



Solutions to the chronic wound problem in Australia



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EXECUTIVE SUMMARY

It is widely acknowledged that chronic wounds represent a significant health and economic burden in Australia. Research suggests that chronic wounds affect approximately 450,000 Australians at any time, costing the health system around \$3 billion each year. While this burden should place wound management at the forefront of health policy decisions in Australia, chronic wounds remain an underfunded, poorly understood, and under-recognised public health issue in Australia. This is in part due to the absence of reliable data on the prevalence of chronic wounds in Australia and the impact on the healthcare system and the economy more broadly, which has resulted in a lack of awareness about the significance of the chronic wound problem in Australia amongst policy makers, healthcare providers, and the public.

Most chronic wounds are managed in the community as opposed to hospital settings, with general practices playing a key role in the prevention, monitoring, and management of chronic wounds. Poor management of chronic wounds results in prolonged healing times, infections, long-term complications, amputations, and hospitalisations, which creates a significant physical and financial burden on patients and places pressure on an already struggling healthcare system. The AMA estimates that the cost of hospital admissions due to chronic wounds in 2019-20 alone was \$352 million, with procedures performed on chronic wounds costing an additional \$115.7 million.

Research suggests that the delivery of evidence-based wound care, specifically using evidence-based practices and evidence-based wound dressings and consumables, is key to reducing the burden on patients and the healthcare system. General practices however face several barriers to delivering evidence-based wound care including inadequate funding for wound consumables, a lack of formal wound management education and training, and the absence of coordinated care pathways. In particular, the current funding arrangements do not support general practices to deliver evidence-based wound care, as the costs of providing the appropriate consumables results in a net financial loss for many general practices.¹ Many patients are therefore required to purchase consumables from the pharmacy at retail price,² or alternatively seek treatment at community healthcare settings that provide free wound care such as hospital outpatient clinics, placing additional burden on these settings.³

Leveraging the work undertaken by the MBS Review Taskforce Wound Management Working Group, the AMA proposes several solutions to improving wound management in general practice, including a funded wound consumables scheme to subsidise the cost of wound dressings and other consumables and the creation of new MBS items to support general practices to assess and manage chronic wounds. These new MBS items would facilitate a stepped care model for wound care and would be linked to regular education and training to encourage upskilling of those involved in the management of wounds and evidence-based practice.

The proposed new MBS items are estimated to “free up” around 148,000 general practitioner consultations in the first year, and 162,000 consultations by the fourth year. With Australia now facing a serious general practitioner workforce shortage, these MBS items will help support general practices to deliver more care to their communities. Additionally, as patients with chronic wounds often suffer from other chronic conditions and comorbidities, it is recommended that the proposed new MBS items and funded wound consumables scheme be linked to voluntary patient enrolment to support the delivery of coordinated care.

The solutions proposed represent value to both the patient and healthcare system, removing the cost barrier to accessing appropriate and evidence-based wound care products, giving patient wounds the best chance to heal. As the AMA’s modelling indicates that receiving care through the general practice is cheaper than receiving care through a hospital outpatient clinic or other community healthcare setting, it is estimated that an investment of \$23.4 million in the delivery of evidence-based wound care will save the health system \$203.4 million, across the forward estimates. **This is a return of \$8.68 for every \$1.00 invested into the delivery of evidence-based wound care.** It is expected that a cost-effective wound care program that delivers evidence-based care will draw more patients over time to receive treatment at their general practice, and the amount saved would continue to increase as the proportion of wounds treated by general practice increases.

THE BURDEN OF CHRONIC WOUNDS IN AUSTRALIA

Wound management procedures are among the most frequently performed in Australia's healthcare system.⁴ Wounds can be classified as either acute or chronic. An acute wound is expected to progress through the phases of normal healing, showing signs of healing within four weeks. Chronic wounds often begin as an acute wound, however fail to proceed through the normal phases of healing, resulting in little or no evidence of healing within four weeks.⁵ These wounds are commonly classified into four categories namely pressure ulcers, diabetic ulcers, venous ulcers, and artery insufficiency ulcers.⁶ Depending on the type of chronic wound and the care provided, it can take months and in some cases years for chronic wounds to heal, with some chronic wounds never fully healing.^{7,8}

While it is widely acknowledged that chronic wounds represent a significant health and economic burden in Australia, national data on the incidence and prevalence of chronic wounds is limited.^{9,10,11}

It is estimated that approximately 450,000 Australians currently live with a chronic wound, costing the health system around \$3 billion a year.^{12,13,14}

Despite both inconsistency and limitations in the data,¹⁵ this represents approximately 2 per cent of national healthcare expenditure.^{16,17,18} This however is likely to be an underestimate, as chronic wounds are often not accurately reflected in data when they are considered to be a comorbidity of another condition.^{19,20} Additionally, the data is largely limited to hospital and residential aged care facilities, and therefore does not reflect those wounds treated in other healthcare settings, such as general practices and community nursing services, or those wounds that go untreated.²¹ This makes it challenging to accurately estimate the economic impact of chronic wounds, including the impact on quality of life and workforce participation.

Chronic wounds are most prevalent amongst people aged 60 years and over,^{22,23} as well as those with chronic health conditions such as diabetes, obesity, and cardiovascular disease.^{24,25,26,27,28} As the Australian population is growing, ageing, and developing more complex and chronic conditions, it is likely that the health and economic burden of chronic wounds will only increase.^{29,30,31} Additionally, some populations, particularly cohorts from lower socioeconomic backgrounds as well as Aboriginal and Torres Strait Islander peoples, are more adversely affected by chronic wounds due to poor access to services and consumables, as well as disproportionately higher prevalence, morbidity and mortality of chronic diseases.^{32,33,34,35,36} While this burden should place wound management at the forefront of health policy decisions in Australia, chronic wounds remain an underfunded, poorly understood, and under-recognised public health issue in Australia.^{37,38}

In addition to the high costs associated with evidence-based wound care, the inability to readily access expert wound advice and care also presents a barrier for patients. Access is of particular concern for those living in rural and remote areas, lower socioeconomic populations, as well as Aboriginal and Torres Strait Islander peoples – populations who are already disproportionately affected by chronic wounds and chronic diseases.^{39,40,41,42,43} For example, in the rural Midwest region of Western Australia, the management of conditions involving wounds constitutes 41 per cent of all outpatient presentations.⁴⁴

The burden that chronic wounds have on Australia's healthcare system is poorly understood, largely because there is limited national data on the prevalence and cost of chronic wounds.

This absence of data has contributed to the lack of awareness amongst policy makers, healthcare providers, and the public about the significance of the chronic wound problem in Australia.

While there are good clinical practice guidelines on treating chronic wounds, there is an absence of reliable and comparable data which makes it challenging to implement and evaluate chronic wound prevention and management strategies. As there is currently no objective evidence on both the costs and benefits of evidence-based interventions for chronic wounds, there is no incentive or guidance for decision makers and healthcare providers to invest in evidence-based wound care. This makes it challenging to secure funding for wound care over other chronic conditions such as severe asthma where comprehensive data is collected through the Australasian Severe Asthma Registry. Other countries, such as Wales, have implemented wound registries, enabling a better understanding of their national wound burdens.⁴⁵

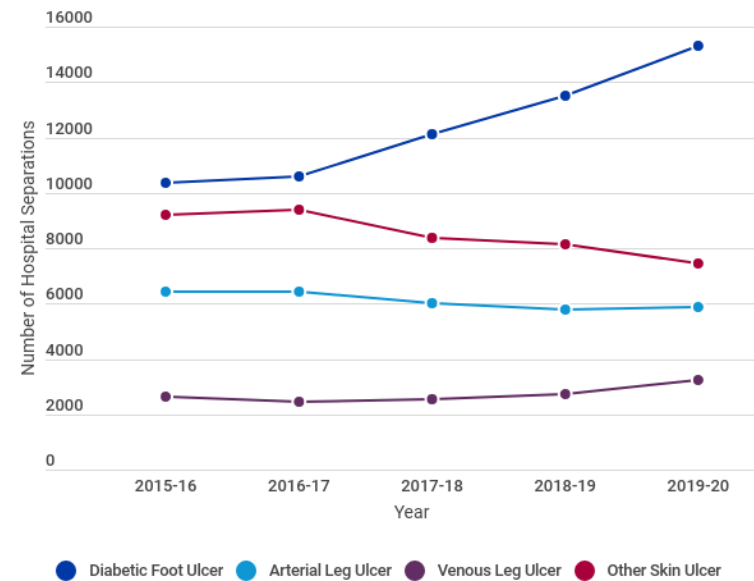
It should however be noted that there is significant work currently underway (see *Past attempts at addressing the burden of chronic wounds*) to collect reliable data on chronic wounds and better understand the burden of chronic wounds in Australia. This data was however unavailable at the time of performing the analysis presented in this research report.



Estimating the burden of chronic wounds in Australia

The number and cost of hospital admissions and procedures for chronic wounds provides a reasonable indication of the costs that could be avoided if community health settings, including general practices, were better supported to provide evidence-based wound care. Figure 1 demonstrates that the number of hospital admissions has been growing for diabetic foot ulcers and venous leg ulcers since 2015-16, with admissions for arterial leg ulcers remaining largely steady. Depicted in Figure 2, there has been an increase in the number of hospitalisations for diabetic foot ulcers amongst younger cohorts, with hospitalisations for the 40-59 year old cohort increasing from 50 per 100,000 people in 2015-16 to 62 per 100,000 people in 2018-19, and hospitalisations for the 60-64 year old cohort increasing from 94 per 100,000 people in 2015-15 to 130 per 100,000 people in 2018-19. Data from 2019-20 has been included in the analysis, however it is likely that these figures were impacted by hospital disruptions due to the COVID-19 pandemic. This increase in younger people being hospitalised with chronic wounds has a significant impact on the health system and is demonstrative of the growing burden of disease in the community, over and above what is implied by ageing alone.

Figure 1: Hospital separations by type of wound, 2015-16 to 2019-20⁴⁶



⁴⁶The 40-59 year old cohort represents a larger age range compared to the other cohorts to reduce volatility in the analysis and allow for a more meaningful comparison over time.

