

Using the new T.I.M.E. Clinical Decision Support Tool to promote consistent holistic wound management and eliminate variation in practice: Part 5, survey feedback from non-specialists

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Background: Variations in wound assessments has prompted the development of wound assessment tools to aid practitioners' decision making and diagnoses to improve consistency of care. **Aims:** This study aimed to explore the experiences of non-wound care specialists using the TIME (Tissue, Infection/inflammation, Moisture imbalance and Edge of wound) Clinical Decision Support Tool (CDST) to help guide the management of chronic wounds and to understand if they could use the tool to make informed decisions in the absence of a wound care specialist.

Methods: A multi-centre clinical evaluation involving four clinical specialists from four different centres (Australia (2), Canada (1), Denmark (1)) in tissue viability were invited to participate. Each specialist asked non-specialists to use and evaluate the tool on five different patients over a 4-week period and report how the tool influenced practice. **Results:** Responses indicated that the T.I.M.E. CDST was easy to use, enhancing confidence, encouraging evidence-based decisions and supported wound assessments, particularly aiding the assessment of tissue type. **Conclusions:** The T.I.M.E. CDST provides a structured wound management approach supporting non-specialists in wound assessments, encouraging consistency of care and better patient outcomes.

Acknowledgement

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Declaration

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Wound care continues to be a significant healthcare burden with substantial clinical, patient and financial implications (Guest et al, 2017). The global cost of wound care is significant; in the United States (US), chronic wound care costs an estimated \$28bn annually (Nussbaum et al, 2018) while in Australia, evidence suggests approximately AUD3.5bn is spent on the costs associated with caring and treating patients with wounds (McCosker et al, 2019). In the United Kingdom (UK), it is estimated that 2.2 million patients are living with a chronic wound, with an estimated cost to the NHS of £5.3bn per year (Guest et al, 2015). In their retrospective cohort analysis of 2,000 patients from The Health Improvement Network (THIN) database, Guest et al (2015) further found that

out of approximately 11,200 wounds, 40% were classified as acute, 48% chronic, while 12% failed to obtain a specific diagnosis, suggesting disparities in the recording and diagnosis of wound types. Moreover, the number of patients living with an acute, chronic or unspecified wound is expected to rise by between 9–13% annually (Guest et al, 2017), signifying the importance of performing appropriate wound assessment and management strategies to limit the consequences associated with inappropriate wound care.

Chronic wounds are defined as those that do not follow the normal healing trajectory (Frykberg and Banks, 2015) and typically include pressure ulcers, venous leg ulcers and diabetic foot ulcers (DFU). Global prevalence estimates of chronic wounds in adults suggests a pooled

prevalence of 2.21 per 1,000 population (Martinengo et al, 2019). Indeed, approximately 1% of the population will suffer from a chronic wound during their lifetime, causing considerable impacts on patient quality of life (due to pain and reduced mobility), lengthy hospital stays and increased financial implications associated with nursing time and care (MacDonald, 2009). The combination of an increasing aging population living with complex wounds and a rise in the incidence and prevalence of chronic wounds (Guest et al, 2017) means that healthcare professionals (HCPs) are expected to possess the knowledge and skills for undertaking complex wound care, while also being challenged with the problem of encountering inadequate resources (Moore et al, 2014). This can become problematic, especially when there is a lack of sufficient tissue viability training and education for many pre-registration nurses to support the development of the knowledge and skills necessitated to treat this patient group (Blackburn et al, 2019).

Skin integrity is fundamental to nursing practice, yet evidence indicates that many pre-registration nurses receive very limited formal teaching on skin integrity (Ousey et al, 2014). In Australia, providing specific training and education to nurses working in General Practices has been found to increase confidence around wound management, resulting in better patient outcomes (Innes-Walker et al, 2019). Furthermore, in a global survey examining wound healing and dressing wear time, nurses in Australia and New Zealand appeared to have better knowledge of these concepts than nurses in regions such as the UK, Europe and North America (Davies et al, 2019). However, in the UK, evidence suggests there are disparities in wound care practices (Gray et al, 2018). Indeed, wound care is often managed in a diverse range of environments by numerous HCPs with variable levels of competence and capability to undertake wound assessments and prescribe treatment strategies (Corbett, 2012).

