age, gender, Braden scores and location of PUs – are reported. The results will be used to provide an organization-wide perspective to quantify and benchmark within healthcare organizations. Results will help to evaluate the effectiveness of newly implemented pressure ulcer prevention strategies in subsequent prevalence and incidence studies.

#### **#7. Wound Diagnosis: LEAVA – The Look Evaluate Analyze Verify Algorithm**

*Jason C. Liu BScOT(c) IIWCC MCIScWH, E. Bardgett; A. Turner; V. Provost. Peace River Professional Orthotics Clinic, Edmonton, Alberta*

**INTRODUCTION:** Healthcare practitioners need to provide a differential diagnosis to a presenting wound. Unless a clinician has received advanced wound care education, few are able to understand the cause, treatment and prevention of wounds. Misdiagnosis of a wound delays healing and affects a patient's emotional, physical and financial health. There are also increased costs within the healthcare system and a risk for medical liability. **OBJECTIVE:** To develop an assessment tool – the Look Evaluate Analyze Verify Algorithm (LEAVA) – that would allow beginner, novice and intermediate clinicians to differentiate and diagnose various wound etiologies and apply appropriate treatments. **METHOD:** Four postgraduate-level clinicians of various practice settings and healthcare backgrounds completed a database search and used group consensus to collect and analyze the most current information on chronic wound differentiation. **RESULT:** An algorithm was developed to differentiate acute wounds from chronic wounds. The algorithm further differentiates ischemic,

neurotrophic, venous stasis, pressure, malignant and uncommon wounds. **CONCLUSIONS:** This completed algorithm will be forwarded to a group of experts in the wound care field for content review to ensure all key information has been included. Future adjustments to the algorithm will be based on the feedback received from said group of experts in discussion with the authors. The completed algorithm will be used as an enabler for healthcare practitioners.

#### **#8. Building Capacity Through Engagement to Reduce the Prevalence and Incidence of Pressure Ulcers**

*Lilibeth Jones Lim RN MN GNC(C), Baycrest, Toronto, Ontario*

Building capacity describes the process that equips individuals with skills, knowledge, access to information and training to enable them to perform effectively and promote best practice. In response to the identified need that improved access to resources and education may improve their efforts, the focus of a new interdisciplinary program aims to reduce the prevalence and incidence of pressure ulcers through a multi-strategy, capacity-building approach. The Wound Warrior Program, together with comprehensive evidence-based policy and educational sessions, engages point-of-care clinicians with a passion for excellence in skin and wound care. Upon completion of the program, additional requirements for designation include evidence of participation in a unit-based activity (i.e. care planning, holding educational sessions). Further, the introduction of skin rounds enabled the interdisciplinary staff to develop and evaluate the effectiveness of preventive measures. In addition, electronic tools were introduced or modified that provide current evidence-based information on the prevention of pressure ulcers, including a reminder system in the electronic health record and access to an e-tool. Prior to the implementation of the program, a prospective prevalence and incidence study (n=577) was conducted, which found that the overall prevalence was 21.84%. Also, an audit and feedback system was devised, and demonstrated an increase in overall compliance in the assessment of PU risk. It is proposed that the implementation of a comprehensive strategy, including multiple interventions that engage staff, will build capacity among the interdisciplinary team and result in a decrease in a planned subsequent prevalence and incidence study of pressure ulcers.

#### **#9. Digital Photography of Wounds**

*Darcie Anderson RN BSN, Saskatoon Health Region, Humboldt, Saskatchewan*

**HYPOTHESIS AND BACKGROUND:** The effective combination of innovative technology and wound care clinical practice will improve client outcomes in rural home care. This educational project was developed for rural home care nurses (HCNs) in the Saskatoon Health Region (SHR) to provide rural HCNs with evidenced-based guidelines and education to obtain the acquired skill to consistently take high-quality images of wounds. It is part of an IIWCC selective project. As photography is not a basic skill taught in healthcare programs, and wound care practice necessitates digital photos of wounds for enhanced documentation, the need for digital photography guidelines becomes paramount in order to do so responsibly and professionally. **PRIMARY PURPOSE:** Development of a standardized clinical photography guideline for rural HCNs taking photos of wounds. **PARTICIPANTS:** SHR rural HCNs are currently piloting this educational program. **OBJECTIVES:** The rural HCN will: verbalize and demonstrate the procedure for successful digital wound photography, maintain client confidentiality, maintain infection control techniques and employ appropriate methods of storing images for documentation purposes. **MATERIALS AND PROCESS:** The process includes: a baseline audit, pre-educational interview, post-education quiz, a competency check-list, and an enabler tool. Data collection was obtained by means of surveys and chart audits, with ongoing post education chart audits to ensure quality and sustainability. **OUTCOMES:** Post-education includes HCN

knowledge and demonstration of program objectives, which currently show that all participants strongly agreed that digital photography education was relevant to their needs and that knowledge and skills will be used in the workplace to improve client outcomes. Implications for practice include: The rural HCN will obtain a high-quality objective adjunctive documentation regimen to the written record, a cost effective tool for interdisciplinary communication, a tool for enhanced wound assessment, and improved client outcomes and satisfaction.

#### **#10. Lean Approach to Prevent Pressure Ulcers**

*Rose Raizman RN ET MS, RVHS, Toronto, Ontario*

**BACKGROUND:** Pressure ulcers greatly influence quality of life for patients and cause economic burden on healthcare systems. Therefore, pressure ulcer prevention has received international attention with multiple guidelines, position papers and tools being developed to improve prevention and treatment. Utilization of these tools and guidelines usually requires additional resources, yet in light of budget restraints and the continuing mandate to do more with less, innovative approaches are needed. In 2007, after experiencing major financial challenges, our community hospital adopted a Lean management philosophy. Focused on the elimination of waste in hospital processes, Lean helped eliminate our budget deficit and improved quality of care. In 2010, when faced with unacceptable pressure ulcer rates, a Lean approach seemed an obvious choice. **OBJECTIVE:** To present a pressure ulcer prevention and management project developed using Lean. **MATERIALS AND METHODS:** We used an environmental scan, A3 events and value stream analysis to identify gaps and opportunities for resource reallocation. We used best practice guidelines, Kamishibai audits, and visual management boards to make and sustain improvements. **OUTCOMES:** The pilot unit pressure ulcer incidence has declined from 23% to 0%. Utilization of the Braden scale has increased from 0% to 80%. All newly hired nurses were trained in ulcer prevention, compared with the previous 0%. Similarly, previously minimal organization-wide nursing education on pressure ulcer prevention was increased to 50%, and hospital-wide prevalence dropped 30%. Two additional positions were created for pressure ulcer prevention without incremental spending. Adjustment of current computer documentation allowed ongoing data collection and initiation of alert system for early prevention strategies.

#### **#11. From Rent to Own: A Business Case Primer to Reduce Pressure Ulcers**

*Rose Raizman RN ET MSc, Rouge Valley Health Systems, Toronto, Ontario*

A 415-bed, multi-site community hospital faced higher than national average pressure ulcer rates. After comprehensive assessment, a number of areas were identified as lacking, e.g. lack of standard screening and intervention, and high costs for rentals. A cost benefit analysis of the last two years' pattern of rental spend was conducted to evaluate the current state, retrospective needs and to determine a potential budget for the program. The program was planned to ensure quick wins and sustainable outcomes, and was to be executed in stages. The business case was presented to the senior management team, which included a proposal to reallocate 30% of an annual budget for rent toward purchase of required surface mix, and to use potential savings to support the program. After the purchase of air mattresses and single-use microclimate management systems, a greater number of patients were able to benefit from appropriate surfaces. A surface allocation protocol based on a risk assessment tool was developed and implemented hospital-wide by conducting lunch and learn presentations and focused education about new surfaces. Within the first three months, there was a significant decrease in the incidence of pressure ulcers (e.g. 0% on the surgical unit), and funds were reallocated for the creation of a Save Our Skin team, which will concentrate on implementation of the following

stages of the wound program as well as education and monitoring protocol implementation at the point of care. Authors will share the business case that allowed reallocation of funds to the pressure ulcer prevention program, the protocol for pressure redistribution and microclimate management surface allocation, and lessons learned.

### **#12. Stomp Out Heel Ulcers: A Pressure Ulcer Prevention Initiative in a Community**

*Richard Bishop BScN, Oakville, Ontario*

**PURPOSE:** Pressure ulcers located on the heels are the second most common anatomical site, after the sacrum/coccyx. The results of our organization's 2010 pressure ulcer prevalence survey revealed that pressure ulcers located on the heels were the most common site, accounting for 35 ulcers or 42% of all pressure ulcers identified. **METHOD:** A review of pressure ulcer prevention literature identifies that a multifaceted approach to any pressure ulcer prevention program should include early skin and risk assessments, pressure management, documentation, and patient and family involvement. Our program, Stomp Out Heel Ulcers, using this framework, included an algorithm to assess patient risk, methods to remove heel pressure, documentation of new facility-acquired pressure ulcers, and educational material directed to inform and educate patients and their families. We took this initiative one step further by reaching out to our community and producing a short video segment which aired on the local community cable network. **CONCLUSION:** This program was launched in early January 2011 with participation in a yearly, industry-sponsored pressure ulcer prevalence survey at the end of February. These early results demonstrated a 49% reduction in heel ulcers (from 35 to 17). It is postulated that this focus on heel pressure ulcers helped to reduce the overall prevalence of all facility-acquired pressure ulcers across the organization to 7.8% (down from 10% the previous year).