Figure 2: Hospitalisation per 100,000 people by age cohort for diabetic foot ulcers^{47,48}

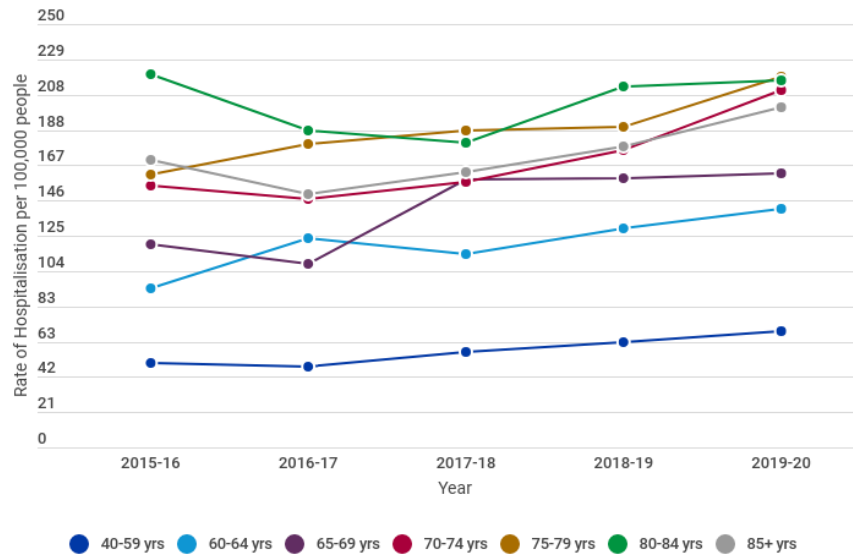


Table 1 provides an overview of hospital separations, patient days and the associated estimated cost for diabetic foot ulcers, arterial leg ulcers, venous leg ulcers and other skin ulcers in 2021-22. The total number of patient days for all ulcers was over 249,000 in 2019-20, with diabetic foot ulcers making up over half of the total patient days. The estimated cost of these hospital admissions was \$352 million in 2019-20.

Table 1: Hospital separations, patient days and estimated cost for the major groups of chronic wounds, 2019-20 (using the Independent Hospital Pricing Authority National Efficient Price Determination 2021-22)⁴⁹

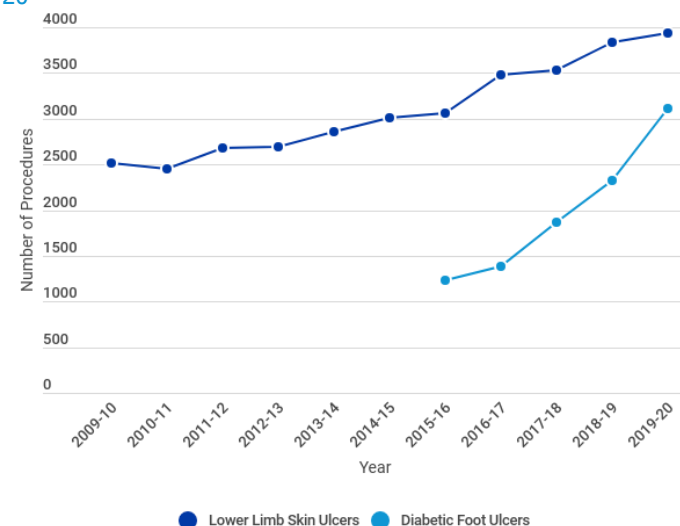
	SEPARATIONS	PATIENT DAYS	ESTIMATED COST \$MIL
Diabetic foot ulcer	15,302	122,561	186
Arterial leg ulcer	5,879	56,171	56
Venous leg ulcer	3,215	24,945	30
Other skin ulcer	7,429	45,669	80
Total	31,825	249,346	352

The direct cost of these hospital admissions to the labour force, based on labour income lost for the patient days in hospital, is estimated to be \$21 million in 2019-20 (based on 2021-22 participation and wages). This however underestimates the labour income lost given recovery would extend beyond the hospital stay itself, with some patients requiring a prolonged absence from work due to the severity of their chronic wound. Additionally, patients with chronic wounds are more likely to develop cellulitis, a common bacterial infection and cause of avoidable hospital admissions. In 2019-20 hospital admissions due to cellulitis cost around \$349 million, and while only a proportion of these hospitalisations would be associated with a chronic wound, evidence-based wound care, including regular dressing changes, would reduce the cases of cellulitis associated with chronic wounds and lead to fewer avoidable hospital admissions.⁵⁰

The number of procedures performed on chronic wounds is also on the rise, presenting a large and potentially avoidable cost to the health system. Figure 3 demonstrates that the number of procedures for diabetic foot ulcers has increased at an alarming rate of 26 per cent between 2015-16 and 2019-20, and the number of procedures for lower limb skin ulcersⁱⁱ has also increased at a steady rate, with 3,941 procedures performed in 2019-20 compared to 2,515 in 2009-10, an increase of 1,426. The cost of these procedures alone in 2019-20 was \$115.7 million.

Refer to *Appendix A: Estimated cost of hospital admissions for chronic wounds* for further details on how the number and cost of hospital admissions and procedures for chronic wounds was estimated.

Figure 3: Procedures for lower limb skin ulcers and diabetic foot ulcers, 2009-10 to 2019-20⁵¹



ⁱⁱArterial leg ulcers and venous leg ulcers have DRG treatment codes (F64, F65) but these codes do not separate surgical procedures, and therefore the surgical code which clearly defines ulcer treatments was used for the analysis (J12 - lower limb procedures with ulcer or cellulitis).

Current funding arrangements for managing chronic wounds

The management of chronic wounds involves several healthcare providers, including general practitioners, practice nurses, nurse practitioners, community nurses, community pharmacists, medical specialists, and allied health professionals such as podiatrists and dietitians.⁵² Often working as part of a multidisciplinary team, these health professionals manage chronic wounds across a variety of healthcare settings, including residential aged care facilities, hospitals and outpatient clinics, general practices, and specialist community-based settings.⁵³

The current funding arrangements are complex, with different funding and reimbursement mechanisms applying to the different healthcare providers and healthcare settings. The cost of treating chronic wounds in public hospitals is funded by both Commonwealth and State and Territory governments.⁵⁴ In residential aged care facilities, the Aged Care Funding Instrument (ACFI) provides some funding for the treatment of chronic wounds, however it does not accurately cover the cost of providing evidence-based wound care to this high-risk population.⁵⁵ Care provided outside of hospital settings and residential aged care facilities however is predominantly funded through Medicare, with healthcare providers reimbursed for the time spent with patients by claiming Medicare Benefits Scheme (MBS) items.⁵⁶ Wound care products however are excluded from both the MBS and the Pharmaceutical Benefits Scheme (PBS)ⁱⁱⁱ, and medical practitioners are unable to bulk-bill the consultation but charge for the cost of the wound consumables. While other funding mechanisms include the Workforce Incentive Program (WIP) which supports general practices to employ a practice nurse,⁵⁷ this does not cover the cost of wound dressings or consumables. By comparison, programs supported by the Department of Veterans' Affairs (DVA) for veterans including the DVA Repatriation PBS do subsidise the cost of some wound consumables.⁵⁸ Many Primary Health Networks (PHNs) have also identified wound management as a priority and are using their flexible funding to support wound management in their regions.⁵⁹

ⁱⁱⁱExcluding the Department of Veterans' Affairs (DVA) Repatriation PBS which provides concessional wound consumables to eligible DVA healthcare card holders.



THE ROLE OF GENERAL PRACTICE IN MANAGING CHRONIC WOUNDS

Primary healthcare services are pivotal in the management of chronic wounds, with most chronic wounds managed in the community as opposed to the hospital setting.^{60,61}

General practices in particular play a key role in the prevention, monitoring, and treatment of chronic wounds, as well as the coordination of care across the multiple healthcare providers and settings involved in managing a wound and associated risk factors.

Studies show that wound management is a task frequently performed in general practice.^{62,63} According to the former Bettering the Evaluation and Care of Health (BEACH) program, wound dressing was the third most frequent procedural treatment performed in general practices 2015-16, accounting for 14.3 per cent of all procedural treatments.⁶⁴

Barriers to evidence-based wound management in general practice

It is widely acknowledged that suboptimal wound care results in prolonged healing times, infections, long-term complications, amputations, and hospitalisations. This creates a significant physical and financial burden on patients and places pressure on an already struggling healthcare system.^{65,66,67,68} Research suggest that the delivery of evidence-based wound care is key to reducing the burden on patients and the healthcare system and preventing avoidable costs, however several barriers to the implementation of evidence-based wound care exist. For general practices, the key barriers include the high costs associated with providing evidence-based care, a lack of adequate funding, a lack of subsidy for wound consumables, lack of formal education and training, and the absence of coordinated care pathways.

“

Many of our practices are open seven days a week, providing wound care seven days a week. From performing dressing reviews after surgery, to redressing a chronic wound several times a week. General practices enable patients to access care locally, without having to travel to hospital – saving patients time and money.

- General practitioner

”



Funding for general practices

For general practices, the Medicare rebate for a consultation is intended to cover the cost of the general practitioners' time, however additional costs associated with nursing time and wound care consumables are often borne by the practice or patient.^{69,70} One study involving 18 general practices found that, for most wound care episodes, the total cost of managing the wound (the cost of general practitioner and nurse time, and the cost of the consumables) was greater than the total income, resulting in a net financial loss to the practice.⁷¹ Where general practices are unable to cover the cost of the consumables, patients are required to pay high out-of-pocket costs.⁷² One study on patients with venous leg ulcers estimated that Australians over the age of 60 are paying \$27.5 million annually in out-of-pocket costs for consumables.⁷³ The costs associated with wound management however are difficult to estimate for both general practices and patients due to the lack of data, and depends on the type of wound, the time it takes for the wound to heal, the time spent with health professionals, and the consumables used.^{74,75,76}



Getting access to the wound dressings I need to treat my venous leg ulcer is challenging. I need to order them through the pharmacy, before visiting my regular general practitioner to have the wound assessed and dressed. The costs really add up, because it's not just the cost of the dressings and compression bandages, it's also the cost of specialist appointments, dermatologist appointments, travel, parking, and time off work.

- Patient



The high costs associated with evidence-based wound management means that treating practitioners and patients are required to choose between more affordable yet suboptimal dressings, or costly higher quality dressings. For example, compression therapy is considered best practice for the treatment of venous leg ulcers,⁷⁷ however recent studies reveal that only 6.3-23 per cent of patients with venous leg ulcers receive compression therapy, prior to admission to a specialist wound clinic.^{78,79} In those that receive compression therapy, non-compliance is high and while this is due to several reasons, a key reason is due to the costs associated with compression products.^{80,81} Ultimately, this puts significant financial strain on both general practices and patients, and results in many practices providing wound care at a financial loss, to meet the needs of a vulnerable and isolated population.

Education and training

Obtaining and maintaining the skills associated with evidence-based wound care requires extensive training and experience.⁸² Most healthcare providers receive little to no formal wound management education and training, both as part of their initial training as well as throughout their career.⁸³ This is likely due to a combination of factors, including a poor understanding of the impact of chronic wounds, a perception that chronic wounds have less severe consequences than other chronic conditions, and a lack of support for providers to upskill particularly when practices often make a loss from treating chronic wounds.⁸⁴ For those providers who do receive education and training, it is often not regular enough to keep pace with advances in technology and treatment options, particularly in busy healthcare settings such as general practices.⁸⁵ Healthcare providers often rely on continuing professional development (CPD) to upskill, and while wound management CPD activities exist,^{86,87} they may not be high on a provider's CPD agenda due to other competing professional development needs.