Wound healing is largely dependent on the clinician's ability to effectively identify barriers to healing, assess, treat and manage a patient's wound and favourable patient outcomes and successful wound healing is explicitly associated with timely interventions (Bosanquet and Harding, 2014), exemplifying the value that effective training and education can have on patient experiences of care. Dowsett and Hall (2019) argue that the clinician's decision-making practices for wound assessments can have significant implications on patient outcomes, potentially resulting in inappropriate treatments, infection and delayed healing.

Assessment and decision-making tools providing a structured approach to wound care can facilitate clinical decision making and wound healing outcomes. Specifically, those instruments that incorporate evidence-based wound management are considered optimal to holistic wound management, limiting variation in practice (Wounds UK, 2018).

Wound assessment tools

Variations in practice of wound assessments have prompted the development of several frameworks and recommendations to aid practitioners' decision-making and diagnoses in wound care. However, despite their value in facilitating consistency of care, there is some evidence to suggest that a significant number of HCPs still do not incorporate an established framework for wound assessment into their clinical practice. In a survey of 196 questionnaires completed by HCPs involved in wound care, 40% of the respondents did not use any form of wound bed assessment tool, despite being aware of their existence (Ousey et al, 2018). This suggests that inconsistencies and incomplete or insufficient wound assessments are still occurring in clinical practice.

TIME concept

In order to provide a coordinated approach to wound bed preparation through enabling HCPs to recognise and identify the barriers to wound healing and employ appropriate management strategies, Schultz et al (2003) developed the TIME concept. This framework, which focused on Tissue, Infection and/or inflammation, Moisture balance and Edge of the wound has been used widely as a pragmatic guide for the assessment, treatment and management of chronic wounds. However, significant advances in wound care since its introduction necessitates that the framework should be considered within a more holistic assessment of individual patients and should evolve. For example, Leaper et al (2012) recognised that significant advances in the understanding of, and acknowledgement of the importance of biofilms, negative pressure wound therapy (NPWT), advances in wound dressings and in the molecular processes involved in chronic wounds, necessitated development of the framework.

More recent developments in wound assessment tools, which are largely based on the original TIME framework, include The Triangle of Wound Assessment (Dowsett et al, 2015; World Union of Wound Healing Societies [WUWHS], 2016); a holistic framework facilitating wound assessments, encouraging improvements in

patient outcomes and experiences of care, and appropriate healthcare resource use (World Union of Wound Healing Societies [WUWHS], 2016); the TIMES model of wound bed preparation (Wounds UK, 2016), which includes the addition of surrounding skin (S) in the framework strategy; and the more recently developed TIMERS framework (Atkin et al, 2019), which extends the original parameters of TIME by recognising those factors involved when a wound does not heal through including the concepts of repair/regeneration (R) and social factors (S) in the guidance. Although there is evidence to suggest that the TIME framework has favourable outcomes on clinician's knowledge of wound care when combined with structured education (Dowsett, 2009), a large number of HCPs still do not use any form of wound assessment framework (Ousey et al, 2018).

The TIME Clinical Decision Support Tool

In order to maximise the number of clinicians choosing to implement a wound assessment framework into their clinical practice, reduce variations in practice and support clinical decision making (Moore et al, 2019), the TIME Clinical Decision Support Tool (CDST) uses an 'ABCD and E' approach to facilitate clinical decision-making [Figures 1 & 2]:

- A** Assessment of the patient, wellbeing and wound.
- B** Bringing in a multidisciplinary team.
- C** Controlling and treating the underlying causes and barriers to wound healing.
- D** Deciding on the most appropriate wound treatment and the desired wound management outcome.
- E** Evaluation and reassessment of how the wound is progressing and if the wound management goals have been achieved.

Real-world use of the T.I.M.E. CDST

Several recent case studies using the T.I.M.E. CDST (Jelnes et al, 2019; Swanson et al, 2019; Woo, 2019; Carville et al, 2019) have highlighted positive benefits, with clinicians reporting how using the tools helps to improve consistency of care through improving confidence in decision making (Jelnes et al, 2019). The tool has also been shown to facilitate non-specialist clinicians to conduct wound care by highlighting the importance of regular holistic wound assessments, documentation and multi-disciplinary team working (Jelnes et al, 2019). The T.I.M.E. CDST has been shown to reduce the tendency to rely on specialist practitioners through supporting accurate

assessment of underlying causes and barriers to wound healing (Swanson et al, 2019). Furthermore, in an engaged group of clinicians, Woo (2019) found that the tool provided a systematic approach to wound management through improving the confidence of non-specialist wound care staff. Consistently, Carville et al (2019) found that non-wound care specialists used the T.I.M.E. CDST to guide wound bed preparation, dressing selection and the management of chronic wounds.

