

The long and winding road: health services for clients with chronic leg ulcers in the community

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ABSTRACT

The prevalence of leg ulcers is 0.12%–1.1% and >3,000 lower limb amputations are performed yearly in Australia due to non-healing leg or foot ulcers. Although evidence on leg ulcer management is available, a significant evidence–practice gap exists. To identify current leg ulcer

management, a cross-sectional retrospective study was undertaken in Brisbane, Australia. A sample of 104 clients was recruited from a community specialist wound clinic and a tertiary hospital outpatients' specialist wound clinic. All clients had an ulcer below their knee or on their foot for ≥ 4 weeks. Data were collected on ulcer care, health service usage and clinical history for the year prior to admission. On admission, participants reported having their ulcer for a median of 25 weeks (range 2–728 weeks); with 51% (53/104) reporting an ulcer duration of ≥ 24 weeks. Including the wound clinic, participants sought ulcer care from a median of three health care providers (range 2–7). General practitioners (GPs) provided ulcer care to 82% of participants. Nearly half (42%) had self-cared for their ulcer; 29% (30/104) received treatment by a community nurse. A gap was found between the community-based ulcer care experienced by this population and evidence-based guidelines in regard to assessment, management, advice and referrals.

Keywords: Chronic leg ulcers, community, management, health services, retrospective.

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INTRODUCTION

A previous deep vein thrombosis (DVT), varicose veins, peripheral vascular disease and diabetes are all risk factors for chronic leg or foot ulcers¹. With a prevalence of 0.12%–1.1%², and an increasing prevalence with age³, leg ulcers of all aetiologies are a distant thought for many, especially those who are young and healthy. For those who develop a leg ulcer, however, it is a formidable burden. It is common for leg ulcers to have associated leakage, odour and pain⁴ and approximately 45% of leg ulcer clients in Australia are housebound⁵. The duration of each ulcer is 12–13 months on average^{6,7} and when an ulcer heals, there is a high probability (60–70%) that another ulcer will develop^{7,8}, sometimes within a few months. In all, those with chronic leg ulcers struggle with the condition on and off for an average of 15 or more years⁹.

Care for leg ulcers primarily occurs in the community by a mix of primary health care providers, including untrained carers; utilising

expensive products and services, which are often out-of-pocket costs for clients¹⁰. Chronic wounds need constant, long-term attention. In Australia wound dressings along with excisions and local injections are the most frequently recorded procedures to be performed in general practice¹¹. Chronic ulcers are a common reason for admission to community nursing services and were the leading reason for admission to an Australian community nursing service that annually treats 35,000 clients¹².

The treatment of chronic wounds is a significant financial expenditure for most Western nations. Venous leg ulceration costs an estimated £400 million annually in the United Kingdom; most of this cost being dressings and community nursing visits. In the United States, venous ulcer treatment is estimated to cost between US\$2.5 and 3 billion¹³ and diabetic foot ulceration management alone is estimated to cost US\$150 million a year¹⁴. In Australia, the Australian Wound Management Association (AWMA) has reported that the annual cost to the health care system and the community of treating and managing chronic wounds exceeded A\$3 billion in 2005¹⁵. If the number of Australians over the age of 60 rises, as projected, then such costs will rise as well.

A considerable amount of research has been undertaken to identify the best assessment, treatments and care practices to use when managing leg ulcers. A minority of clients have ulcers that will not heal despite care, for example, when clients have impaired healing due to particular medical conditions or certain types of medications¹⁶.

For most clients with leg ulcers, however, when evidence-based care is provided along with patient concordance and adequate financial support, healing will be achieved^{17,18}. Approximately 67–80% of leg ulcers will heal in 12 weeks under optimal evidence-based care and this figure reaches 81–90% at 24 weeks^{18,19}.

Evidence-based leg ulcer management, in brief, includes a comprehensive initial assessment and accurate diagnosis followed by evidence-based treatment tailored to the cause, symptoms and features of the ulcer and associated limb tissue; including wound bed and peri-wound care, pain management and, if needed, appropriate support to facilitate patient concordance^{1,15}. Diagnosis of leg and foot ulcers requires health professionals with expertise in vascular and wound assessment, including hand-held Doppler ultrasound testing. The majority of chronic leg ulcers are caused by impaired blood flow in the veins or arteries of the affected leg, damaged nerves (neuropathy), immobility causing unrelieved pressure at a bony prominence or a combination thereof^{15,20}.

