

# Barriers and enablers for effective implementation of the TIME framework for chronic wounds in a district nursing service



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This study aimed to identify gaps in practice, through data collection over a period of 4 years at several district nurse services and to explore the perceived barriers and enablers to implementing the TIME framework when assessing and managing chronic wounds. The data collected ignited a change in wound care practice in the West Hume Region, Victoria, Australia. Individual link clinicians effectively implemented TIME into their own service when assessing and managing chronic wounds. The Link Clinician Group influenced, guided and supported services to demand a higher standard of wound care, which augmented overall improvement in District Nurse Services wound care. Barriers and enablers to implementing the TIME framework were evident and varied between services.

**T**he TIME framework is an evidence-based tool that assists with assessment and management of chronic wounds to promote healing [Figure 1]. Four components underpin the wound bed preparation process:

- Tissue debridement and removal of sloughy and necrotic tissue.
- Infection control and the management of bacterial bioburden.
- Maintenance of moisture balance.
- Epidermal advancement.

Wound care in the West Hume Region (WHR) of Victoria, Australia is predominately managed by district nursing services (DNS). The DNS identified over a period of a week in each service, the:

- Total number of wounds (prevalence)
- Specific wound types
- Frequency of dressing changes.

These were additional to measuring the four components TIME. There were significant inconsistencies in practice despite an agreed set of key performance measures and extensive education on TIME in these services

As a result, the Link Clinician Group (LCG) was formed in 2014, comprising a representative from each of the 10 services in the WHR: Yarrowonga, Nathalia, Cobram, Numurkah, Goulburn Valley Health, Seymour, Nexus, Yea,

Kilmore and Alexandra. The purpose of the group was to improve collaboration and build a culture of enquiry, leading to innovation and changes to lift the standard of wound care and improve client outcomes (Nelson-Brantley and Ford, 2016; Echevarria et al, 2017; Friesen et al, 2017; Gallagher and Melnyk, 2017; Velmurgan, 2017). The Link Clinicians (LCs) identified, challenged and changed practice over a period of 4 years. In this study, the barriers and enablers of implementing the TIME framework when assessing and managing chronic wounds was assessed, monitored, and analysed through retrospective data and explored through experiences of this LCG.

## Methods

The Goulburn Valley Health Health Ethics and Research Committee approved the study plans. This study was divided into two parts: a quantitative analysis of retrospective data (Part A) and a qualitative analysis of individual LC experiences (Part B).

In part A, 1,758 wound care charts were audited by the LCs between 2014 and 2018. Audits were de-identified and collated by administrative support staff using Excel. The audits were to verify if the components of TIME were implemented into wound care practice as