This study formed the final phase in a multi-centre clinical evaluation involving four clinical specialists from four different centres described in the case studies above (Jelnes et al, 2019; Swanson et al, 2019; Woo, 2019; Carville et al, 2019), where specialist wound care clinicians asked non-specialists to use and evaluate the T.I.M.E. CDST on five different patients over a 4-week period to understand how the tool influenced practice.

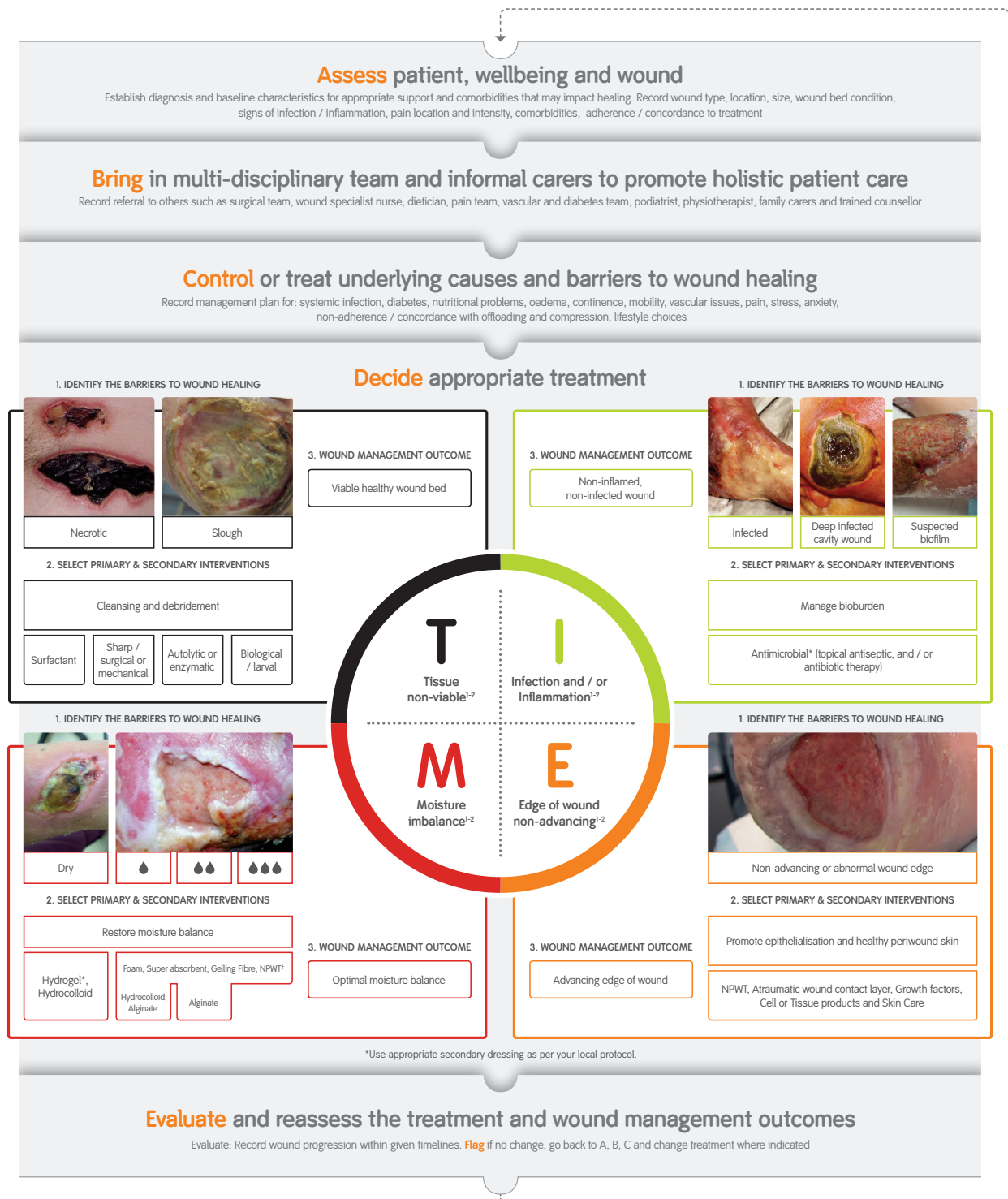
The aims of this study were to examine the experiences of the non-wound care specialists using the T.I.M.E. CDST to understand if the tool helped to guide practice to make informed decisions in the absence of a wound care specialist, and to understand if the tool enhanced their identification, confidence and assessment of treating patients with wounds, promoting holistic wound management and reducing variation in practice.