Although some clients receive evidence-based leg ulcer care and heal in an appropriate time frame, many receive less than optimal management and may endure ulcers which remain unhealed for years. This evidence-practice gap has been well documented²¹⁻²⁴. Diagnosis and care is complex, requiring access to a team of multidisciplinary health professionals with wound care expertise. Many facilities lack the equipment or staff with appropriate expertise to undertake assessment and diagnosis. As a result, the ensuing treatment for many



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Table 1: Socio-demographic characteristics

Sources of income	Number/total (%)
Disability/aged pension/DVA*	71/104 (68%)
Self-funded retiree/currently employed	28/104 (27%)
Supported by family	4/104 (4%)
Health care card	61/104 (59%)
Carer to others	12/104 (12%)
Living alone	26/104 (25%)
Current smoker	14/104 (15%)
Mobility aids	30/104 (29%)

*DVA; Department of Veterans' Affairs

clients does not meet evidence-based guidelines for care. For example, it was found that 40–60% of venous leg ulcers do not receive adequate compression^{16,23,25}. In addition, long-term diligence and continuity of care is needed to achieve progress, as are resources to pay for products and services. For those that have recurring ulcers, these challenges are faced again and again.

The client population facing these challenges is not well suited to the travel involved with frequent appointments or to the expense associated with evidence-based care. A large portion of clients are of advanced age (39% are over the age of 80), have various co-morbid health conditions⁴, poor mobility and/or live off a limited income. The majority of Australians are not compensated for dressing consumables and a recent Australian study following 15 venous ulcer clients found that to manage their ulcer, these clients had spent on average A\$114 out-of-pocket per month (range \$29–\$376/month), predominantly on dressings¹⁰. Those living in remote areas face greater difficulties in finding ulcer expertise.

Concordance to evidence-based guidelines has demonstrated improved wound healing and work continues to improve the healing rates of clients with chronic leg ulcers by shrinking the evidence-based gap in their treatment²⁶. There are evidence-based guidelines available for the most frequently encountered leg and foot ulcers, for example, *The Australian and New Zealand Clinical Practice Guideline for prevention and management of venous leg ulcers, 2011*¹⁵; *Guidelines for the treatment of arterial insufficiency ulcers, 2006*²⁷ and *The National Evidence-Based Guideline: Prevention, identification and management of foot complications in diabetes, 2011*²⁸. Treatment guidelines can promote healing and recurrence prevention, if put into practice. The AWMA has a campaign to facilitate the uptake of such guidelines and to increase the number of health professionals with wound care expertise.

This study aimed to investigate care for community clients with leg ulcers of all aetiologies to identify current health service models, management, health costs, referrals and implementation of

evidence-based guidelines. Phase 1 of the study, outlined here, was a cross-sectional, retrospective survey and chart audit examining the experiences of a population of clients with leg ulcers from when their ulcer appeared until their first appointment at one of two participating specialty wound clinics. For clients with long-standing ulcers, this time period was capped and data were collected for only the last year of ulcer care. Phase 2 of the study, published in 2013, followed all Phase 1 participants for six months who were able and willing to attend the study clinics regularly for care¹⁷.

METHODS

A cross-sectional, retrospective survey, interview and medical record audit were undertaken. Participants were recruited from two locations in Brisbane, Australia; a community-based specialist wound clinic and a tertiary hospital, outpatients' specialist wound clinic. Ethical approval was obtained from relevant human research ethics committees. All participants were provided with an information and consent package containing the aims of the study, the procedures involved and an assurance of confidentiality of data. All participants gave written consent.

Study sample

All clients presenting at the participating community-based and hospital wound clinics from April 2009 to October 2010 with a leg or foot ulcer that was below the knee and at least four weeks in duration were invited to participate in the study, resulting in a sample of 104 participants. Clients were excluded from participating if they had a cognitive impairment, an inability to communicate in English, or had received treatment at one of the participating wound clinics in the previous year.

Data collection and measures

Data were collected upon recruitment via clinic medical records; telephone or face-to-face interview and self-report survey at a time and location convenient to researchers and participants.

