

# Advancing pressure injury prevention around the globe: from the Pan Pacific region to an international pressure injury guideline

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## ABSTRACT

The Australian Wound Management Association (AWMA) has had an integral involvement in the development of two recent clinical guidelines on the prevention and management of pressure injuries: the *Pan Pacific Clinical Practice Guideline for the Prevention and Management of Pressure Injury* (2012) and *Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline* (2014). This paper outlines a comparison of the guideline methodologies, and discusses emerging issues in pressure injury research. Both the guidelines remain relevant to prevention and management of pressure injuries in Australian healthcare settings.

**Keywords:** Pressure injury, clinical guideline, evidence-based practice, pressure ulcer.

## INTRODUCTION

In October 2011 The Australian Wound Management Association (AWMA), the Australian Pressure Ulcer Advisory Panel (APUAP) and the Venous Leg Ulcer Guideline Development Committee (VLUGDC) hosted the inaugural Pan Pacific Pressure Injury Forum in Canberra<sup>1</sup>. This event brought together administrators, policy makers and clinicians for two days of knowledge sharing and, most excitingly, the launch of the *Pan Pacific Clinical Practice Guideline for the Prevention and Management of Pressure Injury* (the Pan Pacific Guideline)<sup>2</sup> for peer review. The guideline was developed in partnership with the AWMA, New Zealand Wound Care Society (NZWCS), Hong Kong Enterostomal Therapists Association (HKETA) and Singapore Wound Healing Society (WHS), under the banner of the Pan Pacific Pressure Injury Alliance (PPPIA). The launch, and the subsequent

publication of the final guideline in March 2012, was the culmination of a rapid review process conducted by clinicians from the four PPPIA partner nations to develop locally relevant, evidence-based clinical guidance in management and prevention of pressure injuries. The launch of the Pan Pacific guideline not only proudly delivered up-to-date recommendations, but also put the spotlight on the newly adopted terminology to describe pressure injuries in Australia<sup>3,4</sup>. The term *injury* was adopted following achievement of a consensus in a survey conducted across the memberships of the four PPPIA partners. The term has now been thoroughly adopted into daily language, accurately describes the preventable nature of the vast majority of pressure injuries<sup>5-7</sup>, and highlights the important role of pressure injury prevention.

On the eve of the launch of the Pan Pacific guideline, an invitation was extended to AWMA and its Pan Pacific partners to join the National Pressure Ulcer Advisory Panel (NPUAP) and European Pressure Ulcer Advisory Panel (EPUAP) in the revision of their pressure ulcer guideline, previously published in 2009<sup>8</sup>. This invitation recognised the rigour and quality of the Pan Pacific guideline and provided an opportunity for health professionals in the Pan Pacific region to be involved in the largest international review to be conducted of pressure injury evidence.

The PPPIA entered a three-way partnership with the NPUAP and EPUAP to undertake the guideline update and, after an intensive 18-month period spent reviewing new evidence on pressure injury management and prevention, *Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline* (the International Guideline)<sup>7</sup> was launched in August 2014. This article will highlight new evidence included in the International Guideline and broadly compare and contrast the processes used to develop the International Guideline and the Pan Pacific Guideline.

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## BACKGROUND

Pressure injuries remain a frequently occurring health problem throughout the world despite their generally avoidable nature<sup>7,9,10</sup> and despite the significant physical, social, emotional and financial burden they present to the individual patient and informal caregivers<sup>11-17</sup>. From the health system perspective, the increased hospital length of stay, high readmission rate and cost of wound management are burdensome. Recent modelling using 2010–11 data found direct health care costs of managing pressure injuries in individuals aged over 15 years in Australian public and private hospitals was approximately A\$1.6 billion<sup>18</sup>. Pressure injury care for the same period was estimated at \$13.9 million in the Australian residential aged care and respite sector<sup>18</sup>. In community settings, cost of pressure injury management is frequently borne by the individual and there are no recent, accurate estimates of the extent of this financial burden.