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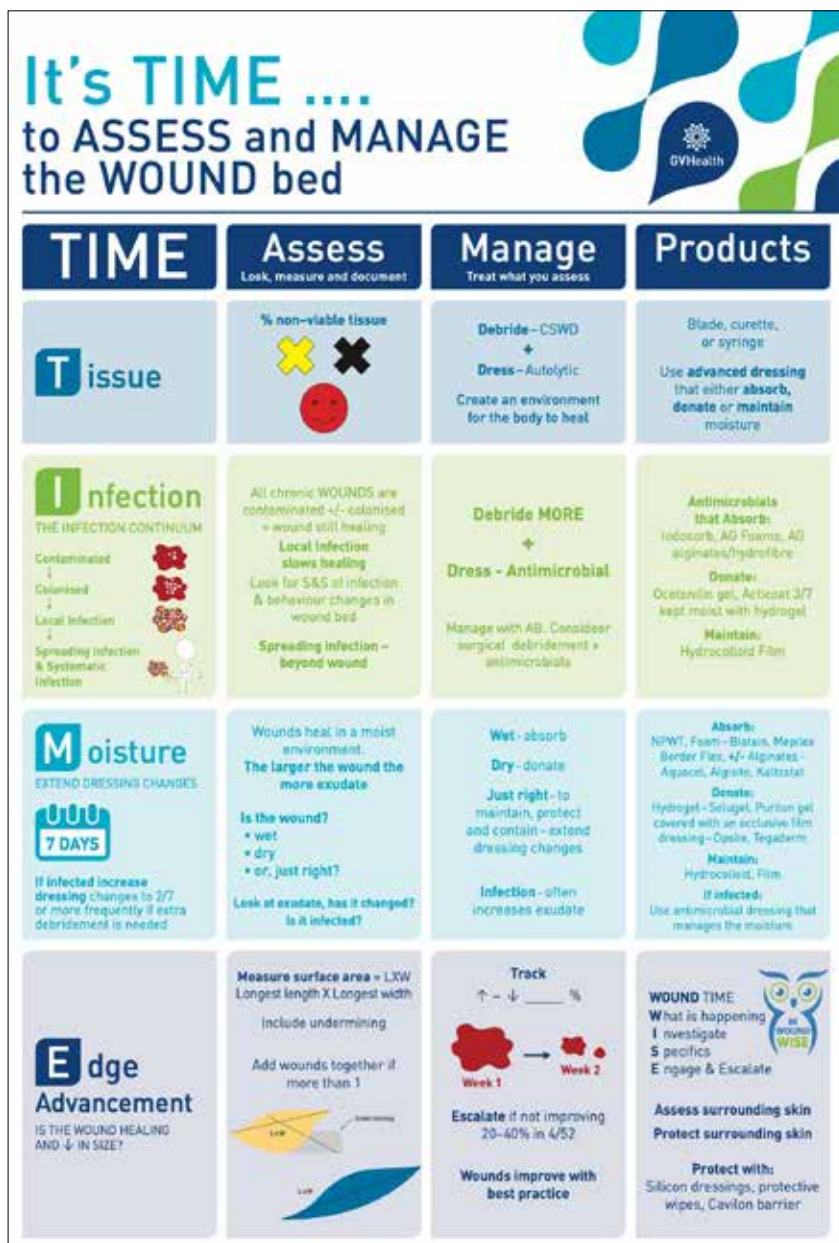


Figure 1. The TIME framework.

evidenced by what had been documented on the wound care chart.

In part B, interviews were conducted with the 10 LCs to explore their perceptions of barriers and enablers of implementing the TIME framework within their service. Qualitative analyses of interview transcripts for theme identification was undertaken by two independent researchers.

## Results

### Part A: Audit of wound care charts

#### Wound type

The overall prevalence of patients in the WHR with any type of wound was 34% over the 4-year period [Figure 2]. Overall, lower-limb wounds had the highest prevalence, varying between 29%

and 38% [Figure 3]. The justification for requiring a change in how these types of wounds were managed was driven by a deficit and gaps in knowledge and skill for managing lower-limb wounds and because it was easier to collate data on wound position in the body.

Initially, the wound aetiology was entered into the medical records as a free text entry which led to >25 different aetiologies documented. Initially, the number of vascular assessments performed across the region varied between each service, with initial numbers as low as 20% [Figure 4].

Later, wounds were categorised into wound types, not aetiologies or mechanism of injuries, except for skin tears. The lower-limb category consisted of venous, arterial, lymphatic, mixed, neuropathic and ischaemic.

Additionally, all lower-limb wounds require initial vascular assessment to determine the status of peripheral circulation, with subsequent management involving application of compression bandaging when clinically indicated (Moore et al, 2019). The collection of this data began in 2016/17 [Figure 4].

Half the services had improved their management of lower-limb wounds by the end of the study; seven services performed a vascular assessment on >50% of all lower-leg wounds. However, the number of lower-limb wounds that had compression applied was significantly lower, with a WHR average of 28% in 2016/17 and 24% in 2017/18.

### TIME assessments and changes

The tissue assessment portion of TIME measures the percentage of the red, yellow and black tissue. Initially, 71% of all wounds audited in the WHR had the tissue type documented. This figure improved by at least 10% throughout the study [Figure 5].