### **#13. To Evaluate if a New Silicone Border Dressing Offers Increased Client Comfort**

*Richard Bishop BScN, Halton Healthcare Services, Oakville, Ontario*

**BACKGROUND:** Silicone dressings have been accepted and used in wound healing because of the increased patient comfort they offer. From a clinical perspective, we sometimes have to compromise between benefits of wound dressings (i.e. wound pain at dressing change and absorption capabilities of the foam, keeping the peri-wound skin healthy) and the ability of the foam to stay in place. **OBJECTIVE:** To evaluate the absorption and adhesion characteristics of a new foam dressing in managing moderately draining wounds in an inpatient population. **METHODOLOGY:** A 5-patient case series was done on an inpatient population in a community-based hospital. Patients were monitored for a two-week period. Evaluation criteria included frequency of dressing changes, peri-wound skin condition, decrease in wound size, ability to conform to the wound, patient comfort and ease of application. Wounds studied were of different etiologies and anatomical locations. **RESULTS:** In the initial results, we noticed that even though the silicone adhesive is only along the border, it is sufficient to hold the dressing in place. The dressing was able to manage the moisture without causing peri-wound maceration. The three-piece opening allowed for increased ease of application, and patient comfort was not compromised. **SUMMARY:** There are multiple product choices on the market aimed at patient comfort and moisture management. This dressing may be a suitable option for a variety of moderately draining wounds. Further investigation is required to suggest whether the new foam dressing would allow for a reduction in dressing change frequency.

### **#14. Wounded No More**

*Catherine Fitzpatrick BScN MHS(c), Trillium Health Centre, Mississauga, Ontario*

**PROBLEM:** Despite a majority of nursing staff having attended wound care education there continued to be a higher than desired prevalence of hospital-acquired pressure ulcers and a lack of transfer of clinical knowledge to the bedside. **SOLUTION:** An interdisciplinary task force, with staff representation from all medical, ICU and complex care units met monthly for six months and established two goals: 1) Less than 5% hospital acquired prevalence of Stage II to IV pressure ulcers; and 2) Zero percent do no harm. The task force determined the factors that prevented the reduction of skin breakdown. Task force members became unit champions, sharing their newly acquired knowledge and mentoring colleagues. **WHAT WAS DISCOVERED:** Audits determined that Braden scales were being completed on nearly all patients on admission and on a weekly basis. However, Braden scores were rarely used to determine prevention strategies or care practices. As well, many staff had little knowledge of how to utilize equipment such as mechanical lifts, wheelchairs and beds to reposition patients, nor how to utilize other strategies and resources to offload pressure areas. **WHAT WAS LEARNED:** The primary focus of the task force needed to be on the prevention rather than the treatment of pressure ulcers. Highlighting Braden scale results and prevention strategies on each patient's revamped Kardex and whiteboard, posting interventions over each patient's bed, educating staff on prevention strategies, providing ongoing task member support and involving the patient and family in prevention, significantly reduced incidences of skin breakdown.

### **#15. Heel Pressure Ulcer Prevention: The Journey within an Acute Care Facility**

*Debbie L Hanna Bull RN BScN MN, Bailieboro, Ontario*

**BACKGROUND:** In 2006, pressure ulcer (PU) rates at our regional 375-bed acute care facility were above international and Canadian benchmarks. Subsequently, a PU Prevention and Wound Treatment Program was implemented. By 2009, facility-acquired PU decreased by 50%. However, heel pressure ulcers (hPU) occurrence worsened. 5.8% of patients developed an hPU, ranking heels the number one location for facility-acquired PU's. hPU's are costly and can lead to osteomyelitis and limb amputation. **METHODS:** In 2009, an hPU prevention initiative was implemented following acceptance of a business case emphasizing the benefit in patient quality of life and cost avoidance. Protocol components included: utilizing a cushioned heel offloading device for patients meeting inclusion criteria, extensive staff education, timely accessibility to the device, ongoing monitoring and reporting of outcomes. **RESULTS:** Six-month data revealed that 43% of patients met criteria to use the device; of these patients, 37% were compliant, resulting in a 40% reduction in hPU's. 10-month data revealed 19% of the 44% of patients who met the criteria were compliant, resulting in a 28% decrease in hPU's. Interestingly, with 17-month data, only 17% of the 49% of patients who met criteria were using the device, yet only 2.6% of the patients had an hPU. **CONCLUSIONS:** Facility-acquired hPU rates have decreased 55% with an approximate cost avoidance of \$1.5 million dollars annually. Positive outcomes seen are a result of extensive staff education, risk identification, frequent skin assessment and device use as necessary. The challenge is to increase protocol compliance to further enhance outcomes.

### **#16. Changing Practice is as Easy as PIES**

*Linda Norton BSc OT MScCH, Shopper's Home Health Care, Mississauga, Ontario*

**INTRODUCTION:** Manual tilt wheelchairs can be used to foster position changes and prevent or manage skin breakdown with clients who are unable to adequately shift their own weight. Manual tilt chairs have also been classified as a restraint in some long-term care settings. This has led to the removal of this beneficial piece of equipment from some long-term care settings in an effort to minimize restraints. **GOAL:** To create an environment where manual tilt wheelchairs are



considered a therapeutic device, and not automatically removed from a resident because it might be a restraint. **METHODS:** The Canadian Association of Wound Care (CAWC) has developed an approach to practice change where activities in four domains are identified: Practice, Institutional, Education and System. This model will be used to explore how the perception of manual tilt wheelchairs is changing from a possible restraint to a therapeutic positioning device. **RESULTS:** Change is beginning to occur. Chartwell Seniors Housing Reit has revised their policy on restraints. In this setting, where a manual tilt wheelchair has been prescribed by a therapist for a specific client, that chair is considered a therapeutic device, and documentation in the chart recognizing this fact is completed. **CLINICAL IMPLICATIONS:** Although creating practice change may seem impossible, the Practice, Institution, Education and System model described by the CAWC fosters the identification of do-able steps which will change practice.

#### **#17. Reduction in Readmissions for Persons with Venous Leg Ulcers: Enhancing a Venous Leg Ulcer Pathway**

*Eva Haratsidis BScN RN, Toronto Central Community Care Access Centre, Toronto, Ontario*

Persons with venous leg ulcers (VLU) suffer from a chronic disease state challenged by high rates of ulcer recurrence (20–70%). Research shows that recurrence is strongly influenced by patient adherence. Clients frequently readmit due to difficulty with stocking application, trauma to newly closed wound areas and inconsistencies in skin care and compression stocking wear. Due to the cause of the wound etiology and frequent readmissions, this client group represents a significant cost to the healthcare system. Typically, Toronto Central Community Care Access Center (TCCAC) clients are discharged to self-care post-wound closure, and readmission rates are high (54%). In an attempt to decrease readmissions, TCCAC and Calea revised the current VLU care pathway using best available evidence and completed an evaluation in the Fast Access to Supportive Treatment (FAST) centres. The revised pathway included: increasing client length of stay post stocking fitting to monitor skin care regime, protection techniques for the closed wound area(s) and reinforcement of compression stocking application. It was determined that these changes would decrease client readmission vs. current standard of care. The evaluation period was from October 2010 to March 2011. Of the 110 clients seen at the FAST centers, 3 (2.7%) were readmitted while 10 of 34 (29%) seen in home care required readmission. The chronicity of VLU requires a modified care pathway supporting clients with a self-management program that increases client independence and improved quality of life, while decreasing readmissions and costs.

### **Public Policy**

#### **#18. A Community-based Prevalence and Incidence (P & I) Study: An Evidence-based Study of Pressure Ulcer Prevention and Management**

*Marine Chan RN BSN MSN IIWCC GNC(C), Fraser Health, Vancouver, British Columbia*

Fraser Health provides acute, outpatient/residential/home health, mental health and public health services to the largest geographical area and population (1.5 million) in BC. Only three formal P&I studies have been conducted recently in acute care (prevalence rates: 28% to 80%; incidence rates: 16% to 27%). The estimated prevalence rates were 25% in home health; 60% of new clients had recent a hospital admission (Paxalere, 2010) and 12% were in residential care (InterRAI, 2010). The Skin Integrity/Wound Management Steering Committee aims to build a culture of quality and safety for pressure ulcer prevention and management. The community-based P & I study was conducted

in January and February 2011 to examine the root causes with an intersectoral collaboration and an interdisciplinary team approach. The study sites included acute care, residential care, and a home health office in the same community. The assessors were WCCs, ETs, nurses, OTs and RDs from other sectors and sites. To complement their skills, the WCC/ET/experienced nurses teamed up with the OT/RDs. In residential care, RCAs also participated. The prevalence rates were 37% in acute care, 27% in residential care, and 42% in home health. The incidence rates were 17% in acute care and 2% in residential care. The next step is undertaking five sequential, phased-initiatives with an inter-sector/interdisciplinary collaboration to implement a sustainable pressure ulcer prevention program, as follows: 1) A one-hour pressure ulcer prevention orientation program for new employees. 2) Braden Scale pressure risk assessment/prevention of skin breakdown guidelines (2011) for clinical practice. 3) A level-one skin/wound care education program for nurses and interdisciplinary staff. 4) Advanced wound skin/management modules for clinical leaders/champions. 5) Educational materials and resources for patients and caregivers.