Studies show that innovative wound management training leads to improvements in the knowledge, skill, and confidence of healthcare providers.^{88,89,90} One diabetes foot ulcer training program was shown to improve evidence-based clinical practice and contributed to reductions in diabetes-related amputation rates.^{91,92} The absence of formal education and training has resulted in many healthcare providers lacking the knowledge, skill, and confidence to manage wounds effectively and deliver evidence-based care.^{93,94,95,96} An education and training needs analysis undertaken in 2013 revealed that healthcare providers working in primary care, as well as those working in residential aged care facilities (RACFs), have the highest need for wound management education and training.⁹⁷ Key knowledge and skill gaps include awareness of the Australian Standards for Wound Prevention and Management, implementation of contemporary evidence-based treatment options, and ability to identify those patients who are at risk of developing a chronic wound, resulting in inconsistent and outdated wound management practices.^{98,99,100,101} This ultimately leads to poor management of chronic wounds, contributing to higher costs and poor patient outcomes.^{102,103}

Education and training should also be provided to patients and carers, as it is important for prevention of chronic wounds, compliance with treatment, and self-management, with several studies showing that patient education contributes to improved patient outcomes.^{104,105,106,107} Research indicates however that many patients with chronic wounds are uninformed when it comes to management of their wound, and therefore more needs to be done to ensure patients are educated.^{108,109}

Coordinated patient-centred care

The absence of a national coordinated care pathway for chronic wound management means that care is often poorly coordinated between the multiple health professionals who work across multiple healthcare settings.¹¹⁰ This complex and uncoordinated provider landscape makes it challenging for patients and carers to access the right care at the right time, resulting in poor continuity of care.¹¹¹ It also makes it challenging for patients to be active participants in their care, which is essential to the delivery of safe and high-quality patient-centred healthcare.¹¹² This can have a detrimental effect on both patient health outcomes as well as costs to the healthcare system, with studies showing that uncoordinated care costs the healthcare system more than coordinated care.^{113,114}

Ensuring all treating practitioners have the tools they need to come together with a shared and patient-centred goal is critical to delivering coordinated evidence-based wound care and improving patient health outcomes.¹¹⁵ This includes electronic sharing of patient records between healthcare settings,^{116,117} as well as a single care coordinator, often the patient's regular general practitioner, to take responsibility for the coordination of care.^{118,119} Achieving system interoperability between healthcare settings in Australia is still in its early stages, which presents a barrier to the delivery of coordinated patient-centred care.¹²⁰ Additionally, it can be challenging for general practitioners to take a lead role in coordinating wound care and treatment where patients choose to receive care from multiple general practices.¹²¹

PAST ATTEMPTS AT ADDRESSING THE BURDEN OF CHRONIC WOUNDS

Acknowledging the increasing burden of chronic wounds in Australia, governments, universities, research centres, peak bodies and other organisations have committed to improving the management of chronic wounds in the primary healthcare sector. While these initiatives, detailed below, have been effective in the context where they were applied, there is an opportunity to take a whole-of-sector approach to the development and implementation of these initiatives to reduce silos and duplication of effort.

Wound Management Pilot

The Wound Management Pilot, which was originally announced in May 2018 at the AMA National Conference¹²² and then subsequently in the 2018-19 Mid-Year Economic and Fiscal Outlook,¹²³ is a government initiative funded under the Primary Health Care Development Program that aims to test models of care for chronic wound management in the primary healthcare sector. These approaches are being tested by the Western Victoria PHN, Westworth Healthcare (provider of the Nepean Blue Mountains PHN), and Primary Care Gold Coast Limited (provider of the Gold Coast PHN), with Wounds Australia providing support.

MBS Review Taskforce: Wound Management Working Group

As part of work undertaken by the MBS Review Taskforce, the Wound Management Working Group was established in 2018 to make recommendations to the Taskforce in relation to chronic wound management in Australia.¹²⁴ The Working Group made several recommendations to improve the management of acute and chronic wounds in Australia, many of which aimed to support general practices in the delivery of evidence-based wound care.¹²⁵ Two-thirds of the recommendations were endorsed by the MBS Review Taskforce, including a recommendation to allow general practitioners to bulk bill patients for a consultation but charge them for the cost of consumables.¹²⁶ While the previous government announced in January 2021 that this recommendation would not be implemented, they did commit to working with general practices on support for wound care, acknowledging that they should not have to bear the cost of consumables and there should be "alternative sources of government support".^{127,128} The MBS Taskforce also endorsed the recommendation for improved wound care education and training, however did not support the introduction of new MBS items for wound care on the basis the existing MBS items and WIP were sufficient.¹²⁹ In doing this, the opportunity to incentivise and reward the upskilling of those involved who treat and manage chronic wounds, as well as an opportunity to better quantify the burden of chronic wounds in Australia was missed. Many of the other recommendations outlined by the Wound Management Working Group also remain unimplemented.

Australian Health Research Alliance Wound Care Initiative

In 2018 the Minister for Health and Aged Care announced that wound management would be the “first priority of the new health system’s translation program under the Medical Research Future Fund (MRFF)”.¹³⁰ The Minister for Health and Aged Care directed the Australian Health Research Alliance (AHRA) to target some of their MRFF funds to wound management research.¹³¹ Known as the Wound Care Initiative, the AHRA has been working with the Western Australian Health Translation Network (WAHTN), Health Translation Queensland, and Wounds Australia on four key projects: determining the actual costs of wound care based on best practice and best product (which includes determining the cost and efficacy of different wound dressings for the various types of chronic wounds), updating the Australian Standards for Wound Prevention and Management, developing an integrated Training and Education Framework, and developing a plan for a coordinated program of research excellence. These four projects aim to address the challenges in wound care at a system, policy, and practice level through an integrated, evidence-based approach.¹³²

Wounds West

Wounds West was established in 2008 to bring together Western Australia Health, Silver Chain Nursing Association, and Curtin University to develop safe sustainable systems for the prediction, prevention, and management of wounds.¹³³ Through this partnership Wounds West has undertaken several projects, including determining the prevalence of wounds within Western Australia public hospitals through patient surveys, improving access to educational resources for wounds through the development of online education programs, improving access to expertise in wound management through the development of an advanced digital wound imaging and documentation system, and establishing a centralised data repository to store wound-related data for the purpose of ongoing research.¹³⁴

Connected Wound Care

In 2009, the Victorian Department of Health implemented the Strengthening Wound Management Practice in Victoria initiative, with the aim of improving wound care outcomes for individuals in regional Victoria by addressing inequity of access to wound experts. As part of this initiative, wound management clinical nurse consultants were appointed in regional areas, collectively known as Regional Wounds Victoria, to provide wound management consultancy, training, and input into improving wound management practice.¹³⁵ In 2010, the Connected Wound Care project was established by the Victorian Department of Health to enable collaboration between Regional Wounds Victoria and Royal District Nursing Service, a service which also uses a clinical nurse consultant model to deliver wound management expertise and education. This was in response to wound management practice and education occurring in isolation across different service settings in Victoria, resulting in inconsistency in wound management approaches.¹³⁶ The establishment of Connected Wound Care has resulted in the identification of gaps in wound management practice across Victoria and the implementation of standardised approaches for wound management through the development and distribution of evidence-based resources.¹³⁷

Wound Management Innovation Cooperative Research Centre

As part of the Commonwealth Government’s Cooperative Research Centre Program, \$28 million was directed to establish the Wound Management Innovation Cooperative Research Centre (WMI CRC), with a consortium of participants across Australia, including universities and research centres, State and Territory governments, nursing agencies, companies with an interest in wound care, peak bodies, and hospitals. The aim of the WMI CRC is to develop cross-organisational and inter-disciplinary projects, connecting researchers and wound practitioners on projects that will improve wound healing and quality of life for people with wounds, and provide cost-effective wound care to lessen the burden on the health system.¹³⁸ Since its establishment in 2010, the WMI CRC has undertaken several projects, including projects to understand the factors, such as genetics, involved in wound healing, the development of new technology and treatment options, the development of education and training programs, and proof of concept clinical trials.¹³⁹

Digital solution to identify wounds

Using the \$6.5 million funding awarded from the MRFF, CoviU is developing a digital toolkit which will help identify wounds through telehealth services. Using artificial intelligence and mobile imaging, this toolkit will allow practitioners to remotely analyse and monitor wounds over time, with a focus on providing high quality wound care in residential aged care settings.¹⁴⁰ The technology is being codesigned with consumers and clinicians, and involves collaboration with CSIRO, the University of Sydney, Australian Unity, Western NSW PHN, and the University of Technology Sydney. Development of the digital wound care toolkit will begin in 2022 and will be available in 2026.¹⁴¹

Wounds Australia 11-point plan

As part of the Wounds Awareness Week 2021 campaign, Wounds Australia, the peak body for wound care and management, developed and launched their 11 Point Plan which is a blueprint for governments to improve the management of chronic wounds. The 11 Point Plan called for several changes, including a dedicated MBS item for wound care, subsidising wound products for those at risk, wound care training, mapping care pathways for chronic wounds, implementing collaborative models, and a study to determine the incidence and financial impacts of wounds.¹⁴²

NSW Health Leading Better Value Care: Chronic Wound Management Initiative

Improving the management of wounds was nominated as an initiative in 2018 as part of NSW Health's Leading Better Value Care (LBCV) program, which aims to use evidence and data to implement solutions for specific diseases or conditions.¹⁴³ Established by the Agency for Clinical Innovation, the LBVC Chronic Wound Management Initiative aims to improve the consistency and integration of care for people with chronic wounds, promote holistic care to support wound healing, and strengthen communication and referral pathways in wound care. The initiative is underpinned by the LBVC Standards for Wound Management, which aim to guide NSW Health Local Health Districts (LHDs), Speciality Health Networks (SHNs) and individual health services to address areas such as service planning, coordination, and integration across care settings in NSW.¹⁴⁴ The initiative is guided by the Chronic Wound Management Taskforce, with expertise from health professionals, patients, carers, and researchers.¹⁴⁵ The initiative is still in its early stages, with the focus on building partnerships across the NSW health system to inform future projects.¹⁴⁶



SOLUTION TO AUSTRALIA'S CHRONIC WOUND PROBLEM

The solutions outlined below draw on those proposed by the Wound Management Working Group, as well as recent research performed by other key groups. They are also consistent with the vision, aims and principles outlined in the National Preventative Health Strategy 2021-2030.¹⁴⁷ While these recommendations are largely focused on improving the management of chronic wounds in general practice as this is where a large proportion of chronic wounds are managed,^{148,149} there is an opportunity to implement these solutions across other healthcare settings such as aged care, community services, and hospitals.

