

# Managing the gap to promote healing in chronic wounds — an international consensus

### Authors:

David H Keast, Kimberly Bain, Christoffer Hoffmann, Terry Swanson, Caroline Dowsett, Jose L Lázaro-Martínez, Tonny Karlsmark, Karl-Christian Münter, Marcelo Ruettimann Liberato de Moura, Mary R Brennan, Hubert Vuagnat, Alessandro Greco, Wen Bing and Mark Bain

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The authors warrant that this manuscript is their original work, has not been published before and is not being considered for publication by another publisher.

### Ethics Approval:

This research did not require ethical approval. It did not include patients, or patient data. Only the opinions of healthcare providers were gathered, and that information was only gathered directly from the providers, who consented to the process and the information collected.

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Non-healing wounds negatively impact healthcare systems and patients' quality of life (Sen et al, 2009). Eighty-five wound specialists developed an international consensus on how to assess and treat chronic wounds to decrease the burden on both patients and healthcare systems. Consensus was reached on the importance of effectively managing the gap between the wound bed and the wound dressing, to manage exudate, create an optimal healing environment and decrease wound healing time.

Chronic wounds present a substantial economic burden to healthcare systems worldwide and significantly reduce the quality of life for those affected; often leading to serious health complications, amputation, and death (Posnett and Franks, 2008; Guest et al, 2015; Jabrunk et al, 2017). An international group of wound care specialists, supported by a professional facilitator, undertook a modified Delphi consensus building process in 2019 with the goal of developing strategies to move moving towards fewer days with chronic wounds.

The purpose of the project was to reach consensus on how to assess and treat chronic wounds, with the ultimate goals of increasing patients' quality of life and decreasing the economic burden on international health systems. The focus of the consensus was on how to manage the gap between the wound bed and the wound dressing, while decreasing the evidence gap and the gap between evidence-based best practices and clinical practice in this important area of chronic wound care. Eight-five wound care specialists from 19 countries took part in the consensus process that spanned 4 months, ending in November 2019. The process included both traditional Delphi surveys, as well as virtual and face-to-face facilitated dialogues. The result was a consensus on best practices in chronic wound assessment and management to improve chronic wound care practices worldwide and help realise the goal of resulting in fewer days with chronic wounds.

### Methodology

Consensus building is the process of helping groups reach a common understanding on an issue or solution (Innes, 2004). It is the process of helping people contemplate together using critical thinking skills to make decisions that build on the collective intelligence of the group. The concept of consensus building is based on the belief that when people think together, they can make better decisions (Bain and Hansen, 2020). A Modified Delphi Process was utilised to reach consensus on how to manage the gap between the wound bed and the dressing. The Modified Delphi combines the rigor and validation of the traditional scientific Delphi method with evidenced-based collaboration processes (Bain and Hansen, 2020). The process included elements of Delphi survey methodology, NGT-R (Rand Nominal Group Technique) and process facilitation (Dalkey and Helmer, 1963; Murphy et al, 1998; Schuman, 2001; Grol et al, 2005; Stone and Jones, 2017).

This consensus process was informed by a systematic review of the literature about how to manage the gap between the wound bed and the wound dressing. The key findings from the review were presented and discussed at the face-to-face interactive dialogue session. The key findings from the literature were:

- A gap between the wound bed and the wound dressing, or dead space, should be avoided as it negatively influences wound healing (Keast et al, 2014; Braunwarth et al,

**David H Keast** is Associate Scientist, Lawson Health Research Institute, Canada; **Kimberly Bain** is Senior Partner-Consensus Building, BainGroup Consulting, Canada; **Christoffer Hoffmann** is Senior Manager, Coloplast A/S, Denmark; **Terry Swanson** is NP Wound Management, Warrnambool, Vic. Australia; **Caroline Dowsett** is Nurse Specialist Tissue Viability, East London NHS Foundation Trust London, UK; **Jose L Lázaro-Martínez** is Head, Diabetic Foot Unit, Universidad Complutense de Madrid, Spain; **Tonny Karlsmark** is Consultant MD, Department of Dermato-Venereology and Copenhagen Wound Healing Center, Bispebjerg University Hospital, Copenhagen, Denmark; **Karl-Christian Münter** is Dr. Med, Gemeinschaftspraxis Bramfeld, Hamburg, Germany; **Marcelo Ruettimann Liberato de Moura** is Vascular Surgery Specialist, Ruettiman Institute President, D'Or Institute for Research & Education (IDOR), São Rafael SA Hospital, Salvador, Bahia, Brazil; **Mary R Brennan** is Assistant Director of Wound & Ostomy Care, North Shore University Hospital, Manhasset, New York, USA; **Hubert Vuagnat** is Head Physician, Wound Care Center Geneva University Hospital, Switzerland; **Alessandro Greco** is Consultant Dermatologist, Outpatient Wound Care Centre, Local Health Care System Frosinone, Italy; **Wen Bing** is Director, Peking University First Hospital, Beijing, China; **Mark Bain** is Senior Partner, Data Strategy, BainGroup Consulting, Canada