In the infection section of TIME, under 50% of all wounds audited were assessed as having some form of bioburden. The audit captured whether these wounds were managed effectively with conservative sharp wound debridement additional to application of antimicrobial dressing [Figure 6]. It was found that >72% of all infected wounds in the region were dressed with an antimicrobial dressing, but only 60% of infected wounds in the WHR were debrided.

The moisture component of TIME was represented by the frequency of dressing changes and visits per week. The WHR has standardised advanced wound care dressing products across the region to effectively manage

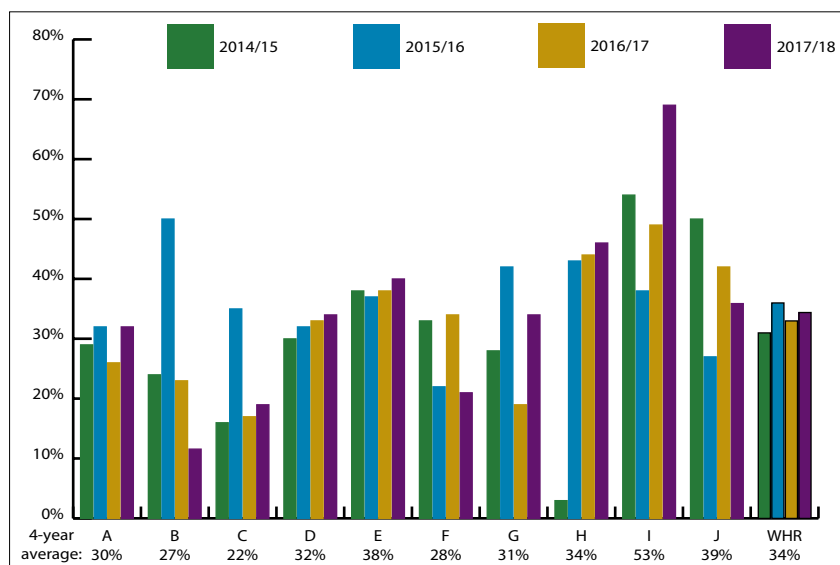


Figure 2. Wound prevalence in the 10 districts (A–J) and the region average (WHR).

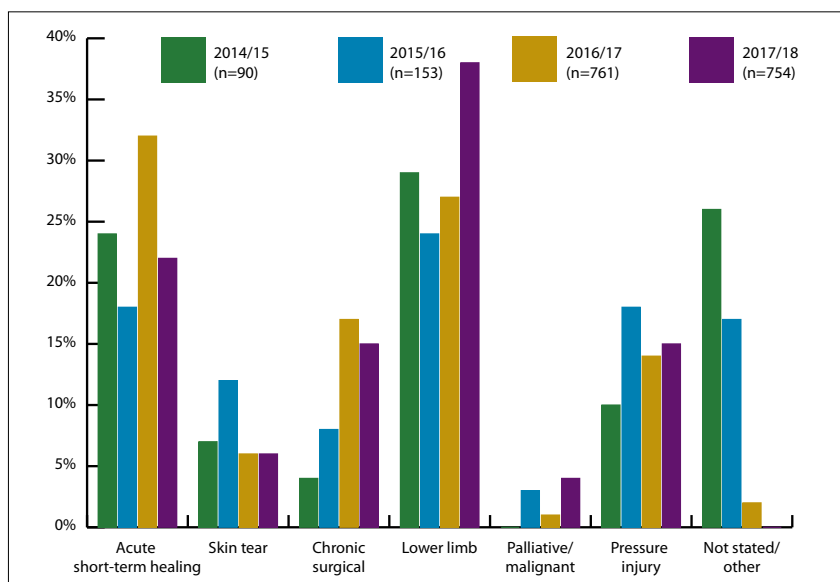


Figure 3. Wound types per year. Acute = burns, trauma and closed surgical wounds; chronic surgical = dehiscence, pilonidal sinus, fistula, abscess and drain tube; and lower limb = venous, arterial, mixed, neuropathic and ischaemic.

moisture and promote autolytic debridement. The intent was underpinned by the desire to improve inefficiencies, especially in product wear time and wasted travel time. The latter is important because many of the nurses in smaller services can drive more than 40 minutes each way for a client visit to assess and manage their wound, and time spent travelling to clients in a day is not counted in their funded hours.