Reimburse the cost of consumables

A Commonwealth-funded wound consumables scheme should be established to subsidise the costs of consumables provided in general practice for patients with chronic wounds.

Subsidised wound consumables will remove the cost barrier to accessing appropriate and evidence-based wound care products, reducing the financial strain on both patients and general practices.

It is recommended that the wound consumables scheme be initially implemented for concession and healthcare card holders, and then subsequently expanded to all patients with chronic wounds. Prioritising concession and healthcare card holders will ensure that those patients who are likely to be greatly impacted by the costs of consumables are prioritised during the implementation of the scheme. The Commonwealth Government announced in the 2021-22 MYEFO update that they were investing \$2.1 million across two years to develop options for a wound consumables scheme.¹⁵⁰ Given the extensive work that has been recently undertaken by the Wound Management Working Group and others on the requirements for a consumables scheme, this funding would be better used to commence the implementation of a consumables scheme.

For patients with chronic wounds^{iv}, the consumables scheme is estimated to cost the Commonwealth Government \$3.7 million in 2022-23 (\$16.1 million from 2022-23 to 2025-26) for the estimated 30 per cent of concession and healthcare card holders that would access wound care through a general practice (as opposed to another healthcare setting such as a hospital outpatient clinic). If this program was expanded to all patients (i.e. not just concession and healthcare card holders), this scheme is estimated to cost \$5.3 million in 2022-23 (\$22.9 million from 2022-23 to 2025-26). Refer to *Appendix B: Impact of evidence-based wound care* for further details and assumptions on how the cost of a funded wound consumables scheme was estimated.



^{iv}The AMA's analysis has focused diabetic foot ulcers, arterial leg ulcers, and venous leg ulcers. The analysis does not include pressure wounds or acute wounds (e.g. surgical or traumatic wounds).

Stepped model of care

Stepped care models comprise of a hierarchy of interventions, providing patients with the least intensive intervention appropriate with regular monitoring and adjustment of treatment as required.¹⁵¹ Stepped care models have been implemented for many chronic conditions, including arthritis,¹⁵² chronic pain,¹⁵³ and asthma.¹⁵⁴ In the context of chronic wounds, a stepped care model would support the provision of evidence-based care which can be stepped up or down depending on the patient's care needs.

Further detailed by the Wound Management Working Group, a stepped care model for wound management would leverage a multidisciplinary team which is led by an appropriately skilled general practitioner with training in chronic wound management. Regular treatment would be provided by a trained practice nurse, Aboriginal and Torres Strait Islander Health Practitioner, or Aboriginal Health Worker, with the general practitioner performing frequent holistic assessments of the wound, including monitoring other risk factors, chronic diseases, and comorbidities. Where a wound does not show signs to adequate healing, the general practitioner could consult or refer the patient to a specialist wound care practitioner.^v The general practitioner can also involve other health care professionals depending on risk factors and comorbidities, for example a podiatrist or dietitian.¹⁵⁵ Care would be well integrated with other services, including community nursing and residential aged care. This stepped care approach to the management of chronic wounds supports the provision of evidence-based, comprehensive, and multidisciplinary care that is adjusted as required to meet the needs of the patient.

^vThe type of specialist wound care practitioner consulted or referred to will depend on the care needs of the patients. This may include specialist nurse practitioners, medical practitioners or other health professionals who have undertaken additional education, training, and qualifications in wound management, as well as specialist wound clinics with multidisciplinary teams. If surgical intervention is required, the patient will be referred to a surgeon, such as a vascular surgeon, plastic surgeon, or general surgeon.

Currently practice nurses are not considered part of the care planning team for the purposes of Team Care Arrangements, which supports general practices to manage patients who require ongoing multidisciplinary care for a chronic condition. Practice nurses however play an essential role in the planning of wound care, and therefore enabling appropriately trained practice nurses be part of the care planning team will be key to the successful implementation of a stepped care model.¹⁵⁶ Additionally, as patients with chronic wounds often suffer from other chronic conditions, access to allied health professionals including podiatrists, occupational therapists, dietitians, physiotherapists, orthotists, and prosthetists is essential to a successful stepped care model.¹⁵⁷ The five MBS-subsidised services which can be accessed under Team Care Arrangements are considered inadequate by both the Allied Health Reference Group and the Wound Management Working Group,^{158,159} and therefore it is recommended that patients with chronic wounds have access to additional MBS-subsidised services, with the referring general practitioner reassessing after every five allied health services.

Raising the cap on the incentive available under the WIP, which supports access to multidisciplinary care in regional, rural, and remote areas,¹⁶⁰ will also be key to enabling a stepped care model in these areas. This will ensure larger practices with more than five full-time general practitioners are able to engage enough nursing and allied health services to meet the care needs of their patients. Importantly, this will mean that patients who visit larger practices are not disadvantaged and are able to access the team-based care that they need. Introducing annual indexation will also be required to ensure the payments to general practices are relevant and support them to build their healthcare team, particularly as the payments under the practice stream have not changed since they were established in 2012 under the former Practice Nurse Incentive Program. Without appropriate indexation, the objectives of the WIP are undermined as the rising costs of employing staff erodes the value of the incentive.

Increasing the cap on the incentive available under the WIP from the current Standardised Whole Patient Equivalent (SWPE) of 5000 (i.e. 5 full-time FTE) to 7000 (i.e. 7 full-time FTE) is estimated to cost around \$48 million in 2022-23 (\$207 million 2022-23 to 2025-26). When an annual indexation of 80 per cent Wage Price Index (WPI) and 20 per cent Consumer Price Index (CPI) is applied, the net cost will be around \$58 million in 2022-23 (\$326 million 2022-23 to 2025-26).

MBS items for wound care assessments and treatment

The Wound Management Working Group outlined several recommendations relating to the creation of new MBS items to support general practices assess and manage chronic wounds. These new MBS items aim to improve the delivery of evidence-based wound care, and include:¹⁶¹

Items for an appropriately trained general practitioner to perform a comprehensive and holistic initial assessment of a chronic wound. As part of this assessment, general practitioners should refer to the Australian Standards for Wound Prevention and Management, including the use of appropriate tools and/or frameworks when undertaking wound assessments.

- Items for appropriately trained general practitioners to perform regular review assessments of a chronic wound. At this point, the general practitioner could assess whether the patient should be referred to a specialist wound care practitioner because the wound is not adequately healing. The general practitioner could consult a specialist wound care practitioner if referral is not appropriate (for example, if there is no local specialist wound care practitioner).
- Items for an appropriately trained practice nurse, Aboriginal and Torres Strait Islander Health Practitioner, or Aboriginal Health Worker to provide short term treatment of a chronic wound. Following either the initial or review assessment by a general practitioner, these items would allow treatment for four weeks up to a maximum of 10 services with a review assessment to be conducted by the general practitioner within the four weeks.

The Wound Management Working Group also made several other recommendations regarding wound MBS items, such as the addition of new items for venous compression bandaging and changes to the existing MBS wound items, however this has not been included in the analysis.

As the intensity of medical and nursing treatment largely depends on the wound, this fee-for-service model would ensure that general practitioners are remunerated for services provided to the patient, as opposed to other models such as block or bundled payments where the rebate is the same regardless of the type of wound and the care required. As recommended by the Wound Management Working Group, these MBS items should also be linked to regular education and training guided by the Australian Standards for Wound Prevention and Management.¹⁶² This will encourage upskilling of those involved in the management of wounds.

A fee-for-service model is also administratively simpler for general practices, and there is an opportunity to leverage the current chronic disease management frameworks for General Practitioner Management Plans and Team Care Arrangements to support implementation of these new MBS items.¹⁶³ As many patients with chronic wounds also have other chronic conditions, there may also be an opportunity to incorporate wound management as part of these existing chronic disease management frameworks.

Importantly, these new MBS items would facilitate a stepped care model for wound care, whereby the assessment and treatment cycles continue, and a specialist wound care practitioner is consulted or the patient is referred to the specialist where the wound does not show adequate signs of healing. These items would enable and encourage service provision and healthcare expertise in excess of that currently subsidised by the WIP, and would introduce a mixed funding model for practice nurses to incentivise and support the delivery of evidence-based care. While telehealth should not be a substitute for face-to-face care, there is an opportunity to implement telehealth MBS items to support a stepped care model, particularly where access to specialist wound care services is required.¹⁶⁴ As highlighted by the Wound Management Working Group, the current MBS wound items should also be updated to enable the provision of evidence-based and financially sustainable wound management.¹⁶⁵

Implementing these new MBS items is estimated to cost the government an additional \$1.7 million in 2022-23 (7.4 million from 2022-23 to 2025-26). This additional cost is on top of what is already funded for the treatment of wounds through the existing MBS consultation structure and the WIP, and accounts for the proposed changes to the consultation structure. The cost however does not account for the cost of a specialist wound care practitioner. As patients with chronic wounds often suffer from other chronic conditions and comorbidities, it is recommended that the proposed new MBS items and funded wound consumables scheme be linked to voluntary patient enrolment to support the delivery of coordinated care. Refer to *Appendix B: Impact of evidence-based wound care* for further details and assumptions on how the cost of these new MBS items was estimated.

Education and training

Implementation of a national education and training program for the management of chronic wounds will be essential to improving competency in the provision of evidence-based wound care in general practice. This education and training program should include how to diagnose a chronic wound, the various management and treatment options, as well as education on when a wound should be referred for expert assessment. Participation in the education and training program should therefore be mandatory for all health professionals responsible for managing chronic wounds in general practices, tailored to the role that each health professional plays in a stepped care model for the management of chronic wounds.

Research indicates that access to specialist wound care practitioners is essential to the delivery of evidence-based care, can result in improved health outcomes, and is an effective and cost-effective use of health resources.¹⁶⁶ As an essential component of the proposed stepped care model, pathways that support the development of specialist wound care practitioners should be assessed to ensure general practitioners have an avenue to refer patients for expert review and advice.

The development of education and training requirements should be coordinated under a national program to prevent duplication and silos within the sector, and codesigned with general practitioners and other health professionals involved in the management of a chronic wound. This will require analysis of existing education and training programs to ensure existing programs are leveraged. It will also require identification of knowledge gaps amongst the health professionals involved in managing wounds, including general practitioners, nurses, Aboriginal and Torres Strait Islander Health Practitioners, Aboriginal Health Workers, nurse practitioners, and pharmacists. All education and training for health professionals should be guided by the Australian Standards for Wound Prevention and Management. It should also include practical guidance materials, such as images of chronic wounds to assess severity and determine when consultation or referral to a specialist wound care practitioner is required. Where possible, wound management education and training should be embedded into continuing professional development (CPD) for health professionals. Furthermore, completion of the required education and training should be a mandatory requirement for claiming the proposed wound management MBS items.