#### **#19. Influencing Accreditation with Pressure**

*Marlene A. Varga RN BScN IIWCC, Covenant Health, Edmonton, Alberta*

It is estimated that 2.5 million pressure ulcers (PU) are treated in acute care facilities within the United States (Reddy et al., 2006). In the United Kingdom, the cost of treating PU is 1.4–2.1 billion pounds, which accounts for 4% of the NHS expenditure (Bennett et al., 2004). As a result, there is a significant threat to the economy and public health around the world (Sen et al., 2009). Pressure ulcers have a negative effect on the health-related quality of life of individuals (Hopkins et al., 2006; Essex et al., 2009). Accreditation Canada (2011) outlines practices for safety within health authorities, including implementing evidence-based protocols to prevent PU in long-term care only. PU prevalence and incidence studies were performed 2007–2010. With ethical approval, data was collected through head-to-toe assessment and staged using NPUAP Guidelines (2009). Prevalence rates were 34% (CI 27.4–41.1%), while incidence rates were 29% (CI 14.5–43.4%) in 2007. With implementation of an evidence-based PU program, clinical practice has improved. This contributed to a decreased prevalence (19% in 2009; CI 12.9%–25.1%) and incidence (19% in 2009; CI 8.7%–28.6%). In 2010, there was an increase in prevalence to 32% and incidence rate to 27%. During the first 2 weeks of hospital admission, PU can occur in 9% of individuals (Frankel et al., 2007). Reducing PU is a high priority. Research and awareness has prompted a province-wide PU prevention committee. It is suggested that AC 2011 should include acute care in standards for PU prevention.

#### **#20. Multidisciplinary Wound and Comprehensive Lower Leg Edema Management**

*Cynthia Timinski RN BScN MN NP, Alberta Health Services, Edmonton, Alberta*

Gottrup, Nix and Bryant (2007) note that no single discipline can meet the complex needs of a patient with a wound; the best outcomes are achieved through a well-educated and dedicated team striving for the provision of holistic care. Integrated Supportive Living (ISL), in Edmonton, AB, has established a multidisciplinary wound/comprehensive lower leg assessment (CLLA) clinic to address the needs of clients with multiple medical and psychiatric comorbidities who often lack a family physician, family support and access to community resources. Professionals actively involved in the clinic include a nurse practitioner, enterostomal therapist and an occupational therapist. Also accessible are a pharmacist, dietician, physiotherapist and social worker. The clinic was developed in response to the need for comprehensive assessment/treatment of wounds and lower leg edema. Without combined attention to pressure reduction, infection, necrotic tissue, tissue perfusion, nutrition, mobility, pain and psychosocial issues,



chronic wounds do not heal (AAWC, 2005). Communicating through an interdisciplinary approach is crucial to ensuring that patients are receiving care that is timely and that follows current, rapidly changing, evidence-based practice (Wallach, 2002). The clinic setting integrates science into holistic, client-centred practice. Standardized assessment and documentation, medication review, CLLA (including ankle brachial indices and toe brachial indices), sharp tissue debridement, specialized footwear and fabrication of custom insoles/offloading, as performed by designated professionals, has enabled the clinic to successfully address the client need within the assisted-living program.

#### **#21. Evidence-based Recommendations for Conservative Sharp Wound Debridement**

*Elise Rodd-Nielsen [for Cathy Harley RN BSN CETN(C)], Independent Consultant, Cantley, Quebec*

Conservative sharp wound debridement (CSWD) is recognized as an important intervention in the rapid preparation of the wound bed for healing, yet in North America there is a lack of standardization regarding policy, education and practice guidelines. Over 20 months, a group of enterostomal therapy nurse volunteers compiled, organized and developed evidenced-based recommendations on CSWD from the available literature. The recommendations are based on a compilation of literature published between 1991 and 2010, focusing on the adult population with wounds where CSWD could be implemented as an intervention. The recommendations were derived through a consensus process that analyzed emerging themes from both the soft literature (opinion, case studies) and higher-level research. Levels of evidence were assigned to the recommendations. Validation of the recommendation headings and content was obtained from 29 volunteer national and international stakeholder reviewers from Canada, the US, the UK, Italy, Brazil, Australia and Mexico. The ten recommendations encompass the domains of policy, clinical practice, etiology-specific wounds and education. A summarization will be given of the development process, challenges faced, and the web-based technologies used in this national/international collaborative effort.

#### **#22. Regionalization of Comprehensive Diabetes Care in Guyana, South America**

*Brian Ostrow MD FRCSC, University of Toronto, Guelph, Ontario*

**PURPOSE:** To develop a community-based diabetes care program inside the multi-level public health system in Guyana, South America. **METHODS:** Regionalize the benefits of the Guyana Diabetic Foot Project-Phase 1 (46% reduction in major amputations) to 6 Administrative Regions (90% Guyanese population) and target 15,000 people with diabetes. Training and clinical targets are the highest-level priorities of diabetes care in developing countries in three streams: Stream 1 – foot care for high risk persons; Stream 2 – glycemic control to HbA1c <9% and blood pressure control to less than 160/95 mm Hg; Stream 3 – integrated expansion of the key opinion leader pool from 7 to 11. Thirty-six training sessions by Guyanese key opinion leaders targeting 353 healthcare workers. Develop training modules and specific enablers in diabetes education, glycemic control and blood pressure treatment. Ten visits by Canadian diabetes/wound care experts to train the trainers and monitor results. Employment of project manager and clerical staff. Rehabilitation and supply of 7 new regional diabetic foot centers with the interprofessional model and provision of appropriate equipment. Develop the public HbA1c testing capacity **RESULTS:** The project is ongoing. The logistic and infrastructure elements have been established. The first cohort of 192 trainees, from 89 facilities, has received training in medical and foot care. Three regional foot centers are operational. More than 1000 screenings for high-risk foot status have been completed. **CONCLUSIONS:** This model has important implications for healthcare delivery in low-income settings.

## **Research**

#### **#23. Wound of Necrotizing Fasciitis with Underlying Pyoderma Gangrenosum**

*Eric Marcotte MD MSc, Department of Surgery, Centre Hospitalier Universitaire de Sherbrooke, Sherbrooke, Quebec*

Pyoderma gangrenosum is a rare ulcerative disease for which medical control is often difficult. It is characterized by the phenomenon of pathergy. We present a case of pyoderma gangrenosum that was complicated by a soft tissue necrotizing infection of the perineum and the thigh. An extensive surgical debridement was performed and there was important deterioration under negative-pressure wound therapy. There were also many infections by multiresistant *Pseudomonas aeruginosa*. We describe the multidisciplinary management with immunomodulators, corticosteroids and immunoglobulins, as well as cadaveric and autologous skin grafts. Once the disease was controlled medically, the grafts allowed for progressive granulation and contraction of the wound. Because it is a long-term treatment, collaboration between the teams, as well as devoted personnel and the motivation of the patient, are key elements in the management of such a case.

#### **#24. Risk Factors for Venous Leg Ulcers: A Systematic Review**

*Kelly Heron RN BScN CETN (C) MCISC(WH), Windsor Regional Hospital, LaSalle, Ontario*

**INTRODUCTION:** Literature indicates that venous leg ulcers are common and costly, and their development is difficult to predict. If risk can be identified, strategies can be put in place to prevent or reduce the likelihood that ulceration will occur. **PURPOSE:** To determine if risk assessment tools exist for the prediction of venous leg ulcers. In the absence of existing risk assessment tools, we sought to identify predictor variables that could be included in the development of a predictive risk assessment tool. **METHOD:** A systematic review using key search terms was conducted using PubMed, HaPI, CINAHL, Scopus and Embase. By title and abstract, 21 articles were identified and reviewed independently. Of these, 8 research articles were chosen based on a set of predetermined criteria. The methodological quality of the articles was determined utilizing the Scottish Intercollegiate Guidelines Network (SIGN) checklists. **FINDINGS:** No risk assessment tools were found, but numerous risk factors were found. Because the studies were diverse – e.g. population investigated, study design, endpoints – it was not possible to combine results. Despite high odds ratios (OR) for several risk factors, e.g. previous venous ulceration (OR 19.4; 95% CI, 14.5–25.9), history of deep vein thrombosis (OR 17.6; 95% CI, 2.9–106.8), few common risk factors were identified. **CONCLUSIONS:** While a valid, reliable and predictive risk assessment tool was not found for clinician use, variables were identified that could be included in the development of such a tool. Further research is required.

#### **#25. Prevalence of Skin Tears in Long-term Care Facility**

*Kimberly LeBlanc RN BScN MN CETN(C), KDS Professional Consulting, Ottawa, Ontario*

The appropriate management of patients with skin tears is an ongoing challenge for healthcare professionals. Skin tears are often painful, acute wounds resulting from trauma to the skin and are largely preventable. Healthcare professionals must be able to identify individuals at risk for skin tears, and aid in the prevention of these wounds and in their treatment when they occur. Despite preliminary studies that suggest skin tears may be more prevalent than pressure ulcers, there remains a paucity of literature to guide prevention, assessment and treatment of skin tears. As a result, these wounds

are often mismanaged and misdiagnosed, leading to complications, including pain, infection and delayed wound healing. In addition, skin tears increase caregiver time and facility costs, cause anxiety for patients and families, and may reflect poorly on the quality of care delivered in a facility. This poster will highlight the findings of a point prevalence study conducted at a 114-bed long-term care facility in Eastern Ontario. While further research is needed to determine the prevalence and incidence of skin tears across healthcare settings, the results of this prevalence study provide a much needed first step in establishing a Canadian database on the prevalence of skin in the elderly population.

#### **#26. Effectiveness of Manual Lymph Drainage Plus Compression on Volume Reduction for Lower-extremity Lymphedema: A Systematic Review**

*Andrea C. Turner BSN MCIsc(c), University of Western Ontario, Victoria, British Columbia*

**OBJECTIVE:** To determine the benefit of manual lymph drainage plus compression for the management of individuals with lower extremity lymphedema. **METHODS:** Electronic databases [CINAHL, Cochrane Library, PubMed, Embase, SCOPUS and ProQuest] were searched using the following key search terms: lymphedema, lymphoedema, lower extremity, leg, compression, manual lymph drainage [MLD], complete decongestive therapy [CDT] and compression. Clinical studies reviewed included those in which the participants received treatment with MLD in conjunction with compression, as part of CDT for lower extremities. The primary outcome measure investigated was volume reduction of the affected limb. A secondary outcome was health-related quality of life [HRQoL]. **RESULTS:** Nine articles (n=1475 legs) examined the effect of MLD plus compression to reduce volume in lower extremity lymphedema. No studies were found that included a comparison group. Downs and Black scores for methodological quality ranged from 7/44 to 33/44. All 9 studies reported that MLD was associated with a decrease in leg volume, with reductions ranging between 22% and 88% by 4 weeks. Two studies reported that HRQoL improved with volume reduction. **CONCLUSIONS:** A comprehensive review of existing literature revealed there are several poorly controlled clinical trials that document the effect of MLD plus compression on edema associated with lower extremity lymphedema. However, the benefits of this therapy must be confirmed in further research involving properly designed controlled clinical trials.