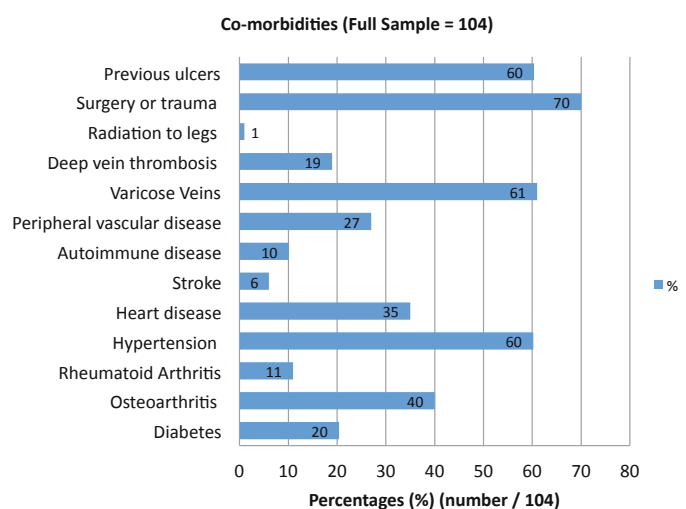


Figure 1: Co-morbidities presented among participants on admission

Data were collected on:

- Demographics, socio-economic status, general health, medical history.
- Previous ulcer history (date of onset, number, time to healing, site).
- History and assessment of the study ulcer including: type, size, duration, site, tissue type; if more than one ulcer was present, the largest was selected as the study ulcer. The Pressure Ulcer Score for Healing (PUSH) tool for ulcer healing²⁹ was used to clinically assess ulcers. It takes into account the size, exudate amount and tissue type of the wound and has been validated for use with chronic leg ulcers³⁰. Ankle brachial pressure index and neuropathic assessment data were also collected.
- Pathways of care and cost data past and present including: treatments, investigations, wound dressings, bandage and/or health service providers, referrals, occasions of care, allied health and community services; and prevention strategies.
- The implementation of evidence-based guidelines: for example, compression therapy for venous leg ulcers, multidisciplinary team involvement, advice on leg ulcer management.
- Psychosocial and quality of life were measured using the following instruments:
 - SF-12³¹: A 12-item version of the SF-36 that measures health-related quality of life by assessing health, physical functioning, physical and mental role limitations, social functioning, mental health and pain. The SF-12 has been shown previously to be useful in detecting changes in leg ulcer patients³².
 - Medical Outcomes Study Pain Measures: A 7-item questionnaire measuring the impact of pain on daily life and intensity, frequency and duration³³.
 - Geriatric Depression Scale (GDS): This abbreviated, 15-item scale was designed to be easily completed by older populations in an outpatient setting; it has high reliability, sensitivity (84%) and specificity (95%)³⁴.
 - Instrumental Activities of Daily Living: This scale measures physical functioning for community populations. Seven items measure independence in activities of travel, shopping, preparing meals, housework, managing medications, telephone and money³⁵.
 - Medical Outcomes Study (MOS) Social Support Scale³⁶: This 19-item instrument with good reliability and validity was designed for chronically ill clients³⁷.

Data analysis

Data were analysed with SPSSv18; descriptive statistics were calculated for each variable.

Table 2: Patient reports of wound management services

Health services	Median (range)	Number/total (%)
Number of service providers	3 (2-7)	
Treated by		
GP		85/104 (82%)
Self		43/102 (42%)
Community nurse		30/104 (29%)
Podiatrist		8/104 (8%)
Length of care from each service provider	Mean (weeks)	(range)
GP (1-2 GPs/patient)	21	(1-60)
Self	21	(2-52)
Community nurses	20	(1-52)
Podiatrist	16	(4-30)
No. visits per week per service provider	Mean (number/week)	(range)
Presented at GP	1.5	(0.04-5)
Self-cared for leg ulcer	4	(1-14)
Treated by community nurses	3	(0-7)
Presented to podiatrist	1.0	(0.25-2)
Treated by allied health services		Number/full sample (%)
Occupational therapist		8/104 (8%)
Podiatrist		8/104 (8%)
Physiotherapist		2/104 (2%)
Others		8/104 (8%)
Investigations/tests		
Wound swabs		67/100 (67%)
Doppler/Duplex		29/102 (28%)
Wound biopsy		13/101 (13%)
Blood chemistry		25/101 (25%)
Angiography/venogram		4/102 (4%)

RESULTS

A total of 202 clients attended one of the two Brisbane wound clinics between 16 April 2009 and 31 August 2010. Of these, 82 were excluded from participating because they had not met the inclusion criteria (for example, no leg wound, insufficient cognitive abilities), or were considered by the clinician to be too frail to be interviewed (n=5). Of the 120 clients who fit the inclusion criteria and were invited to participate in the study, 104 agreed to participate and completed the survey, yielding a response rate of 87%.

