

Organisational models of care for chronic wound

Evidence check

24 June 2021

Peer-reviewed research evidence

Evidence report question

1. What evidence is available on organisational models to deliver chronic wound care and prevention?
2. What models of care or their components have been recommended by national and international wound care organisations in preventing or managing chronic wounds?

In brief

Question 1 organisational models evaluated by systematic reviews

This evidence check incorporates findings from 17 systematic reviews, meta-analyses and integrative reviews published in the last 10 years.

The reviews included:

Home-based telemedicine for wound care

- Home-based telemedicine for wound care includes remote telemonitoring (electronically transmitting patient information through a secure network to health care professionals who assess it and provide their recommendations accordingly) and teleconsultations (real-time medical consultation between a patient and a health care professional using an electronic network, such as the internet).
- A 2018 systematic review found that home-based telemedicine programs reduced care costs for various chronic conditions, including chronic wounds, although detailed cost data were either incomplete or not presented in detail.(1)
- Teleconsultations and remote monitoring for diabetic foot care were associated with significant improvements in mortality rate (8 of 193 vs 1 of 181; $P = 0.0001$) and in all wound types, remote monitoring was associated with improved wound healing rates (risk ratio 1.50, CI 1.06–2.13, $p = 0.02$) when compared to control groups. However, across wound types including diabetic foot ulcers, there were no statistically significant differences between patients managed via telemedicine versus conventional care in healing time (adjusted and unadjusted for age), unhealed ulcers, amputations, odds of complete ulcer healing and wound size.(2, 3)
- Telemedicine, for example, email, telephone, Skype and mobile apps, was similar in efficacy and safety as conventional (face-to-face) care modality of chronic wounds for outcomes, including wound healing and healing time.(4, 5) One systematic review found that telemedicine was more effective at reducing risk of amputation in randomised controlled trials (RR 0.45, 95% CI 0.29–0.71; $p=0.001$).(4)

Community-based social model of care

- The Lindsay Leg Club is a community-based social model of care in 30 locations predominantly in the United Kingdom. For chronic leg wounds, it had a positive impact on ulcer healing and recurrence, mood, sleep, quality of life and pain. It was also more cost-effective than usual care and was viewed positively by patients and nurses, with particular emphasis on improved social interactions and delivery of patient-centred care.(6)

Nurse-led wound care, in various care settings

- Community-based, nurse-led wound care was found to be cost effective, reported high levels of client satisfaction and contributed to improved wound healing and reduced levels of pain.(7)
- An integrative review found that in nurse-led wound centres, a multidisciplinary approach was likely to achieve better patient outcomes, while patient-centred care with strong patient engagement was likely to assist patients' compliance with treatment.(8)
- A systematic review on the impact of advanced practice nursing in residential aged care showed long-term care residents being managed by advanced practice nurses were more likely to be free of pressure ulcers, or had improvements in pressure ulcer rates, compared to residents receiving the usual care.(9)
- The introduction of hospital-based, nurse-led care has a positive effect and reduces the risk of developing pressure ulcers.(10)
- An integrative review highlighted little consensus on the level of competence, educational requirements and qualifications required to practice as a wound care nurse.(11)

Multidisciplinary wound care team

- There is no standard definition of a multidisciplinary wound care team. In the included studies, 'multidisciplinary teams' refers to at least two healthcare professionals from different disciplines caring for patients using a coordinated approach.
- In 2015, a systematic review sought to assess the impact of wound care teams in preventing and treating pressure ulcers but was unable to identify any studies.(12)
- A 2018 Cochrane review found inconclusive evidence on the impact of care delivered by a multidisciplinary wound care team versus standard care by a single professional.(13)
- Two systematic reviews were conducted on diabetic foot ulcer management by multidisciplinary teams.(14, 15) Care delivery by a multidisciplinary team led to a reduction in major amputations in 94% (31 of the 33) of studies.(14) Compared to delivery of care by an individual health professional or using an unstructured, non-collaborative care model, care by multidisciplinary teams improved outcomes such as severity of amputation, death rates, length of hospital stay, ulcer healing and quality of life.(15)
- A 2020 systematic review found that managing diabetic patients via specialist vascular limb salvage services with medical and surgical management of peripheral arterial disease and infection was associated with improved rates of major amputation. However, there were no significant changes in minor amputation and mortality rates.(16)

Care delivered by informal carers

- A 2015 integrative review found that the current literature rarely focuses on the role of the informal carer in wound management as the aim of the research. As a result, the experience of informal carers in relation to wounds comprises only a component of the research findings.(17) However, from the 23 mainly qualitative studies reviewed, informal carers were found to play a valuable role in wound management and prevention. These people were also faced with significant physical and psychological impacts of caregiving without structured information, support or training for informal carers.(17) They often flagged this as an area of need.

- The 2018 Cochrane review assessed transmural care, a model that provides activities to support patients and their family or partners. However, it was unable to find any clear evidence of the benefits of this model on incidence of pressure ulcers.

Hospital-in-the-home care

- The 2018 Cochrane review found inconclusive evidence on the delivery of wound care via a hospital-in-the-home model, compared to in-patient care, due to poor quality of evidence.(13)

Question 2 recommended models from expert groups

- International guidelines and recommendations on the prevention and management of diabetic foot ulcers advocate for integrated foot care, for example, multidisciplinary foot care team, regular patient examination, structured education of patients and health professionals. The guidelines also recommend early identification and prevention of surgical wound complications using a patient-centred approach.(18–21)
- Guidance from international, Australian, Canadian and UK organisations for overall chronic wound management and care is based on:
 - A **home-based wound care** approach based on the components of the Chronic Care Model, including patient self-management and decision support, access to community resources and organisation of health care.(18)
 - A **community-based, open access social model of care**, The Lindsay Leg Club, which has proven extremely effective for a range of outcomes such as improved healing time (within two months), lower rate of ulcer recurrence, high patient and staff satisfaction, member wellbeing and cost-effectiveness.(19)
 - A **stepped wound care approach for Australian primary care**, whereby general practitioners (GPs) are upskilled to correctly diagnose and manage chronic wounds and those people at high risk of becoming chronic. The GPs would make referrals to appropriate specialist wound care practitioners when required.(20)
 - **Outpatient wound clinics** to enable and improve access to quality wound treatment for patients without requiring them to travel further to wound specialists or vascular surgeons. Wound clinics can be implemented in primary care, such a general practice, and in secondary or tertiary care settings.(21, 22) Secondary level wound specialty clinics, such as transdisciplinary outpatient clinics run by appropriately trained healthcare providers, could fill referral gaps in the community, provide education and training in wound management and encourage the implementation of evidence-based wound management.
 - **The Champions for Skin Integrity** model of wound care, which has been successfully trialled in 835 residential aged care facilities in Australia. This involves local champions being identified and trained to be key contacts and supports for healthcare staff.(23)
 - **Models of care across settings**, including organisational and health system-level policies to optimise the provision and delivery of services for wound management that responds to the needs of patients, carers and families and empowers healthcare staff.(24-28)

Background

Chronic wounds have a substantial impact on those who suffer from them, on their carers and on the healthcare system.(29) Approximately 450,000 cases of patients with wounds present to the healthcare system in Australia each year, with annual costs estimated to be \$3 billion.(30)

In NSW, wound care is uneven with variation across districts in wound types treated and service utilisation.(25)

Methods

PubMed, Google, and Google Scholar were searched on 21 October 2020. (see Appendix for search terms). The Cochrane Wounds Systematic Reviews (<https://wounds.cochrane.org/news/reviews>) and ClinOwl (<https://clinowl.com/the-latest-wound-care-journal-articles/>) databases were searched for additional articles. Searches were limited to English-language systematic reviews, integrative reviews, and meta-analyses published between 2011 and present.

Grey literature searches were initially conducted through Google, followed by referential and targeted searches of websites of national and international wound care organisations.

The literature identified in the searches also reported findings on multicomponent strategies, and patient education and self-management support programs (31-34) focused on the prevention of chronic wounds.(35-41) While potentially relevant to inform wound models of care, the interventions discussed in these studies did not qualify as models of care themselves. These have been presented separately as a Supplemental Table of Findings.

Limitations

There was no one standard definition of 'chronic wounds' applied across the studies included in this review. We included studies focusing on patients living with diabetic foot ulcers, pressure ulcers, long-lasting wounds (non-specified) and non-healing surgical wound complications. Guidance and evidence on wound care is often context dependent.

The literature search identified several studies relating to geriatric models of care, which, while leading to improved functional and clinical outcomes in elderly patients including for wounds, were not designed specifically for the delivery of wound care.(35-37) These were excluded from the evidence check.

Given the volume of published literature on the topic, studies were limited to systematic reviews, integrative reviews and meta-analyses only. Therefore, the evidence check may not include an exhaustive list of organisational models of wound care in published or grey literature.

Results

Table 1. Research evidence on models of wound care

Source	Summary
Peer reviewed sources	
Remote Delivery of Care (Telemedicine)	
Telemedicine in Chronic Wound Management: Systematic Review And Meta-Analysis Chen, et al. 2020 (4)	<p>Summary:</p> <ul style="list-style-type: none"> To evaluate the efficacy and safety of telemedicine in chronic wound management. Meta-analysis and qualitative analysis conducted on six randomised controlled trials and six cohort studies including 3,913 patients, published from inception to 12 June 2019. <p>Model(s) of care:</p> <ul style="list-style-type: none"> Telemedicine, defined as the use of tablets or mobile phones programmed with apps, such as Skype and specialised interactive systems (n=4); or email, telephone, and videoconferencing to facilitate the implementation of telemedicine using a specialised system (n=8). <p>Findings:</p> <ul style="list-style-type: none"> Randomised controlled trials: <ul style="list-style-type: none"> No significant differences for: <ul style="list-style-type: none"> Wound healing (hazard ratio [HR] 1.16, 95% confidence interval (CI) 0.96–1.39; P=.13), Wound healing around 1 year (risk ratio [RR] 1.05, 95% CI 0.89–1.23; P=.15). Better outcomes for those receiving telemedicine for: <ul style="list-style-type: none"> Risk of amputation (RR 0.45, 95% CI 0.29–0.71; P=.001). Cohort studies: <ul style="list-style-type: none"> Telemedicine more effective than standard care (HR 1.74, 95% CI 1.43–2.12; P<.001) No significant difference between telemedicine and standard care for:

	<ul style="list-style-type: none"> ▪ Outcome efficacy RR of wound healing around 1 year (RR 1.21, 95% CI 0.96–1.53; P=.56) ▪ Outcome efficacy RR of wound healing around 3 months (RR 1.24, 95% CI 0.4–3.3; P=.67). ▪ Authors' conclusions: <ul style="list-style-type: none"> • Telemedicine seems to have similar efficacy and safety and met noninferiority criteria with conventional standard care of chronic wounds.
<p>Costs of home-based telemedicine programs: a systematic review</p> <p>Michaud, et al. 2018 (1)</p>	<p>Summary:</p> <ul style="list-style-type: none"> • To systematically investigate existing literature on the costs of home-based telemedicine programs, and to further summarise how the costs of these telemedicine programs vary by equipment and services provided. Included 12 studies published from January 2000 to November 2017. <p>Model(s) of care:</p> <ul style="list-style-type: none"> • Home-based telemedicine programs <p>Findings:</p> <ul style="list-style-type: none"> • Overall annual cost: <ul style="list-style-type: none"> ○ Varied substantially depending on specific chronic conditions, ranging from US\$1,352 for heart failure to US\$206,718 for congestive heart failure, chronic obstructive pulmonary disease and diabetes as a whole. • Estimated cost per patient visit: <ul style="list-style-type: none"> ○ Ranged from US\$24 for cancer to US\$39 for congestive heart failure, chronic obstructive pulmonary disease or chronic wound care. <p>Authors' conclusions:</p> <ul style="list-style-type: none"> • The costs of home-based telemedicine programs varied substantially by program components, disease type, equipment used and services provided. • All the selected studies indicated that home telemedicine programs reduced care costs, although detailed cost data were either incomplete or not presented in detail.

[Telemedicine in Diabetic Foot Care: A Systematic Literature Review of Interventions and Meta-analysis of Controlled Trials](#)

Tchero, et al. 2017 (2)

Summary:

- To evaluate whether telemedicine can be effective in diabetic foot patient care. Ten studies were included, published up to April 2017. Meta-analysis conducted on two controlled trials (213 patients on telemedicine and 301 patients on usual care).