#### **#27. Managing Skin Tears in the Elderly Population with a Non-Adherent Silicone Contact Layer: A Case Series**

*Kimberly LeBlanc BScN RN MN CETN(C) IIWCC, KDS Professional Consulting, Ottawa, Ontario*

Skin tears are a common problem that healthcare professionals face when caring for the elderly. These frequently seen wounds are the result of trauma to the skin from shearing, friction or blunt injury. Skin tears can cause stress to the patients and their families and are often challenging wounds for the healthcare professional providing care. The elderly are at a higher risk for skin tears due to the fragility of the aging skin, flattening of the basal cell layer and impaired circulation. While prevention of skin tears is the primary focus for managing this problem, healthcare professionals working with the elderly population must be equipped to manage these challenging wounds when they occur. In recent literature, there has been an increase in the attention given to these wounds; however, there has been no gold standard developed for their management. Through case study format, this poster will review one treatment option available for skin tears. We will show pictorially the use of a non-adherent silicone contact layer in the care of five elderly patients living in a long-term care facility. Their wounds ranged from partial to full thickness skin tears. These case studies will include case history, and initial and final assessments of the wounds, including photos of the skin tears initially

and after 4 weeks of treatment, the treatment plan, the problems encountered, patient outcomes and implications for the future.

#### **#28. Point Prevalence of Chronic Edema in a Long-term Care Facility**

*Kimberly LeBlanc BScN RN MN CETN(C) IIWCC, KDS Professional Consulting, Ottawa, Ontario*

Chronic edema of the legs is a complex, underappreciated and progressive medical condition. For the elderly, who have an increased risk of developing skin tears, pressure ulcers and other skin wounds due to changes associated with aging, those who have chronic edema have an additional causative factor which puts them at increased risk for developing wounds. It has been reported that lower leg edema is an increasing medical problem, particularly in the aging population. However, there is limited published data pertaining to the prevalence of chronic edema in the long-term care population in Canada. This poster will highlight the findings of a point prevalence study conducted at a long-term care facility in Eastern Ontario. While further research is needed to determine the prevalence and incidence of lower leg edema across healthcare settings, the results of this prevalence study provide a much-needed first step in establishing a Canadian database on the prevalence of chronic lower limb edema in the elderly population living in a long-term care facility.

#### **#29. A Wearable PRFE Device for the Healing of Chronic Ulcers**

*Ian Rowe PhD, BioElectronics Corporation, Frederick, Maryland*

**INTRODUCTION:** Pulsed radio frequency energy (PRFE) has previously been used to successfully treat longstanding diabetic and venous stasis ulcers. In this case study, a miniaturized, lightweight wearable PFRE (RecoveryRx) device was used to treat 3 patients with diabetic foot ulcers and 1 patient with a venous stasis ulcer. **METHODS:** The ulcers were present on the 4 patients for greater than 3 months and had failed to heal after 4 weeks treatment with conventional therapies. These treatments included debridement, offloading, Promogran matrix and sterile dressing for the diabetic ulcers, and multilayer compression therapy for the venous stasis ulcer. A lightweight, battery-powered, wearable form of PRFE device was introduced as a treatment and was used 6 to 8 hours per day for a period of 6 weeks. Wounds were evaluated, and wound size recorded, on a weekly basis. **RESULTS:** All ulcers after 1 week of PRFE therapy showed improvement and wound size was seen to decrease. The patient with the venous stasis ulcer reported significant pain relief after 2 weeks of treatment, and after 6 weeks a 95% reduction in wound size was achieved. Two patients with diabetic ulcers achieved complete healing after 3 weeks of treatment, and the remaining diabetic ulcer patient had an 88% reduction in wound size after the 6-week study period. Continued PRFE treatment after the 6-week study period resulted in complete healing of both the venous stasis ulcer and the remaining diabetic ulcer. **CONCLUSION:** PRFE treatment delivered in the form of a wearable lightweight patch appears to offer promise in the treatment of recalcitrant chronic wounds.

#### **#30. Evaluation of a Highly Absorbent Foam Dressing**

*Kimberly LeBlanc BScN RN MN CETN(C) IIWCC, KDS Professional Consulting, Ottawa, Ontario*

Through the absorption of exudate, topical wound dressings protect the peri-wound skin from moisture damage and maintain the wounds' moisture balance. When the topical dressing is unable to contain the exudate, results may include: wound deterioration, peri-wound maceration, frequent dressing changes, altered patient comfort and increased nursing time. This poster looks at five institutionalized patients and explores the performance of a newly formulated highly absorptive foam on wounds with copious exudate. Wounds that

did not previously have their exudate well-contained were selected via chart review. The wounds of these five patients required daily foam dressing changes due to the volume of wound drainage, and it was felt that they would benefit from a more absorbent product. Outcome measures included an assessment of peri-wound skin (including maceration), presence of strike through, leakage and required frequency of dressing changes. All five patients demonstrated fewer dressing changes with less peri-wound maceration.

### **31. Light Compression Therapy in Leg Edema Management for the Long-term Care Elderly**

*Ye Feng, NP MN BScN, YCH/MSH, Scarborough, Ontario*

**INTRODUCTION:** Managing elderly patients with leg edema and leg ulceration due to venous insufficiency but unable to tolerate therapeutic high compression bandages presents a clinical challenge in the long-term care (LTC) setting, particularly when diuretics use is usually not effective in treating leg edema due to venous insufficiency in the geriatric population. **PURPOSE:** To evaluate the effectiveness of light compression therapy in managing leg edema in the LTC geriatric population. **METHOD:** A multi-centre study to investigate 29 patients ranging from 66 to 98 years old at 19 LTC facilities, who presented with unilateral or bilateral leg edema treated with an elasticated tubular bandage. Inclusive criteria included venous insufficiency, CHF, post DVT, lymphedema and cellulitis. The compression pressure used was 5–10 mm Hg. Patients at high risk of combined arterial insufficiency were started with less than 5 mm Hg pressure. The widest part of the calf was measured before initiation and at 1 to 6 weeks later. **RESULTS:** A decrease in calf size ranging from 2 cm to 10 cm within a period of 1 to 6 weeks resulted in decreased use or discontinuation of diuretics. No voiced complaints of pain or obvious complications were reported and the nursing staff appreciated the easy and simple technique used to apply and monitor the application. **CONCLUSION:** Light compression with an elasticated tubular bandage achieved significant success in managing leg edema for the LTC geriatric population. An increase in compliance, optimal outcomes and cost effectiveness, with a decrease in nursing time, were achieved.

### **32. Evaluation of Turn and Position Product to Reduce the Incidence of Pressure Ulcers in Postoperative Cardiovascular ICU Patients**

*Linda Flockhart BScN, University Health Network, Toronto, Ontario*

**BACKGROUND:** Despite efforts to reduce pressure ulcers in critical care patients, the prevalence of nosocomial pressure ulcers ranges from 8.8 to 10.4% (VanGilder et al., 2009). Immobility and moisture are two risk factors associated with an increased risk of skin breakdown. The turn and assist product (TAP) is a new device designed to offload pressure from bony prominences and control the microclimate to reduce the risk of moisture and pressure-related skin injury. **OBJECTIVE:** To evaluate the effectiveness of implementing a turn and position system on the incidence rate of sacral ulcers in the CVICU. **METHOD:** Specially trained wound care resource nurses in the CVICU perform weekly skin and chart audits on all patients in the 22-bed unit using the pressure ulcer staging guidelines developed by the National Pressure Ulcer Advisory Panel to identify all pressure ulcers attributable to their ICU stay. Incidence rates for sacral ulcers were compared for the 11 months prior to the implementation of the TAP product with the incidence rates of sacral ulcers during the 3 month trial. **RESULTS:** Pre-trial, the average number of ICU-related sacral ulcers among the 517 patients observed was 7.2 per month (mean 0.15), compared with 2.3 per month (mean 0.042) during the 3-month trial (n=165). This represents a significant sacral incidence reduction of 68%. **CONCLUSION:** There was a reduction in the incidence of sacral ulcers attributable to ICU stays during the implementation trial of a TAP. The results are encouraging and warrant further evaluation and research.

### **#33. Protect Our Patients' Skin (P.O.P.S.)**

*Heather Morrow RN, Headwaters Health Care Centre, Orangeville, Ontario*

At an 87-bed acute and complex continuing care facility, options were needed for the prevention of incontinence-associated dermatitis (IAD) that would enhance staff efficiency and improve patient care. **OBJECTIVE:** To provide best practice patient care by preventing skin breakdown in incontinent patients. **METHODOLOGY:** Pre-implementation skin assessments were conducted on incontinent patients over 3 separate days on medical, surgical and rehab floors. Of those identified with incontinence, a total of 24 patients with compromised skin integrity were found. In-servicing was provided for staff in the use of 3% dimethicone barrier cloths, chosen for their ease of use. After a six-month period using the 3% dimethicone-based barrier on incontinent patients, a repeat sampling was carried out with a result of only 5 exhibiting IAD. **RESULTS:** Hospital-wide implementation of 3% dimethicone barrier cloths resulted in a 79% decrease in IAD. The added benefit was the reduced development of pressure ulcers and the related time and expense associated with caring for this type of wound. Further to improved and more efficient patient care, gone is the need for creams and lotions. **CONCLUSION:** With the implementation of 3% dimethicone barrier cloths, we are able to protect our patients' skin from exposure to excessive moisture and reduce the risk of skin breakdown related to IAD.