Our aim was to extend the length between dressing changes to twice weekly when using antimicrobial dressings or when moisture indicated a change, thus aiming to push dressing changes to weekly. Three services saw clients when it worked for their system: Monday,

Wednesday and Friday, with one service seeing 46% of their clients using this schedule. The frequency of dressings varied often within each data collection point, but the WHR yearly summary improved from 41% to 66% of clients having their dressing changed once or twice weekly [Figure 7]. This is comparable to 70% in the UK (Ousey et al, 2013). The decision to switch to a twice weekly dressing change from three times a week was resultant of various factors: data analysis, further education and confidence in clinicians, standardisation of a product formula encouraging the use of advanced dressings, increasing length of time allocated to each visit, and a change in behaviour, roster and expectations within services.

Edge advancement was verified if a wound measurement was documented within the last week. Weekly wound measurements of the surface area (length × width) and undermining in cm encouraged consistency with 4-weekly tracking of wounds for improvement or deterioration resulting in evaluation of the current wound plan. The number of documented measurements was very inconsistent, even within the services with an overall WHR improvement of 11–15% over the study [Figure 8]. In terms of what was achieved, the study helped in driving practice change, encouraging clinicians and services to evaluate and be accountable for their practice to objectively measure longest length × longest width irrespective of the anatomical position of the wound to the body. A decreased wound size within a 4-week period indicates the effectiveness of the treatment and management plan for that client.

Part B: Analysis of individual LCs' experiences  
A thematic analysis of the interviews was undertaken. A thematic analysis of the interview was undertaken with questions developed about specific themes. Five elements proved to be the determinant factors contributing to implementing TIME in DNS in the WHR: TIME framework and principles, LCG, data; individual services and respective staff members, and the strength of the LC as the leader and driver of practice change. These are discussed in more detail below.

#### TIME

TIME was an enabler in assessing and managing chronic wounds. Participants described it as a “simplified wound care” process that explains things and gives you “clear steps that if you just follow TIME, you shouldn't get it wrong”.

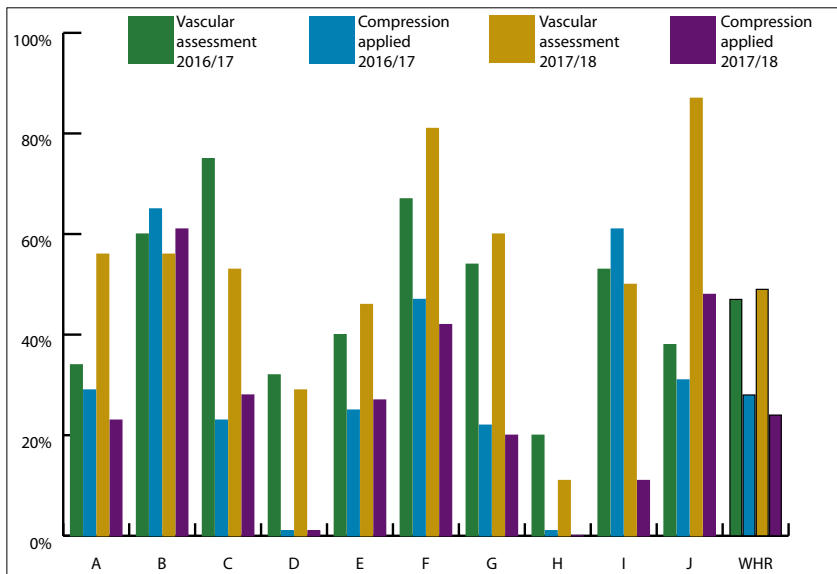


Figure 4. Documented evidence of vascular assessment to lower leg and compression subsequently applied where clinically indicated.