As recommended by the Wound Management Working Group, the proposed subsidised wound consumables scheme should only be available to general practices who are accredited or registered for accreditation against the Royal Australian College of General Practitioners (RACGP) Standards for general practices. Wound management criteria could also be included in these accreditation standards to support the provision of evidence-based wound care.¹⁶⁷

Coordination of wound care initiatives

The current approach to reforming the management of chronic wounds in Australia is largely piecemeal, with governments, universities, research centres, peak bodies and organisations largely taking siloed approaches to the development and implementation of wound care initiatives. This is resulting in duplication of effort, with several initiatives and programs aimed at achieving similar outcomes currently underway. There is an opportunity to implement a national and system-wide program to coordinate the development, implementation and evaluation of programs and initiatives across all levels of the healthcare system involved in the management of chronic wounds. This would include the development and implementation of a national education and training program, oversight of research priorities, coordination of public health campaigns to raise awareness of chronic wounds, and oversight and coordination of other programs and initiatives aimed at improving the delivery of evidence-based wound care. The national program could also be responsible for the Australian Standards for Wound Prevention and Management.

Evidence-based wound care in other healthcare settings

Residential Aged Care Facilities

Chronic wounds also represent a major health burden in RACFs, as the elderly are at a higher risk of impaired skin integrity and infection,^{168,169,170} and often present with other chronic conditions and comorbidities which affect their predisposition to chronic wounds.^{171,172,173} While the ACFI provides some funding for the treatment of chronic wounds, it does not accurately cover the cost of providing evidence-based wound care to this high-risk population.¹⁷⁴ As recommended by the Wound Management Working Group, a review of the funding arrangements for the management of chronic wounds in RACFs should be undertaken to ensure funding is supporting the delivery of evidence-based care.¹⁷⁵ RACFs would also directly benefit from many of the other solutions outlined, including a stepped model of care and access to specialist wound care practitioners, education and training on evidence-based wound care, and better coordination of wound care initiatives. Implementation of solutions however should align to the Royal Commission into Aged Care Quality and Safety recommendations.

Hospitals

Hospital inpatient and outpatient services play an important role in both the prevention and management of chronic wounds. Hospital-acquired pressure injuries, surgical site infections, and other post-operative complications are common conditions which can contribute to, or result in, the development of a chronic wound.^{176,177,178} Mitigating avoidable clinical risks through the delivery of best-practice patient care is key to ensuring these hospital-acquired conditions do not progress into a chronic wound. Additionally, when a chronic wound is unable to be treated in the community, patients may be referred to inpatient or outpatient services for specialist care. Hospitals may therefore benefit from some of the other solutions outlined, including education and training on evidence-based wound care.

Integration of care between healthcare settings

As outlined by the Wound Management Working Group, there is an opportunity to better integrate care between the various healthcare settings as well as develop appropriate mechanisms to enable clinical accountability.¹⁷⁹ This will improve the management of patients with chronic wounds or wounds, as well as ensure that responsibility and cost for treatment is not inappropriately shifted between settings. It will also enable healthcare settings to accurately report the incidence of chronic wounds or hospital-acquired conditions that may result in a chronic wound, which is essential for data-driven quality improvement.

Impact of evidence-based wound care

While it is widely acknowledged that evidence-based wound care results in improved health outcomes for patients, data on the incidence, prevalence, and cost of chronic wounds in Australia is limited. This has made it challenging to determine the economic impact of funding evidence-based wound care. Research however supports the implementation of evidence-based wound care in general practice would be a cost-effective step to reducing the burden of disease on patients and the healthcare system.^{180,181,182}

Impact on hospital admissions

While the underlying chronic conditions which contribute to the development of a chronic wound may eventually result in hospitalisation, the delivery of evidence-based wound care in general practice through new MBS items linked to education and training, a stepped care approach to treating chronic wounds, and subsidised wound consumables should lead to a reduction in hospital admissions. Assuming a modest 20 per cent reduction in hospital admissions, the delivery of evidence-based wound care will result in a saving of \$19.9 million in 2022-23 (\$84.9 million from 2022-23 to 2025-26).

Impact on hospital outpatient clinics

The delivery of evidence-based wound care in general practice is also predicted to reduce the burden on hospital outpatient clinics. While the data on the number of chronic wounds treated in outpatient clinics is limited, it is assumed that approximately 20 per cent of chronic wounds are treated in hospital outpatient clinics, which is consistent with other studies.¹⁸³ Therefore, out of the number of chronic wounds estimated for 2022-23 (76,250), outpatient clinics are estimated to provide approximately 200,000 wound management services during that year. Assuming the delivery of evidence-based care results in 7.5 per cent of patients with chronic wounds transition from receiving care in hospital outpatient clinics to general practice, this would result in a saving of \$22 million in 2022-2023 (\$96.2 million from 2022-23 to 2025-26).

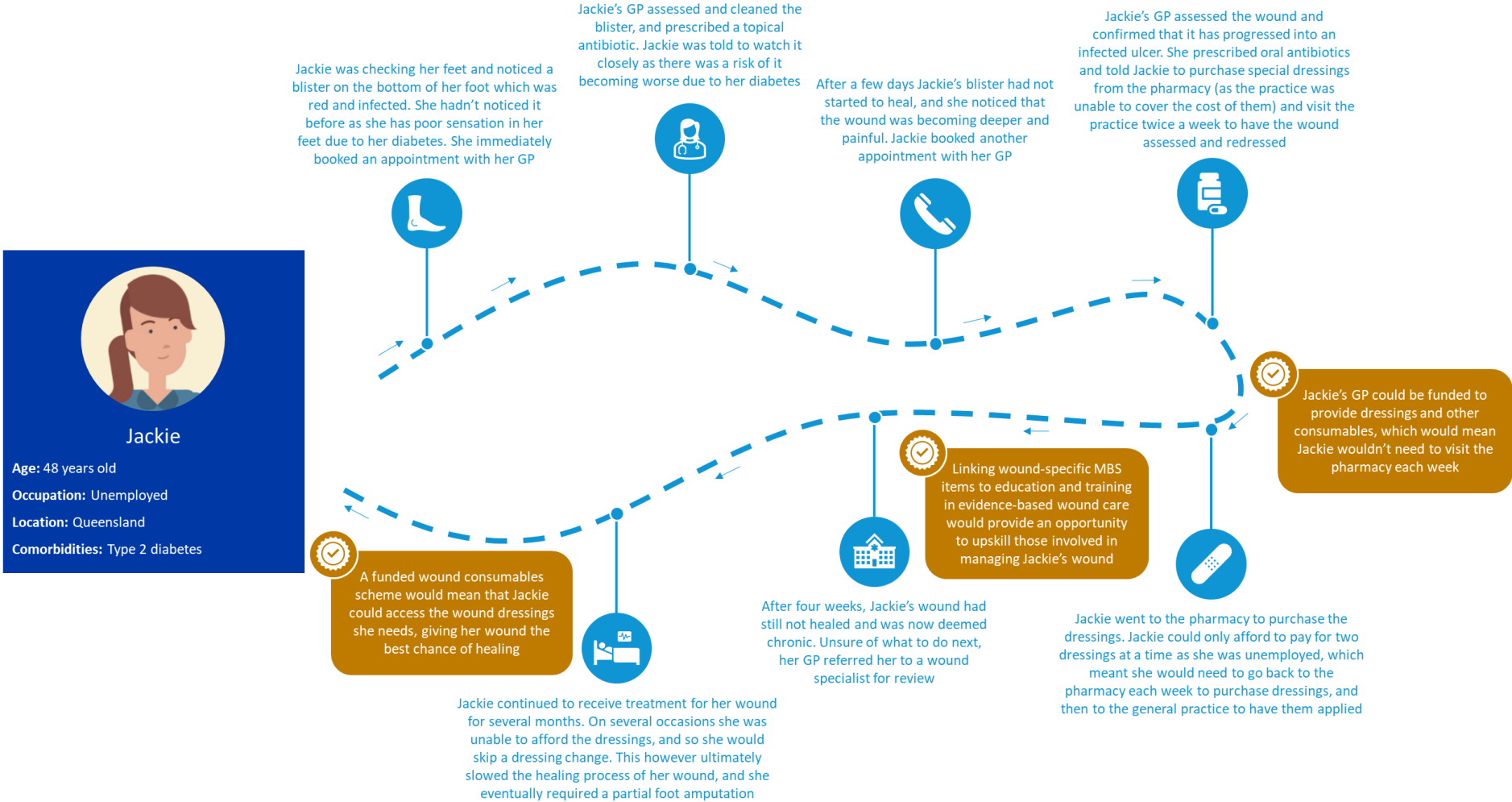
Impact on other community healthcare settings

While the proportion of patients currently receiving care through other community healthcare settings is not able to be quantified with available data, it is likely the delivery of evidence-based wound care will result in some patients transitioning from receiving wound care through other community health settings to general practice. Assuming 2.5 per cent of patients with chronic wounds transition from receiving care in other community healthcare settings to general practice, this will result in an estimated saving of \$1.4 million in 2022-2023 (\$6.3 million from 2022-23 to 2025-26).

Impact on patients

Subsidising the cost of wound consumables is estimated to save patients \$3.7 million in 2022-23 (\$6 million from 2022-23 to 2025-26). The delivery of evidence-based care however would likely reduce healing times for wounds and therefore result in further savings for the patient. Depicted in Figure 4, the provision of evidence-based wound care will also have a profound impact on the patient journey, saving patients both time and money, and improving health outcomes.

Figure 4: Impact of evidence-based care on the patient journey

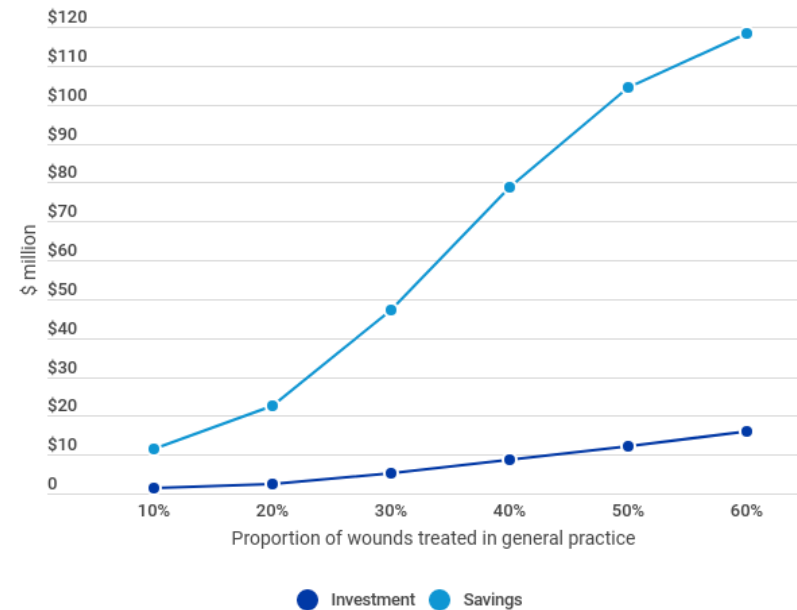


The total savings for the delivery of evidence-based wound care from a 20 per cent reduction in hospitalisation, savings to the patient, and savings from transitioning a proportion of the care currently delivered in hospital outpatient clinics and other community healthcare settings is estimated to be \$47.1 million in 2022-23 (\$203.4 million from 2022-23 to 2025-26). Additionally, the implementation of the MBS items for trained practice nurses, Aboriginal and Torres Strait Islander Health Practitioners, or Aboriginal Health Workers is estimated to “free up” around 148,000 general practitioner consultations in the first year, and 162,000 consultations by the fourth year, as under the current consultation structure a general practitioner is required to be present on all occasions to bill the MBS. As the program continues to expand with more chronic wounds treated in general practice, this will “free up” consultations from other healthcare settings (i.e. hospital outpatient clinics). With Australia now facing a serious general practitioner workforce shortage and a hospital crisis, these MBS items will help support general practices to deliver more care to their communities and reduce the strain on public hospitals.