### **#34. Interprofessional Team Approach to Wound Management in Long-term Care**

*Selina Hune PhD MScNP BScN RN, Southlake Regional Health, Willowdale, Ontario*

Optimal wound healing requires accurate assessment, infection management, moisture balance, removal of non-viable tissue, the use of proper wound care products and a pressure-reduction surface. An outreach nurse practitioner team worked with seven nursing homes conducted a study to determine effective and cost-efficient ways to select wound care products to achieve moisture balance in order to maximize wound healing outcome. **METHODS:** A multi-centre study with an information-oriented sampling of six residents who suffered from infected Stage III, IX, or unstageable wound(s) with moderate to high exudates. Self-adherent foam dressings and calcium alginate were compared for their efficiency. Residents were referred to a dietician for nutritional assessment and an occupational therapist for pressure-reduction surface consults. **RESULTS:** After a two-week use of the selected calcium alginate Ag to pack wounds and silicone self-adherent foam dressing used as outer dressing, wound exudate was controlled and necrotic tissue was reduced. All wounds showed significant improvement over four weeks, with an average wound size reduction of 20% and a noticeable reduction of necrotic tissue. Four ulcers were completely healed. No maceration of the surrounding skin was noted. Residents reported less pain on dressing changes. Nurses reported that the dressing was easy to apply. **CONCLUSION:** A team approach to wound products selection based upon the ability of products to control infection and moisture in wound healing or maintenance improved patient outcome. Calcium alginate Ag was effective in debridement and antimicrobial effect. The use of silicone self-adherent foam dressing is effective in moisture balance. A pressure-reduction surface helped to prevent ulcers from developing.

### **#35. Team Approach to Product Selection and Chronic Wound Management in Long-term Care**

*Selina Hune PhD MScNP BScN RN, Southlake Regional Health, Willowdale, Ontario*

**PROBLEM & OBJECTIVES:** The long-term care population is predominantly over 70 years of age, with multi-system illnesses, cognitive decline and mobility challenges, making wound healing a



challenge. A long-term care outreach nurse practitioners team worked with the nursing homes to conduct a study to determine a team approach to product selection in wound management. **METHODS:** A multi-centre study with an information-oriented sampling of 20 residents who suffered from infected chronic wound with necrotic wound bed. Medical grade active *Leptospermum* honey calcium alginate dressing (ALH) and foam dressing with adhesive were used to treat infected wounds when other treatment regimens had failed. **RESULTS:** After three weeks' treatments with medical grade honey dressing and covered with adhesive foam dressing, all wound beds were clear of necrotic tissue. After two to five months, the wounds had improved noticeably, i.e. reduced in size or completely healed. The most significant finding involved a 92-year-old resident who suffered from an infected chronic lower leg wound with protruding necrotic tendon and black necrotic tissues. After three months of ALH treatment, the wound size had decreased from 13.5 x 7 cm to 10 cm x 5 cm. Healthy tissues had grown over the entire tendon and amputation was no longer needed. **CONCLUSION:** A team decision is appropriate for the selection of wound management product use based upon the ability of products to control infection, moisture balance and degree of wound healing or maintenance. The wound care team has determined ALH as an effective first- or second-line therapy for debridement, antimicrobial effect and moisture balance in wound healing.

### #36. The Braden Scale: Are We Identifying Long-term Care Residents at Risk?

*Machelle Wilchesky BAH MA PhD, Donald Berman Maimonides Geriatric Centre, Montreal, Quebec*

Pressure ulcers (PU) are both a health concern and an indicator of the quality of care provided to residents of nursing home facilities. A few studies have evaluated the validity of the Braden Scale (BS) within the long-term care population, and have found it to be of only modest sensitivity and specificity, and some studies question its validity entirely. We took advantage of a longitudinal evaluation of a training and monitoring program for the reduction of PU to evaluate the sensitivity and specificity of the BS at various cut-off levels within our institution and determined that it was differentially valid when comparing mobile versus immobile residents. A total of 31 (8.5%) residents had a PU at baseline, and a further 53 developed a PU during the one-year study period which saw both prevalence and incidence falling from 9.02%–4.01% and 7.23%–2.63%, respectively. A BS cut-off score of 18 was found to provide the best measure of sensitivity (range: 33.3%–64.3%) and specificity (range: 57.4%–59.3%) when assessing the entire population at risk. Among residents with immobility deficits, sensitivity improved (range: 61%–86%) at the expense of markedly lower specificity (range: 14.2%–19.8%). Reducing the cut-off value to 16 improved BS performance within this population subset. For patients without immobility deficits, the BS exhibited poor validity. The BS Friction and Shear component was associated with a statistically significant protective odds ratio of 0.42 (95% CI: 0.30–0.68) and exclusive use of a Friction/Shear cut-off score of >2 improved validity (sensitivity: 59%; specificity: 68%) for the mobile resident population.

### #37. Sequential Use of Advanced Wound Care Products in Healing Dehisced Surgical Wounds

*Helen Arputhanathan RN BScN IIWCC, VON, Toronto, Ontario*

This poster will describe and provide pictures of the sequential use of advanced wound care products to facilitate healing by secondary intention of a dehisced surgical wound. The goal of treatment and the use of each product will be identified along with the product description and clinical outcomes at the different stages of healing. A post-appendectomy with peritoneal abscess presented as an open abdominal wound which developed into an abdominal hernia. Initial assessment upon discharge from hospital with measurement of

8 cm x 3.7 cm x 2 cm, undermining 2–3 cm around wound, copious exudate levels, rolled edges 6–12 o'clock and attached edges 12–6 o'clock, 100% friable granulation tissue. In the inflammatory phase, silver with alginate was selected to decrease the bioburden, and wound bed preparation. In the proliferative phase, collagen/silver/ORC dressing was used to provide protection of the wound from infection and granulation to fill depth of wound. For epithelialisation, a povidone-iodine nonadherent dressing was chosen. Secondary dressing was a hydropolymer dressing for exudate management until 90% epithelialisation occurred. For the remaining 10% epithelialisation, due to minimal exudate, the secondary dressing used was a nonadherent pad. Clinical outcome is successful wound healing over 6 months. The extended healing time was due to the abdominal hernia. This challenging case study summarizes the clinical experience of how sequential use of advanced wound care products during the appropriate phase of wound healing contributes to optimal wound outcomes.

### #38. Evaluation of a New Silicone Foam Dressing: Patient and Caregiver Satisfaction

*David Keast MSc MD FCFP, Aging, Rehabilitation, and Geriatric Care Research Centre, London, Ontario*

**INTRODUCTION:** Dressing selection should consider the form and function of the dressing. Functions such as ability to absorb or donate moisture, to promote autolytic debridement and to maintain bacterial balance should be considered. Dressing selection must also account for patient preference, caregiver preference and skills, as well as available resources. Evaluation of a new dressing should include patient and caregiver acceptability as well as performance parameters. **PURPOSE:** To assess patient acceptance and performance of a new silicone adhesive foam dressing. **METHODOLOGY:** Patients with moderately draining wounds of any etiology were treated. Treatment was provided by study nurses with twice weekly visits for 4 weeks. Outcome measures assessed at all visits included: wound surface area, Photographic Wound Assessment Tool (PWAT), peri-ulcer skin score (PWSS), Verbal Numeric Pain Score, patient satisfaction questionnaire, nursing satisfaction, and wound photographs. **RESULTS:** 7 patients with 10 wounds were enrolled. No patients were intolerant of this dressing. Within 4 weeks, mean wound surface area decreased from 8.2 cm<sup>2</sup> to 3.9 cm<sup>2</sup> with 3 wounds that closed. Mean pain score decreased from 4.0 to 2.7. Mean PWAT scores decreased from 10.7 to 5.3 and mean PWSS decreased from 1.3 to 0.6. **DISCUSSION:** All 10 wounds showed improvement over 4 weeks with average size reduction of 52%. Patients reported satisfaction with the silicone foam compared to the previously used dressing and found dressing changes were atraumatic. **CONCLUSION:** This silicone foam adhesive dressing performed well in all performance characteristics and was well-rated by both patients and nurses.

### #39. Retrospective Clinical Case Studies of Effectiveness of Inelastic Band

*Jason C. Liu BScOT(c) IIWCC MCIScWH Peace River Professional Orthotics Clinic, Edmonton, Alberta*

**PURPOSE:** To complete a cost comparison of elastic versus inelastic compression bandaging in the treatment of wounds and/or volume reduction of clients with edema or lymphedema. **METHODS:** Retrospective chart reviews were completed on twelve clients who received compression therapy and wound treatment for ulcers caused by venous insufficiency or lymphedema, or who received treatment for volume reduction of lymphedematous legs. All clients had measurements taken of the wound surface area or leg circumference at baseline and then monthly. Wounds were initially treated with standard wound care and elastic compression bandages. Clients with lymphedema initially were treated with elastic bandaging. The treatment for all clients changed to include inelastic bandages. A cost



comparison of treatments before and after the initiation of inelastic bandages was calculated. RESULTS: All wounds which failed to close with elastic compression system closed with inelastic compression system. The study also showed that the inelastic compression system is able to manage venous edema and lymphedema in less than 4 weeks. CONCLUSION: An inelastic compression system can lead to improved edema reduction and faster wound healing time, which results in a cost saving in adult clients. Faster healing time and edema reduction would also increase a client's quality of life and reduce the cost burden on the healthcare system. The benefits of this therapy need to be confirmed in further research involving controlled clinical trials with larger numbers of subjects.