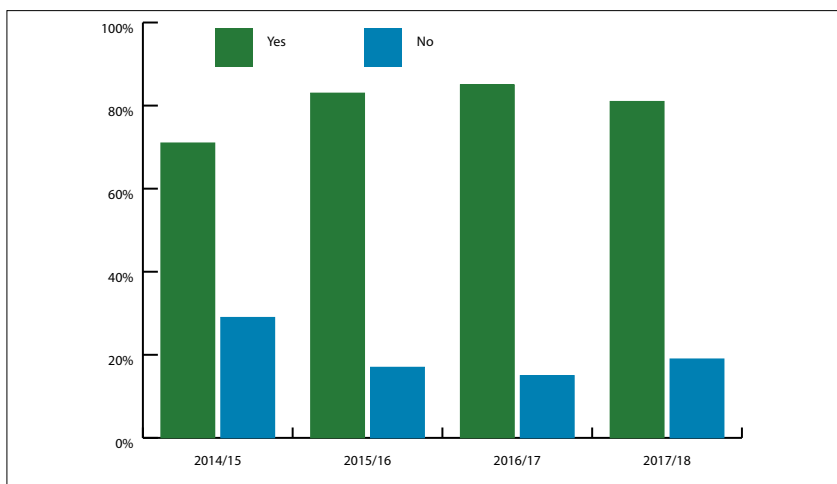


Figure 5. "T" Tissue documented as red, yellow or black on wound care charts.

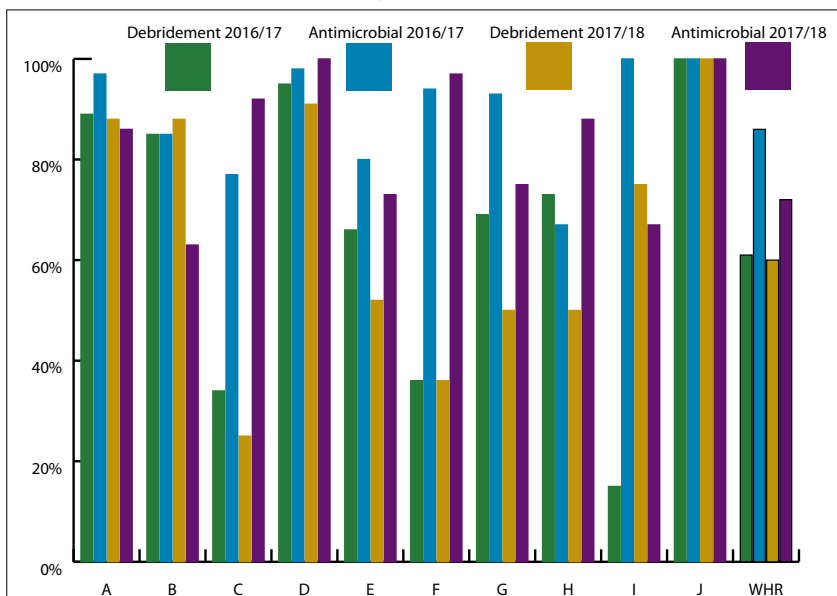


Figure 6. "I" Infection: Bioburden identified, debrided and antimicrobial dressing applied.

Over half of the interviewees conceded they needed to truly "understand TIME" to imbed it into their practice. They also said they needed "education and confidence" for performing conservative sharp wound debridement and needed to be able to identify infection with less "product focus".

#### Link Clinician Group

Unanimously all LCs felt they "got something out of the LCG each time they attended a meeting". They believed the LCG was an influential platform that enabled "permission to challenge practice", and easy adoption of processes and systems in their organisation because of the collective group and the shared tools, education and resources.