Methods

A questionnaire assessing the use of the T.I.M.E. CDST was designed at The University of Huddersfield and administered to non-specialists (defined as a generalist who has not specialised in wound care) treating patients with wounds at four centres: Sygehus Sønderjylland Hospital, Sønderborg, Denmark (Jelnes et al, 2019); Cambourne Medical Clinic, Victoria, Australia (Swanson et al, 2019); West Park Healthcare Centre, Chronic Care and Rehabilitation Hospital, Ontario, Canada (Woo, 2019); and Silver Chain, a community nursing organisation in Perth, Australia (Carville et al, 2019). Each specialist asked non-specialists to use and evaluate the tool on five different patients over a 4-week period, capturing the details of the care provided and how the tool influenced practice.

Participating clinicians were asked what types of wounds they were involved in treating (options: leg ulcers; pressure ulcers; surgical wounds; burns; diabetic foot ulcers); and the duration of their employment in health care. Information on patient gender, age and wound type was collected.

T.I.M.E. clinical decision support tool



Developed with the support of Glenn Smith²

*Use appropriate secondary dressing as per your local protocol. †NPWT: Negative Pressure Wound Therapy; ‡Level of exudate for wounds suitable for NPWT.

Reference: 1. Schultz GS, Sibbald RG, Falanga V et al., Wound bed preparation: a systematic approach to wound management. Wound Rep Reg (2003);11:1-28. 2. Leaper DJ, Schultz G, Carville K, Fletcher J, Swanson T, Drake R. Extending the TIME concept: what have we learned in the past 10 years? Int Wound J 2012; 9 (Suppl. 2):1-19. 3. Smith G, Greenwood M, Searle R. Ward nurse's use of wound dressings before and after a bespoke educational programme. Journal of Wound Care 2010, vol 19, no. 9

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Figure 1. The T.I.M.E. clinical decision support tool — a non-product-specific version.

T.I.M.E. clinical decision support tool

Use MolecuLight iX™ wound assessment tool to measure wound surface area and evaluate bioburden level

Assess patient, wellbeing and wound

Establish diagnosis and baseline characteristics for appropriate support and comorbidities that may impact healing. Record wound type, location, size, wound bed condition, signs of infection / inflammation, pain location and intensity, comorbidities, adherence / concordance to treatment