#### #40. Evaluation of a New 3D Polymer Foam Dressing – A Barrier-free Foam

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BACKGROUND: Foam dressings are designed to absorb exudates. Although silicone technology has been proven to prevent skin stripping and promote pain-free removal, a recent study suggested that the silicone adhesive layer on the foam appears to be hydrophobic. This encouraged us to evaluate whether absorption capacity of the foam increases if there is no barrier silicone layer on it. Such foam was recently launched and it has the benefits of the silicone adhesive border combined with high absorption of a 3D polymer foam. OBJECTIVE: To compare the effectiveness of a new foam dressing with silicone adhesive border against other foam dressings currently available on the market. MATERIALS AND METHOD: A prospective case series was conducted on both inpatient and outpatient populations with different wound etiologies during a 6-week period. 12 patients were recruited and treated with available foam dressing per hospital or community formulary for at least two weeks prior to application of new foam. The performance of the dressings was evaluated based on changes in wound size, edges and peri-wound skin condition, ease of use and comfort from a clinician and patient perspective, and frequency of dressing changes. OUTCOMES: The most profound outcome was resolution of peri-wound maceration at the next dressing change for 100% of the population: 100% of the people reported equal or greater comfort. In 60% of cases, dressing changes were decreased from Q2 to Q3 or Q4 days after 1 week of treatment. To conclude, the new foam is comparable, if not superior, to existing foams.

#### #41. Le plâtre de contact total pour l'ulcère du pied diabétique

Melanie Fauteux, Inf.BSc. E.T., CSSSS Alphonse Desjardins, Laval, Québec

Étude de cas sur l'utilisation en clinique de plaies complexes d'un plâtre de contact total en trousse complète pour l'ulcère du pied diabétique. Le plâtre de contact total (PCT) est reconnu comme l'étalon or pour la libération de la mise en charge des ulcères de la face plantaire du pied diabétique (1), pourtant, moins de 2 % des spécialistes l'utilisent (2). But de l'étude : Démontrer que l'application d'un PCT en trousse complète peut être faite de façon sécuritaire et avec confiance par le personnel infirmier d'une clinique de plaies complexes achalandée et que l'utilisation de ce PCT est sécuritaire et rentable. Méthodologie : Le PCT a été appliqué sur un des membres inférieurs de deux sujets avec un ulcère de la face plantaire antérieure de stade Wagner 2. Ces patients avaient des ulcères de longue date traités par décharge amovible du pied. Le suivi de la plaie ainsi que la satisfaction du personnel infirmier de la clinique de plaies complexes ont été documentés. Une étude pharmacoeconomique a également été réalisée. Résultats : Le personnel infirmier de la clinique de plaies complexes a été en mesure d'installer six PCT pour ces deux patients jusqu'à guérison complète des ulcères. Le patient 1 a obtenu en 24 jours, au coût de 970 \$, la guérison d'un ulcère qui perdurait depuis 835 jours, et ce malgré l'utilisation de pansements standard et la libération de la mise en charge complète (MEC) par décharge amovible dont le coût totalisait 9228 \$. Le patient

2 a été guéri en 16 jours avec PCT (727 \$) d'un ulcère traité auparavant par des pansements standard et libération de MEC pendant 180 jours (3173 \$). Le personnel infirmier a été satisfait de la facilité d'application du PCT. Il n'y a eu aucune complication liée à l'application du PCT. Conclusions : L'application du PCT en trousse complète est efficace, rentable et sécuritaire. Sa facilité d'utilisation par le personnel infirmier d'une clinique de plaies complexes achalandée a été démontrée.

#### #42. In Vitro and Healthy Human Studies Assess Foam Adhesive Dressing Breathability and Fluid-handling Properties

David Holm PhD, 3M Health Care, St Paul, Minnesota

PURPOSE: To assess breathability and fluid handling properties of several marketed foam adhesive wound dressings under simulated high moisture conditions using in-vitro and in-vivo test models. METHODOLOGY: Two in-vitro models assessed breathability: 1) Moisture vapor transmission rates (MVTR) in contact with liquid according to EN 13726-2:20021; and 2) continuous infusion of test fluid under the dressing at a rate of 0.75 mL/hr (24 hours per day) for 7 days (126 mL total). The in-vivo model assessed wear time with 12–24 healthy human subjects in 6 separate studies. Dressings A-G were worn on the back and manually injected with 1.0 mL of artificial wound fluid every hour during waking hours (12 x per day) over 7 days (up to 87 mL total) or until the dressing failed (delamination, fall off, leakage, lift to pad) and were compared using a Cox regression model. RESULTS: Dressing A had a liquid contact MVTR of 12,800 +/- 370 g/m<sup>2</sup>/24 hour. By comparison, the other marketed dressings MVTR values ranged from 800 +/- 400 to 11,400 +/- 700 g/m<sup>2</sup>/24 hours. For the continuous fluid infusion model, Dressing A evaporated approximately 85% of the test fluid over the 7-day period. By comparison, the evaporation amount for the other marketed dressings ranged from approximately 21% to 85%. For the in-vivo model, the median fluid volume administered until dressing failure was significantly higher for Dressing A (>87 mL) compared to the other marketed dressings (13–44.5 mL). CONCLUSION: Dressing A has high breathability and fluid handling capacity under simulated high moisture conditions when tested using both in-vitro and in-vivo methods in comparison to other marketed foam adhesive dressings.

#### #43. Case Series: Use of a Foam Adhesive Dressing on Chronic Wounds

Marie Brown-Etris RN CWOCN, Etris Associates, Philadelphia, Pennsylvania

INTRODUCTION: Foam wound dressings are designed to manage wound fluid while maintaining a moist wound environment. This multi-centre study focused on patients with a variety of wounds being treated with an adhesive foam dressing that is designed handle low to high exuding wounds. MATERIALS AND METHODS: The wounds selected were low to high exuding, partial and full thickness dermal wounds that were currently being treated with a foam dressing and were expected to use the study foam dressing for four weeks. Weekly dressing changes were recommended if possible, but more frequent changes were not restricted. Up to 40 patients are expected to be enrolled when the study is complete. RESULTS: At the interim analysis, there were ten women and ten men who had completed the study from three different facilities (home care, long-term care and a wound clinic). Ages ranged from 19 to 91 years. Eleven wounds were pressure ulcers, 4 were venous ulcers, 4 were surgical and 1 was traumatic. Twelve (60%) wounds had moderate to high exudate levels, and seven (35%) had mild exudate levels. There were 93 dressing changes occurring after 1 to 9 days of wear (27% had 2 or 3 days of wear and 57% had at least 5 days of wear) with 54% of the time, the clinician who removed the dressings stated the dressing could have remained on longer. Ninety-two percent of dressing changes were due to routine procedures, 4% were due to soiled dressing or leakage and 3% had

missing reasons for dressing change. For all 20 patients, the clinicians stated that the study dressing had met their wear time expectations. IMPLICATIONS FOR PRACTICE: Meeting dressing wear time expectations may have a role in management of overall treatment costs.

#### **#44. Comparing the Ability of Various Dressings to Reduce Protease Activity**

*Breda Cullen PhD, Systagenix, Gargrave, North Yorkshire, United Kingdom*

This study compared collagen/oxidised regenerated cellulose (ORC)/silver to other dressings to evaluate their capability to reduce inflammatory proteases, *in vitro*. INTRODUCTION: Chronic wounds generate an excessive amount of inflammatory proteases causing it to be detained in an inflammatory cycle. These high levels of inflammatory proteases have a detrimental impact on the wound healing process; consequently many different treatment options are used to try and rebalance the wound environment. METHOD: Biopsies of each dressing were incubated at 37C in a protease solution. The activity of the protease solution was then measured using fluorometric assays. Each dressing was tested for the ability to reduce neutrophil-derived elastase and matrix metallo proteases (MMP) activity. RESULTS: The ability to reduce the level of inflammatory proteases was found to differ between the dressings tested. The results show that collagen/ORC/silver was more effective at reducing the level of neutrophil-derived elastase and MMP activity over collagen only dressings, dressings impregnated with NOSF and other silver containing dressings. CONCLUSION: This study demonstrates the effectiveness of different dressings to reduce protease activity using an *in vitro* model. Collagen/ORC/silver has the ability to reduce protease activity more effectively than any of the other dressings that were tested. This unique combination of collagen/ORC/silver provides benefits that cannot be achieved by either collagen or silver alone. Collagen/ORC/silver is effective at reducing inflammatory protease activity, suggesting that this therapy is able to help rebalance the environment of the chronic wound to promote healing.

#### **#45. Biochemical Differences in Healing and Non-healing Diabetic Foot Ulcers**

*Breda Cullen PhD, Systagenix, Gargrave, North Yorkshire, United Kingdom*

The aim of this clinical trial was to establish whether there are any differences in the protease levels between healing and non-healing diabetic foot ulcers. Patients were randomised to receive either collagen/oxidised regenerated cellulose (ORC)/silver (24 patients) or control treatment (15 patients). Wounds were classed as healing if there was at least 50% reduction in wound area from baseline to Week 4; all other wounds were classed as non-healing. Elastase activity, matrix metallo protease-1 (MMP-1) and matrix metallo protease-9 (MMP-9) levels were measured in wound fluid samples which were taken at baseline and after 4 weeks of treatment. There was a significantly higher proportion of healing wounds in the collagen/ORC/silver group compared to the control group ( $P=0.035$ ). The summation of the proteases MMP-1, MMP-9 and elastase provided the most significant difference between the healing and non-healing groups. The sum of elastase activity + MMP-1 + MMP-9 was significantly higher in non-healing wounds compared to the healing wounds at both baseline and at week 4. This level of distinction between the two groups was not seen between any individual proteases. These results suggest that a combination of proteases may provide a more accurate predictor of wound healing than looking at any individual protease. This study has confirmed that high levels of inflammatory proteases are associated with non-healing wounds. Previous studies have shown that collagen/ORC/silver is able to reduce protease activity; this may explain why there is a higher proportion, of healing wounds in the collagen/ORC/silver group compared to the control group.