There is currently a disincentive for patients to receive wound care through their general practice due to the out-of-pocket costs associated with wound consumables. As patients can access free wound consumables through hospital outpatient clinics and other community healthcare settings, a funded wound consumables scheme which subsidises the cost of dressings provided in general practice will remove this disincentive. As the AMA’s modelling indicates that receiving care through the general practice is cheaper than receiving care through a hospital outpatient clinic or other community healthcare setting, it is anticipated that the solutions proposed will result in an overall cost saving to the healthcare system. It is expected that a cost-effective wound care program that delivers evidence-based care will draw more patients over time to receive treatment at their general practice, and the amount saved would continue to increase as the proportion of wounds treated by general practice increases, as depicted in Figure 5. There are also likely to be other savings and benefits which come from the delivery of evidence-based wound care in general practice, such as reduced cases of cellulitis.

As outlined above (see *Past attempts at addressing the burden of chronic wounds*), there is significant work currently underway to determine the cost and efficacy of different wound dressings for the various types of chronic wounds. Where this research demonstrates greater efficacy of some types of dressings for a given wound, the consumables scheme would further enhance the delivery of evidence-based wound care and result in greater savings. There may also be an opportunity to extend the proposed solutions to wounds that are at risk of becoming chronic, however this has not been included in the analysis.

Figure 5: Estimated savings from delivering evidence-based wound care in general practice¹⁸⁴



See *Appendix B: Impact of evidence-based wound care* for further details and assumptions on how the savings from the delivery of evidence-based wound care were calculated.

CONCLUSION

Chronic wounds represent a significant health and economic burden in Australia, presenting a large and in many cases an avoidable cost to patients and the healthcare system. The solutions proposed aim to enable access to affordable evidence-based care that improves the financial sustainability of delivering evidence-based wound care services in general practice and represents value to both the patient and the healthcare system. The AMA's analysis demonstrates that an investment of \$23.4 million in the delivery of evidence-based wound care is estimated to save the health system \$203.4 million, across the forward estimates. This is a return of \$8.68 for every \$1.00 invested into the delivery of evidence-based wound care.



APPENDICES

Appendix A: Estimated cost of chronic wounds

Estimated cost of hospital admissions for chronic wounds

The cost of hospital admissions due to chronic wounds was estimated using the list of underlying causes for admission to hospital from the Australian Institute of Health and Welfare (AIHW) dataset 'principal diagnosis data cubes'.¹⁸⁵ These predominately relate to ICD-10 category 'L00–L99 diseases of the skin and subcutaneous tissue' but also stem from underlying conditions of the circulatory system such as arterial leg ulcers which are counted in the 'I00–I99 diseases of the circulatory system' ICD-10 category. Diabetic foot ulcers are another significant source of ulcers, and are categorised in the 'E00–E89 endocrine, nutritional and metabolic diseases' category. The analysis only included those conditions which specifically relate to ulcers.

Using information from the AIHW on the principal diagnosis for admission to hospital by year and age,¹⁸⁶ the analysis on the direct impact on hospitals was performed. Grouping of similar codes involving admission for treatment which explicitly has a wound as the principal diagnosis was performed. For example, diabetic foot includes all diagnoses which lists a 'foot ulcer' and 'diabetes' together, such as principal diagnosis code E11.73: Type 2 diabetes mellitus with foot ulcer due to multiple causes.¹⁸⁷ For the analysis, chronic wounds were grouped into four categories: diabetic foot ulcer, arterial leg ulcer, venous leg ulcer and other skin ulcer.

Data on the reason for a hospital admission (ICD-10 code) provided by the AIHW^{188,189,190} can be matched to a specific treatment (DRG code) which is provided and costed by the Independent Hospital Pricing Authority (IHPA), enabling the cost of hospital admissions to be estimated. The estimated cost of \$352 million for chronic wounds was calculated based on the average cost of the DRG treatment codes associated with conditions in the circulatory system¹⁹¹ and skin.^{192,193}

Estimated cost to labour force

45 per cent of hospital separations for diabetic foot ulcers, arterial leg ulcers, venous leg ulcers and other skin ulcers are of working age cohorts aged 20 to 69.¹⁹⁴ Of these, age specific employment to population ratio, estimated by the Australian Bureau of Statistics (ABS),¹⁹⁵ indicates that approximately 32.3 per cent of this working age cohort would be employed in the labour force. Based on labour income lost for the direct patient-days in hospital (depicted in Table 1), the direct cost to the labour force was estimated to be \$21 million.¹⁹⁶

Estimated cost of hospital admissions for cellulitis

The estimated cost of \$349 million in the financial year 2019-20 for cellulitis¹⁹⁷ was calculated using the number of separations for cellulitis and the average cost using the latest IHPA cost¹⁹⁸ for major diagnostic category 09, disorders of the skin.

Estimated cost of surgeries

Surgery items have an assigned DRG which makes it simple to identify and cost them, with IHPA providing an efficient price estimate for each DRG code. The DRG code for lower limb procedures with skin ulcers is J12 – 'Lower limb procedures with ulcer or cellulitis', and the DRG code for diabetic foot ulcers is K01 'general interventions for diabetic complications' (only the proportion relating to diabetic foot have been included in the analysis). The proportion relating to 'diabetic foot' was determined from the AIHW 'principal diagnosis data cube'¹⁹⁹ which lists the detail behind the main reason for being admitted to hospital for each hospital admission as well as the age of patients and the number of patient days. The methodology counts only those hospitalisations which directly relate to the narrow definition which lists 'foot ulcer'. Arterial leg ulcers and venous leg ulcers do not have a separate surgical code and so have not been included in the analysis. Additionally, surgeries that involve an ulcer but do not have the ulcer listed as the principal diagnosis have also been excluded. It is therefore likely that this is a conservative estimate of the cost of surgeries.

Appendix B: Impact of evidence-based wound care

Table 2 provides a summary of the impact of treating 30 per cent of all diabetic foot ulcers, arterial leg ulcers and venous leg ulcers in general practice with the proposed MBS items for wound care assessment and treatment, as well as the proposed funded wound consumables scheme. Additional investments and savings could be achieved by treating other types of chronic wounds however this analysis was limited to diabetic foot ulcers, venous leg ulcers, and arterial leg ulcers.

Table 2: Summary of the impact of evidence-based wound care²⁰⁰

	2022-23	2023-24	2024-25	2025-26	TOTAL
Cases	76,250	78,750	81,000	83,250	319,250
Hospitalisation	27,750	28,750	30,000	31,250	117,750
Investment					
MBS \$mil	\$1.7	\$1.8	\$1.9	\$2.1	\$7.4
Consumables \$mil	\$3.7	\$3.9	\$4.1	\$4.3	\$16.0
Total investment	\$5.3	\$5.7	\$6.0	\$6.4	\$23.4
Savings in-patient hospital	\$19.9	\$20.8	\$21.6	\$22.6	\$84.9
Patient savings	\$3.7	\$3.9	\$4.1	\$4.3	\$16.0
Out-patient savings	\$22.0	\$23.4	\$24.7	\$26.1	\$96.2
Other community savings	\$1.4	\$1.5	\$1.6	\$1.7	\$6.3
Total saved	\$47.1	\$49.6	\$52.1	\$54.7	\$203.4
Return on investment multiple	8.808	8.72	8.65	8.57	8.68

Key assumptions underpinning analysis

The following assumptions underpin the analysis and costings presented in this research report.

Estimating the prevalence of chronic wounds in Australia

The AMA has utilised the available data from public sources to estimate the prevalence of chronic wounds in Australia. These include diabetic foot ulcers, venous leg ulcers, and arterial leg ulcers. These are broad estimates defined as a share of the population with diabetes, prevalence per 100,000 in each age cohort for arterial leg ulcers, or both under and over the age of 60 for venous leg ulcers, based on a study conducted in Western Australia.²⁰¹

- Prevalence of diabetic foot ulcers was estimated to be 1.7 per cent of the population with diabetes. When allowing for re-occurrence, the prevalence is estimated to be 2.2 per cent of the population with diabetes across the year.²⁰² A ratio of 1.3 was applied to account for recurrence across the year for venous leg ulcers and arterial leg ulcers.
- Prevalence of chronic leg ulcers is based on a study of prevalence screening in a metropolitan population of 238,000 people, 90 per cent of whom were aged over 60 years. The prevalence among the 60 years and over cohort was 3.3 per 1,000 people for a chronic leg ulcer.²⁰³ The same study indicated 57 per cent of these chronic leg ulcers were venous leg ulcers. The number and aged distribution of ulcers among the under 60 years population is based on the ratio of actual hospitalisations for venous leg ulcers in the under 60 years to over 60 years population, which is approximately 20 per cent of total hospitalisations.
- Data on prevalence of arterial leg ulcers is less robust than venous leg ulcers, however there has been a conservative assumption that arterial leg ulcers comprise approximately half of the remaining chronic leg ulcers observed, or approximately 20 per cent of the total leg ulcers from the 238,000 sample population.²⁰⁴ This is congruent with the hospitalisation data for arterial leg ulcers.