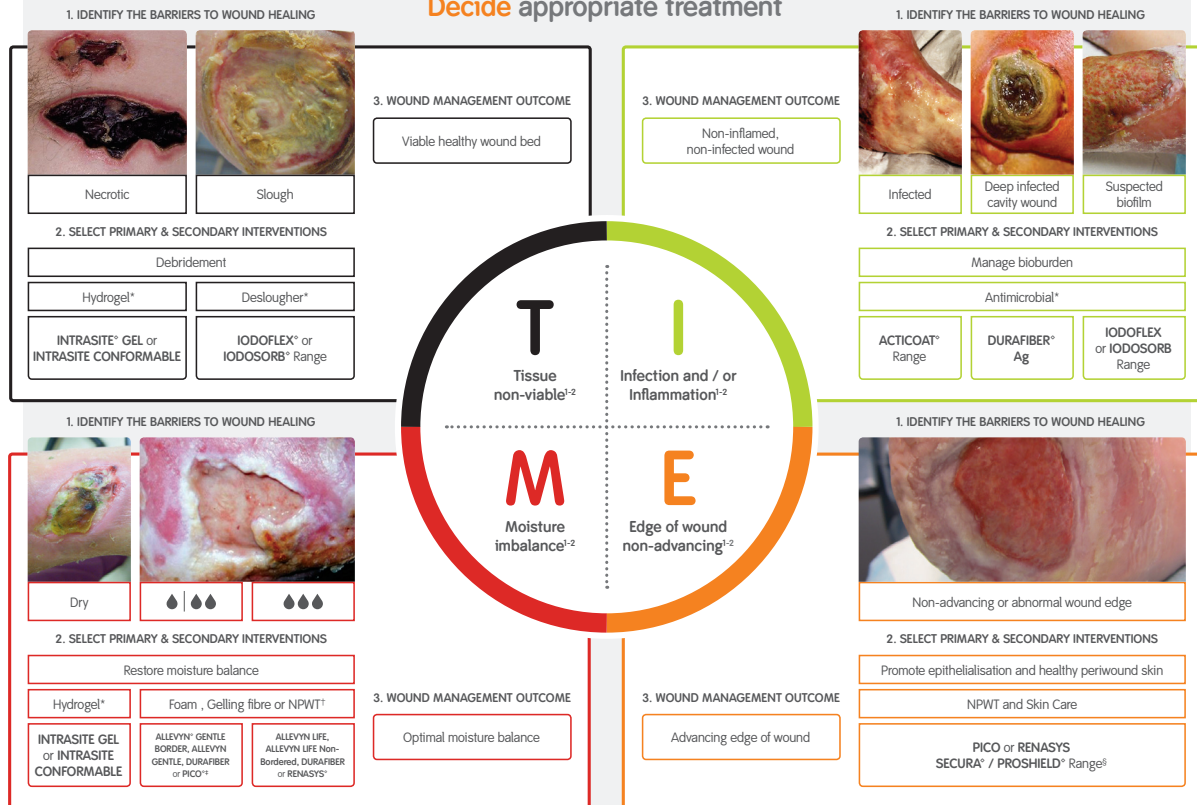
Bring in multi-disciplinary team and informal carers to promote holistic patient care

Record referral to others such as surgical team, wound specialist nurse, dietician, pain team, vascular and diabetes team, podiatrist, physiotherapist, family carers and trained counsellor

Control or treat underlying causes and barriers to wound healing

Record management plan for: systemic infection, diabetes, nutritional problems, oedema, continence, mobility, vascular issues, pain, stress, anxiety, non-adherence / concordance with offloading and compression, lifestyle choices

Decide appropriate treatment



*Use appropriate secondary dressing as per your local protocol

Evaluate and reassess the treatment and wound management outcomes

Evaluate: Record wound progression within given timelines. **Flag** if no change, go back to A, B, C and change treatment where indicated

Developed with the support of Glenn Smith³ and Moore et al. 2019⁴

¹NPWT: Negative Pressure Wound Therapy. ²Level of exudate for wounds suitable for NPWT. ³SECURA Range includes SECURA Moisturising Cleanser, SECURA Total Body Foam, SECURA Dimethicone Protectant, SECURA Extra Protective Cream, No Sting Skin Prep, PROSHIELD Range includes PROSHIELD Plus and PROSHIELD Foam and Spray, ALLEVYN Range includes ALLEVYN LIFE, ALLEVYN GENTLE BORDER and ALLEVYN GENTLE BORDER LIFE.

Reference: 1. Schultz GS, Sibbald RG, Falanga V, et al. Wound bed preparation: a systematic approach to wound management. *Wound Rep Reg* (2003);11(1):28. 2. Leaper DJ, Schultz G, Carville K, Fletcher J, Swanson T, Drake R. Extending the TIME concept: what have we learned in the past 10 years? *Int Wound J* 2012; 9 (Suppl. 2):11-19. 3. Smith G, Greenwood M, Searle R. Wound nurse's use of wound dressings before and after a bespoke educational programme. *Journal of Wound Care* 2010; vol 19, no 9: 4. Moore Z, Dowsett C, Smith G, et al. TIME COST: an updated tool to address the current challenges in wound care. *Journal of Wound Care*, vol 28, no 3, March 2019: 154-161.