#### Data

Initially the experience of collecting data was stressful and time consuming. Over time, all LCs agreed the data collected drove practice change. The data helped identify gaps, promote early intervention when assessing and managing chronic wounds and was "reflective", with gradual improvements. LCs noted "increased debriding" and "decreased dressing frequency".

#### Individual service

Every service in the WHR differed. Six services stated that they felt "staff were resistant to change", despite education and support. LCs reported service staff's "inability to use clinical judgement" and "make their own decisions". It was suggested staff were "happy just to tick a box" on the wound care chart, but "there is no culture of change" and "as long as they were meeting all the standards, they didn't need to do any more". Eight services suggested there was no accountability within their services regarding wound care.

There was a benefit for small services. They knew of all their clients and could easily monitor improvement or deteriorations. These benefits were twofold: increased confidence, efficiency, knowledge, evaluation and changes to practice for clinicians, as well as their service, lead to increased wound ownership, expectation, decreased expenses and improved wound healing times and outcomes for clients. Where DN clinicians "liked wounds", one service suggested that only 5–10% of the staff in their service were passionate about wounds and those staff were the ones who would adapt to change easily. In the larger services, getting consistency of care was an issue. Most services acknowledge part time staff and communicating

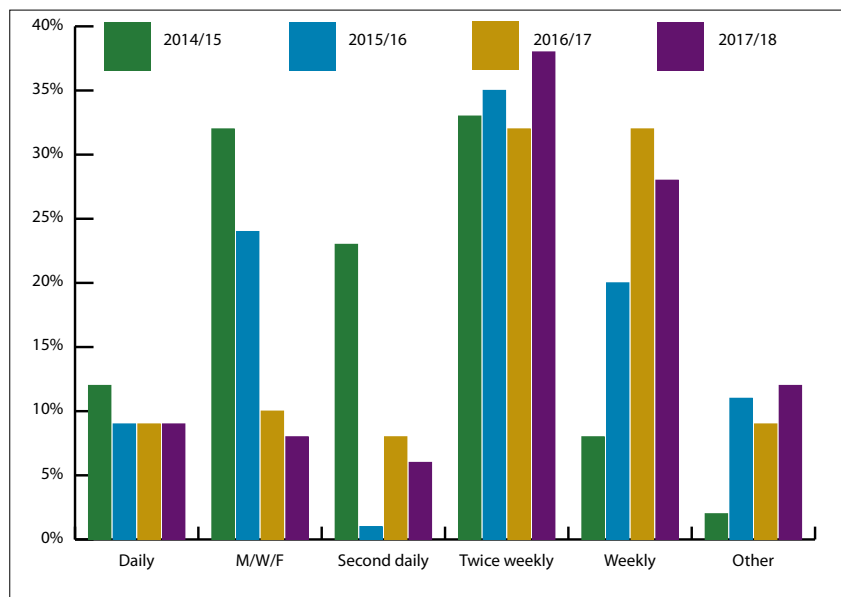


Figure 7. "M" Moisture: Wound dressing frequency.