- 2017; Dowsett et al, 2018; Dowsett et al, 2019)
- Increased bacterial invasion and impaired healing result from unfilled dead-space (referred to as the gap throughout this article) between the wound bed and the wound dressing (Ousey and Cook, 2012; Swanson et al, 2014; Dowsett et al, 2019)
  - Effectively managing the gap helps decrease the risk of infection (Benbow and Stevens, 2010; Swanson et al, 2015; International Wound Infection Institute [IWII], 2016)
  - Effective exudate management allows moist wound healing and prevents maceration of the wound bed and periwound skin (World Union of Wound Healing Societies [WUWHS], 2007; 2019; Adderley, 2010; Romanelli et al, 2010; Haryanto et al, 2017)
  - Appropriate dressing selection can help manage exudate and avoid exudate pooling (Adderley, 2010; Romanelli et al, 2010; Cartier et al, 2014; Keast et al, 2014)
  - The literature identifies what the dressing should do for effective exudate management but does not provide guidance on how to manage the gap between the wound bed and the dressing.

Two surveys were sent out to 87 wound care specialists across 19 countries in two languages — English and Chinese. The surveys were conducted online in 2019, the first in September and the second in October. The first survey was responded to by 71 specialists, a response rate of 82%. The survey focused on current practices in chronic wound care and best practices in assessing and treating chronic wounds. Respondents spent between 8–12 minutes completing the survey, with an overall completion rate of 96%, as not all survey questions were mandatory. The second survey received 61 responses, a response rate of 71% and focused on more specific topics and led to a narrowing of consensus.

In November 2019, 84 of the survey participants met in Denmark to review the research evidence and the results of the Delphi process and then engaged in an interactive facilitated dialogue. The goal of the meeting was to reach consensus on how healthcare providers can effectively manage the gap between the wound bed and the wound dressing to create an optimal healing environment for chronic wounds.

The face-to-face interactive dialogue was designed as a round-robin iterative process to gather the views and ideas of all participants and to allow time for participants to build their collective intelligence and have in-depth

discussions with international colleagues about their ideas. Organizers divided participants into groups of 8–9, with each group having members from around the globe and from different professions (nurses, surgeons, dermatologists, physicians, podiatrists, pharmacists and healthcare educators). Groups cycled through a series of discussion stations, in an iterative process, where they could see the contributions of previous groups and add their perspectives on each topic.

Eight stations were situated along what was called the 'Road to Consensus', which circled the perimeter of the meeting facility. Each station numbered 1–8, had a topic, a summary of the relevant research and a series of open-ended questions to guide group discussions. Groups were self facilitated and were encouraged to discuss their ideas on each of the topics, guided by the open-ended questions, and to document their collective and individual views on 21 cm x 15 cm post-it notes. The 'sticky notes' were attached to the dialogue wall for others to see and consider/comment on. For the first two rounds of dialogue, groups were given 15 minutes to discuss and document their collective wisdom. As the rounds continued, time was reduced. In the last two rounds, groups were given 8 minutes to read all the comments, discuss their own views and add anything not already identified on the wall.

After all groups had cycled through each of the eight stations, participants were given 10 minutes to 'walk the road to consensus' and review the documentation at each station. Participants were encouraged to add checkmarks to comments they liked and to add more comments if they so desired. At the end of the process, every comment at each station was transcribed and thematically grouped by the facilitators. The themes were generated inductively (Boyatis, 1998) from the transcribed comments and utilising the trustworthiness process as defined by Lincoln and Guba (1985) and refined by Nowell et al (2017). The results of the exercise were presented back to participants who validated the results over a 30-day review period following the event.