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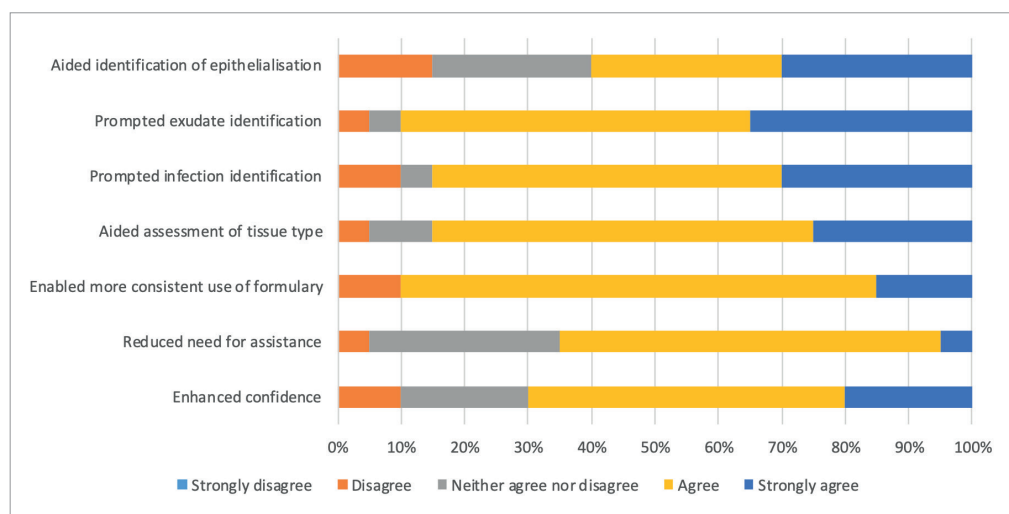


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Figure 2. The T.I.M.E. clinical decision support tool — including Smith & Nephew products.

Figure 3: Clinician responses after 1 week of using tool.



Assessment of the tool was facilitated via a series of 5-point Likert-style items focusing on clinicians use of the tool in wound treatment. These items elicited information relating to whether the use of the tool resulted in: enhanced confidence; reduced need for assistance; more consistent use of formulary; improved assessment of tissue type; prompt identification of infection; prompt identification of exudate; improved identification of epithelialisation. Three additional items eliciting open-ended responses were also included in the questionnaire. The data were collected weekly after commencement of treatment for four occasions.

Data were analysed descriptively; considering changes with time in overall patterns of responses to individual items and also in a summed score measure. This score was based on responses to all 7 items and hence could range from 7 points (representing extreme dissatisfaction with the tool) to 35 points (representing extreme satisfaction with the tool) A consistently neutral respondent would score 21 points on this measure.

Results

Quantitative data analysis

Data were collected over the 4-week period from clinicians treating 20 patients (9 males, 11 females); aged between 51 and 88 years (mean age 75.0; SD 8.40 years). Most clinicians treated one patient only; a small number of clinicians treated more than one patient; and a small number of patients were treated by more than one clinician. Types of wounds reported to be treated by participating clinicians included leg ulcers (80% of respondents), pressure ulcers (90% of respondents), surgical wounds (65% of respondents), burns (50% of respondents) and diabetic foot ulcers (75% of respondents).

Participating clinicians had been employed in health care for periods of time stated to be from less than 5 years to over 20 years. The median length of employment in health care was between 10 and 15 years. Complete sets of data over the 4-week period were obtained from clinicians treating 19 patients. Data from week 1 and week 2 only were obtained from the treatment of one patient.

Week 1 response data

Responses were generally positive, with a mean summed score of 27.5 points (SD 4.91 points). No respondent gave the response Strongly disagree to any item. For most items, the most common response was Agree; an equal number of respondents gave the response Strongly agree to the item which asked whether the tool had assisted in the identification of epithelialising wounds. However, this item also produced the highest number of negative statements, with 3 respondents (15%) disagreeing that the tool had aided identification of epithelialising wounds. Respondents found the tool to be most useful in aiding the assessment of tissue type. The proportion of respondents who gave responses of either Agree or Strongly agree varied across items from 13 to 18 out of 20 (65% to 90%). Week 1 responses are summarised in Figure 3.

Week 2 response data

Responses were similar to those obtained at week 1, but slightly more positive; with a mean summed score of 28.3 points (SD 4.86 points). As before, no responses of Strongly disagree were reported for any item; and the proportion of responses of Disagree reduced such that only one item included more than 1 (5%) of these responses.

Figure 4: Clinician responses after 2 weeks of using tool.