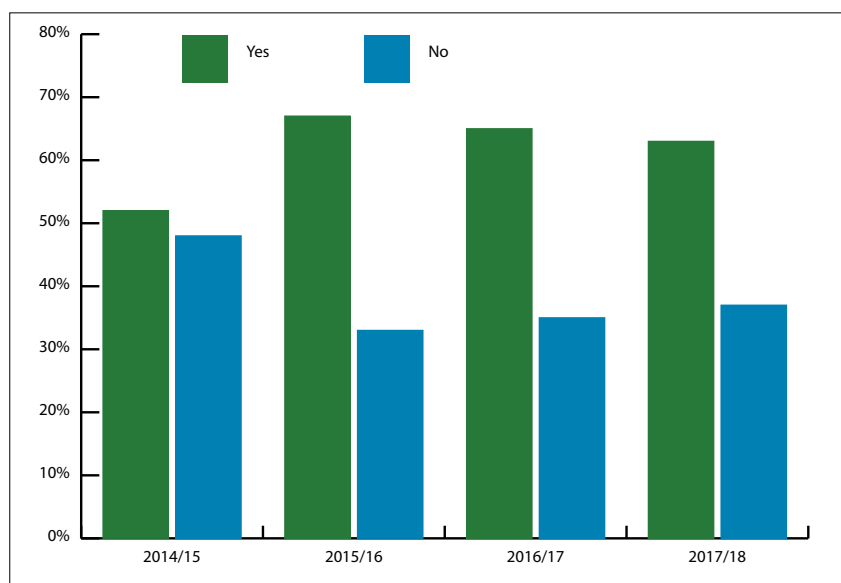


Figure 8. "E" Edge advancement: Wound measurement documented within the last week.

changes are issues.

Many LCs felt their manager supported them with audits and meeting time allocations, but the support was limited if the manager was required to do something, follow up or enforce accountability. Most of those interviewed felt that their executive had little to no idea or understanding about wound care, except for one service who said their CEO could "see the big picture".

#### The Link Clinician

Some of the LCs understood their role was to lead their organisation, implementing changes to improve wound care. However, some struggled to make required changes and lead

the whole organisation because they felt they were "not valued by management as they were not part of the decision-making team", and some "lacked confidence and crumbled when challenged". One LC admitted she was "a bit slow in pushing it through, I'm not really a person to be out there giving instructions".

Four LCs were on committees within their organisation providing opportunities to influence change, with "the board asking questions relative to the data". One of the LCs "runs through the TIME principles and products every shift, suggesting we want to get rid of the yellow and black, use antimicrobials if infected, absorb moisture and measure to see if it has come down or not".

### Discussion

Wounds form a large part of the average daily workload of DNS, with a prevalence of 34%, and there is an expectation that best practice is delivered (Ousey et al, 2013). However, the community services are not funded for quality care, economic advantages or sustainable systems. Our funding model is not outcome measured with financial incentives and appropriate remuneration for wound care practice that is evidence-based and accountable (Davidson and Brown, 2014; Orr and Davenport, 2015; Nelson-Brantley and Ford, 2016; Friesen et al, 2017; Patterson et al, 2017; Yates, 2017; Bowers, 2018; Grothier, 2018; McCorsker et al, 2018; Kuhmke et al, 2019).

Unfortunately, only an estimated 2% of national health expenditure is spent on wound care. There is insufficient data to demonstrate the extent of the problems that is required to foster change towards sustained improvements and clinical outcomes (Ritt, 2013; Graves et al, 2014; Bridges, 2015; Vowden and Vowden, 2016). Further research on healing rates per wound type and a national wound registry could assist data provision to attract financial incentive when the standard of wound care is elevated (McCorsker et al, 2018).

Prevalence data from the UK in 2012/13 reported chronic wound types comprised of lower-limb (venous, neuropathic, arterial and mixed; 52%) pressure injuries (7%), chronic surgical (22%) and unspecified (12%) (Guest et al, 2015). Although these were in different settings, the WHR 4-year average showed a different mix of chronic wound types, with fewer lower-limb wounds (29.5%), more pressure injuries (14.25%), fewer chronic surgical wounds (11%) and a similar percentage of unspecified (13.75%).



Previous studies suggest 16–32% of leg and foot ulcer patients had a Doppler ankle-brachial pressure index measurement, while 16–26.6% had compression applied (Ousey et al, 2013; Guest et al, 2015). The WHR exceeded this percentage of vascular assessments performed, with 47% in 2016/17 and 49% in 2017/18. This was despite some of the services not having a toe pressure machine, making it difficult to carry out a peripheral vascular assessment. The WHR compression application was comparable, at 28% in 2016/17 and 24% in 2017/18 [Figure 4].