Model(s) of care:

- Telemedicine for diabetic foot patient care – teleconsultation and remote patient monitoring:
 - Teleconsultation: any medical consultation between a patient and a health care professional using an electronic network, such as the Internet.
 - Remote patient monitoring: the technology that enables the monitoring of patients and collection of their health data (in our case, related to diabetes) outside of conventional clinical settings. This information is electronically transmitted through a secure network to health care professionals who assess it and provide their recommendations accordingly. It should be noted that telemedicine in this setting was used for monitoring patients not as a treatment modality.

Findings (of meta-analysis):

- Statistically similar (telemedicine vs control groups):
 - Healing time (43 vs 45 days; $P = 0.83$)
 - Healing time ratio adjusted for age (1 vs 1.4; $P = 0.1$)
 - Unhealed ulcers or loss to follow-up (3 of 20 vs 7 of 120; $P = 0.13$)
 - Amputations (12 of 193 vs 14 of 182; $P = 0.59$)
 - Odds of complete ulcer healing (odds ratio = 0.86; 95% CI = 0.57–1.33; $P = 0.53$).
- Significantly higher for telemedicine group:
 - Mortality rate (8 of 193 vs 1 of 181; $P = 0.0001$), due to unexplained factors.
- No adverse events attributed to using the telemedicine technology.

Authors' conclusions:

- Most of the studies showed that implementing telemonitoring programs increased the rate of complete ulcer healing, while the patients were highly satisfied.

	<ul style="list-style-type: none"> • Telemedicine care is promising for the management of diabetic foot patients as the results were comparable with usual care. Large scale studies are needed. <ul style="list-style-type: none"> ▪
<p>Effectiveness of Telemedicine for Distant Wound Care Advice towards Patient Outcomes: Systematic Review and Meta-Analysis</p> <p>Goh, et al. 2017 (3)</p>	<p>Summary:</p> <ul style="list-style-type: none"> • To evaluate whether the use of telemedicine for distant wound care advice was effective in improving wound outcomes. Five studies were included, published to September 2005. Meta-analysis was conducted on four randomised controlled trials and before-and-after studies (274 wounds). <p>Model(s) of care:</p> <ul style="list-style-type: none"> • Having home care nurses sending digital images electronically to the remote wound care experts weekly or every two weeks. The home care nurses would then act upon the instructions of the wound care experts to manage the patients' wounds. • Control group: Home care nurses solely managed the patients' wound and referred the patients to the wound care experts only when deemed necessary. <p>Findings (of meta-analysis on three controlled trials):</p> <ul style="list-style-type: none"> • No significant change: <ul style="list-style-type: none"> ○ Wound size (MD 3.86, CI 5.04–12.75, p = 0.40) • Telemedicine led to significant improvement in: <ul style="list-style-type: none"> ○ Wound healing rates (RR 1.50, CI 1.06–2.13, p = 0.02) <p>Authors' conclusions:</p> <ul style="list-style-type: none"> • The use of telemedicine in wound care could effectively improve wound healing rate but not the change in wound size. More randomised controlled trials are needed.

<p>Effect of telemedicine follow-up care of leg and foot ulcers: a systematic review</p> <p>Nordheim, et al. 2014 (5)</p>	<p>Summary:</p> <ul style="list-style-type: none"> To assess the effect of telemedicine follow-up care on clinical, behavioural or organisational outcomes among patients with leg and foot ulcers. One non-randomised study (n=140) was included, published in 2004. <p>Model(s) of care:</p> <ul style="list-style-type: none"> Real-time interactive video consultation versus face-to-face follow-up <p>Findings:</p> <ul style="list-style-type: none"> No statistically significant differences on: <ul style="list-style-type: none"> All outcomes assessed: healing time, adjusted healing ratio and the number of ulcers at 12 weeks among patients with neuropathic forefoot ulcerations The study was assessed to have a high risk of bias. <p>Authors' conclusions:</p> <ul style="list-style-type: none"> There is insufficient evidence available to unambiguously determine whether telemedicine consultation of leg and foot ulcers is as effective as traditional follow-up.
<p>Community-based 'Leg Club'</p>	
<p>A systematic review of community Leg Clubs for patients with chronic leg ulcers</p> <p>Abu Ghazaleh, et al. 2018 (6)</p>	<p>Summary:</p> <ul style="list-style-type: none"> To appraise the evidence on the outcomes of Leg Clubs on ulcer healing, psychosocial outcomes, patient safety, cost and experiences of Leg Club members. A review and synthesis of 17 relevant publications (including four randomised controlled trials) (n=532). <p>Model(s) of care:</p> <ul style="list-style-type: none"> The Leg Club, a community-based social model of care in 30 locations in the United Kingdom and nine overseas for treating patients with chronic leg wounds. <p>Findings:</p> <ul style="list-style-type: none"> Positive impact reported on ulcer healing and recurrence, mood, sleep, quality of life and pain.

	<ul style="list-style-type: none"> • Three studies assessing wound infections reported no infections had occurred during treatment at the Leg Clubs. • Economic evaluations find Leg Clubs to be probably more cost-effective than usual care. • Positive views reported from patients and nurses, with particular emphasis on improved social interactions and delivery of patient-centred care. <p>Authors' conclusion:</p> <ul style="list-style-type: none"> • The Leg Club holds potential for providing cost-effective specialist community-based wound care.
<p>Nurse-led Care</p>	
<p>The outcomes and experience of people receiving community-based nurse-led wound care: A systematic review</p> <p>Dhar, et al. 2020 (7)</p>	<p>Summary:</p> <ul style="list-style-type: none"> • To review the literature related to the outcomes and experience of people receiving nurse-led care for chronic wounds in the community. A systematic quantitative literature review of 12 studies published from 2009–2019. <p>Model(s) of care:</p> <ul style="list-style-type: none"> • Community-based nurse-led care for chronic wounds (three types): <ul style="list-style-type: none"> ○ Home nursing care ○ Social community care ○ Nursing within a wound clinic <p>Findings:</p> <ul style="list-style-type: none"> • Nurse-led care was found to be cost-effective, reported high levels of client satisfaction and contributed to improved wound healing and reduced levels of pain. <p>Authors' conclusions:</p> <ul style="list-style-type: none"> • Nurse-led care is a positive experience for people with chronic wounds and leads to better outcomes. • The findings suggested a need for further client education and specialised training for healthcare practitioners managing chronic wounds.

<p>Quality indicators for a community-based wound care centre: An integrative review</p> <p>Seaton, et al. 2020 (8)</p>	<p>Summary:</p> <ul style="list-style-type: none"> To identify the role and contribution of community-based, nurse-led wound care as a service delivery model. An integrative review of 18 studies published between 2007–2018. <p>Model(s) of care:</p> <ul style="list-style-type: none"> Community-based, nurse-led wound care <p>Findings:</p> <ul style="list-style-type: none"> The findings showed a need for nurse-led clinics to provide evidence-based care using best practice guidelines for all wound types. Wound care practices should be standardised across the particular service and be integrated with higher levels of resources such as investigative services and surgical units. A multi-disciplinary approach was likely to achieve better patient outcomes, while patient-centred care with strong patient engagement was likely to assist patients' compliance with treatment. <p>Authors' conclusions:</p> <ul style="list-style-type: none"> High-quality, community-based wound services should include nursing leadership based on a hub-and-spoke model. This is ideally patient-centred, evidence-based and underpinned by a commitment to developing innovations in terms of treatment modalities, accessibility and patient engagement.
<p>The role of the wound care nurse: an integrative review</p> <p>Dutton, et al. 2014 (11)</p>	<p>Summary:</p> <ul style="list-style-type: none"> To determine the state of knowledge in relation to the context of practice, scope of practice and impact of the wound care nurse. An integrative review of 37 articles published between 1980–2011 (including 30 peer-reviewed research papers, three editorials, two theses (one

	<p>randomised control trial and one descriptive study), one job description or competency standard and one transcribed panel debate).</p> <p>Model(s) of care:</p> <ul style="list-style-type: none"> • Wound care nurses <p>Findings:</p> <ul style="list-style-type: none"> • The impact and outcomes of the wound care nurse were poorly represented within the literature, providing little evidence to demonstrate that a wound care nurse makes a difference and, if they do, what it is that they do that makes a difference. • However, there was some evidence that the wound care nurse improved healing times and decreased pressure injury prevalence. • There is little consensus on the level of competence, educational requirements and qualifications required to practise as a wound care nurse. <p>Authors' conclusions:</p> <ul style="list-style-type: none"> • Although the literature discusses the day-to-day work that a wound care nurse performs, there is little information about the clinical practices of wound care nursing or of the impact that the role provides. Further research and detailed exploration into the wound care nursing role is recommended.
<p>A systematic review of the effectiveness of advanced practice nurses in long-term care</p> <p>Donald, et al. 2013 (9)</p>	<p>Summary:</p> <ul style="list-style-type: none"> • To report evidence of the effectiveness of advanced practice nursing roles, clinical nurse specialists and nurse practitioners in meeting the healthcare needs of older adults living in long-term care residential settings. A quantitative systematic review of four prospective studies conducted in the USA and reported in 15 papers were included. <p>Model(s) of care:</p> <ul style="list-style-type: none"> • Advanced practice nursing in long-term care residential settings: <ul style="list-style-type: none"> ○ Clinical nurse specialists working with clinical nurse assistants to implement protocols ○ Clinical nurse specialist consultation

	<p>Findings:</p> <ul style="list-style-type: none"> • Four of the five studies reporting on pressure ulcer outcomes found that compared to usual care, long-term care residents being managed by advanced practice nurses were more likely to be ulcer free or had improvements in ulcer rates. • One of the five studies found no significant difference between the groups. <p>Authors' conclusions:</p> <ul style="list-style-type: none"> • Advanced practice nurses were found to be associated with improvements in several measures of health status of older adults in long-term care settings and in family satisfaction.
<p>Preventing pressure ulcers in hospitals: A systematic review of nurse-focused quality improvement interventions</p> <p>Soban, et al. 2011 (10)</p>	<p>Summary:</p> <ul style="list-style-type: none"> • To inform the evidence base for the implementation of pressure ulcer prevention programs into routine care through quality improvement, specifically via nurse-focused interventions conducted in the hospital setting. A systematic review of 39 studies, published from January 1990–September 2009, most of which used a before-and-after study design in a single site. <p>Model(s) of care:</p> <ul style="list-style-type: none"> • Nurse-focused pressure ulcer prevention programs conducted in the hospital setting. Intervention strategies in this review included pressure ulcer-specific changes in combination with educational or quality improvement strategies. <p>Findings:</p> <ul style="list-style-type: none"> • The pooled risk difference for developing pressure ulcers was -0.07 (95% CI -0.0976 to -0.0418) comparing the pre- and post-intervention status. <p>Authors' conclusions:</p> <ul style="list-style-type: none"> • For nearly all the studies, the authors concluded that the intervention had a positive effect. • Future research can build the evidence base for implementation through an increased emphasis on understanding the mechanisms by which improved outcomes are achieved

	<p>and describing the conditions under which specific intervention strategies are likely to succeed or fail.</p>
<p>Multidisciplinary Wound Care Teams</p>	
<p>A systematic review of multidisciplinary teams to reduce major amputations for patients with diabetic foot ulcers</p> <p>Musuza, et al. 2020 (14)</p>	<p>Summary:</p> <ul style="list-style-type: none"> • To assess the association between multidisciplinary teams and the risk of major amputation in patients with diabetic foot ulcerations and to compile descriptions of these diverse teams. In all, 33 studies (no randomised controlled trials) were included, published from inception to May 2019. No meta-analysis. <p>Model(s) of care:</p> <ul style="list-style-type: none"> • Care delivery by multidisciplinary teams, that is two or more types of clinicians working together <p>Findings:</p> <ul style="list-style-type: none"> • Institution of a multidisciplinary team led to a reduction in major amputations in 94% (31 of 33) of studies. • There were four elements that were common across teams: <ul style="list-style-type: none"> ○ Teams were composed of medical and surgical disciplines ○ Larger teams benefitted from having a ‘captain’ and a nuclear and ancillary team member structure ○ Clear referral pathways and care algorithms supported timely, comprehensive care ○ Multidisciplinary teams addressed four key tasks: glycaemic control, local wound management, vascular disease and infection. <p>Authors’ conclusions:</p> <ul style="list-style-type: none"> • Multidisciplinary team composition and functions were highly diverse. Teams consistently addressed glycaemic control, local wound management, vascular disease and infection in a timely and coordinated manner to reduce major amputation for patients with diabetic foot ulcerations. • Care algorithms and referral pathways were key tools to their success.
<p>The utilisation of vascular limb salvage services in the assessment and management of chronic limb-</p>	<p>Summary:</p>

[threatening ischaemia and diabetic foot ulceration: A systematic review](#)

Nickinson, et al. 2020 (16)

- To explore the nature of reported services, investigate their outcome in the management of chronic limb-threatening ischaemia or diabetic foot ulceration. Narrative synthesis was performed on 12 articles (describing 11 services), published between January 1995–January 2019.