Prevalence of pressure injuries varies significantly around the world, with reports ranging from 0%<sup>19</sup> to 72.5%<sup>20</sup>, depending on the clinical and geographic setting and study methodologies<sup>21</sup>. However, in acute care settings the average pressure injury prevalence is approximately 10%<sup>22</sup>. In the Pan Pacific region, pressure injury prevalence is as varied as estimates around the globe. In the past decade, Australian studies place prevalence at between 5.6% and 48.4%<sup>23-25</sup>; and estimates from New Zealand range from 29% to 38.5%<sup>1</sup>. Singaporean acute and rehabilitation settings report prevalence ranges from 9%

to 14%, while the most recent estimates from Hong Kong report prevalence at 21% in a rehabilitation setting<sup>21</sup>.

The growing international health policy focus on pressure injury prevention, clearly demonstrable in Australia through the inclusion of Standard 8: Preventing and Managing Pressure Injuries in the Australian National Safety and Quality Health Service Standards<sup>26</sup>, appears to be contributing to a gradual decline in pressure injury prevalence in the acute care setting<sup>27</sup>. Clinical guidelines are a one strategy associated with improved benefits for patient, clinician and healthcare systems<sup>28</sup>, including decrease in preventable disease prevalence rates.

## WHAT'S NEW IN THE INTERNATIONAL GUIDELINE?

The International Guideline provides more recent and more extensive research to support recommendations included in the Pan Pacific Guideline, for the most part reinforcing the recommendations in our regional guideline rather than replacing them. Evidence from primary research is presented, and a wider range of clinical options are discussed in many sections of the guideline. For example, a full chapter of the International Guideline addresses surgical management of a pressure injury, with 30 recommendations covering pre-, intra- and post-operative care, including the design and care of flaps<sup>7</sup>. This contrasts to the general advice provided in the Pan Pacific Guideline, with one recommendation detailing when a surgical intervention

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| 1500                                                   | ~1.8              | ~2.2                |
| 2000                                                   | ~2.2              | ~2.8                |
| 2500                                                   | ~2.8              | ~3.5                |
| 3000                                                   | ~3.5              | ~4.2                |
| 3500                                                   | ~4.2              | ~5.0                |

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could be considered<sup>2</sup>. Similar comprehensive recommendations and detail of the underpinning literature is provided throughout the International Guideline. Below, a few specific areas of new and/or significant content in the International Guideline are outlined in brief.

### Pressure injury prevention and management for special patient populations

The International Guideline includes recommendations addressing the care of special populations including bariatric individuals, paediatrics; individuals in the operating room, palliative care and critical care settings; older adults; and individuals with spinal cord injury (SCI). The paediatric section of the guideline includes a specific focus on support surfaces and positioning for infants and neonates, but also includes novel recommendations on paediatric nutrition strategies for the prevention of pressure injuries. Recommendations for individuals with SCI are primarily based on expert opinion and informed by the recent Canadian SCI pressure injury guidelines<sup>29</sup>, and include new guidance on care during the acute injury phase and progressive seating protocols. In the chapter addressing pressure injuries in critically ill individuals particular focus is given to repositioning, including guidance on assessment of tolerance to repositioning in haemodynamically unstable individuals<sup>7</sup>.

### Assessment of darkly pigmented skin

Of particular note to the Pan Pacific region, with its diverse nationalities and Indigenous populations, is the comprehensive guidance provided on assessing skin and tissue in individuals with darkly pigmented skin. Assessment for the presence and nature of erythema is cornerstone in determining an individual's response to pressure loading and ongoing risk for injury; however, assessment of erythema is not always possible in skin of darker pigmentation. The International Guideline recommends prioritisation of assessment of skin temperature, oedema, and changes in the consistency of surrounding tissues (for example, induration/hardness) when conducting a skin assessment and/or classifying a pressure injury. Pain as an indicator of injury that should be considered when classifying Category I pressure injuries and suspected deep tissue injury is also noted<sup>7</sup>.

### Management of microclimate

An emerging area of interest, microclimate management, is alluded to in the Pan Pacific Guideline; however, its discussion is limited. Microclimate refers to the temperature and humidity (levels of heat and moisture) at the interface between the support surface and the individual. As detailed in the International Guideline, the impact of skin moisture and body temperature are factors to consider in a comprehensive risk assessment due to their influence on the microclimate and (inconsistent) relationship to increased pressure injury risk<sup>30</sup>.