The mean age of participants was 68 (SD 14.5); with those <65 making up 39% of the population. Just over half were male (54%). In regard to income, 68% relied on disability, aged pension or benefits from

Table 3: Health-related quality of life, pain, social support and depression scales

Variables	Mean (n=104)	SD
SF-12 (range 0–100)		
PCS	32.89	10.29
MCS	46.09	12.74
MOS* Pain Measures (range 0–100)		
Effect of pain	51.48	23.04
Severity of pain	54.87	20.76
MOS Social Support Scales (range 0–100)		
Emotional/informational	78.58	23.57
Tangible support	80.43	27.13
Affectionate support	81.44	26.25
Positive social interaction	75.15	27.53
Geriatric Depression Scale (range 1–15)	4.76	3.66
	% (number/ total)	
Depression score >10	9% (8/87)	
Instrumental Activities of Daily Living		
Needed assistance on ≥1 task	83% (72/87)	

*MOS; Medical Outcomes Study

the Department of Veterans' Affairs (DVA). A quarter of participants lived alone; 29% required an aid to mobilise (Table 1).

The majority of participants reported a history of varicose veins (61%) surgery or trauma to their legs (70%). Several reported previous DVT or peripheral vascular disease (27%). Over half of participants (60%) had experienced a leg ulcer previously; which was reported to take on average 22 weeks (range 2–728 weeks) to heal. Many participants had additional health conditions (Figure 1).

The median ulcer size of the sample was 2.9 cm² (range 0.1–47.6 cm²) and the median ulcer duration on admission was 25 weeks (range 2–728 weeks). The mean PUSH score (which ranges from 0 to 17, where 0=healed and 17 is the worst possible score), of the ulcers presented on recruitment was 10.1 +/- 3.0. The ulcer type presented most often was venous 43% (45/104); 31% (32/104) presented with an ulcer of mixed aetiology, 10% (11/104) arterial and 8% (8/104) with a diabetic foot ulcer. Two ulcers were suspected to be basal cell carcinomas (BCC), which was confirmed by histological testing. The remaining six participants presented with inflammatory, post-surgical or pressure injuries.

Including their appointment at the wound clinic, participants sought care for their designated ulcer from a median of three health care providers (range 2–7). General practitioners (GPs) were the most common provider of leg ulcer care, with 82% of participants receiving ulcer treatment by a GP for a mean length of 21 weeks (range 1–60 weeks). Participants presented to GPs 1.5 times per week on average (range 0.04–5). Prior to admission, 67% (67/100) reported having

one or more wound swabs (range 1–16 swabs). Nearly half (42%) had self-cared for their ulcer 4 times per week on average (range 1–14) for an average of 21 weeks (range 2–52) (Table 2). Of those reporting on dressing costs for self-care, \$10.00 was the median weekly out-of-pocket cost for dressings (range \$1–200, n=34) and \$142 was the median total cost for dressings in the months prior to admission (range \$3–10,400, n=34). Nine per cent had a relative or friend who had treated their ulcer.

Twenty-nine per cent (30/104) of participants had been treated by a community nurse (Table 2). As participants >65 are subsidised under the government-funded Home and Community Care Scheme for community nursing services, they are charged only a token amount of the out-of-pocket cost per visit plus the cost of the dressings. Clients >65 are significantly more likely to see a community nurse than clients 65 and under who pay the full price for community nursing services, as they are ineligible for government funding plus dressings, as confirmed by Chi Square analysis, which yielded a value of 10.54 (p=0.001).

Participants scored a lower level of health-related quality of life than a cohort of Australians of a similar age of the general population. Specifically, our study group yielded a mean physical component score (PCS) of 33 and a mean mental component score (MCS) of 46, whereas a cohort of 198 South Australians of the general population aged between 65 and 74 yielded a mean PCS score of 44 and a MCS score of 54³⁸. The majority (83%) of participants required some or full assistance to perform daily living tasks. The mean depression score of the sample was 4.8 (SD 3.7, scale 1–15); 9% of clients yielded a score of 10 or greater and were classified as at high risk of clinical depression. The mean severity-of-pain scores were at a moderate level and, in general, clients received satisfactory social support in all four dimensions studied (Table 3).