Model(s) of care:

- Specialist vascular limb salvage services, defined as those services conforming to the definition of 'centres of excellence' within the 2019 Global Vascular Guidelines:
 - Multi-disciplinary team:
 - Consisting of a specialist team who can provide both medical and surgical management of peripheral arterial disease (i.e. vascular surgery or interventional radiology) and infection (e.g. podiatry, orthopaedics, plastic surgery or other specialty that perform surgical debridement), and provide general and intensive medical care
 - Protocol-driven care:
 - The service follows evidence-based clinical protocols, procedures and pathways
 - Outcome monitoring and improvements:
 - Have an established process for data collection and reporting data to the literature
 - Have an established process for continual improvement based upon outcomes and new techniques
 - Education:
 - Serves as an educational resource for the medical community via mentoring, publishing, teaching or conferences
 - Added criterion for this study: services must provide daily patient review plus vascular review more than twice per week.

Findings:

- All services ran akin to the 'toe-and-flow' model, with care comprising a team who can assess and manage ischaemia and provide complex lower limb wound care and ulcer prevention strategies. Several services have additional input from diabetology, microbiology, allied health professionals, and internal and vascular medicine.
- The inception of services was associated with improved rates of major amputation.

	<ul style="list-style-type: none"> No significant changes in minor amputation or mortality rates were identified. <p>Authors' conclusions:</p> <ul style="list-style-type: none"> Further research should adopt more a standardised study design and outcomes measures in order to improve the quality of evidence within the literature.
<p>The impact of the multidisciplinary team in the management of individuals with diabetic foot ulcers: a systematic review</p> <p>Buggy, et al. 2017 (15)</p>	<p>Summary:</p> <ul style="list-style-type: none"> To assess the impact of the multidisciplinary team in the management of diabetic foot ulcers compared with those who did not receive multidisciplinary care. There were 19 studies included, published between 1995–2005. <p>Model(s) of care:</p> <ul style="list-style-type: none"> Multidisciplinary team approach (by multidisciplinary health professionals) versus delivery of care by an individual health professional or using an unstructured, non-collaborative care model <p>Findings:</p> <ul style="list-style-type: none"> Severity of amputation, death rates and length of hospital stay of clients receiving multidisciplinary team care were improved when compared with those who did not receive multidisciplinary team care. Ulcer healing and quality of life showed an improvement but not all studies explored these outcomes. <p>Authors' conclusions:</p> <ul style="list-style-type: none"> A positive impact of the multidisciplinary team on diabetic foot outcomes can be seen, but due to the lack of high-quality evidence and substantial heterogeneity in the studies, these results should be interpreted with caution.

<p>Wound-care teams for preventing and treating pressure ulcers Moore, et al. 2015 (12)</p>	<p>Summary:</p> <ul style="list-style-type: none"> To assess the impact of wound-care teams in preventing and treating pressure ulcers in people of any age, nursed in any healthcare setting. <p>Model(s) of care:</p> <ul style="list-style-type: none"> Wound-care teams <p>Findings:</p> <ul style="list-style-type: none"> No studies met the selection criteria (i.e. randomised controlled trials that evaluated the effect of any configuration of wound-care teams in the treatment or prevention of pressure ulcers). <p>Authors' conclusions:</p> <ul style="list-style-type: none"> There is a lack of evidence concerning whether wound-care teams make a difference to the incidence or healing of pressure ulcers. Well-designed trials addressing important clinical, quality of life and economic outcomes are needed.
<p>Informal carers</p>	
<p>Informal carers and wound management: an integrative literature review Miller, et al. 2015 (17)</p>	<p>Summary:</p> <ul style="list-style-type: none"> An integrated literature review of the published evidence regarding the experience and role of informal caregivers in wound management or prevention. <p>Model(s) of care:</p> <ul style="list-style-type: none"> Wound management or prevention by informal caregivers (e.g. family and friends) <p>Findings:</p> <ul style="list-style-type: none"> There was a scarcity of studies for which informal carers were the primary focus. The available evidence suggests that informal carers have a role in wound management and prevention and that their involvement is likely to represent a noteworthy economic contribution to the wound management health-care team.

	<p>Authors' conclusions:</p> <ul style="list-style-type: none"> • Wound management was also determined to yield physical and psychological impacts for the carer. There was limited evidence of structured information, support or training for informal carers, which was flagged by carers as an area of need. • General conclusions about the burdensome experience and the valuable role of carers were the main interpretations possible from the evidence. • More research which purposively and comprehensively examines the experience and role of informal caregivers is required.
Multiple models of care	
<p>Organisation of health services for preventing and treating pressure ulcers</p> <p>Joyce, et al. 2018 (13)</p>	<p>Summary:</p> <ul style="list-style-type: none"> • To assess the effects of different provider-orientated interventions targeted at the organisation of health services, on the prevention and treatment of pressure ulcers. A systematic review and analysis of four studies reporting on pressure ulcer incidence or pressure ulcer healing, or both. <p>Models of care:</p> <ul style="list-style-type: none"> • Transmural care (a care model that provided activities to support patients and their family or partners and activities to promote continuity of care): one controlled before-and-after study (n=62) • Hospital-in-the-home care: one randomised controlled trial (n=100) • Being cared for by enhanced multidisciplinary teams: 1 cluster-randomised stepped-wedge trial (n=161) • Multidisciplinary wound care: one quasi-experimental cluster trial (n=176) <p>Findings:</p> <ul style="list-style-type: none"> • Transmural care vs usual care

	<ul style="list-style-type: none"> ○ Unclear whether it leads to a difference in pressure ulcer incidence (risk ratio (RR) 0.93, 95% CI 0.53–1.64). ● Hospital-in-the-home care vs hospital admission <ul style="list-style-type: none"> ○ Unclear whether it leads to a difference in pressure ulcer incidence (RR 0.32, 95% CI 0.03–2.98). ● Being cared for by enhanced multidisciplinary teams versus usual care <ul style="list-style-type: none"> ○ Unclear if there are differences in the following: <ul style="list-style-type: none"> ▪ Pressure ulcer incidence rate (hazard ratio (HR) 1.12, 95% CI 0.74–1.68) ▪ Number of wounds healed (RR 1.69, 95% CI 1.00–2.87) ▪ Reduction in surface area (healing rate 1.006; 95% CI 0.99–1.03) ▪ Time to complete healing (HR 1.48, 95% CI 0.79–2.78) ● Multidisciplinary wound care versus usual care <ul style="list-style-type: none"> ○ Unclear if there are differences in the following: <ul style="list-style-type: none"> ▪ Number of pressure ulcers healed (RR 1.18, 95% CI 0.98–1.42) ▪ Time to complete healing (HR 1.73, 95% CI 1.20–2.50) <p>Authors' conclusions:</p> <ul style="list-style-type: none"> ● In all studies the certainty of the evidence is very low due to high risk of bias and imprecision. ● Evidence for the impact of organisation of health services for preventing and treating pressure ulcers remains unclear, and the studies reporting outcomes were of very low certainty and high risk of bias.
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Table 2. Grey literature evidence on models of care: Recommendations from wound care organisations and expert groups

Source	Summary
Grey literature sources	
International	
<p>Guidelines on the prevention of foot ulcers in persons with diabetes (IWGDF 2019 update)</p> <p>Bus, et al. 2020 (38)</p> <p>On behalf of The International Working Group on the Diabetic Foot</p>	<p>The International Working Group on the Diabetic Foot describe 16 recommendations for the prevention of diabetic foot ulcers, including the implementation of integrated foot care for people with diabetes who are at high risk of foot ulceration to help prevent a recurrent foot ulcer. This foot care should be repeated, or re-evaluated once every 1-3 months.</p> <p>Integrated foot care is defined as an intervention that at a minimum integrates regular foot care and examination by an adequately trained professional, structured education, and adequate footwear.</p> <ul style="list-style-type: none"> • Professional foot care, by an adequately trained health care professional, consists of treating risk factors and pre-ulcerative signs; structured education about foot self-care; and providing adequate footwear. The patient's feet should be regularly examined. • Integrated foot care may further include foot self-management, access to surgery, and foot-related exercises and weight-bearing activity. • For all aspects of an integrated foot care program, adherence to what is recommended increases the benefits, and this should be given adequate attention in communication with the patient. <p>This recommendation is based on analysing two reviews that have investigated the effect sizes of the various components of integrated foot care. State-of-the-art integrated foot care has been suggested to be able to prevent up to 75% of all diabetic foot ulcers.</p> <p>Integrated foot care should be provided by an adequately trained health care professional or a team of professionals. People with diabetes at risk of foot ulceration who are cared for by professionals without specific expertise on diabetic foot disease should be referred by these professionals to integrated foot care services. Educational interventions targeting health care professionals to improve completion rates of yearly foot examinations and to improve the knowledge of clinicians not involved in daily diabetic foot care may be important, but the effectiveness of this education is unclear.</p>

Source	Summary
Grey literature sources	
<p>Practical Guidelines on the prevention and management of diabetic foot disease (IWGDF 2019 update)</p> <p>Schaper, et al. 2020 (39)</p> <p>On behalf of The International Working Group on the Diabetic Foot</p>	<p>Organisation of Care for Diabetic Foot Disease</p> <p>Successful efforts to prevent and treat diabetic foot disease depend upon a well-organised team that uses a holistic approach in which the ulcer is seen as a sign of multi-organ disease. The team also needs to integrate the various disciplines involved. Effective organisation requires systems and guidelines for education, screening, risk reduction, treatment and auditing. Local variations in resources and staffing often dictate how to provide care, but ideally, a diabetic foot disease program should provide the following:</p> <ul style="list-style-type: none"> • Education for people with diabetes and their carers, for health care staff in hospitals and for primary health care professionals • Systems to detect all people who are at risk, including annual foot examination of all people with diabetes • Access to measures for reducing the risk of foot ulceration, such as podiatric care and provision of appropriate footwear • Ready access to prompt and effective treatment of any foot ulcer or infection • Auditing of all aspects of the service to identify and address problems and ensure that local practice meets accepted standards of care • An overall structure designed to meet the needs of patients requiring chronic care, rather than simply responding to acute problems when they occur. In all countries, optimally there should be at least three levels of foot-care management with interdisciplinary specialists like these listed below. <p>Levels of care for diabetic foot disease</p> <p>Level 1: General practitioner, podiatrist, and diabetes nurse</p> <p>Level 2: Diabetologist, surgeon (general, orthopaedic or foot), vascular specialist (endovascular and open revascularisation), infectious disease specialist or clinical microbiologist, podiatrist and diabetes nurse, in collaboration with a shoe-technician, orthotist, or prosthetist</p> <p>Level 3: A centre that specialises in diabetic foot care, with multiple experts from several disciplines each specialised in this area working together, and that acts as a tertiary reference centre</p>

Source	Summary
Grey literature sources	
	<p>Studies around the world have shown that setting up an interdisciplinary foot care team to prevent and manage diabetic foot care is associated with a decrease in the frequency of diabetes-related lower extremity amputations. But the team must be created according to the principles outlined in this guideline.</p> <p>If it is not possible to create a full team from the outset, the authors recommend building a team, step-by-step, and introducing the various disciplines as it becomes possible. This team must act with mutual respect and understanding, work in both primary and secondary care settings and have at least one member available for consultation or patient assessment at all times.</p>
<p>International Best Practice Recommendations for the Early Identification and Prevention of Surgical Wound Complications: Recommendations from an Expert Working Group</p> <p>Sandy-Hodgetts, et al. 2020 (40)</p> <p>On behalf of Wounds International</p>	<p>It is estimated that surgical wound complications are one of the leading global causes of morbidity following surgery. With mortality affecting 1–4% of patients following gastrointestinal surgery, the impact of surgical wound complications on patients and family members is considerable. It is not dissimilar to the plight of those suffering with chronic wounds.</p> <p>The International Surgical Wound Complications Advisory Panel recommends that a patient-centred approach that encompasses the entire patient surgical journey is needed from the identification of surgical wound complications onwards. It is vital that care remains patient centred. Patients must be informed and engaged in the care of their incisional wound. They must understand when and how to seek medical assistance.</p> <p>They discussed and agreed upon the following key statements, in order to guide best practice and provide optimum care to patients.</p> <p>Statement 1</p> <p>Individual patient assessment should be undertaken as per local guidance during the pre, peri and post-operative periods (including post-discharge from acute care). Utilising an individualised care plan for prevention is ideal.</p>