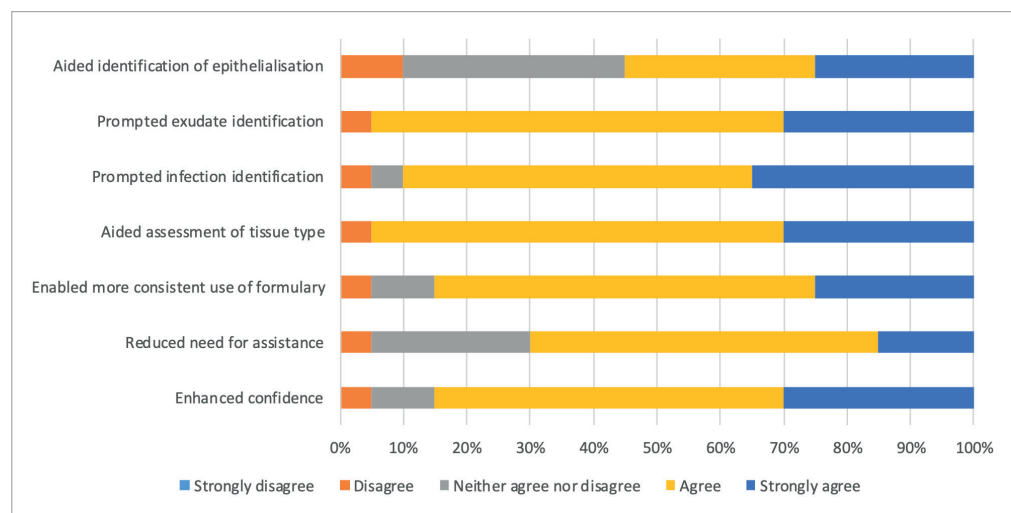
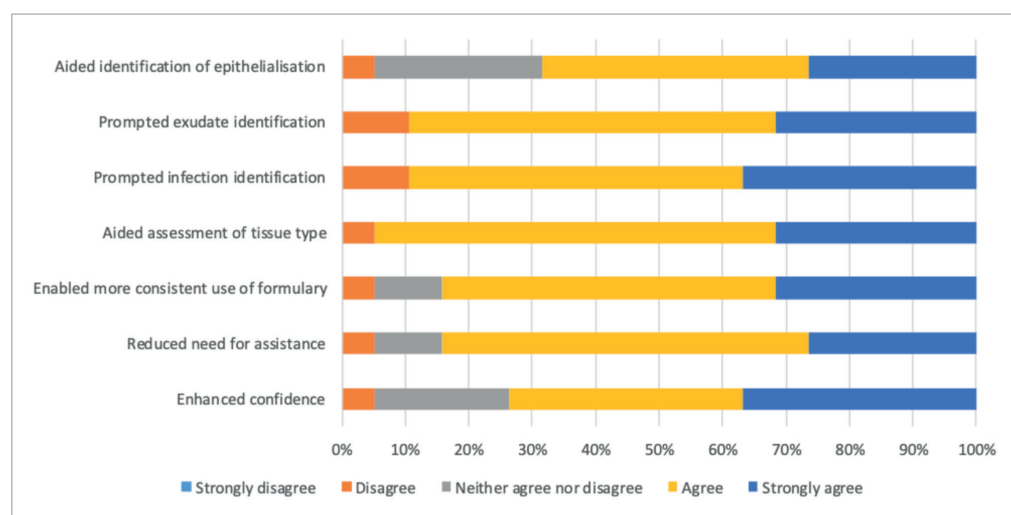


Figure 5: Clinician responses after 3 weeks of using tool.



The most common response remained Agree, with slightly fewer responses than at Week 1: in a small number of cases, opinions had changed to Strongly agree. The proportion of respondents who gave responses of either Agree or Strongly agree varied across items from 11 to 19 out of 20 (55% to 95%). As in week 1, respondents found the tool to be most useful in aiding the assessment of tissue type, and least useful in aiding the identification of epithelialising wounds. Week 2 responses are summarised in Figure 4.

Week 3 response data

A further slight improvement was observed in responses collected at week 3, although these were broadly very similar to those obtained at week 2. The mean summed score increased from 28.3 to 28.6 points (SD 5.06 points). However, there was a very slight increase in the number of responses of Disagree. As before, no responses of Strongly disagree were reported for any item.