### International consensus on high specification foam mattresses

In 2004, Dean and Young<sup>31</sup> presented their work on defining a high specification foam mattress to the 5th national AWMA conference in Tasmania. This work represented the most comprehensive discussion to date on components that could be considered a

requirement for a foam mattress to receive classification as a high specification support surface. Dean and Young's<sup>31</sup> comparison between a standard mattress and a high specification mattress with respect to Australian Standards classification, multilayering, density/hardness, support factor, depth, mattress cover and other considerations was further advanced and presented in the Pan Pacific Guideline, and received excellent reception from industry and other stakeholders. The quality and significance of this work has now been recognised through the attainment of international consensus on high specification foam mattress characteristics as part of the International Guideline development.

### Prophylactic dressings

The International Guideline provides recommendations on interventions that were emerging in clinical practice at the time of its development. One practice that is receiving increasing attention is the prophylactic use of polyurethane foam dressings. The International Guideline recommends considering the application of a polyurethane foam dressing to bony prominences to reduce exposure to friction and shear forces. The best quality evidence supporting the use of prophylactic dressings resulted from a study conducted by Santamaria *et al.* (2013)<sup>32</sup> in an Australian critical setting. As outlined in the International Guideline, emerging evidence suggests that in selecting a prophylactic dressing, consideration should be given to its impact on microclimate; ease of application and removal; structural design of the dressing and its size; the anatomical location to which it will be applied; and ability to continue regular skin assessments<sup>7</sup>.

### Guideline implementation

When evidence-based guideline recommendations are followed carefully, one can anticipate an improvement in clinical outcomes<sup>33</sup>. Despite this, failure to translate recommendations into every day clinical practice is a recognised limitation of evidence-based guidelines<sup>33,34</sup>. The International Guideline includes four chapters aimed at facilitating its implementation. One chapter addresses assessment and management of both facilitators and barriers to guideline implementation, with a focus on facility and organisation level strategies to promote uptake of best practice. This chapter is supported by a chapter outlining quality indicators that could be used to monitor implementation of the guideline within a facility. These quality indicators are specific to the content of the International Guideline, and address structure, process and outcome indicators of quality pressure injury prevention and management strategy. The implementation section of the International Guideline also contains a chapter addressing health professional education, including recommended learning content and evidence focused on education delivery styles. Finally, a chapter addressed to patient consumers and their caregivers provides recommendations on patient responsibilities in ensuring their optimal care, particularly in the home environment.

## DEVELOPMENT PROCESSES FOR THE PRESSURE INJURIES GUIDELINES

Although the specific processes used to develop the Pan Pacific Guideline and the International Guideline varied, both guidelines

Table 1: Comparison of guideline development processes

| Pan Pacific Guideline (2012)                                                                                                                                                                                                                                                  | International Guideline (2014)                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Development team</b>                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                |
| 16-member Guideline Development Steering Committee                                                                                                                                                                                                                            | 12-member Guideline Development Group                                                                                                                                                                                                                                                          |
| 40 experts involved in evidence review                                                                                                                                                                                                                                        | 101 experts involved in evidence review in Small Working Groups (SWGs)<br>40 experts representing the PPPIA                                                                                                                                                                                    |
| <b>Evidence base and quality</b>                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                |
| Synthesised evidence                                                                                                                                                                                                                                                          | Primary evidence                                                                                                                                                                                                                                                                               |
| 44 systematic reviews<br>4 evidence-based guidelines                                                                                                                                                                                                                          | Direct evidence from 356 clinical trials<br>Additional indirect evidence                                                                                                                                                                                                                       |
| Inclusion criteria limited to level 1 evidence (i.e. assigning level of evidence not required)<br>Appraised and rated according to quality                                                                                                                                    | Assigned a level (1 to 5) of evidence based on study design<br>Appraised and rated according to quality                                                                                                                                                                                        |
| <b>Recommendations and their strength</b>                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                |
| 54 recommendations                                                                                                                                                                                                                                                            | 575 recommendations                                                                                                                                                                                                                                                                            |
| Includes practice points to support implementations of recommendations                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                |
| <u>Grades (A to D)</u><br><ul style="list-style-type: none"> <li>Based on quality, quantity and consistency of evidence; clinical impact; applicability and generalisability to practice; potential harms; implications to practice.</li> <li>Determined by PIGDSC</li> </ul> | <u>Strength of evidence (A to C)</u><br><ul style="list-style-type: none"> <li>Based on quality, quantity and consistency of evidence</li> <li>Determined by SWGs and GDG</li> </ul>                                                                                                           |
|                                                                                                                                                                                                                                                                               | <u>Strength of recommendation (5 levels)</u><br><ul style="list-style-type: none"> <li>Based on strength of evidence; benefits versus harms, applicability and generalisability to practice, cost effectiveness and implications to practice.</li> <li>Determined by consensus vote</li> </ul> |
| Includes non-graded consensus-based recommendations (CBR)                                                                                                                                                                                                                     | Includes expert opinion recommendations with a low strength of evidence                                                                                                                                                                                                                        |
| <b>Peer review</b>                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                |
| Direct invitations, newspapers, websites<br>33 responses received                                                                                                                                                                                                             | Direct invitations, websites<br>596 registered reviewers<br>600 comments received                                                                                                                                                                                                              |