Source	Summary
Grey literature sources	
	<p>Statement 2</p> <p>Local and national surgical site infection policies must be evidence-based and should be adhered to, and documented, in the patient notes with a seamless flow from discharge to community and primary healthcare settings. Post-discharge surveillance should be mandatory across teams.</p> <p>Statement 3</p> <p>There should be defined assessment, treatment and referral pathways in each clinical area for surgical wound complications management that utilise digital platforms for ease and rapid access of information.</p> <p>Statement 4</p> <p>Prevention and treatment should encompass a multidisciplinary team approach that reflect the patient’s surgical journey.</p> <p>Statement 5</p> <p>If a bacterial cause for an infection is suspected, appropriate microbiological investigations should be started to identify the causative agent(s). The use of antibiotics must comply with local antimicrobial stewardship policies.</p> <p>Statement 6</p> <p>Novel strategies for patient engagement should be used to aid early identification of surgical wound complications wherever necessary (e.g. dressings that allow visibility without removal, telemedicine in rural areas, new diagnostic technology, smart phone applications, validated fit-for-purpose risk assessment tools).</p> <p>Statement 7</p> <p>All surgical wound complications should be documented and reported appropriately and accurately and using global standardised definitions.</p> <p>Statement 8</p> <p>Further research is required to expand scientific knowledge to determine evidence-based best practice for the prevention of surgical wound complications with regards to advanced wound care therapies.</p>

Source	Summary
Grey literature sources	
	<p>Statement 9</p> <p>Outcomes, including patient-reported outcomes, must be tracked, reported and, where possible, published, to enable a global understanding of the prevalence of surgical wound complications.</p>
<p>EWMA Document: Home Care- Wound Care Overview, Challenges and Perspectives</p> <p>Probst, et al. 2014 (18)</p> <p>On behalf of the European Wound Management Association</p>	<p>This document provides an overview of the main approaches to the organisation of wound care within homecare settings across Europe with case studies from England, Germany and the Nordic countries. The authors identified possible barriers to best-practice wound care in home care settings and uncovered the preconditions needed to provide safe and high-quality care for wound patients and support for their families. As a result, they provided a list of minimum recommendations for the treatment of patients with wounds in their own homes.</p> <p>The authors define ‘home care wound care’ as the care that is provided by health care professionals and families, also called informal carers, to patients with wounds living at home. This home care wound care may be supportive, rehabilitative or palliative.</p> <p>In taking care of patients with a chronic wound, an assessment of the patient’s needs is mandatory. This can only be performed by specialists, although the tendency in home care is shifting towards employment of non-registered nurses. Therefore, health care professionals are required to acquire skills and knowledge on how to manage wounds in the home care setting. It is recommended that patients and informal carers are included in the wound management process.</p>

Source	Summary
Grey literature sources	
	<p>The Chronic Care Model</p> <p>To offer patient-centred care, the use of the Chronic Care Model is recommended to provide patients and their families with self-management skills and tracking systems. The Chronic Care Model is a way to facilitate partnerships between health care systems and communities.</p> <p>The Chronic Care Model is based on six components, which are described in this document. All six components are required in order to affect functional and clinical outcomes associated with the disease management of each patient with a wound, and thus enable an efficient collaboration between primary and secondary care.</p> <p>Recommendations for Home-based Wound Care using the Chronic Care Model:</p> <ul style="list-style-type: none"> a. Effective communication is key to improving service delivery. Examine current communication pathways and structures and explore means through which these can be further developed. <p>1. Health system — organisation of health care</p> <ul style="list-style-type: none"> b. Communication is enhanced through accurate, timely and comprehensive documentation. Review current documentation practice and identify areas for shared documentation in order to avoid repetition. c. Identify key professionals required to deliver wound care in the home care setting. Once identified, aim to establish links and build a team approach. <hr/> <p>2. Self-management support</p> <ul style="list-style-type: none"> a. Promote an inclusive and concordant approach to patient care and include the patient and his or her informal carer in treatment decisions and goal setting

Source	Summary
Grey literature sources	
	<p>3. Decision support</p> <p>a. Identify the education needs of individuals delivering home care wound care; this should form a baseline for future planning and service provision</p> <p>b. Define the possibilities of the health system in providing multi-professional and also very specialised knowledge and assessment for decision-making in home care settings</p> <hr/> <p>4. Delivery system design</p> <p>a. Adapt clinical practice guidelines to meet the needs of the home care setting</p> <p>b. Determine wound aetiology</p> <hr/> <p>5. Clinical information systems</p> <p>a. Baseline data on the prevalence of home care wound care in an area can provide vital quantitative data to contribute to future service development and may justify the need for specialist services in your area.</p> <p>b. On-going audit of practice development, guideline driven care and patient outcomes is essential in order to monitor and evaluate performance and for future planning.</p> <hr/> <p>6. Community resources and policies (i.e. sustaining care by using community-based resources and public health policy)</p> <p>a. Define the possibilities of community resources to support home care wound care service development</p> <p>b. Evaluate and document the quality, cost and effectiveness of home care wound care and report on a regular basis to policy makers</p>

Source	Summary
Grey literature sources	
<p data-bbox="143 331 542 434">Managing Wounds as a Team: Exploring the concept of a team approach to wound care</p> <p data-bbox="143 450 430 481">Moore, et al. 2014 (24)</p> <p data-bbox="143 545 573 609">On behalf of the European Wound Management Association 2014</p>	<p data-bbox="636 331 2020 507">This project by the European Wound Management Association provides recommendations for implementing a team approach to wound care within all clinical settings and, through this, to develop a model for advocating the team approach toward decision makers in national government levels. An integrative literature review was conducted using 84 included studies. Using this knowledge, the authors arrived at a consensus on the most appropriate model to adopt and realise a team approach to wound care.</p> <p data-bbox="636 555 1326 587">Universal Model for the Team Approach to Wound Care</p> <p data-bbox="636 635 2047 769">The authors state that a ‘one-model-fits-all’ approach to building a team for the provision of wound care is unrealistic. Available resources, access to relevant expertise, remuneration provisions and patient populations will always be context specific. It is evident, however, that the inclusion of key elements within wound care services will foster collaborations between different health care professionals and keep the needs of the patient in the forefront.</p> <p data-bbox="636 817 2011 880">The authors recommend that effective management of wounds as a team include the development of these five essential elements:</p> <div data-bbox="958 922 1738 1273" style="border: 1px solid gray; padding: 10px;"> <ol style="list-style-type: none"> <li data-bbox="1016 970 1666 1040">1. A patient focus using an advocate for the patient <ul style="list-style-type: none"> <li data-bbox="1115 1008 1375 1040">• Wound navigator <li data-bbox="1016 1046 1576 1078">2. Referral mechanisms that are responsive <li data-bbox="1016 1085 1666 1155">3. Aggregation of assessment data to form a single plan <li data-bbox="1016 1161 1496 1193">4. Appropriate remuneration systems <li data-bbox="1016 1200 1644 1232">5. A health care system sensitive to team models </div>

Source	Summary
Grey literature sources	
	<p>The patient forms the focus of the care but relies on the expertise of a wound navigator to organise wound care service via established referral mechanisms. The wound navigator and other health professionals either collaborate to explore beneficial remuneration and health care systems and/or lobby to meet the needs of the patient.</p> <p>Each element can be realised, either via health care system reform, or local collaboration. It has been suggested that clinicians interested in establishing wound team services begin at the local level by assuming the role of the wound navigator. Interested clinicians could generate a list of local services, collaborate with identified services to develop referral mechanisms, aggregate assessment data collected by the services into to a whole of system care plan, explore options for better utilisation of existing remuneration schemes to fund identified patient need and collect outcomes data that supports the benefits of the wound team approach highlighted in the literature. Over time, the local initiatives suggested have the potential to grow into a ‘groundswell’ of evidence that can be used to lobby government to instigate needed health care reform.</p>

Source	Summary
Grey literature sources	
<p data-bbox="143 331 586 434">International Best Practice Guidelines: Wound Management in Diabetic Foot Ulcers</p> <p data-bbox="143 450 542 481">Wounds International 2013 (41)</p>	<p data-bbox="636 331 2011 434">Wounds International describe an Integrated Care Approach to appropriately address diabetic foot ulcers. It advises that as diabetic foot ulcers are a multifaceted condition, no one individual or clinical specialty should be expected (or should attempt) to address all aspects of management in isolation.</p> <p data-bbox="636 450 1684 481">As a result, the Integrated Care Approach should comprise of two main components:</p> <p data-bbox="636 545 1048 577">1. Multidisciplinary footcare team</p> <p data-bbox="636 593 2056 737">Evidence consistently highlights the benefits of multidisciplinary footcare teams in the outcomes of diabetic foot ulcers. Over 11 years, one study (Krishnan et al. 2008) found total amputations fell by 70% following improvements in footcare services, including multidisciplinary teamwork. Major guidelines also recommend that patients identified with new diabetic foot ulcers should be referred to a dedicated multidisciplinary footcare team.</p> <p data-bbox="636 753 1989 896">The International Diabetes Federation recommends that a specialist footcare team will include doctors with a special interest in diabetes, people with educational skills and people with formal training in foot care (usually diabetes podiatrists and trained nurses). For comprehensive care, this team would be enhanced by vascular surgeons, orthopaedic surgeons, infection specialists, orthotists, social workers and psychologists.</p> <p data-bbox="636 912 1460 944">Recommended levels of foot care in acute and community settings</p> <ol data-bbox="636 960 1944 1120" style="list-style-type: none"> 1. General practitioner, diabetes podiatrist and diabetic nurse 2. Diabetologist, surgeon (general or vascular, plastic or orthopaedic), infectious diseases or microbiology specialist, diabetes podiatrist and diabetic nurse 3. Specialised foot centre with multiple disciplines specialised in foot care. <p data-bbox="636 1136 2020 1321">The skill mix and scope of any footcare team will likely be dictated by local resources. In the UK there is a move towards having a core team of specialist diabetes podiatrists, medical specialty consultants, orthotists and surgeons, which works with additional relevant disciplines (such as nurses and general practitioners) almost in a virtual manner. The key is the ability to gain immediate access to relevant healthcare professionals (such as a vascular surgeon) as needed.</p>

Source	Summary
Grey literature sources	
	<p>2. Patient footcare education</p> <p>Wounds International also advises that patient education should be an integral part of management and prevention. Treatment outcomes will be directly influenced by patients' knowledge of their own medical status, their ability to care for their wound and concordance with their treatment. It is vital that patients know who to contact if a diabetic foot ulcer develops or recurs, including emergency numbers for the multidisciplinary footcare team and out-of-hours contact details.</p> <p>The development of an ulcer is a major event and a sign of progressive disease. It is important to discuss the impact of the ulcer on life expectancy with the patient. Education should be offered on ways in which patients can help to improve outcomes by making lifestyle changes (e.g. stop smoking) and working with practitioners to reduce the risk of recurrence and life-threatening complications.</p> <p>A Cochrane systematic review found that educating people who have diabetes about the need to look after their feet improves their footcare knowledge and behaviour in the short term. However, there was insufficient evidence that education alone, without any additional preventive measures, effectively reduces the occurrence of ulcers and amputations.</p> <p>According to the International Working Group on the Diabetic Foot, patient education should be provided in several sessions, using a variety of methods based on standard effective communication techniques. It is essential to evaluate whether the patient has understood the messages, is motivated to act and has sufficient self-care skills. Remember that elderly and disabled patients may need home or special care.</p> <p>Practitioners should ensure patients understand the aims of treatment, how to recognise and report the signs and symptoms of (worsening) infection and the need for prompt treatment of new wounds.</p>
Australia	