Key aspects of evidence-based wound assessment and management were investigated. Eleven per cent of participants with a venous ulcer (5/45) and 9% with a mixed ulcer (3/32) reported having undergone a Doppler ultrasound assessment of arterial circulation (portable ABPI or duplex assessment) in the 12 months prior to recruitment to the study; no participants with arterial or diabetic leg or foot ulcers reported this investigation (Table 4). At the specialty wound clinics associated with the study, ABPI Doppler ultrasound assessment or referral to an ultrasound specialist was undertaken on 92% of participants. Eight per cent of the study group (8/104) did not proceed with an ABPI Doppler ultrasound because of procedural pain or difficulty in lying flat for the procedure.

In the 12 months prior to admission to the wound clinics, 35% of participants with venous leg ulcers (15/43) reported receiving compression therapy, whereas 97% of these venous participants were subsequently treated with compression at the study wound clinics (Table 4). According to guidelines, clients with arterial or mixed arterial/venous leg ulcers should be referred to a vascular surgeon early on in care. Of the 11 participants with arterial ulcers, two (18%) reported they visited/were referred to a vascular surgeon in the 12 months prior to admission (Table 4). Twenty-nine per cent of clients

with diabetic foot ulcers (2/7) reported being advised on pressure offloading (Table 4). Of those with a diabetic ulcer, 38% (3/8) had visited a podiatrist.

Two participants presented at baseline with persistent ulcers that were soon identified as BCCs by pathology testing. These two cases had ulcer durations between 4 and 6 years; and had sought care from a variety of health care providers.

The most common methods of transport to the wound clinics were private car (67/102, 64%); government-subsidised community transport (10/102, 10%), bus 8/102 (8%) and taxi (6/102, 6%). Two participants had travelled by plane from remote areas of Queensland 750 km and 1200 km away. Nearly a quarter of participants (23%, 24/104) had travelled ≥ 50 km one-way to their appointment and 9% (9/104) had travelled ≥ 125 km. Even when excluding the plane travel, younger clients travelled farther; participants under the age of 60 (24/101) travelled a mean distance of 45 km to the clinic, whereas those aged 60–80 travelled a mean distance of 30 km.

DISCUSSION

Compared to the general population, study participants were of older age, with poor mobility and a considerable number of health problems. A notable portion were under the age of 65 (39%); 10% were in their fifties and 11% in their forties. Often clients under 60 did not consider their wound to be a chronic ulcer, which they regarded as a condition of advanced age. Baker *et al.* measured the point prevalence of leg ulcers in the Australian city of Perth; attempting to count as many community leg ulcers as possible⁵. When comparing our data to Baker's, the wound clinics appear to attract a younger subset of leg ulcer clients from the community. Specifically, our clinic population had a median age of 69, (range 27–95) whereas Baker's had a median age of 75 (range 20–99). This disparity may be due to the difficulties faced by older clients in accessing clinics, in comparison to in-home community nursing care, and that the clinics in this study offered subsidised care to patients under 65. In-home nursing services are subsidised for clients >65 and tend to be commonly used by them; however, clients <65 pay the full price for in-home nursing services and are unlikely to access them. Baker's population had 91% aged >60 as compared to our clinic population, which had only 74% over 60 years. Interestingly, Baker's population had a male to female ratio of 1:2 whereas we had a male to female ratio of 1:1. We attribute this difference in part to our population being younger, as the prevalence of ulceration in younger men and women is almost identical. In regard to duration, the percentage of the study group presenting with an ulcer that they had for more than a year was 21%; for Baker's community population it was 24%⁵.

The study wound clinics were only able to treat clients who could travel to the clinic. On average, younger clients had travelled farther than older clients. Baker *et al.*⁵ reported that in their community population, only 39% had unrestricted mobility, whereas 71% of our clinic population did not require a mobility aid, pointing again to potential differences in home-nursed community client populations and those able to access a specialist clinic.