Estimating the cost of evidence-based wound care

The following assumptions have been made in estimating the cost of evidence-based wound care:

- The new MBS items (calculated using 2021-22 benefit rates) would allow for the general practitioner to undertake a comprehensive initial assessment of the wound for \$75.75. Subsequent reviews by the general practitioner of wounds cost \$39.10.²⁰⁵ These new MBS items would cover the time it takes for the general practitioner to perform a comprehensive review of the wound. Additional MBS items could be claimed in clinically appropriate circumstances for unrelated services.
- The new allied health MBS item for applying the wound dressing would cost \$14.70 for consultations less than 20 minutes, or \$23.50 for consultations 20 minutes and over.²⁰⁶ The costings assume that 85 per cent of wound dressing changes would take less than 20 minutes, with 15 per cent taking 20 minutes or more.²⁰⁷
- Following initial assessment or review of the wound by a general practitioner, a maximum of 10 services for dressing changes can be claimed during a four week period, after which review by the general practitioner is required. The costings assume an average of nine services for dressing changes per cycle of treatment.²⁰⁸
- Most wounds are expected to heal with one cycle of treatment, however difficult wounds may require subsequent treatment cycles. The costings assume that 90 per cent of wounds will be healed within one treatment cycle, with the remaining 10 per cent being healed within two treatment cycles.²⁰⁹
- Where a wound is not healing adequately, a specialist wound care practitioner should be consulted or the patient be referred to the specialist where the wound does not show adequate signs of healing. The cost of the specialist wound care practitioner, and additional treatment cycles, has not been included in this analysis.
- 20 per cent of all chronic wounds are assumed to be treated in general practices. There are currently no MBS items for the services provided by the nurse, so it is assumed that the general practitioner charges a Level A MBS consultation item (\$17.90) 80 per cent of the time and a Level B MBS consultation item (\$39.10) the remaining 20 per cent.^{210,211} There is a small allowance for allied health under the current subsidy arrangements utilising the WIP, estimated at \$3.02 per dressing based on a 25% subsidy and 12 minutes per dressing.²¹²
- It is assumed that the average wound takes 13 weeks to heal, and that one dressing change is required per week. Therefore, the average number of dressings (and therefore consultations) per chronic wound is assumed to be 13. This is a conservative assumption as literature suggests this can be up to 6 months.²¹³
- The AMA has calculated the cost of wound services delivered by an allied health professional in the home to be \$57.04 per service. This is based on 22 minutes of travel time and 40 minutes of care time.²¹⁴ The time was based on an industry survey conducted by KPMG in 2013.
- The DVA services are assumed to be 5 per cent of all treated wounds, estimated to cost \$67.17 per service. This is based on the DVA Community Nursing schedule of fees, after 1 January 2022, for 50 services in a week delivered by a consulting nurse (NL26 = \$3,358.25 for the bundle of 50 clinical services).²¹⁵
- It is assumed that 20 per cent of patients with chronic wounds are treated in hospital outpatient clinics, costing \$253 per service in 2019-20 estimated by the IHPA.²¹⁶
- Wound consumables are assumed to cost \$25.00 for venous leg ulcers (due to the use of compression therapy), and \$20.00 for all other types of wound consumables, per consumable change. This cost is an estimated average cost based on consultation with industry experts (at wholesale prices), however the cost of consumables and products is dependent on multiple factors such as the size, severity, and type of wound, patient comorbidities etc.
- Concession card holders are estimated to be approximately 70 per cent of patients with chronic wounds given the age profile of those with chronic wounds.

- Increasing the cap for the SWPE from 5,000 to 7,000 is based on the distribution of nurses among general practitioners under the last available Practice Nurse Incentive Program data by Services Australia in 2018-19, the distribution of SWPE across practices using the Department of Health's number of GPs and the distribution of part-time/full-time,²¹⁸ and the size of a general practice based on the RACGP 'Health of the nation' report²¹⁹ was estimated to cost \$375.9 million among the 5,393 practices. The cost to increase the cap to 7,000 and index the rate of payment is estimated to cost \$326.1 million across the 4 year forward estimates 2022-23 to 2025-26.
- The current model of wound management requires the general practitioner to schedule a consultation with the patient to access the MBS. Under the proposed new MBS items, the majority treatment will be provided by a trained practice nurse, Aboriginal and Torres Strait Islander Health Practitioner, or Aboriginal Health Worker, with the general practitioner performing regular assessments. Using the conservative assumption that it takes 13 consultations for a chronic wound to heal under the current model of care. In the proposed model the general practitioner will account for 3.3 consultations (assuming that the initial consultation is equivalent to two regular consultations). The remaining 9.7 consultations will be delivered by the trained practice nurse, Aboriginal and Torres Strait Islander Health Practitioner, or Aboriginal Health Worker, with the general practitioner performing regular assessments. Under the assumption that 20 per cent of the chronic wound cohort receives care from the general practice, it is estimated that around 148,000 general practitioner consultations in the first year, and 162,000 consultations by the fourth year would be "freed up".

Appendix C: Chronic wounds included in analysis

The analysis only includes hospitalisations with an ICD-10-AM^{vi} code which directly relates to a condition of a wound with an ulcer, as well as arterial leg ulcers which have progressed to gangrene. The analysis to estimate the impact of evidence-based wound care focused on chronic wounds where data on estimated prevalence was available, and chronic wounds that could be defined as diabetic foot ulcers, arterial leg ulcers, and venous leg ulcers.

Table 3: List of chronic wounds and corresponding ICD-10-AM codes included in analysis

AMA BROAD CATEGORY	ICD-10-AM CODE
Diabetic Foot (DFU)	E10.73 Type 1 diabetes mellitus with foot ulcer due to multiple causes
Diabetic Foot (DFU)	E11.73 Type 2 diabetes mellitus with foot ulcer due to multiple causes
Diabetic Foot (DFU)	E13.73 Other specified diabetes mellitus with foot ulcer due to multiple causes
Diabetic Foot (DFU)	E14.73 Unspecified diabetes mellitus with foot ulcer due to multiple causes
Arthritic Leg Ulcer (ALU)	I70.23 Atherosclerosis of arteries of extremities with ulceration
Arthritic Leg Ulcer (ALU)	I70.24 Atherosclerosis of arteries of extremities with gangrene
Venous Leg Ulcer (VLU)	I83.0 Varicose veins of lower extremities with ulcer
Venous Leg Ulcer (VLU)	I83.2 Varicose veins of lower extremities with both ulcer and inflammation
Ulcer (Other)	L97.0 Ulcer of foot
Ulcer (Other)	L97.8 Ulcer of lower limb, other sites
Ulcer (Other)	L97.9 Ulcer of lower limb, unspecified
Ulcer (Other)	L98.4 Chronic ulcer of skin, not elsewhere classified
Cellulitis (lower limb or foot)*	L03.13 Cellulitis of lower limb
Cellulitis (lower limb or foot)*	L03.14 Cellulitis of foot

*Note: analysis of the total cost of hospital admissions due to cellulitis was performed for reference, however cellulitis was not included in the analysis to estimate the impact of evidence-based wound care, as the proportion of cellulitis presentations related to a chronic wound was unable to be determined using the available ICD-10-AM data. The total cost of hospital admissions due to cellulitis however was provided for reference.

^{vi}International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM) – used to classify diseases, injuries and related health problems

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Aggregate counts by DRG: J12A Lower Limb Procs W Ulcer/Cellulitis W Cat CC, J12B Lower Limb Procs W Ulcer/Cellulitis W/O Cat CC W Skin Graft/Flap Repair, J12C Lower Limb Procs W Ulcer/Cellulitis W/O Cat CC W/O Skin Graft/Flap Repair, K01 - OR Procedures for Diabetic Complications has been adjusted for the share attributed to diabetic foot ulcers being the ratio of surgical interventions to medical treatments performed for the DRG codes related to diabetic complication admissions (K01 and K60) as applied to the total of admissions for diabetic foot ulcers from the principal diagnosis data cube as indicated in earlier tables.

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- Separation statistics by principal diagnosis (ICD-10-AM 11th edition), Australia, 2015-16 to 2019-20. Separation statistics by principal diagnosis, Aggregate counts for principal diagnosis at 5-character level: Data, (column F 'Age Group', Column I 'Separations').

¹⁸⁷Australian Institute of Health and Welfare. (2021). *Principal Diagnosis data cubes*. Retrieved 04/05/2022 from: <https://www.aihw.gov.au/reports/hospitals/principal-diagnosis-data-cubes/contents/data-cubes>

Separation statistics by principal diagnosis (ICD-10-AM 11th edition), Australia, 2015-16 to 2019-20

These are organised by 'Diagnosis chapter' for the underlying cause of the disease. An admission listed as "E10.73 Type 1 diabetes mellitus with foot ulcer due to multiple causes" is listed under the "E00–E89 Endocrine, nutritional and metabolic diseases" classification. The diagnosis relates to the 'foot ulcer' and is a direct result of a "circulatory complication". If the patient was admitted with diabetes mellitus with a condition relating to the eye it would have been listed as "E10.3 Type 1 diabetes mellitus with ophthalmic complication".

This definition has been chosen to narrow the scope of admissions to those explicitly involving wounds, excluding others even though the cause of the wound may relate to underlying co-morbidities.

¹⁸⁸Australian Institute of Health and Welfare. (2021). *Principal Diagnosis data cubes*. Retrieved 04/05/2022 from: <https://www.aihw.gov.au/reports/hospitals/principal-diagnosis-data-cubes/contents/data-cubes>

Separation statistics by principal diagnosis (ICD-10-AM 11th edition), Australia, 2015-16 to 2019-20.

Separation statistics by principal diagnosis, Aggregate counts for principal diagnosis at 5-character level: Data, (column E - '5 digit diagnosis').

¹⁸⁹Australian Institute of Health and Welfare. (2021). *Admitted patients*. Retrieved 04/05/2022 from: <https://www.aihw.gov.au/reports-data/myhospitals/sectors/admitted-patients>

Data on cost of care for 2019-20 obtained from Table 7.4: Selected cost statistics(a), by Major Diagnostic Category version 9.0 and DRG partition, public hospitals. The cost of the treatments for these admissions has been given the average cost of Major Diagnostic Category (MDC) that best relates to the treatment rather than the underlying disease. In this case someone with a circulatory complication from diabetes mellitus would be given the average cost of MDC category 05, "Diseases and disorders of the circulatory system".

¹⁹⁰Independent Hospital Pricing Authority. (2021). *National Efficient Price Determination 2021-22*. Retrieved 04/05/2022 from: <https://www.ihoa.gov.au/publications/national-efficient-price-determination-2021-22>

The Major Diagnostic Category cost is adjusted for cost indexation implied by the Independent Hospital Pricing Authority National Efficient Price Determination 2021 of 2.7% since 2019-20.

¹⁹¹Australian Institute of Health and Welfare. (2021). *Admitted patients*. Retrieved 04/05/2022 from: <https://www.aihw.gov.au/reports-data/myhospitals/sectors/admitted-patients>

The cost of the treatments for these admissions has been given the average cost of Major Diagnostic Category (MDC) that best relates to the treatment rather than the underlying disease. In this case someone with a skin ulcer, "Diseases and disorders of the skin, subcutaneous tissue and breast".