#### **#46. A Randomized Controlled Trial to Study Collagen/ORC/Silver Treatment of Diabetic Foot Ulcers**

*Finn Gottrup MD DMSci, Copenhagen Wound Healing Center, Denmark, Copenhagen*

The aim of this randomised controlled trial was to compare the clinical outcomes of collagen/oxidised regenerated cellulose (ORC)/silver with control therapy in the treatment of diabetic foot ulcers. 24 patients were randomised to collagen/ORC/silver and 15 to control (standard treatment protocol). Patients received the allocated treatment for up to 14 weeks and wound area was measured weekly. The groups were compared using 3 main criteria; number of wounds to show at least 50% reduction in wound area by Week 4 (known prognostic indicator of wound healing), number of wounds to heal within the study and adverse events that were related to the wound. The healing data show that in the collagen/ORC/silver group significantly more patients reached at least 50% reduction in wound area by Week 4 compared to the control group (79% vs. 43%,  $p=0.035$ ). In the collagen/ORC/silver group 52% of wounds healed in the 14 week study period compared to 31% in the control group. In the control group 31% of patients had to withdraw from the study due to wound infection. In contrast to this, there were no withdrawals due to wound infection in the collagen/ORC/silver group; this difference was significant ( $P=0.012$ ). In conclusion, treatment of diabetic foot ulcers with collagen/ORC/silver led to increased rates of healing and decreased incidence of wound infection. Collagen/ORC/silver has a combined mode of action and this study has shown that the multi-factorial approach to wound healing leads to improved clinical outcomes by reducing the risk of infection and promoting wound healing.

#### **#47. Effect of Collagen/ORC/Silver Wound Size and Protease Activity**

*Breda Cullen PhD, Systagenix, Gargrave, North Yorkshire, United Kingdom*

AIM: To determine the effect of collagen/oxidised regenerated cellulose (ORC)/silver therapy on wound healing and protease activity. During the 14 weeks treatment, the wound was measured weekly and wound fluid samples were taken for analysis of matrix metalloprotease-9 (MMP-9) and elastase activity. RESULTS: A female presented with an ulcer of 4 years duration. Baseline wound area was 1.3cm<sup>2</sup>. After 14 weeks treatment the wound size decreased to 0.3cm<sup>2</sup>. This was coupled with a 99% decrease in MMP-9 and elastase activity. A male presented with an ulcer of 7 months duration. Baseline wound area was 2.5cm<sup>2</sup>. By Week 12, MMP-9 and elastase activity had decreased by 98% and 51%, respectively. The wound healed by Week 13. A male presented with an ulcer of 3 years duration, wound area 1.4cm<sup>2</sup>. After 1 week of treatment there was a reduction in MMP-9 and elastase activity (96% and 100% respectively). This reduction in protease activity was sustained for 14 weeks, at which time the wound had decreased in size and was too small to measure. A male presented with an ulcer of 4 months duration. After 2 weeks of treatment, there was an 84% decrease in MMP-9 activity and a 33% reduction in elastase activity. The wound healed by Week 4. CONCLUSION: wounds treated with collagen/ORC/silver show a reduction in inflammatory protease activity which is coupled with a decrease in wound area. This study demonstrates that collagen/ORC/silver therapy positively impacts proteolytic imbalances associated with the chronic wound environment and promotes wound healing.

#### **#48. A Clinical Study Examining the Effect of Collagen/ORC/Silver**

*Breda Cullen PhD, Systagenix, Gargrave, North Yorkshire, United Kingdom*

Wounds subjected to repeated trauma, infection, hypoxia or malnutrition are at risk of chronic inflammation and the expression of abnormally high levels of proteases. This can result in the breakdown of components of the ECM and ultimately lead to impaired wound

healing. In this study, we investigate the effect of collagen/ORC/silver therapy on chronic venous leg ulcers. In order to determine the effect of the therapy, levels of proteases were examined in wound fluid prior to, and during, treatment. This was compared to clinical outcomes. Wounds which achieved a greater than 50% reduction in wound area by week 4, as determined by the Margolis Index, were designated a treatment responder. Our results indicate that by week 4, more wounds had responded to collagen/ORC/silver than standard therapy alone. This trend was predictive of total healing, which was significantly improved in the collagen/ORC/silver group by week 12, as was the rate of wound closure. Reduced levels of proteases were also apparent in wounds which responded to therapy. This clinical evidence validates our previous in vitro and ex vivo studies, showing that collagen/ORC/silver can rebalance the wound environment, by reducing proteolytic activity thereby facilitating healing in chronic ulcers. Moreover, it also suggests that therapies which are designed to deal with the underlying biochemistry, may be beneficial as first line treatments of chronic wounds.

#### #49. Evaluation of a Nonadhering Silicone Wound Contact Layer

*Sally Stephens BSc, Systagenix, Gargrave, North Yorkshire, United Kingdom*

**AIM:** Primary wound contact layers are designed to provide low trauma removal for use in combination with secondary therapies such as under compression, beneath absorbent secondary dressings and with negative pressure therapy. It is therefore essential that a primary wound contact layer is non-adherent whilst allowing the free passage of fluid into a secondary dressing. The aim of this study was to assess a new non-adhering silicone wound contact layer under simulated wound conditions. **METHOD:** The performance of a new non-adhering silicone wound contact layer was evaluated using in-vitro and in-vivo methods to assess the following: Adherence to the wound bed and the peri-wound skin; reduction of adherence of the secondary dressing to the wound; assessment of trauma to the wound when compared to commercially available wound contact layer dressings; the ability of fluid to pass unimpeded to the secondary dressing; and the ability to remain in place unassisted during application and under simulated use. **RESULTS & CONCLUSIONS:** The new non-adhering silicone wound contact layer demonstrated low adherent characteristics in both in-vitro and in-vivo. The soft silicone ensured the dressing adhered to the peri-wound skin unassisted for easy application and remained in place under high and low exudative conditions whilst allowing for atraumatic removal. Furthermore, the pore size and the open area of the dressing were shown to be optimal to ensure free passage of fluid into the secondary dressing and also prevent adherence of the secondary dressing.

#### #50. Evaluating the Design Characteristics of Hydropolymer Foam Dressings

*Breda Cullen PhD, Systagenix, Gargrave, North Yorkshire, United Kingdom*

**INTRODUCTION:** Wounds often vary in terms of area, cavity size, exudate levels and amount of blood present, and no one dressing is suitable for all wound types. To achieve optimal moist wound healing and help avoid peri-wound maceration, a family of hydropolymer dressings has been developed to treat differing wound types. **AIM:** To evaluate the performance characteristics of different types of dressings within the hydropolymer dressing family. **METHODS:** Dressings used for wounds of varying exudate levels were tested for total fluid handling using standard methodologies. Other features – such as wear time, strike through and fluid retention – were examined using in vitro model systems. Adherence was assessed using an in vitro fibrin clot model, for dressings indicated for use on low exuding or bleeding wounds. Tensile strength was used as an outcome measure for cavity wound dressings where one-piece removal is important.

**RESULTS:** The dressings within the hydropolymer family have been optimised to deal with the unique properties of different wound types, including high to low exudate levels and awkward wound sites. In addition, we have cutable dressings and non-adherent options that can be used on bleeding wounds and packing dressings which have the tensile strength and absorbency necessary for use in cavity wounds. Dressings available within the hydropolymer family are usable under compression. **CONCLUSIONS:** This study demonstrates that instead of providing one dressing format across a number of wounds, we offer a family of dressings which have been optimised to deal with the unique properties of different wound types.

#### #51. The Relationship Between the Amount of Electrical Stimulation Therapy and Wound Size Reduction: A Systematic Review

*Jason C. Liu BScOT(c) IIWCC MCIScWH, Peace River Professional Orthotics Clinic, Edmonton, Alberta*

**OBJECTIVES:** To determine if a relationship exists between the amount of electrical stimulation therapy (EST) and the rate of wound size reduction. **DATA SOURCES:** Electronic databases and bibliography searches were used to find related research studies. **STUDY SELECTION:** Articles were included according to predetermined inclusion/exclusion criteria and selected based on consensus by at least two independent reviewers. Included studies involved adult human subjects with chronic wounds treated with EST. Excluded studies: abstracts, review articles, non-English, not available, not possible to determine total EST treatment time or to calculate percentage area reduction (PAR) at 4 weeks. **DATA EXTRACTION:** Mean  $\pm$  standard deviations (SD) of the total treatment time and PAR at 4 weeks were calculated. **DATA SYNTHESIS:** Of 167 articles, 12 with 143 subjects met inclusion criteria. Five studies involved pressure ulcers only, 3 venous leg ulcers and 4 ischemic ulcers. Mean  $\pm$  SD for PAR at 4 weeks for pressure ulcers was  $42\% \pm 18\%$ ,  $35\% \pm 13\%$  for venous,  $18\% \pm 33\%$  for ischemic ulcers, and  $34\% \pm 20\%$  for all chronic wounds. With a mean EST treatment time of 5.5 hours (hrs) per week a PAR of  $35\% \pm 22\%$  is observed at 4 weeks in chronic wounds. According to our exclusion criterion, there is a lack of data regarding diabetic ulcers. **CONCLUSION:** The average PAR in chronic wounds treated with EST at 4 weeks was 34%. Pressure ulcers demonstrated a faster healing rate than venous and ischemic ulcers.