Table 4: Patient reports of evidence-based practice in previous 12 months by ulcer type

Ulcer type		Number/total (%)
Venous	Ankle brachial pressure index	5/45 (11%)
	Compression therapy	15/43 (35%)
	Education on leg elevation	30/43 (70%)
	Education on exercise	20/43 (47%)
Arterial	Education on moisturising	22/43 (51%)
	Ankle brachial pressure index	0/11 (0%)
	Visited or referred to vascular surgeon	2/11 (18%)
Diabetic	Education on exercise	2/11 (20%)
	Ankle brachial pressure index	0/8 (0%)
	Education on blood sugar monitoring	7/7 (100%)
	Education on preventing foot wounds	3/7 (43%)
Mixed	Education on pressure off loading	2/7 (29%)
	Ankle brachial pressure index	3/32 (9%)
	Education on compression stockings	21/30 (70%)
	Education on exercise	14/30 (47%)

Finances were limited for the wound clinic clients, with 68% of the study group reporting they rely on disability, aged pension or benefits from the Department of Veterans' Affairs (DVA). Coyer *et al.*'s report found that up-front costs for long-term wound care (wound dressings, bandages, costs of health care service providers) and follow-up preventative care were a barrier to implementing evidence-based practice²⁴. This is also discussed by Fife *et al.* who state that the provision of adequate compression among venous leg ulcer patients has been hindered by an inadequate reimbursement policy²¹.

Analysis of the data reveals a considerable gap between evidence-based guideline recommendations and the care this population experienced prior to attending the wound clinics. For example, the retrospective Doppler ultrasound data imply that the majority of participants had not had an ABPI as part of their assessment. Other hallmarks of evidence-based care, such as compression therapy for venous leg ulcers, appear to have been underutilised. Ulcer guidelines recommend considering specialist referral on or after three months, if an ulcer has not reduced in size by 25% in four weeks or fails to heal in 12 weeks¹⁵. During the period prior to admission in the wound clinics, many participants reported that they had not been referred to a specialist when their ulcer failed to heal in 12 weeks. These findings support what others have reported in regard to the evidence-practice gap in the care of chronic leg ulcers^{21–24}. Without evidence-based care, many leg ulcers fail to heal in a timely manner, as suggested by this sample's median ulcer duration of 25 weeks on admission. During this period of prolonged healing, money is expended to cover regular visits to health care providers, self-care of ulcers and constant supply of dressing consumables.

The value of expertise in wound management is also apparent when considering the care pathways of the two participants who had undetected BCC diagnosed as chronic leg ulcers and had received several lines of ulcer care treatments for a total of 10½ years. BCC is a common skin ailment throughout Australia that often presents as an open, non-healing sore; 296,000 BCC cases were diagnosed in Australia in 2008³⁹. After beginning treatment at the wound clinic, both of these clients were diagnosed with BCC within a couple of weeks and had these cancers removed.

As retrospective measures of pain, quality of life, functional ability, depressive symptoms, past treatments and health service use were obtained via interviews and self-report questionnaires, these data have limitations regarding recall, accuracy and response bias. The generalisability of the study results is limited by its descriptive design and participant sample, which was restricted to clients attending one of two specialised wound clinics.

CONCLUSION

Fife *et al.* describe with clarity the difficulty in providing evidence-based care to those with a chronic wound. “For venous and diabetic foot ulcers, poor compliance with the most basic practice guidelines can be explained by the high cognitive effort to either learn or remember the treatment, the complexity of implementing the treatment, and the lack of sufficient reimbursement for performing the treatment”²¹. Considering the wide spectrum of services that general practice and community nursing provide, it is understandably challenging to meet the complex needs of those presenting with a chronic wound. Specialty wound clinics, such as the clinics participating in this study, have the opportunity to focus solely on wound care and appear able to provide evidence-based wound care to a large percentage of patients.

Based on these findings, funding directed towards expanding specialist wound services and fostering the connection between leg ulcer clients and professionals with wound expertise is likely to lead to more clients receiving evidence-based care, wounds that heal faster and cost saving. Subsidised community travel for older clients living outside the city limits to visit wound experts would also increase the number of older clients able to receive care at such wound clinics. For clients residing in remote locations, air travel is a costly way to access expert care; Medicare payments to cover consultations using telecommunication services should be considered. Such consultations, often involving ulcer photos and conversations by phone or videoconferencing, are recommended¹⁵ and already occurring in some health services. The study results identify models of wound service that improve healing by providing evidence-based care and stand as a possible impetus to health care providers to seek alternative methods of providing quality wound management to clients.

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