Source	Summary										
Grey literature sources											
<p>Wound Clinic in General Practice</p> <p>Australian Primary Health Care Nurses Association (APNA) 2020 (21)</p>	<p>APNA discuss the local experience of Junction Place Medical Centre (JPMC), a busy general practice located in one of Melbourne’s eastern suburbs. The discussion focused on the lessons learnt from creating a two-day a week wound clinic to ensure local patients could access quality wound treatment without travelling further to wound specialists or vascular surgeons.</p> <p>The clinic process flow involved the following elements:</p> <table border="1"> <tr> <td data-bbox="631 635 1019 774">A clear plan</td> <td data-bbox="1019 635 2054 774"> <ul style="list-style-type: none"> • Community need: provide a best practice approach to wound management • Improve the billing process for wound management • Wound clinic model based on JPMC’s established diabetes clinic </td> </tr> <tr> <td data-bbox="631 774 1019 877">Location and facilities</td> <td data-bbox="1019 774 2054 877"> <ul style="list-style-type: none"> • Clinic held on regular days and hours • Flexibility to provide care for patients outside set clinic times </td> </tr> <tr> <td data-bbox="631 877 1019 1133">Funding</td> <td data-bbox="1019 877 2054 1133"> <ul style="list-style-type: none"> • Developed budget • Billing needed to be flexible, and include a mixed billing option • Staff education on dressing costs and selection • Chronic Disease Management items included in the clinic (if eligible) and if time available, or followed up by another team member </td> </tr> <tr> <td data-bbox="631 1133 1019 1276">Systems and processes</td> <td data-bbox="1019 1133 2054 1276"> <ul style="list-style-type: none"> • Booking system changed to make the process easier for staff and improve billing process </td> </tr> <tr> <td data-bbox="631 1276 1019 1345">Best practice care</td> <td data-bbox="1019 1276 2054 1345"> <ul style="list-style-type: none"> • Evidence-based care </td> </tr> </table>	A clear plan	<ul style="list-style-type: none"> • Community need: provide a best practice approach to wound management • Improve the billing process for wound management • Wound clinic model based on JPMC’s established diabetes clinic 	Location and facilities	<ul style="list-style-type: none"> • Clinic held on regular days and hours • Flexibility to provide care for patients outside set clinic times 	Funding	<ul style="list-style-type: none"> • Developed budget • Billing needed to be flexible, and include a mixed billing option • Staff education on dressing costs and selection • Chronic Disease Management items included in the clinic (if eligible) and if time available, or followed up by another team member 	Systems and processes	<ul style="list-style-type: none"> • Booking system changed to make the process easier for staff and improve billing process 	Best practice care	<ul style="list-style-type: none"> • Evidence-based care
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Source	Summary
Grey literature sources	
	<ul style="list-style-type: none"> • Clinical guidelines developed for use by the practice team • Staff education <hr/> <p>Staffing and HR</p> <ul style="list-style-type: none"> • Focus on improving communication within the team • Worked with a local pharmacy to access cheaper dressings for patients <hr/> <p>Patient engagement</p> <ul style="list-style-type: none"> • Patients referred to a wound clinic from within practice • Word of mouth and local pharmacy support assisted referrals to the clinic <hr/> <p>Evaluation and improvement</p> <ul style="list-style-type: none"> • Value of the clinic evaluated in relation to patient outcomes and satisfaction
<p>Draft Report from the Wound Management Working Group</p> <p>Medicare Benefits Schedule Review Taskforce 2019 (20)</p>	<ul style="list-style-type: none"> • This report focused on the primary care model of wound management due to the high potential for increased cost-efficiency and reduced burden to patients associated with improved prevention and wound treatment in this setting. The model outlined below has the potential to improve the quality of life for consumers and generate significant savings for consumers and taxpayers, in excess of the investment required. • Principles underpinning the primary care model: <ul style="list-style-type: none"> ○ The model should inspire and reward quality care and promote patient-centred, integrated care ○ Education and upskilling are significant components – these are vital to improving outcomes ○ The model should be flexible, have minimal administrative burden and maximise access ○ The model should reward outcomes, not just service provision

Source	Summary
Grey literature sources	
	<ul style="list-style-type: none"> • The working group recommend provision of wound care products to key target groups and a mandatory education component, particularly for GPs and practice nurses. • It also recommends a stepped care approach for wound management in primary care, whereby GPs are upskilled to correctly diagnose and manage chronic wounds, and those at high risk of becoming chronic, with referral to appropriate specialist wound care practitioners when required. • Within general practice, this model includes: <ul style="list-style-type: none"> ○ An initial GP assessment of the wound ○ A defined period of short-term treatment of the wound by a practice nurse, Aboriginal and Torres Strait Islander Health Practitioner or appropriately trained Aboriginal and Torres Strait Islander health worker within Aboriginal Medical Services. Referral to an allied health professional may also be appropriate at this stage ○ A subsequent GP review of the wound and reassessment of required services; and an additional defined period of treatment by a practice nurse where a wound has not healed, but is observed to be improving adequately; or ○ A mandatory referral to more specialised wound care when a wound is observed not to be healing adequately. Specialised wound providers may include medical, nursing and allied health practitioners who have undertaken advanced education and clinical training in wound care and hold a credential in this field of practice. • The review, treatment or referral cycle continues repeatedly as appropriate until the wound is healed. Services supported under this cycle should also accommodate arrangements to allow for patients who move practices during treatment, where appropriate. • The working group recommend review of this model two years after implementation.

Source	Summary														
Grey literature sources															
<p data-bbox="136 325 584 395">Leading Better Value Care Standards for Wound Management</p> <p data-bbox="136 453 427 491">NSW Health 2019 (25)</p>	<ul data-bbox="633 325 2054 472" style="list-style-type: none"> The Leading Better Value Care (LBVC) chronic wound management initiative aims to improve the way wounds are managed; deliver better experiences of receiving and providing care, enhancing outcomes for patients, carers and families and optimising the use of resources. The LBVC Standards for Wound Management (the Standards) provides guiding Standards that all districts should strive for to deliver these improvements. <p data-bbox="633 533 1279 571">Summary of the Standards for Wound Management</p> <table border="1" data-bbox="633 587 2054 1235"> <tbody> <tr> <td data-bbox="633 587 987 657">Standard 1: Wound model of care</td> <td data-bbox="987 587 2054 657">Districts and networks have a documented and implemented wound model of care</td> </tr> <tr> <td data-bbox="633 689 987 727">Standard 2: Wound team</td> <td data-bbox="987 689 2054 727">Services have a wound team aligned to their resources</td> </tr> <tr> <td data-bbox="633 759 987 829">Standard 3: Staff development</td> <td data-bbox="987 759 2054 829">Districts and networks provide staff with access to education and development programs for wound management</td> </tr> <tr> <td data-bbox="633 861 987 932">Standard 4: Consumer information</td> <td data-bbox="987 861 2054 932">Patients, carers and families can access relevant information on wound management that empowers them to participate in decision-making and ongoing care</td> </tr> <tr> <td data-bbox="633 963 987 1034">Standard 5: Wound documentation</td> <td data-bbox="987 963 2054 1034">Agreed key information on all wounds is documented throughout the patient journey and across care settings</td> </tr> <tr> <td data-bbox="633 1066 987 1136">Standard 6: Applying data to improve care</td> <td data-bbox="987 1066 2054 1136">Wound data is regularly monitored and reported at all service levels to improve clinical care and service provision</td> </tr> <tr> <td data-bbox="633 1168 987 1238">Standard 7: Products and equipment</td> <td data-bbox="987 1168 2054 1238">Services have access to wound products and equipment that enables the delivery of best practice care</td> </tr> </tbody> </table> <p data-bbox="633 1302 1178 1340">With regards to Standard 1. Models of care:</p>	Standard 1: Wound model of care	Districts and networks have a documented and implemented wound model of care	Standard 2: Wound team	Services have a wound team aligned to their resources	Standard 3: Staff development	Districts and networks provide staff with access to education and development programs for wound management	Standard 4: Consumer information	Patients, carers and families can access relevant information on wound management that empowers them to participate in decision-making and ongoing care	Standard 5: Wound documentation	Agreed key information on all wounds is documented throughout the patient journey and across care settings	Standard 6: Applying data to improve care	Wound data is regularly monitored and reported at all service levels to improve clinical care and service provision	Standard 7: Products and equipment	Services have access to wound products and equipment that enables the delivery of best practice care
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Standard 7: Products and equipment	Services have access to wound products and equipment that enables the delivery of best practice care														

Source	Summary
Grey literature sources	
	<ul style="list-style-type: none"> • All districts and networks should have an overarching model of care to guide the provision and delivery of services for wound management that responds to the needs of patients, carers and families. • The model should take a broad view of wound management and support continuity of care across settings including acute care, outpatient care, community care, and interactions with primary care and residential aged care (including private and non-government facilities). • It should incorporate information from established national and international clinical standards and guidelines on best-practice wound prevention and management. At the service level the model may be supplemented with clinical practice guidelines for managing specific types of wounds. <p>Components for Wound Model of Care</p> <p>Foundational</p> <p>The model of care has been developed in collaboration with consumers and stakeholders from community care, primary care and other relevant settings including residential aged care.</p> <p>The model of care is readily available to all relevant NSW Health staff and is shared with participating external care providers.</p> <p>The model articulates the vision for the future state of wound management and identifies and prioritises issues requiring action. It includes the following components.</p> <ul style="list-style-type: none"> ▪ 1.1. Promotion of patient-centred care that is respectful of, and responsive to, individual patient preferences, needs and values, and focuses on the relationships that clinicians build with patients, family and carers as partners in health care delivery ▪ 1.2. Governance structures to oversee wound management at the local health district or/ specialty health networks level and the service level

Source	Summary
Grey literature sources	
	<ul style="list-style-type: none"> ▪ 1.3. Identification of relevant clinical practice guidelines, protocols and standards for each wound type to be used by services ▪ 1.4. Strategies to promote timely healing and prevent acute wounds from recurring or becoming chronic wounds, including medication review where indicated ▪ 1.5. Protocols to improve the active identification of chronic wounds and wounds at risk of becoming chronic in all care settings ▪ 1.6. Protocols to define the wound aetiology and treat the underlying chronic disease or causative factors for individual chronic wounds ▪ 1.7. A triage system to support timely access to care and identify the most appropriate care setting to manage the patient’s wound, including at home ▪ 1.8. Specified escalation points for acute and chronic wounds, based on timing or changes in pre-determined clinical indicators that trigger review by the wound team ▪ 1.9. Pathways for communication and transfer of patient care across all care settings ▪ 1.10. Integration and referral pathways for specialties relevant to common comorbidities in patients with wounds

Source	Summary
Grey literature sources	
	<p>Advanced</p> <ul style="list-style-type: none"> ▪ 1.11. Triage systems facilitate hospital avoidance, where appropriate, and early discharge to community care reducing length of stay and avoidable admissions ▪ 1.12. Escalation is a stimulus for detailed case discussion and consideration, specifically where clinicians have a difference of opinion over the management of a wound ▪ 1.13. Identification of telehealth modalities and relevant equipment to support and supplement face-to-face wound care and management ▪ 1.14. Relationships between care providers are formalised, with representation from all settings, including Primary Health Networks, primary care and residential aged care, included in governance groups ▪ 1.15. Integrated approaches consider the patient’s underlying conditions, goal of care and preferences of patients, carers and families, and coordinate care with other providers
<p>Solutions to the Chronic Wounds Problem in Australia: A Call to Action</p> <p>Australian Centre for Health Services Innovation (AusHSI)2018 (22)</p>	<p>The AusHSI held a Chronic Wounds Solutions Forum in August 2017, from which 17 key recommendations arose to address some of the existing barriers to implementing evidence-based wound care in Australia, such as:</p> <p>Advocacy and awareness</p> <ul style="list-style-type: none"> • Establish chronic wounds as a national priority area with widespread public health campaigns and national leadership and advocacy <p>Intensify and improve education and training</p> <ul style="list-style-type: none"> • Upskill and incentivise specialised training for primary care and specialised health professionals <p>Accreditation or Credentialing</p>

Source	Summary
Grey literature sources	
	<ul style="list-style-type: none"> Establish governing body for performing and monitoring accreditation and credentialing wound care activities including transdisciplinary clinics <p>Access to wound care products and services (improving physical access and financial support)*</p> <ul style="list-style-type: none"> Public funding, adequate reimbursement or subsidy plans for evidence-based wound care; implementing transdisciplinary teams, encouraging use of telehealth in remote or rural areas <p>Transdisciplinary patient-centred care</p> <ul style="list-style-type: none"> Transdisciplinary and patient-focused approach with clear communication, establish clear referral pathways, support effective and efficient communication between providers <p>Surveillance and research</p> <ul style="list-style-type: none"> Conduct nationally representative prevalence survey at regular interval and establish a national wound registry in line with international guidelines <p>*To improve access to care, the AusHSI advise that both static and mobile wound management clinics are needed. There is a need to implement standard models of transdisciplinary wound care teams across the country.</p> <p>Wound management in primary healthcare, with general practice at its core, as a priority Primary care has a crucial role in wound management. Improving education, skills and financial incentives in primary care can prevent wounds, increase recognition of infection and complications, and reduce hospitalisations.</p> <hr/> <p>Transdisciplinary outpatient clinics Secondary level wound specialty clinics run by appropriately trained healthcare providers would fill referral gaps in the community, provide education and training in wound management and encourage the implementation of evidence-based wound management.</p>