#### #52. Exercise as a Treatment for Venous Leg Ulceration: An Update

*Deirdre O'Sullivan-Drombolis BScPt, MCISc Wound Healing, University of Western Ontario, Fort Frances, Ontario*

Venous leg ulcers (VLU) are the most severe outcome of chronic venous insufficiency (CVI). Though the exact pathogenesis is unknown, sustained ambulatory venous pressure is an integral component of the pathway from venous stasis to ulceration. This review seeks to investigate the literature that has been published linking venous ulceration and exercise as a treatment of both stasis and ulceration as well as how to encourage exercise in this patient population. Attributing venous hypertension to one or two causative factors can lead to ineffective treatment of patients with ulceration. Failure of the calf muscle pump can be correlated to decreased ankle range of motion, decreased muscle strength, neuropathy, decreased activity, altered gait and balance. Physiotherapy has been shown to be effective in treating these impairments and could potentially be very beneficial in aiding in the treatment of VLU. The concept of self-management was an important theme in patient adherence to exercise programs. Clear-cut information about the chronicity of VLU, individualized and structured treatment programs, and knowledge of and strategies to work with patients with the wide range of perceptions of physical activity improved patient adherence. Physiotherapists have expertise in these areas. There has been little research done to show direct healing of VLU resulting from exercise programs. Future studies



need to incorporate all aspects of the calf muscle pump in order to fully investigate the usefulness of physiotherapy in treating VLU.

### **#53. Preventing Pressure Ulcers in Long-Term Care: Cost-Effectiveness Analysis**

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**BACKGROUND:** Pressure ulcers are common in many care settings, with adverse health outcomes and high treatment costs. We evaluated the cost-effectiveness of evidence-based strategies to improve current prevention practice in long-term care (LTC) facilities. **METHODS:** We used a validated Markov model to compare current prevention practice with four quality improvement strategies: 1) pressure-redistribution mattresses for all residents, 2) oral nutritional supplements for high-risk residents with recent weight loss, 3) skin emollients for high-risk residents with dry skin, and 4) foam cleansing for high-risk residents requiring incontinence care. Primary outcomes included lifetime risk of stage 2-4 pressure ulcers, quality adjusted life years (QALYs) and lifetime costs, calculated according to a single healthcare payer's perspective and expressed in 2009 Canadian dollars (CND\$1=US\$0.84). **RESULTS:** Strategies cost on average \$11.66 per resident per week. They reduced lifetime risk; the associated number-needed-to-treat was 45 (strategy-1), 63 (strategy-4), 158 (strategy-3), and 333 (strategy-2). Strategy-1 and -4 minimally improved QALYs and reduced the mean lifetime cost by \$115 and \$179 per resident, respectively. The cost per QALY gained was approximately \$78,000 for strategy-3 and \$7.8 million for strategy-2. If decision makers are willing to pay up to \$50,000 for one QALY gained, the probability that improving prevention is cost-effective is 94% (strategy-4), 82% (strategy-1), 43% (strategy-3), and 1% (strategy-2). **CONCLUSIONS:** The clinical and economic evidence supports pressure-redistribution mattresses for all LTC residents. Improving prevention with perineal foam cleansers and dry skin emollients appears to be cost effective, but firm conclusions are limited by the available clinical evidence.

### **#54. Intraoperative Prevention of Pressure Ulcers in Surgical Patients**

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**BACKGROUND:** Patients who undergo prolonged surgical procedures are at risk of developing pressure ulcers. Recent systematic reviews suggest that pressure redistribution overlays on operating tables significantly decrease the associated risk. Little is known about the cost effectiveness of using these overlays in a prevention program for surgical patients. **METHODS:** Using a Markov cohort model, we evaluated the cost effectiveness of an intraoperative prevention strategy with operating table overlays made of dry, viscoelastic polymer from the perspective of a healthcare payer over a 1-year period. We simulated patients undergoing scheduled surgical procedures lasting

≥90 min in the supine or lithotomy position. **RESULTS:** Compared with the current practice of using standard mattresses on operating tables, the intraoperative prevention strategy decreased the estimated intraoperative incidence of pressure ulcers by 0.51%, corresponding to a number-needed-to-treat of 196 patients. The average cost of using the operating table overlay was \$1.66 per patient. Compared with current practice, this intraoperative prevention strategy would increase slightly the quality-adjusted life days of patients and by decreasing the incidence of pressure ulcers, this strategy would decrease both hospital and home care costs for treating fewer pressure ulcers originated intraoperatively. The cost savings was \$46 per patient, which ranged from \$13 to \$116 by different surgical populations. Intraoperative prevention was 99% likely to be more cost effective than the current practice. **CONCLUSION:** In patients who undergo scheduled surgical procedures lasting ≥90 min, this intraoperative prevention strategy could improve patients' health and save hospital costs. The clinical and economic evidence support the implementation of this prevention strategy in settings where it has yet to become current practice.

### **#55. Early Prevention of Pressure Ulcers among Elderly Patients Admitted Through Emergency Departments**

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**BACKGROUND:** Every year, approximately 6.2 million hospital admissions through emergency departments (ED) involve elderly patients who are at risk of developing pressure ulcers. We evaluated the cost-effectiveness of pressure-redistribution foam mattresses on ED stretchers and beds for early prevention of pressure ulcers in elderly admitted ED patients. **METHODS:** Using a Markov model, we evaluated the incremental effectiveness (quality-adjusted life-days) and incremental cost (hospital and home care costs) between early prevention and current practice (with standard hospital mattresses) from a healthcare payer perspective during a 1-year time horizon. **RESULTS:** The projected incidence of ED-acquired pressure ulcers was 1.90% with current practice and 1.48% with early prevention, corresponding to a number needed to treat of 238 patients. The average upgrading cost from standard to pressure-redistribution mattresses was \$0.30 per patient. Compared with current practice, early prevention was more effective, with 0.0015 quality-adjusted life-days gained, and less costly, with a mean cost saving of \$32 per patient. If decision makers are willing to pay \$50,000 per quality-adjusted life-year gained, early prevention was cost-effective even for short ED stay (i.e. 1 hour), low hospital-acquired pressure ulcer risk (1% prevalence), and high unit price of pressure-redistribution mattresses (\$3,775). Taking input uncertainty into account, early prevention was 81% likely to be cost-effective. Expected value-of-information estimates supported additional randomized controlled trials of pressure-redistribution mattresses to eliminate the remaining decision uncertainty. **CONCLUSION:** The economic evidence supports early prevention with pressure-redistribution foam mattresses in the ED. Early prevention is likely to improve health for elderly patients and save hospital costs.



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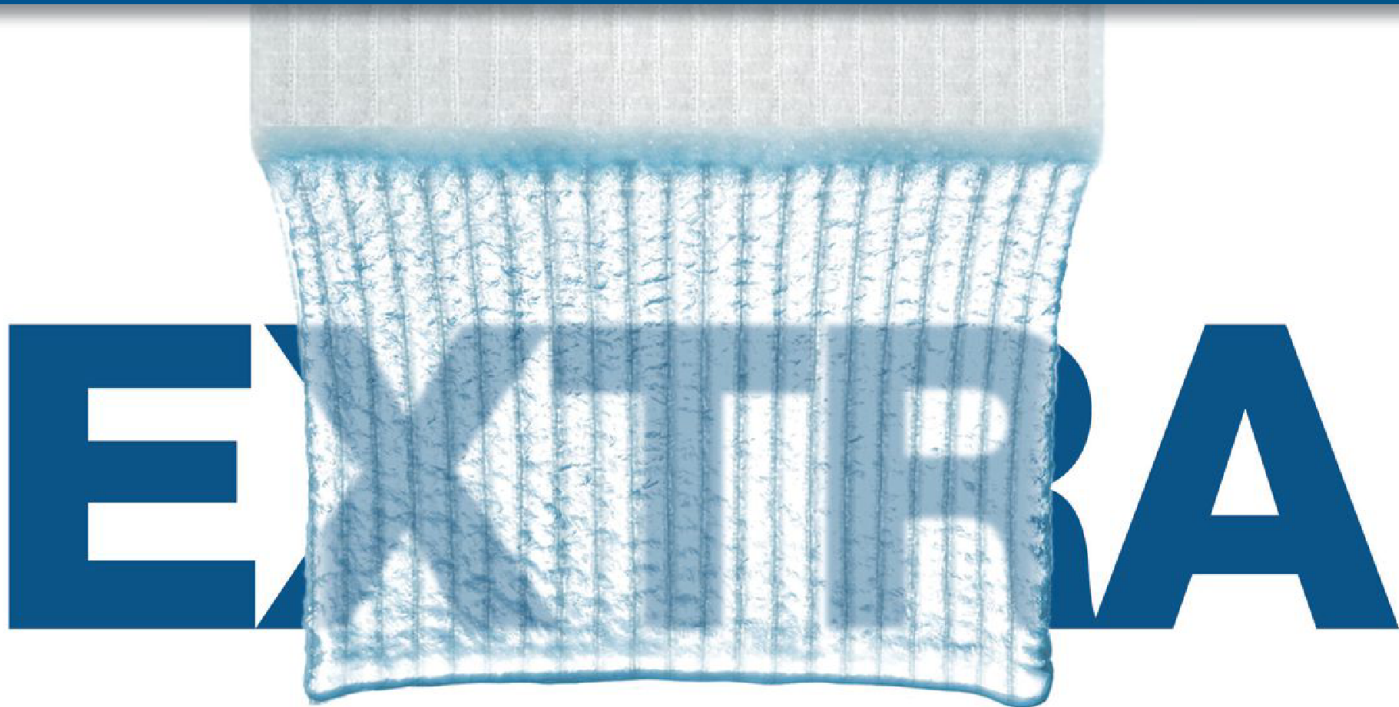
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