Assessment of the tissue and infection components of TIME was poor, with <50% of all wounds being considered as having bioburden (60–100%; Munro, 2017), which is likely to be well below the true number of wounds that are infected (Ousey et al, 2018).

Management of T and I components of TIME with debridement in combination with an antimicrobial dressing proved difficult to embed into practice for many services, despite education, additional support and resources. Initially, barriers included a lack of debridement equipment and policies, clinician confidence and time allocated, and pain experienced by some clients when debriding was being performed.

Addressing moisture management with reduced dressing frequency has many benefits, including economic (unpaid travel time, wastage of products), physiological (minimising changes to wound temperature and encouraging autolytic debridement) and psychological (preventing trauma when removing dressings and minimising interruptions to client's day). However, this change was met with resistance, with pressure to keep frequent visits so the service would not lose funding or nursing positions. Some services have more cars on the road on Mondays, Wednesdays and Fridays, and thus see clients on those days irrespective of whether the wound dressing requires a change. Alternatively, roster changes could improve dressing frequency. Smaller services with fewer staff could easily reduce dressing frequency especially if travel time was extensive.

It remains true that TIME is the evidence-based practice framework that is most commonly used and easily implemented to assess and manage chronic wounds (Ousey et al, 2018). When the LCs fully understood the TIME framework, their services' data collection improved. The LCG developed tools and strategies to promote the TIME principles and assist in its implementation across the region. These included sharing and standardising the

wound care chart, posters, time allocation of visits, and changes to the product formula. The product formula consisted of curette and blades to debride (T); antimicrobial dressings to manage bioburden, additional to debriding (I), advanced dressings to absorb exudate and extend wear time to weekly changes (M); tracing and measuring tools and tracking improvement strategies (E). These were used to assess if the current plan of care was effective or needed alterations.

Järbrink et al (2017) suggested adopting a national strategy based on best practice guidelines could possibly reduce the costs for wound management by more than 30%.

It was clear in the interviews that the inability to use one's own judgement and critical thinking is a barrier to implementing evidence-based practice. Potentially, this was the underlying barrier to truly understanding the TIME framework and perhaps those who took extra time to understand TIME lacked critical thinking. LCs who demonstrated real leadership qualities were most successful in implementing TIME. Many nurses are happy to follow, as they have no desire to lead and drive practice change even with support (Davidson and Brown, 2014). Inconsistencies in the data often reflected when the LC was on leave or audits were delegated to another person. This demonstrates how capacity was not transferred to other clinicians within the services.

LCs who had a voice in the organisation coupled with confidence, motivation, and drive adopted evidence-based practice to their own environment (Kuhnke et al 2019). Effective drivers push critical thinking and problem solving, enforce changed behaviour, contest the inconsistencies and substandard care (Facchiano and Snyder, 2012a; 2012b; Bridges, 2015; Guest et al, 2015; Nelson-Brantley and Ford, 2016; Friesen et al, 2017; Ginex, 2018). Strong leaders are brave and persistent. However, they become fatigued when constantly pushing and driving practice change. It is easier to maintain the status quo. This seemed evident throughout the study as the data results fluctuated within each service and within the region at various times.

## Conclusion

The data, TIME principles, and the LCG (inclusive of the individual LCs) were enablers to implementing the TIME framework into the everyday practice of the DNS in the WHR.

The data collected in this study has added to the body of wound care evidence, including analytics, wound prevalence and wound types.

## Disclosure of interest

The author declares no conflicts of interest. No funding was secured for this study.

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This data was the instigator of changing practice for the LCs within the WHR. It challenged the quality and standard of wound care being delivered by DNS.

This study corresponds to previous research that suggests accountability and outcome measures, as well as the lack of inquiry entrenched in the nursing fraternity are barriers. A culture of enquiry remains critical to successfully translate evidence into practice. Change management is a collective responsibility, with a top down and bottom up approach requiring multiple simultaneous adjustments in thinking, resources inclusive of capacity building roles, financial reward or retribution, and an understanding of the needs of the system and the client.

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