Source	Summary									
Grey literature sources										
	<p>Telemedicine for those outside of metropolitan areas</p> <p>For those patients who cannot access specialist care, such as those living in rural and remote areas or older patients with various comorbidities who may be unable to travel or are in aged care facilities, telemedicine may be particularly appropriate. Formats may include digital imaging options for wound assessment and algorithms for treatment decisions, which enhance clinical and learning outcomes.</p>									
<p>Standards for Wound Prevention and Management, Third Edition</p> <p>Wounds Australia 2016 (26)</p>	<p>Wounds Australia recommend seven core standards for wound prevention and management, including the scope under which health care professionals and workers practice, work in collaboration, clinical decision making (two standards that focus on assessment, planning and practice), documentation, education and corporate governance.</p> <p>Seven core standards of wound prevention and management</p> <table border="1" data-bbox="636 785 2056 1329"> <thead> <tr> <th data-bbox="636 785 869 833">Standard</th> <th data-bbox="869 785 1236 833">Expected level of care</th> <th data-bbox="1236 785 2056 833">Criteria</th> </tr> </thead> <tbody> <tr> <td data-bbox="636 833 869 1145">Scope of practice</td> <td data-bbox="869 833 1236 1145">Safety and wound healing potential of the individual is enhanced by practice that respects and complies with legislation, regulations, scope of practice, service provider policies, current evidence and ethics</td> <td data-bbox="1236 833 2056 1145"> 1.1. Performance in accordance with legislation, regulations, scope of practice and service provider policies 1.2. Implementation of evidence-based wound prevention and management 1.3. Provision of care within an ethical practice framework </td> </tr> <tr> <td data-bbox="636 1145 869 1329">Collaborative practice</td> <td data-bbox="869 1145 1236 1329">Wound prevention and management are delivered using a collaborative approach between the individual, interprofessional</td> <td data-bbox="1236 1145 2056 1329"> 2.1. Empowerment of the individual and their informal carers to participate in health care decisions and wound management 2.2. Communication that facilitates collaboration and coordination of care </td> </tr> </tbody> </table>	Standard	Expected level of care	Criteria	Scope of practice	Safety and wound healing potential of the individual is enhanced by practice that respects and complies with legislation, regulations, scope of practice, service provider policies, current evidence and ethics	1.1. Performance in accordance with legislation, regulations, scope of practice and service provider policies 1.2. Implementation of evidence-based wound prevention and management 1.3. Provision of care within an ethical practice framework	Collaborative practice	Wound prevention and management are delivered using a collaborative approach between the individual, interprofessional	2.1. Empowerment of the individual and their informal carers to participate in health care decisions and wound management 2.2. Communication that facilitates collaboration and coordination of care
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		<p>team, health care workers and informal carers</p>	<p>2.3. Recognition of the skills, knowledge, and contributions of the individual, interprofessional team, health care workers and informal carers with respect to prevention and management of wounds</p> <p>2.4. Recognition of the cultural diversity and setting of the individual, interprofessional team, health care workers and informal carers</p>
	<p>Clinical decision making: assessment</p>	<p>A comprehensive, ongoing assessment of the individual, their wound and the healing environment is performed</p>	<p>3.1. A comprehensive and ongoing assessment of the individual</p> <p>3.2. A comprehensive and ongoing assessment of risk of wounding</p> <p>3.3. A comprehensive and ongoing assessment of the individual's wound</p> <p>3.4. A comprehensive and ongoing assessment of the individual's healing environment that identifies factors that could impact on confidentiality, safe performance of procedures, infection control or wound healing is performed</p> <p>3.5. Appropriate diagnostic investigations are performed when clinically indicated to ascertain a definitive diagnosis or identify reasons for delayed wound healing and the outcomes are documented</p>
	<p>Clinical decision making: planning and practice</p>	<p>Wound prevention and management are practised according to the best available evidence for optimising outcomes for</p>	<p>4.1. Goals of care are established with the individual, the interprofessional team, health care workers and informal carers and reflect evidence-based practice and the preferences of the individual</p>

Source	Summary	
Grey literature sources		
		<p>the individual, their wound and their healing environment</p> <p>4.2. Strategies to prevent wound development are implemented according to comprehensive individual assessment</p> <p>4.3. The ability of the individual to heal is optimised</p> <p>4.4. The type of aseptic technique selected when performing a wound dressing procedure is appropriate to the individual, their wound and their healing environment</p> <p>4.5. Aseptic techniques are performed in a manner consistent with best available evidence</p> <p>4.6. Showering or washing of approximated incisions and lacerations and chronic wounds is only performed after a risk assessment and in a manner consistent with best available evidence</p> <p>4.7. Wound bed tissue is protected and optimised for wound healing</p> <p>4.8. Wound-related infection and cross infection are prevented and managed</p> <p>4.9. An optimal wound moisture balance is maintained and the peri-wound or surrounding tissue is protected from moisture</p> <p>4.10. An optimal wound temperature is maintained when performing a wound dressing procedure</p> <p>4.11. An optimal wound pH is maintained when performing a wound dressing procedure and skin care</p> <p>4.12. Potential and actual impact of wound-related pain is minimised</p>

Source	Summary		
Grey literature sources			
			<p>4.13. Innovations for stimulating wound healing, including biophysical technologies and treatments that alter the biology of the wound, are considered with respect to the evidence base demonstrating their efficacy in similar populations and the potential risks of treatment</p> <p>4.14. Products, pharmaceuticals and devices are used in accordance with licensing acts, regulations and manufacturer guidelines and their integrity is maintained</p>
	Documentation	Documentation will provide a legal, comprehensive, chronological record of assessments and progress, investigations of the individual's wound and risk of wounding, wound management and prevention plans, and the outcome of care	<p>5.1. Maintenance of a legible health record (e.g. health history and wound management plan) that meets legislative, regulatory and service provider requirements</p> <p>5.2. Documented consultation with the individual and their informal carer regarding the use of their health information</p> <p>5.3. The individual's health record is documented comprehensively, chronologically and accurately</p>
	Education	Opportunities for advancing self-knowledge and skills in wound prevention and management are maximised	<p>6.1. Learning needs of members of the interprofessional team and health care workers in wound prevention and management are identified</p> <p>6.2. Opportunities for advancing knowledge and skills in wound prevention and management are undertaken</p>

Source	Summary		
Grey literature sources			
			<p>6.3. The learning needs of the interprofessional team are supported</p> <p>6.4. The interprofessional team regularly identifies, critiques, implements and evaluates evidence for wound prevention and management</p> <p>6.5. Learning needs of the individual and their informal carers are supported</p>
	Corporate governance	The service provider framework supports evidence based wound prevention and management	<p>7.1. Evidence based practice is endorsed</p> <p>7.2. Resources to ensure systematic collection of information are provided</p>
<p>Improving Wound Management for Residents in Residential Aged Care Facilities: National Dissemination and Implementation of the Evidence Based Champions for Skin Integrity Program: Final Report</p> <p>Edwards, et al. 2015 (23)</p>	<p>Queensland University of Technology’s nursing researchers developed the Champions for Skin Integrity model of wound care. This report provides the findings from the implementation of this model in residential aged care facilities. A total of 37 project workshops were delivered with 1,286 participants, representing 835 facilities.</p> <p>The Champions for Skin Integrity model of wound care incorporates a range of strategies that involves residents, families and care providers, and is supported by clinical decision-making support systems. Local champions are identified and trained to be key contacts and supports for healthcare staff. Information is easy to access with hands-on training, documentary reminder systems, and audit and review cycles.</p> <ul style="list-style-type: none"> The implementation of the evidence-based Champions for Skin Integrity model of wound care was successful in significantly decreasing the prevalence and severity of wounds in residents. 		

Source	Summary
Grey literature sources	
	<ul style="list-style-type: none"> • Staff outcomes included providing increased education, improved knowledge, implementation of protocols and resources which lessened workload, and increased staff awareness of their roles in evidence-based wound care at all levels. • Organisational outcomes included up-skilling and empowerment of staff, residents and families, which provided opportunities for improving processes and procedures relating to skin integrity and wound care in these organisations. These included reviews of current policies and protocols, establishment of Champions for Skin Integrity teams, and processes involving the implementation of the Champions for Skin Integrity model and resources, such as, regular meetings, audits, evaluations, monitoring, resident surveys and cost comparisons. • There was also evidence that changes in practice and organisational protocols had been sustained for over two years since the completion of the original project. This has resulted in improved resident outcomes, decreased prevalence of wounds and improved awareness of evidence-based management of wounds.
Canada	
<p>Best Practice Recommendations for the Prevention and Management of Wounds</p> <p>Orsted, et al. 2018 (27)</p> <p>On behalf of Wounds Canada</p>	<ul style="list-style-type: none"> • The authors outline a process that supports patient-centred wound care. These steps are organised into a scheme labelled the Wound Prevention and Management Cycle. This guides the clinician through a logical and systematic method for developing a customised plan for the prevention and management of wounds. The process begins from the initial assessment and leads to a sustainable plan targeting self-management for the patient. • It is based on three key principles: <ol style="list-style-type: none"> 1. The use of a logical and systematic approach, regardless of the specifics, to prevent and manage skin breakdown 2. The constant, accurate and multidirectional flow of meaningful information with the team and across care settings 3. The patient is at the core of all decision making.

Source	Summary											
Grey literature sources												
	<ul style="list-style-type: none"> The authors recommend this framework to provide all members of the care team with a process to enable care that is individualised, while still following best practice. <p>Table. Five Steps in the Wound Prevention and Management Cycle and Recommendations</p> <table border="1" data-bbox="636 459 2027 1347"> <thead> <tr> <th data-bbox="636 459 945 512">Step</th> <th data-bbox="945 459 2027 512">Recommendation</th> </tr> </thead> <tbody> <tr> <td data-bbox="636 512 945 836"> 1 Assess reassess </td> <td data-bbox="945 512 2027 836"> 1.1 Select and use validated patient assessment tools. 1.2 Identify risk and causative factors that may impact skin integrity and wound healing. 1.2.1 Patient: Physical, emotional and lifestyle 1.2.2 Environmental: Socio-economic, care setting, potential for self-management 1.2.3 Systems: Health-care support and communication 1.3 Complete a wound assessment, if applicable. </td> </tr> <tr> <td data-bbox="636 836 945 983"> 2 Set goals </td> <td data-bbox="945 836 2027 983"> 2.1 Set goals for prevention, healing, non-healing and non-healable wounds. 2.1.1 Identify goals based on prevention or ability of wounds to heal. 2.1.2 Identify quality-of-life and symptom-control goals. </td> </tr> <tr> <td data-bbox="636 983 945 1129"> 3 Assemble the team </td> <td data-bbox="945 983 2027 1129"> 3.1 Identify appropriate health-care professionals and service providers. 3.2 Enlist the patient and their family and caregivers as part of the team. 3.3 Ensure organisational and system support. </td> </tr> <tr> <td data-bbox="636 1129 945 1347"> 4 Establish and implement a plan of care </td> <td data-bbox="945 1129 2027 1347"> 4.1 Identify and implement an evidence-informed plan to correct the causes or co-factors that affect skin integrity, including patient needs (physical, emotional and social), the wound (if applicable) and environmental or system challenges. 4.2 Optimise the local wound environment aided through 4.2.1 Cleansing </td> </tr> </tbody> </table>		Step	Recommendation	1 Assess reassess	1.1 Select and use validated patient assessment tools. 1.2 Identify risk and causative factors that may impact skin integrity and wound healing. 1.2.1 Patient: Physical, emotional and lifestyle 1.2.2 Environmental: Socio-economic, care setting, potential for self-management 1.2.3 Systems: Health-care support and communication 1.3 Complete a wound assessment, if applicable.	2 Set goals	2.1 Set goals for prevention, healing, non-healing and non-healable wounds. 2.1.1 Identify goals based on prevention or ability of wounds to heal. 2.1.2 Identify quality-of-life and symptom-control goals.	3 Assemble the team	3.1 Identify appropriate health-care professionals and service providers. 3.2 Enlist the patient and their family and caregivers as part of the team. 3.3 Ensure organisational and system support.	4 Establish and implement a plan of care	4.1 Identify and implement an evidence-informed plan to correct the causes or co-factors that affect skin integrity, including patient needs (physical, emotional and social), the wound (if applicable) and environmental or system challenges. 4.2 Optimise the local wound environment aided through 4.2.1 Cleansing
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Source		Summary	
Grey literature sources			
			4.2.2 Debriding 4.2.3 Managing bacterial balance 4.2.4 Managing moisture balance 4.3 Select the appropriate dressings and advanced therapy. 4.4 Engage the team to ensure consistent implementation of the plan of care.
	5	Evaluate outcomes	5.1 Determine if the outcomes have met the goals of care. 5.2 Reassess patient, wound, environment and system if goals are partially met or unmet. 5.3 Ensure sustainability to support prevention and reduce risk of recurrence.
United Kingdom			
Lower Limb Recommendations for Clinical Care National Wound Care Strategy Program 2020 (28)		The National Wound Care Strategy Program (NWCSP) provides the following evidence-informed recommendations to support the prevention, assessment and treatment of people with leg and foot wounds. The aim is to optimise healing and minimise the burden of wounds for patients, carers, and health and care providers. The recommendations outline a pathway of care that promotes rapid diagnosis, enabling fast access to appropriate therapeutic interventions with swift escalation of treatment, or service provision, for patients requiring more complex care in all clinical care settings. The recommendations offer a framework for the development of local delivery plans that includes consideration of relevant research evidence, where it exists, to inform care; configuration of services and deployment of workforce; appropriate education for that workforce and relevant metrics to measure quality improvement.	