Data on cost of care obtained from Table 7.4: Selected cost statistics(a), by Major Diagnostic Category version 9.0 and DRG partition, public hospitals, 2019–20.

¹⁹²Independent Hospital Pricing Authority. (2021). *National Efficient Price Determination 2021-22*. Retrieved 04/05/2022 from: <https://www.ihoa.gov.au/publications/national-efficient-price-determination-2021-22>

¹⁹³The Major Diagnostic Category cost is adjusted for cost indexation implied by the Independent Hospital Pricing Authority National Efficient Price Determination 2021 of 2.7% since 2019-20.

¹⁹⁴Australian Institute of Health and Welfare. (2021). *Principal Diagnosis data cubes*. Retrieved 04/05/2022 from: <https://www.aihw.gov.au/reports/hospitals/principal-diagnosis-data-cubes/contents/data-cubes>

Separation statistics by principal diagnosis (ICD-10-AM 11th edition), Australia, 2015-16 to 2019-20.

Calculations based on hospitalisations of those aged 0-69 for conditions involving diabetic foot ulcers, arterial leg ulcers, venous leg ulcers and all other ulcers, in the AIHW principal diagnosis data cube. Aggregate counts for principal diagnosis at 5-character level: Data, (column E - '5 digit diagnosis' combined with Column F, 'Age Cohort')

¹⁹⁵Australian Bureau of Statistics. (2022). *Labour Force, Australia, Detailed*. March 2022. Retrieved 04/05/2022 from: <https://www.abs.gov.au/statistics/labour/employment-and-unemployment/labour-force-australia-detailed/latest-release>

Labour Force Australia Detailed, Table 01. Labour force status by Age, Social marital status, and Sex

¹⁹⁶Australian Bureau of Statistics. (2021). *Average Weekly Earnings, Australia*. November 2021. Retrieved 04/05/2022 from: <https://www.abs.gov.au/statistics/labour/earnings-and-working-conditions/average-weekly-earnings-australia/latest-release>

'All employees average weekly total earnings' allowing for part-time workers has been used.

¹⁹⁷Australian Institute of Health and Welfare. (2020). *Principal Diagnosis data cubes*. Retrieved 04/05/2022 from: <https://www.aihw.gov.au/reports/hospitals/principal-diagnosis-data-cubes/contents/data-cubes>

Separation statistics by principal diagnosis (ICD-10-AM 11th edition), Australia, 2019-20.

Aggregate counts for principal diagnosis at 5-character level: Data, (column E - L03.13 Cellulitis of lower limb and L03.14 Cellulitis of foot)

¹⁹⁸Australian Institute of Health and Welfare. (2021). *Admitted patients*. Retrieved 04/05/2022 from: <https://www.aihw.gov.au/reports-data/myhospitals/sectors/admitted-patients>

Admitted patient care 2019-20: Costs and funding. Table 7.4: Selected cost statistics, by Major Diagnostic Category version 9.0 and DRG partition, public hospitals, 2019-20, 09 Diseases and disorders of the skin, subcutaneous tissue and breast.

¹⁹⁹Australian Institute of Health and Welfare. (2021). *Principal Diagnosis data cubes*. Retrieved 04/05/2022 from: <https://www.aihw.gov.au/reports/hospitals/principal-diagnosis-data-cubes/contents/data-cubes>

Separation statistics by principal diagnosis (ICD-10-AM 11th edition), Australia, 2019-20.

Aggregate counts for principal diagnosis at 5-character level: Data, (column E - E10.73 Type 1 diabetes mellitus with foot ulcer due to multiple causes, 'E11.73 Type 2 diabetes mellitus with foot ulcer due to multiple causes', 'E13.73 Other specified diabetes mellitus with foot ulcer due to multiple causes' and 'E14.73 Unspecified diabetes mellitus with foot ulcer due to multiple causes')

²⁰⁰AMA modelled calculations of cost based on per case treatment cost under the proposed MBS items in a general practice setting compared with existing cost of treatment options under existing MBS Level A, B,C,D structure and the WIP. Other community savings was estimated per dressing change. Out-patient services cost was estimated by AIHW 'wound management' non-admitted item number 40.13. Consumables was estimated at \$20.00 per dressing. Further detail is provided on all key assumptions in Appendix B.

²⁰¹Baker, S. R., Stacey, M. C., Jopp-McKay, A. G., Hoskin, S. E., & Thompson, P. J. (1991). Epidemiology of chronic venous ulcers. *Journal of British Surgery*, 78(7), 864-867.

²⁰²Armstrong, D. G., Boulton, A. J., & Bus, S. A. (2017). Diabetic foot ulcers and their recurrence. *New England Journal of Medicine*, 376(24), 2367-2375.

²⁰³Baker, S. R., Stacey, M. C., Jopp-McKay, A. G., Hoskin, S. E., & Thompson, P. J. (1991). Epidemiology of chronic venous ulcers. *Journal of British Surgery*, 78(7), 864-867.

Prevalence for people over the age of 60 was used as the benchmark for that cohort as the sample of those under 60 with an ulcer is much smaller. Instead, the prevalence for ulcers under the age of 60 was determined as a relative rate compared with over 60s based on the ratio of hospitalisation of the same ulcer conditions and ages.

²⁰⁴Baker, S. R., Stacey, M. C., Jopp-McKay, A. G., Hoskin, S. E., & Thompson, P. J. (1991). Epidemiology of chronic venous ulcers. *Journal of British Surgery*, 78(7), 864-867.

²⁰⁵Wound Management Working Group, Medicare Benefits Schedule Review Taskforce. (2020). *Report from the wound management working group*. Retrieved 04/05/2022 from: <https://www.health.gov.au/resources/publications/report-from-the-wound-management-working-group>

Recommendation 1: GP Initial wound assessment, Recommendation 2: GP wound assessment review

Appendix B: Proposed descriptor for new item for GP initial assessment of wound and relevant clinical assessments for initial and subsequent assessments

²⁰⁶Wound Management Working Group, Medicare Benefits Schedule Review Taskforce. (2020). Report from the wound management working group. Retrieved 04/05/2022 from: <https://www.health.gov.au/resources/publications/report-from-the-wound-management-working-group>

Recommendation 3a: Practice Nurse wound treatments

²⁰⁷AMA consultation with expert general practitioners on the proportion of wounds likely to require longer than 20 minutes for a dressing.

²⁰⁸AMA consultation with wound care experts estimated a reasonable average of nine services for dressing changes per cycle of treatment. This is conservative estimate when the maximum recommended by the Wound Management Working Group, Medicare Benefits Schedule Review Taskforce recommended 10 services.

²⁰⁹AMA consultation with wound care experts on the proportion of patients that would require a second cycle of treatment for the wound to heal, or alternatively to then be sent to a specialist wound care practitioner.

²¹⁰Medicare Benefits Schedule. (2022). *Medicare Benefits Schedule – Item 3*. Retrieved 04/05/2022 from: <http://www9.health.gov.au/mbs/fullDisplay.cfm?type=item&q=3&qt=item>

The proportion of items claimed was determined in consultation with clinical experts in wound care. This proportion is likely to vary by practice and by method of treatment/billing.

²¹¹Medicare Benefits Schedule. (2022). *Medicare Benefits Schedule – Item 23*. Retrieved 04/05/2022 from: <http://www9.health.gov.au/mbs/fullDisplay.cfm?type=item&q=23>

The proportion of items claimed was determined in consultation with clinical experts in wound care. This proportion is likely to vary by practice and by method of treatment/billing.

²¹²Queensland Health. (2021). *Wage rates – nursing stream*. Retrieved 04/05/2022 from: <https://www.health.qld.gov.au/hrpolicies/salary/nursing>

The 25 per cent subsidy is based on the maximum \$25,000 WIP subsidy for a registered nurse where salary for a registered nurse with five years of experience is \$84,015 before on-costs, or approximately \$100,000 after allowing for superannuation, payroll tax and other on-costs, according to the Queensland Health The salary for enrolled nurses, aboriginal health workers etc. would be lower, approximately \$60,000 to \$65,000 but the subsidy is also lower at \$12,500. For simplicity, the 25 per cent subsidy rate was used in the analysis.

²¹³McCosker, L., Tulleners, R., Cheng, Q., Rohmer, S., Pacella, T., Graves, N., & Pacella, R. (2019). Chronic wounds in Australia: a systematic review of key epidemiological and clinical parameters. *International wound journal*, 16(1), 84-95.

²¹⁴AMA calculations based on at home delivered care with a travelling nurse. The fixed cost of a car per visit is \$3.74 allowing for purchase/lease cost, registration, insurance, \$2.67 per visit allowing for 20 kms per visit as well as \$50.63 for the cost of a nurse per visit, allowing for 40 minutes per visit and 22 minutes for travel time. Home visits are typically slower than in-room visits due to the time to meet with the patient and gain familiarity.

²¹⁵Department of Veterans' Affairs. (2022). *DVA Community Nursing Schedule of Fees, Core Items, 1 January 2022*. Retrieved 04/05/2022 from: <https://www.dva.gov.au/sites/default/files/2021-12/community-nursing-schedule-of-fees-1-january-2022.pdf>

Wound care counts as clinical time on the DVA schedule, if it is the sole reason for visit then those would count towards a 'Long visit' of 21 minutes or more, presuming the nurse can perform 50 visits per week, they can claim \$3,358.25 for their entire week of work or \$67.17 per visit. The final average price per visit will depend on how many services are performed and type of service however the amount will not vary significantly as the schedule is designed to adjust the price for quantity ratio. The simplest way to remove this complication is to account for one type of nurse that only provides specialist wound care travelling to clients.

²¹⁶Independent Hospital Pricing Authority. (2022). *National Benchmarking Portal*. Retrieved 27/07/2022 from: <https://benchmarking.ihpa.gov.au/extensions/ihpanbp/index.html#/periodic-insights/overview>

Dashboard filters: Stream (non-admitted), Tier 2 (40.13 Wound Management), Year (2019-20).

²¹⁷Australian Government Services Australia. (2019). *2018-19 Annual Report*. Retrieved 05/04/2022 from: <https://www.servicesaustralia.gov.au/sites/default/files/annual-report-191019-v2.pdf>

Table 28: Practice Nurse Incentive Program

²¹⁸Australian Government Department of Health. (2018). *2018 Doctors in Focus*. Retrieved 04/05/2022 from: <https://hwd.health.gov.au/resources/publications/factsheet-mdcl-2018-full.pdf>

Table 4: Principal area headcount, 2015 and 2018, Table 5: Principal area full time equivalent (FTE), 2015 and 2018

²¹⁹Royal Australian College of General Practitioners. *Health of the Nation Report 2021*. Retrieved 04/05/2022 from: https://www.racgp.org.au/getmedia/714e4ef3-1163-437d-839b-81fb4610c6a3/ID-949-HOTN-21-summary-v4-WEB_1.pdf.aspx



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