Table 2: Pan Pacific Pressure Injury Alliance representatives for International Guideline development

| PPPIA Guideline Development Group Members |                        |                 |
|-------------------------------------------|------------------------|-----------------|
| Keryln Carville (Chair)                   |                        |                 |
| Susan Law                                 |                        |                 |
| Pam Mitchell                              |                        |                 |
| Ai Choo Tay                               |                        |                 |
| PPPIA Small Working Group Members         |                        |                 |
| Merrilyn Banks                            | David Huber            | Alison Stockley |
| Judith Barker                             | Kok Yee Onn            | Ai Choo Tay     |
| Carmel Boylan                             | Susan Siu Ming Law     | Sue Templeton   |
| Jill Campbell                             | Michelle Lee           | Maria ten Hove  |
| Pang Chak Hau                             | Bernadette McNally     | Wan Yin Ping    |
| Kerrie Coleman                            | Edel Murray            | Joan Webster    |
| Chang Yee Yee                             | Wayne Naylor           | Wong Ka Wai     |
| Cheng Siu Wah Winnie                      | Susan Nelan            | Jan Wright      |
| Sandra Dean                               | Tracy Nowicki          | Quek Yan Ting   |
| Amy Darvall                               | Ong Choo Eng Elizabeth | Cathy Young     |
| Ann Marie Dunk                            | Lin Perry              | Clarissa Young  |
| Margaret Edmondson                        | Jan Rice               | Ang Shin Yuh    |
| Nikki Frescos                             | Emil Schmidt           |                 |
| Anne Gardner                              | Colin Song             |                 |

used well-established methodologies that reflect rigor in review and synthesis of evidence. Comparisons of the processes are outlined in Table 1.

## DEVELOPMENT TEAMS

The development of both recent pressure injury guidelines was underpinned by extensive interdisciplinary teamwork. It had previously been noted that ensuring the development team is interdisciplinary and includes practising clinicians has a positive influence on the eventual uptake and implementation of a guideline in clinical settings<sup>35,36</sup>. The Pan Pacific Guideline was overseen by a 16-member interdisciplinary Pressure Injury Guideline Development Steering Committee (PIGDSC), consisting of representatives from the four Pan Pacific partner nations. The PIGDSC selected 40 interdisciplinary experts to undertake evidence appraisals on which recommendations were based. The International Guideline development was directed by a 12-member Guideline Development Group (GDG), with four representatives from each of the three partner organisations. Small working groups (SWGs) were established to focus on individual topics of interest. The SWG members were selected based on their clinical and academic expertise, with care to ensure interdisciplinary input, and the members of each SWG selected their own group leader. Forty experts, acknowledged in Table 2, represented the PPPIA on the International Guideline SWGs.

The development of both guidelines included a methodologist who worked with the development teams to manage and support the review process; facilitate communication within and between groups; and to promote and document a systematic, transparent and uniform approach to the guideline development process. Attention to these aspects in the development process is consistent with production of a guideline in which clinicians trust the final outcomes<sup>36</sup>.