## Participants

Participants were qualified wound care specialists, with a high level of experience and who treat a high volume of wound care patients. Forty-five (45%) of participants had more than 20 years' experience and 86% had more than 10 years' experience. Eighteen per cent of participants reported that their practice

is 100% wound care. The average amount of time providing wound care, across all participants, in the working week was 65%. Participants included: doctors (29%), nurse specialists (61%) and other healthcare professionals (10%). Sixty-nine per cent had specialised wound care credentials, training, or academic qualifications, while 13% received on-the-job wound care training [Figure 1].

## Survey results

Nearly all, (96%) of participants agreed that wound care treatment should be primarily focused on providing an optimal healing environment. Ninety per cent agreed that the most important factor in promoting an optimal healing environment for wounds is managing the space between the wound bed and the dressing, herein referred to as 'the gap'.

Ninety-eight per cent of participants agreed that managing the gap is important or very important for effective wound healing. Participants further agreed that effective gap management must promote moisture balance in the wound (98% agree) and exudate management (96% agree) [Figure 2].

When asked why managing the gap was important for effective treatment of chronic wounds, participants identified the following (in order of prevalence):

- Removing pools of exudate from the wound bed
- Decreasing the risk of infection; avoiding exudate from leaking onto the wound edge and periwound skin
- Decreasing the risk of the development of biofilm in the wound
- Providing a moist healing environment

[Figure 3].

Eighty-five per cent of participants identified exudate management as the most important critical success factor for managing the gap in chronic wounds [Figure 4].

Eighty-two per cent of participants indicated that a full wound assessment should be completed at least once per week. A total of 99% of participants agreed that assessing the wound at each dressing change provides an opportunity to diagnose and treat a wound infection in the early stages and decreases the potential of limb- or life-threatening infections [Figure 5].

Participants agreed that healthcare professionals should focus on the following when assessing the gap [Figure 6]:

- the wound bed (depth, undermining, tunneling and fistulas, underlying wound bed structure and topography, tissue quality/

- granulation, and necrosis)
- Exudate (quality, colour and odour)
- Age of the wound
- Infection/bioburden colonisation
- Wound edge and periwound skin
- Aetiology.

When asked what should be included in a checklist for assessing chronic wounds, participants reached consensus on the following three assessment categories:

- Wound progression and wound characteristics
- Patient history and health status
- Signs of infection.

Eighty-three per cent of participants agreed that the best dressing choice for wounds down to 2 cm is a dressing that conforms to the wound bed. It was determined early in the process to focus exclusively on chronic wounds down to 2cms deep. The expert panel felt that dealing with all types of wounds would create too many variables and so focused on these wounds. When asked how managing the gap can help determine the most appropriate dressing choice, participants agreed that exudate management and moisture balance (44%), dressing conformability with the wound bed (28%) and patient comfort and ability to perform self care (28%) were the most important factors to consider in dressing choice. Participants also reported that the most important features of a dressing, to promote wound healing, are antimicrobial properties, vertical absorption of exudate, patient comfort, and conformability to the wound bed [Table 1].

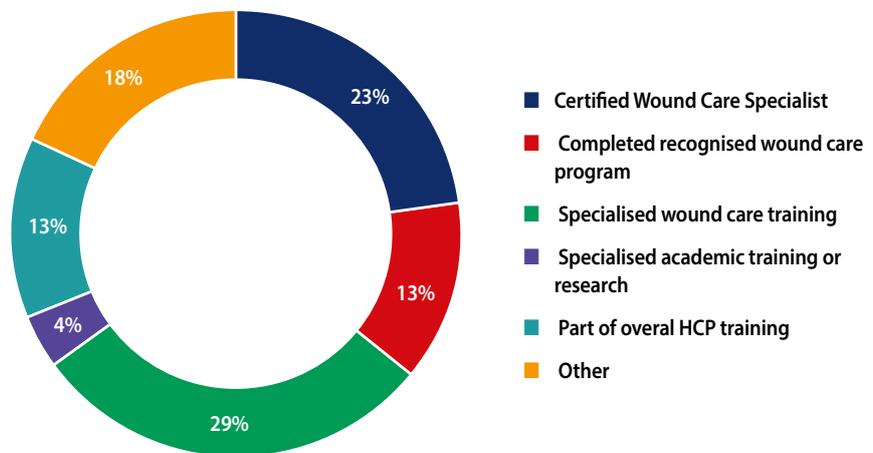
## Consensus

Consensus was reached on a number of key areas:

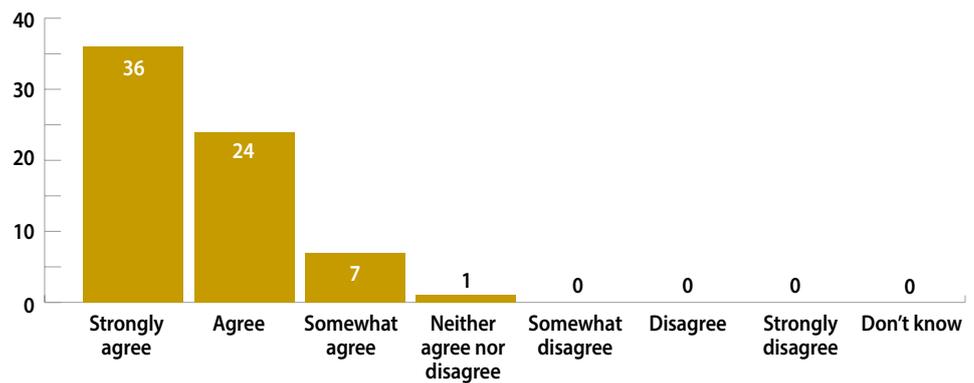
- Best practice wound care should focus on providing an optimal healing environment
- Managing the gap is one of the best methods to promoting an optimal healing environment
- Gap management should focus on moisture balance and exudate management which are critical for effective wound healing
- The best way to manage the gap is to fill it with a dressing that conforms to the wound bed;
- The best dressing choice for wounds down to 2 cm deep is a dressing that conforms to the wound bed
- The two most important dressing features that promote healing are conformability to the wound bed and antimicrobial properties
- Managing the gap is one of the best ways to decrease the risk of infection leading to fewer days with wounds.

The consensus process also resulted in detailed

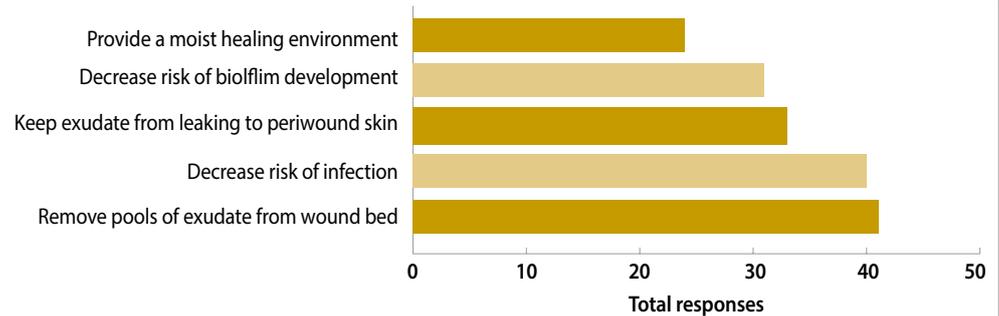
**Figure 1: Specialised Training in Wound Care.**



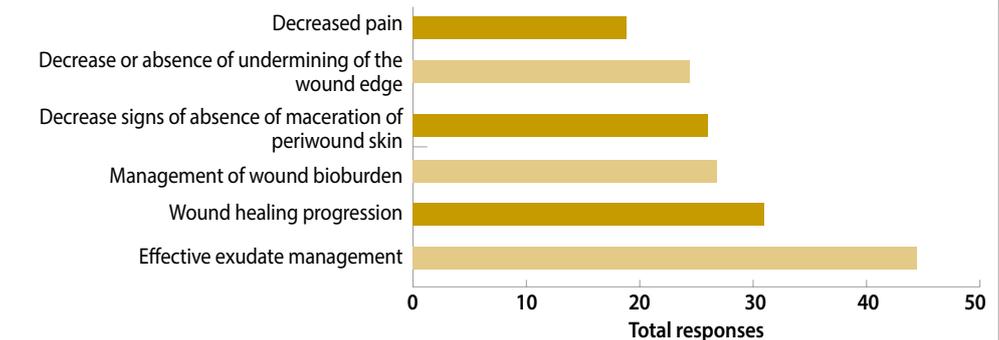
**Figure 2: Effective management of wound exudate is one of the best ways to promote an optimal healing environment.**