Source	Summary		
Grey literature sources			
	<p>Diagnosis and treatment</p>	<p>Wounds on the foot</p> <p>1 Assess and identify contributing causes for non-healing</p> <p>2 Diagnose cause of non-healing and formulate treatment plan</p> <p>People with confirmed or suspected diabetic foot ulceration:</p> <ul style="list-style-type: none"> • Refer to diabetic foot team • Provide care in line the National Institute for Health and Care Excellence (NICE) Guideline for Diabetic Foot Problems. <p>People with confirmed or suspected peripheral arterial disease</p> <ul style="list-style-type: none"> • Refer for vascular surgical opinion • Provide care in line the NICE Guideline for Peripheral Arterial Disease 	<p>Wounds of the leg</p> <p>1 Assess and identify contributing causes for non-healing</p> <p>2 Diagnose cause of non-healing and formulate treatment plan</p> <p>Leg wounds with an adequate arterial supply and no aetiology other than venous insufficiency:</p> <ul style="list-style-type: none"> • Refer for venous surgical or endovenous interventions • Strong compression therapy <p>Leg wounds with signs of arterial disease:</p> <ul style="list-style-type: none"> • Refer for vascular surgical or endovenous interventions and advice on compression • Pending vascular opinion, if no symptoms of arterial insufficiency, continue with mild graduated compression <p>Leg wounds of other or uncertain aetiology:</p> <ul style="list-style-type: none"> • Refer for dermatology opinion (or other specialist depending on symptoms and service arrangements) - Pending specialist opinion if no symptoms of arterial insufficiency, continue with mild graduated compression.

Source	Summary		
Grey literature sources			
			Lymphoedema: <ul style="list-style-type: none"> • Refer for expert diagnosis and advice about lymphoedema.
	Ongoing care and review	Review at each dressing change and at weekly intervals: <ul style="list-style-type: none"> • Monitor healing at four-week intervals (or more frequently if concerned). • If unhealed at 12 weeks, reassess 	Review at each dressing change and at weekly intervals Monitor healing at four-week intervals, or more frequently if concerned: <ul style="list-style-type: none"> • If deteriorating or no significant progress towards healing, escalate If unhealed at 12 weeks, reassess: <ul style="list-style-type: none"> • If progressing to healing but still unhealed, undertake comprehensive re-assessment • If deteriorating or no significant progress towards healing, escalate
	Following healing		Venous Leg Ulceration <ul style="list-style-type: none"> • Compression hosiery • Six-monthly review for replacement of compression garments and ongoing advice • If there are changes in lower limb symptoms or skin problems relating to hosiery, undertake comprehensive re-assessment

Source	Summary
Grey literature sources	
<p>The Role of Social Models of Care in Wound Management</p> <p>Lindsay, et al. 2018 (19)</p>	<p>The authors argue that to effectively address the complex therapeutic area of wound management, a social model of care is needed. It attempts to address the broader influences on health. It focuses on social, cultural, environmental and economic factors as opposed to just disease and injury. Social models of care appear to have a higher success rate when concordance with treatment and informed decision-making are required. Although different in their emphases, in social models of care:</p> <ol style="list-style-type: none"> 1. Treatment needs to take place at a consistent place and time 2. Appointments should not be necessary, and patients should not feel under any time constraints 3. Addressing patient-centred concerns is a critical component of treatment 4. Education, prevention and patient empowerment are emphasised 5. Both clinical and non-clinical services must be available 6. Patients and their families or carers should have access to the treatment centre, find it easy to reach and feel comfortable there 7. While confidentiality should always be respected, patients should be able to socialise with other people while attending these centres 8. Active participation by patients, ex-patients and volunteers should be encouraged and facilitated. <p>The Lindsay Leg Club Model is underpinned by an understanding of how wider social factors, in addition to medical treatment, affect the management of all aspects of the lower limb and venous leg ulcers. The concept of the non-medical community-based clinic was primarily aimed at integrating individuals with leg ulcers into an environment where they can socialise with others who are experiencing similar problems.</p> <p>In this model of care, patients are referred to as members, since they have a stake in the clubs. Membership implies an empowered role in an environment based on social interaction, rather than on a typical appointment-based model of clinical care. Leg Clubs are characterised by four binding principles that differentiate them from conventional clinics:</p> <ol style="list-style-type: none"> 1. They are held in a non-medical setting, such as a community, church or village hall. This avoids the stigma or fear of attending a medical setting and reinforces the community ownership of the club

Source	Summary
Grey literature sources	
	<ol style="list-style-type: none"> 2. They are informal, open access and no appointment is required. This encourages opportunistic attendance for information and advice, providing greatly increased opportunities for early diagnosis and leg ulcer prevention. It also helps isolated older people reintegrate into their community 3. Collective treatment. People share their experience, gain peer support, and are encouraged to take ownership of their treatment 4. An integrated 'well leg' regime, that supports maintenance of healthy legs, positive health beliefs and broad health promotion <p>Lindsay Leg Clubs have been demonstrated in peer-reviewed literature to be effective in:</p> <ul style="list-style-type: none"> • Healing – The majority of healed ulcers within the Leg Club network achieve healing within two months • Recurrence – Leg ulcers are half as likely to recur at 24–48 weeks in Leg Club members as in other leg ulcer sufferers in the UK • Satisfaction – High levels of satisfaction with members and Leg Club nursing staff • Wellbeing – Leg Clubs improve the wellbeing of members • Cost effectiveness <ul style="list-style-type: none"> ○ Widespread adoption of the Leg Club model can generate considerable savings in district nursing time ○ If Leg Clubs were to be introduced across the UK, the total potential savings to the National Health Service has been estimated at £107 million per year

Supplemental Table of Findings. Research evidence on wound prevention-focused care interventions

Source	Summary
Peer reviewed sources	
Multicomponent Strategies	
Complex interventions for preventing diabetic foot ulceration Hoogeveen, et al. 2015 (42)	<p>Summary:</p> <ul style="list-style-type: none"> To assess the effectiveness of complex interventions in the prevention of foot ulcers in people with diabetes mellitus compared with single interventions, usual care or alternative complex interventions. A systematic review of six randomised controlled trials. <p>Intervention(s):</p> <ul style="list-style-type: none"> Complex interventions in the prevention of foot ulcers, defined as an integrated care approach, combining two or more prevention strategies on at least two different levels of care: the patient, the healthcare provider or the structure of health care. <p>Findings:</p> <ul style="list-style-type: none"> Three studies compared an education-centred complex intervention with usual care or written instructions: <ul style="list-style-type: none"> Only little evidence of benefit Three studies compared more intensive and comprehensive complex interventions with usual care: <ul style="list-style-type: none"> One study found a significant and cost-effective reduction, one of lower extremity amputations (RR 0.30, 95% CI 0.3–0.71) One study found a significant reduction of both amputation and foot ulcers One study reported improvement of patients' self-care behaviour <p>Authors' conclusions:</p> <ul style="list-style-type: none"> The study characteristics differed substantially in terms of healthcare settings, the nature of the interventions studied, and outcome measures reported.

Source	Summary
Peer reviewed sources	
	<ul style="list-style-type: none"> All six randomised controlled trials included were at high risk of bias, with hardly any of the predefined quality assessment criteria met. There is no high-quality research evidence evaluating complex interventions for preventing diabetic foot ulceration and insufficient evidence of benefit.
<p>Preventing In-Facility Pressure Ulcers as a Patient Safety Strategy</p> <p>Sullivan, et al. 2013 (43)</p>	<p>Summary:</p> <ul style="list-style-type: none"> To review evidence regarding multicomponent strategies for preventing pressure ulcers and to examine the importance of contextual aspects of programs that aim to reduce pressure ulcers acquired in a facility. A systematic review of 26 implementation studies published from 2000–2012. <p>Intervention(s):</p> <ul style="list-style-type: none"> Multicomponent initiatives to prevent pressure ulcers in acute and long-term care settings. Key components in this review include: <ul style="list-style-type: none"> the simplification and standardisation of pressure ulcer-specific interventions and documentation involvement of multidisciplinary teams and leadership use of designated skin champions ongoing staff education sustained audit and feedback <p>Findings:</p> <ul style="list-style-type: none"> The integration of several core components improved processes of care and reduced pressure ulcer rates: <ul style="list-style-type: none"> Two studies reported that process-of-care quality measures improved but that pressure ulcer rates did not. The other 24 studies reported at least some improvement in pressure ulcer rates.

Source	Summary
Peer reviewed sources	
	<ul style="list-style-type: none"> ▪ Statistically significant reductions in pressure ulcer rates were reported in 11 (42%) of 26 studies (median reduction, 82% [range 67–100%]). ▪ Of the 13 studies with improvements not reaching statistical significance, five reported improvements in both pressure ulcer rates and process-of-care measures. <p>Authors' conclusions:</p> <ul style="list-style-type: none"> • Future research should report strategies to sustain momentum of preventive programs, as this was rarely reported on. • Further study of both system-level and patient-care interventions aimed at preventing pressure ulcers is still needed for clinicians and managers to choose the most effective and efficient practices.
<p>Comprehensive programs for preventing pressure ulcers: a review of the literature</p> <p>Niederhauser, et al. 2012 (44)</p>	<p>Summary:</p> <ul style="list-style-type: none"> • To examine the evidence supporting the combined use of interventions to prevent pressure ulcers in acute care and long-term-care facilities. A systematic review of 24 studies. <p>Intervention(s):</p> <ul style="list-style-type: none"> • Multifaceted pressure ulcer prevention programs. Recurring components in this review included: <ul style="list-style-type: none"> ○ preparations prior to the start of a program ○ pressure ulcer prevention best practices ○ staff education ○ clinical monitoring and feedback ○ skin care champions ○ cues to action <p>Findings:</p>

Source	Summary
Peer reviewed sources	
	<ul style="list-style-type: none"> • Nine out of 10 studies reported decreased pressure ulcer <i>prevalence</i> rates at the end of their programs. • Five out of six studies reported a decrease in pressure ulcer <i>incidence</i> rates. • Of the four studies measuring care processes: <ul style="list-style-type: none"> ○ one study reported an overall improvement ○ two studies reported improvement on some, but not all, measures ○ one study reported no change <p>Authors' conclusions:</p> <ul style="list-style-type: none"> • Outcomes reported in these studies suggest that multipronged, multidisciplinary programs can be successful in reducing pressure ulcer prevalence or incidence rates in acute-care settings and long-term-care facilities. • To strengthen the level of evidence, sites should be encouraged to rigorously evaluate their programs and to publish their results.
Education and Self-management support	
<p>Evidence for person-centred care in chronic wound care: A systematic review and recommendations for practice</p> <p>Gethin, et al. 2020 (31)</p>	<p>Summary:</p> <ul style="list-style-type: none"> • To review the evidence on the use of person-centred care in chronic wound care management and provide recommendations for practice and future research. A systematic review of 18 articles on studies involving 3,149 patients from nine countries. <p>Intervention(s):</p> <ul style="list-style-type: none"> • Person-centred care in chronic wound care management, defined as care that values patients' perspectives, beliefs and autonomy and considers the person within the cultural context in which care is provided. • Studies were conducted under three broad categories: <ul style="list-style-type: none"> ○ Healthcare professional education (n=1), by a local wound expert nurse practitioner