## EVIDENCE BASE AND QUALITY

The Pan Pacific Guideline was undertaken within a tight time frame and a practical strategy of limiting inclusion to synthesised evidence was adopted. The National Health and Medical Research Council (NHMRC) classifies synthesised evidence (that is, systematic reviews and meta-analyses) as Level I in its levels of evidence hierarchy<sup>37</sup>. A level of evidence primarily reflects the strength of the study design and the type of knowledge that it can provide in answering a clinical question. The strategy of limiting inclusion criteria to Level I evidence allowed a feasible quantity of research to be appraised while capturing the best evidence available. Using the NHMRC guideline development processes, all evidence was appraised and rated according to its quality using critical appraisal tools. The quality appraisal focuses on internal and external validity of the study and potential sources of bias in the way the study was designed and undertaken. These factors, which can vary between study designs and appraisals, are standardised through the use of

recognised clinical appraisal tools<sup>2,30</sup>. The literature searches for the Pan Pacific Guideline identified approximately 200 systematic reviews and guidelines for appraisal. Of these, 44 systematic reviews and 4 evidence-based clinical guidelines, one of which is the 2009 NPUAP/EPUAP guideline<sup>8</sup>, met inclusion criteria and were appraised and used to underpin recommendations in the guideline.

In contrast, the International Guideline focused on direct primary evidence conducted in participants with, or at risk of, pressure injuries. As such, the critical appraisal processes required a level of evidence to be assigned to each study, alongside a quality ranking. A scale developed by the Oxford Centre for Evidence Based Medicine<sup>38</sup>, which is not significantly different from that prescribed by the NHMRC, was used, together with the same critical appraisal tools used in development of the Pan Pacific Guideline. The International Guideline searches identified over 1,000 studies for appraisal and of these, 356 clinical studies providing direct evidence were included. In addition, indirect evidence (studies conducted in patients with other wound types, laboratory studies and animal trials) was used to support both recommendations and expert opinion when required. As with the Pan Pacific Guideline, the International Guideline built on the body of evidence included in the 2009 NPUAP/EPUAP guideline<sup>8</sup>.

## RECOMMENDATIONS

For both guidelines, data was extracted from each study, summarised by the SWG members and recommendations for clinical practice were developed. The Pan Pacific Guideline included 54 recommendations, each with practice points outlining considerations and strategies for implementation. The International Guideline includes 575 recommendations, many of which cover practice points in the Pan Pacific Guideline.

Although a recommendation represents best practice as supported by a synthesis of the best available evidence, its implementation requires reflection at the patient level, with consideration to the specific clinical circumstances, resources available, and clinician and patient preferences. Thus, the evidence-based medicine process necessitates clinical judgement as well as scientific research<sup>2,30</sup>. Reflecting the paucity of direct clinical evidence addressing many aspects of pressure injury prevention and treatment, both guidelines include recommendations that are underpinned by consensus opinion and/or indirect evidence in addition to their evidence-based recommendations.

## RECOMMENDATION STRENGTH

Evaluating the risk of bias in specific studies is only one component of determining the strength of evidence that underpins a clinical practice recommendation. To determine the strength of recommendation, an evaluation is made of the body of evidence as a whole<sup>37</sup>. Different approaches are used to evaluate the body of evidence in the Pan Pacific Guideline and the International Guideline; however, both approaches in essence address the same considerations.

The Pan Pacific Guideline utilised the NHMRC body of evidence matrix that required an evaluation of the quantity, quality and level

of evidence of studies on which a recommendation was based, as well as consideration of the consistency of the study findings; the clinical impact of the intervention; the generalisability of the study findings to the target population; and the applicability of the recommendation to the target clinical context. Additional consideration was given to cost effectiveness, translation into practice and the level of consensus of the guideline developers regarding the recommendation<sup>37</sup>. Application of the NHMRC matrix, which was performed by the PIGDSC, led to assignment to each recommendation of a grade (A to D).

A two-pronged approach was used to evaluate the strength of each recommendation in the International Guideline. Firstly, strength of evidence (A to C) was assigned. This rating provided an indication of the strength of the cumulative body of evidence supporting the recommendation<sup>30</sup> (similar to the assessment of the quality, quantity and consistency of evidence required in the application of the NHMRC matrix<sup>37</sup>). This evaluation was made by the SWG members, and then reviewed by the GDG to promote consistency of application of evidence strengths between recommendations and between SWGs. Secondly, a strength of recommendation was assigned. Underpinned by processes documented by the GRADE working group<sup>39-41</sup>, an evaluation of the strength of evidence; the balance of harms versus benefits; cost effectiveness; and translation into different clinical settings was performed (that is, components that are all considered in the NHMRC matrix<sup>37</sup> used in the development of the Pan Pacific Guideline). Each SWG and GDG member was invited to conduct the evaluation of every recommendation using an online platform, and the final strength of recommendation was determined through application of an algorithm that considered level of consensus. Five recommendation strengths are used in the International Guideline to indicate the level of trust a clinician can have that implementation of the recommendation will do more good than harm<sup>30</sup>.