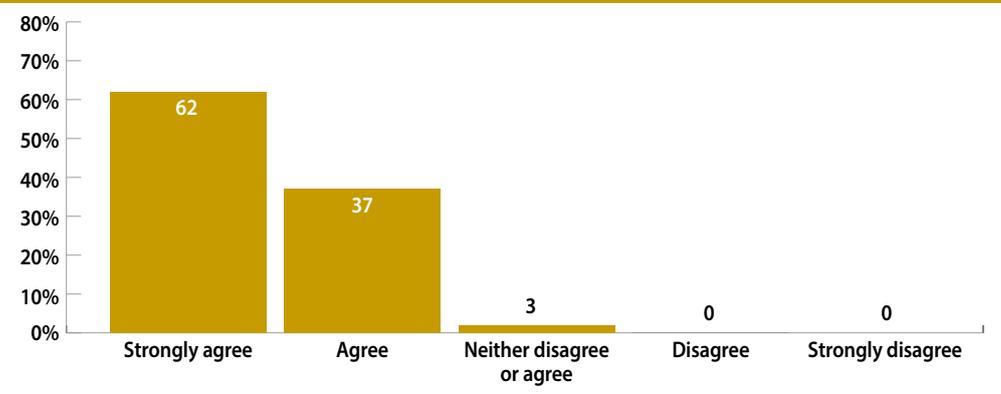
**Figure 3: Why is important to Manage the Gap in chronic wounds.**



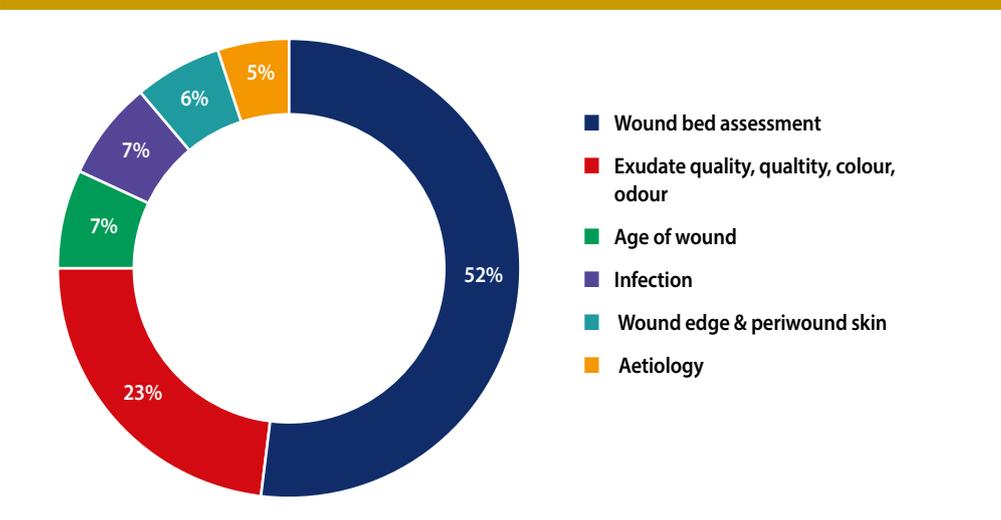
**Figure 3: Why is important to Manage the Gap in chronic wounds.**



**Figure 5: Assessing the wound at each dressing change provides an opportunity to diagnose and treat a wound infection in the early stages and decreases the potential of limb- or life-threatening infections.**



**Figure 6: Assessment of the gap in chronic wounds should include.**



**Table 1: Most important dressing features to promote healing.**

Top 4 dressing feature choices of participants	Responses
Antimicrobial properties	49
Verticle absorption of exudate to protect surrounding tissue	37
Patient comfort & ability to perform self care	28
Conforms to wound bed	27
Cost effectiveness	21
Promotes a moist healing environment	14

recommendations and an emerging consensus that can form the basis of a checklist or practice guidance on managing the gap, how to identify the warning signs of infection and when to refer patients to a wound care specialist. Since the majority of patients with chronic wounds are treated by healthcare professionals without specialised wound care training, participants agreed that the development of accessible practice guidelines in managing the gap for effective chronic wound treatment would be an important next step.

### Conclusion

It is estimated that 1 to 2% of the population in developed countries will experience a chronic wound during their lifetime (Jabrink et al, 2016). The purpose of this project was to reach consensus among a group of international wound care specialists on how to assess and treat chronic wounds with the goal of decreasing the number of days with wounds; thereby decreasing the economic burden of wounds on health systems and increasing patient quality of life.

Participants concluded that evidence-based, experientially based, accessible guidelines on

managing the gap between the wound bed and the wound dressing are required to decrease the number of days with wounds. Guidelines will help stop routine or ritualistic care and encourage holistic planned wound care focused on wound healing rather than wound treatment. While this project reached consensus on the importance of managing the gap, further work is needed to develop guidelines that help health care providers effectively move wound care evidence/best practice into clinical practice. WINT

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