Source	Summary
Peer reviewed sources	
	<p data-bbox="631 327 750 359">Findings:</p> <ul style="list-style-type: none"> <li data-bbox="974 327 1332 359">○ Patient education (n=14) <li data-bbox="974 363 1265 395">○ Telemedicine (n=3) <ul style="list-style-type: none"> <li data-bbox="873 462 2049 534">● Only two studies evaluated the impact on wound healing and one study estimated the cost of implementing person-centred care <li data-bbox="873 539 2049 1053">● Health care professional education: <ul style="list-style-type: none"> <li data-bbox="974 574 2049 909">○ Of the nine staff who completed the questionnaire, an increase in knowledge and confidence on all measures was reported: <ul style="list-style-type: none"> <li data-bbox="1064 646 1758 678">▪ Confidence in assessment increased from 56–100% <li data-bbox="1064 683 1836 715">▪ Using investigations to diagnose increased from 22–100% <li data-bbox="1064 719 2049 791">▪ Knowledge of the roles of other healthcare professionals increased from 78–89% <li data-bbox="1064 796 1792 828">▪ Documenting a treatment plan increased from 67–89% <li data-bbox="1064 833 1691 865">▪ Implementing a plan increased from 56–100% <li data-bbox="1064 869 1668 901">▪ Patient monitoring increased from 67–100% <li data-bbox="974 914 1982 978">○ Of the 15 patients who completed the questionnaires, 11 reported being more satisfied and more able to help themselves <li data-bbox="974 983 2049 1053">○ Data on healing outcomes were available for 23 patients and showed that all 23 had healed <li data-bbox="873 1058 1937 1129">● For patient education programs, significant improvements were reported in patient knowledge, pain and self-care behaviours <p data-bbox="631 1141 907 1173">Authors' conclusions:</p> <ul style="list-style-type: none"> <li data-bbox="873 1197 2004 1268">● Person-centred care in wound management has shown improved outcomes in areas of pressure ulcer prevention, patient satisfaction, patient knowledge and quality of life.

Source	Summary
Peer reviewed sources	
	<ul style="list-style-type: none"> Clinical outcomes, such as wound healing, were less well explored. Further research with more objective outcome measures are required.
<p>Patient education for preventing recurrence of venous leg ulcers: a systematic review</p> <p>Shanley, et al. 2020 (32)</p>	<p>Summary:</p> <ul style="list-style-type: none"> To investigate the impact of patient education interventions on preventing the recurrence of venous leg ulcers. It included four randomised controlled trials and cluster randomised controlled trials of patient educational interventions for preventing venous leg ulcer recurrence (n=274). <p>Intervention(s):</p> <ul style="list-style-type: none"> Patient education interventions: <ul style="list-style-type: none"> The Lively Legs program Education delivered via a video compared with education delivered via a pamphlet The Leg Ulcer Prevention Program The Lindsay Leg Club <p>Findings:</p> <ul style="list-style-type: none"> Level of evidence on the following outcomes was assessed as very low: <ul style="list-style-type: none"> Venous leg ulcers recurrence at 18 months: risk ratio (RR) 0.82; 95% CI 0.59–1.14 Patient behaviours: walked at least 10 minutes, five days a week, RR 1.48; 95% CI 0.99–2.21; walked at least 30 minutes, five days a week, RR 1.14; 95% CI 0.66–1.98; performed leg exercises, RR 1.47; 95% CI 1.04–2.09 Knowledge scores (mean difference 5.12, 95% CI 1.54–11.78) Quality of life (mean difference 0.85, 95% CI: 0.13–1.83) Whether different types of education delivery make any difference to knowledge scores (mean difference 12.40; 95% CI 5.68–30.48) <p>Authors' conclusion:</p>

Source	Summary
Peer reviewed sources	
	<ul style="list-style-type: none"> The studies were at high risk of bias and outcome measures were imprecise due to wide confidence intervals and small sample sizes. Further well-designed trials, addressing important clinical, quality of life and economic outcomes are needed, based on the incidence of the problem and the high costs associated with venous leg ulcer management.
<p>Interventions for helping people adhere to compression treatments for venous leg ulceration</p> <p>Weller, et al. 2016 (33)</p>	<p>Summary:</p> <ul style="list-style-type: none"> An update of a previous Cochrane review to assess the benefits and harms of interventions designed to help people adhere to venous leg ulcer compression therapy, to improve healing and prevent recurrence after healing. One randomised controlled trial was added to this update making a total of three. One ongoing study was also identified. <p>Intervention(s):</p> <ul style="list-style-type: none"> Interventions which help people adhere to compression treatments: <ul style="list-style-type: none"> A community-based Leg Club® that provided mechanisms for peer-support, assistance with goal setting and social interaction (vs home-based care); A community-based, nurse-led self-management programme of six months' duration promoting physical activity (walking and leg exercises) and adherence to compression therapy via counselling and behaviour modification (Lively Legs®) in a wound clinic (vs usual care); Patient education delivered via video (vs education delivered by a pamphlet) <p>Findings:</p> <ul style="list-style-type: none"> Leg Club vs home-based care: <ul style="list-style-type: none"> No clear difference in healing rates: <ul style="list-style-type: none"> At three months (12 of 28 people healed in Leg Club group versus seven of 28 in a home-based care group; RR 1.71, 95% CI 0.79–3.71); At six months (15 or 33 people healed in Leg Club group versus 10 of 34 in a home-based care group; RR 1.55, 95% CI 0.81–2.93);

Source	Summary
Peer reviewed sources	
	<ul style="list-style-type: none"> ○ No clear difference in quality of life outcomes at six months (mean difference (MD) 0.85 points, 95% CI -0.13–1.83; 0 to 10-point scale). ○ A small reduction in pain at six months, but not clinically significant (MD -12.75 points, 95% CI -24.79 – -0.71; 0 to 100-point scale, 15-point reduction is usually considered the minimal clinically important difference). ● Lively Legs® vs usual care: <ul style="list-style-type: none"> ○ No clear differences in healing rates at 18 months follow-up (51 of 92 people healed in Lively Legs group versus 41 of 92 in usual care group; RR 1.24 (95% CI 0.93–1.67)); ○ No clear differences in rates of recurrence of venous leg ulcers (32 of 69 people with recurrence in a Lively Legs group versus 38 of 67 in a usual care group; RR 0.82 (95% CI 0.59–1.14)); ○ No clear differences in adherence to compression therapy (42 of 92 people fully adhered in the Lively Legs group versus 41 out of 92 in a usual care group; RR 1.02 (95% CI 0.74–1.41)) ● Patient education via video vs text: <ul style="list-style-type: none"> ○ No outcomes relevant to this review were reported. <p>Authors' conclusions:</p> <ul style="list-style-type: none"> ● It is unclear whether interventions designed to help people adhere to compression therapy improve venous ulcer healing and reduce recurrence. <ul style="list-style-type: none"> ▪ There is a lack of trials of interventions that promote adherence to compression therapy for venous ulcers.
<p>Patient education for preventing diabetic foot ulceration</p> <p>Dorresteyjn, et al. 2014 (34)</p>	<p>Summary:</p> <ul style="list-style-type: none"> ● To assess the effects of patient education on the prevention of foot ulcers in patients with diabetes mellitus. A systematic review of 12 randomised controlled trials (RCTs). <p>Intervention(s):</p> <ul style="list-style-type: none"> ● Patient education

Source	Summary
Peer reviewed sources	
	<p>Findings:</p> <ul style="list-style-type: none"> • One of the RCTs showed reduced incidence of foot ulceration (RR 0.31, 95% CI 0.14–0.66) and amputation (RR 0.33, 95% CI 0.15–0.76) during one-year follow-up of diabetes patients at high risk of foot ulceration after a one-hour group education session. However, one similar study, with lower risk of bias, did not confirm this finding (RR amputation 0.98, 95% CI 0.41 -2.34; RR ulceration 1.00, 95% CI 0.70–1.44). • Three other studies also did not demonstrate any effect of education on the primary end points but were most likely underpowered. • Five of eight randomised controlled trials showed an improvement in patients' foot care knowledge in the short term in which this outcome was assessed. • Seven of nine randomised controlled trials showed an improvement in patients' self-reported self-care behaviour in the short term. • One of five RCTs showed improvements in callus, nail problems and fungal infections. <p>Authors' conclusions:</p> <ul style="list-style-type: none"> • In some trials, foot care knowledge and self-reported patient behaviour seem to be positively influenced by education in the short term. • However, there seems to be insufficient robust evidence that limited patient education alone is effective in achieving clinically relevant reductions in ulcer and amputation incidence. This conclusion is based on the only two sufficiently powered studies reporting the effect of patient education on primary end points.

Appendix

PubMed search terms

((("diabet*" [Title/Abstract] OR "foot" [Title/Abstract] OR "pressure" [Title/Abstract] OR "decubitus" [Title/Abstract] OR "venous" [Title/Abstract] OR "varicose" [Title/Abstract] OR "stasis" [Title/Abstract] OR "arteria*" [Title/Abstract] OR "arterie*" [Title/Abstract] OR "artery" [Title/Abstract] OR "chronic" [Title/Abstract] OR "non-healing" [Title/Abstract] OR "complex" [Title/Abstract]))

AND ("ulcer*" [Title/Abstract] OR injur* [Title/Abstract] OR "wound*" [Title/Abstract] OR "wounds and injuries" [MeSH Terms]))

AND ("Patient Care Team" [MeSH] OR Models, Organizational [MeSH] OR organizational innovation [MeSH] OR "Patient-Centered Care/organization and administration" [Mesh] OR Delivery of Health Care, Integrated [MeSH] OR "patient care management" [MeSH Terms] OR "model of care" [tiab] OR "models of care" [tiab] OR "care model*" [tiab] OR "care delivery model*" [tiab] OR "organisation of care" [tiab] OR "organisational model*" [tiab] OR "organisation model*" [tiab] OR "organization of care" [tiab] OR "organizational model*" [tiab] OR "organization model*" [tiab] OR "healthcare delivery model*" [tiab] OR "integrated care" [tiab] OR "integrated model*" [tiab] OR model [title]))

AND (((systematic review [Title/Abstract]) OR ("systematic review" [Publication Type])) OR (meta analysis [Title/Abstract])) OR (meta analysis [Publication Type]))

AND ((english [Filter]) AND (2011:2020 [pdat]))

= **190 hits** (21 October 2020)

Google (first 5 pages of search results)

- "chronic wound model of care systematic review"
- wound model of care impact

Google Scholar (limit to 2011-present, first 10 pages of search results)

- Chronic wound model of care "systematic review"
- "chronic wound" "systematic review"
- "wound clinic" "systematic review"
- "wound team" "systematic review"

Journal databases:

- [ClinOwl](#) database (25 November 2020)
- [Cochrane Wound Systematic Reviews](#) database (22 October 2020)
- [Journal of Wound Care](#) database (27 November 2020)

Inclusion and exclusion criteria

Inclusion	Exclusion
<ul style="list-style-type: none"> • Systematic review, meta-analysis, integrative reviews only • PICO: <ul style="list-style-type: none"> ○ Population: People with, or at high-risk of, developing chronic wounds, defined as wounds that have shown no significant progress toward healing in 30 days. Types of chronic wounds include ischaemic ulcers, venous ulcers, pressure ulcers, ulcerated and fungating malignancy-related wounds and infected wounds, including surgical site infections ○ Intervention: Organisational models of care (the way in which care is organised and delivered) implemented for the prevention and/or management of chronic wounds ○ Comparison: None or various ○ Outcome: Various • Published in 2011–present • English language 	<ul style="list-style-type: none"> • Does not meet criteria for publication type (e.g. non-systematic reviews, review protocol); PICO; publication date; or language. • Does not evaluate effectiveness of the model of care based on clinical outcomes, patient-reported outcomes (e.g. quality of life), cost-effectiveness, etc. • Is solely about individual strategies or interventions for treating wounds; or clinical management of wounds (studies that focus on what the care is, e.g. different types of dressings, rather than the way in which care is delivered).

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