## PEER REVIEW

Peer review is considered an essential component of guideline development. A peer review process provides the opportunity to attain impartial, independent input from all stakeholders (for example, clinicians, researchers, peak bodies, patient consumers and informal caregivers) and provides a check to the decision making process of guideline developers<sup>42</sup>.

A draft for consultation version of the Pan Pacific Guideline was launched at the AWMA Pan Pacific Pressure Ulcer Forum<sup>1</sup> in 2011 and, in line with NHMRC guideline development processes, the peer review process was advertised in national newspapers, on organisation websites and through invitations to peak bodies. Response from 33 stakeholders was received and addressed by the PIGDSC before release of the final version of the guideline. For the International Guideline, almost 1,000 stakeholders who had previously commented on the NPUAP/EPUAP 2009 guideline received invitations to register to participate in the peer review process, and public invitation was made via organisation websites. Across all SWGs, approximately 600 comments were received and addressed before the final guideline was launched.

## CONCLUSION

The Pan Pacific Guideline and the International Guideline are two locally relevant, evidence-based pressure injury prevention and management guidelines. Both guidelines have been developed using similarly rigorous processes and are underpinned by the best available clinical research in the field. The International Guideline provides more extensive guidance in many areas of interest, and contains more comprehensive address of prevention and management of pressure injuries in special interest populations. Published two years after the Pan Pacific Guideline, the content is more recent and additional evidence supports many of the recommendations, and emerging fields of interest are included. Both of these pressure injury guidelines remain relevant to local practice in the Pan Pacific region.

## IMPLICATIONS FOR PRACTICE

- The Pan Pacific Guideline remains relevant to pressure injury prevention and management in the Pan Pacific region and is accessible from the AWMA and NZWCS websites.
- The International Guideline provides more recent and more extensive research to support recommendations included in the Pan Pacific Guideline.
- The International Guideline includes recommendations addressing the care of special populations.
- The International Guideline addresses newly emerging topics of research and/or interest, including management of biofilm, use of prophylactic dressings, microclimate management, and medical device-related pressure injuries.
- The International Guideline includes a section on guideline implementation to facilitate address of pressure injury prevention and management at a facility and whole organisation level.
- The International Guideline is available for purchase or free download (abridged version) via the AWMA and NZWCS websites and the International guideline website ([www.internationalguideline.com](http://www.internationalguideline.com)).

## ACKNOWLEDGEMENT

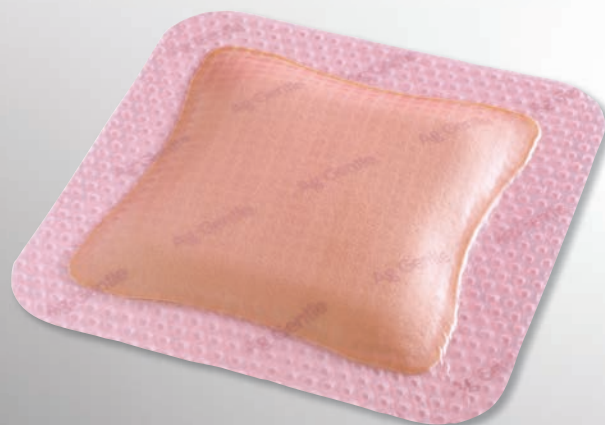
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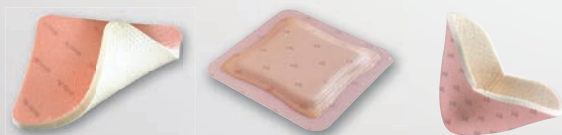


ALLEVYN Ag is indicated for exuding wounds where the risk of infection is suspected or needs to be managed.

2 in 1 dressing: easy to use and no secondary dressing costs

Effective antimicrobial action for up to seven days<sup>1</sup>

ALLEVYN Ag Gentle Border has a silicone gel adhesive which minimises pain on removal<sup>2</sup>



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