The most common response remained Agree. However, there was a notable transition of

responses from Agree to Strongly agree, with the total proportion of responses of Strongly Agree increasing from 27% at week 2 to 32% at week 3, with slightly fewer responses than at week 1: in a small number of cases, opinions had changed to Strongly agree. The proportion of respondents who gave responses of either Agree or Strongly agree varied across items from 13 to 18 out of 19 (68% to 95%). The tool continued to be most highly rated in the item assessing its aid in the identification of tissue type; and least useful in aiding the identification of epithelialising wounds. Week 3 responses are summarised in Figure 5.

Week 4 response data

The pattern of change between weeks 3 and 4 continued the earlier trend, with a small number of respondents transferring responses from Disagree to Neither agree nor disagree; and a small number of respondents transferring responses from Agree to Strongly agree. However, there was a slight decrease in the mean summed score from 28.6 to 28.2 points, with data variability also increasing (SD

Figure 6: Clinician responses after 4 weeks of using tool.

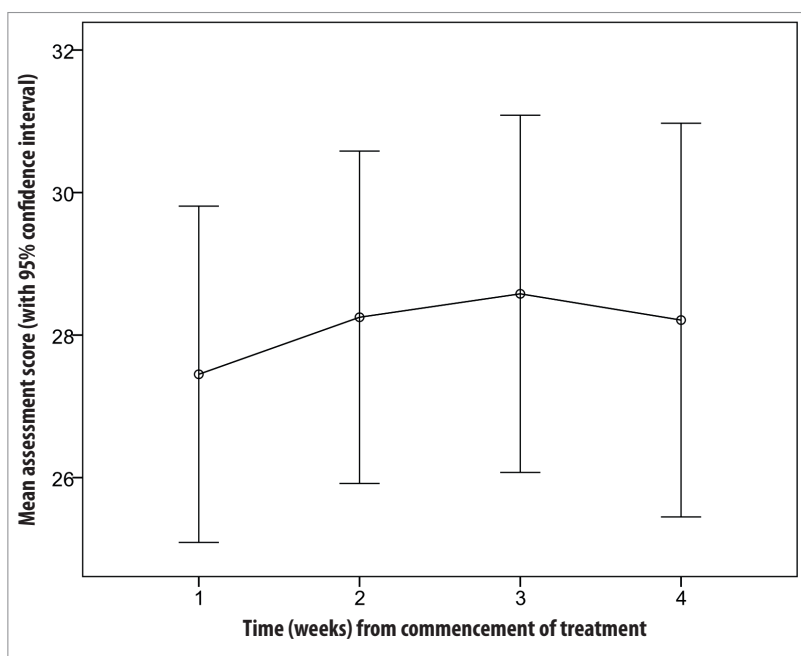
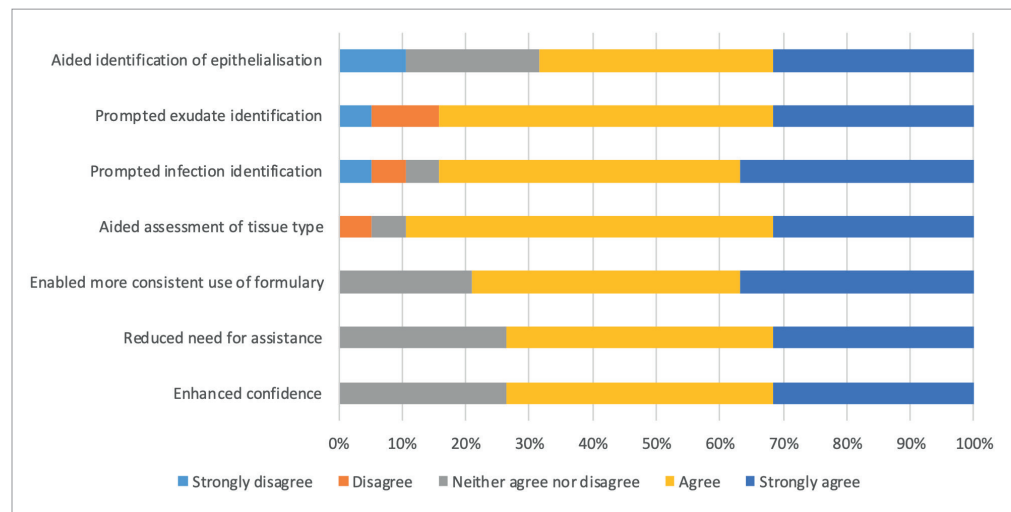


Figure 7: Mean summed scores at 1, 2, 3 and 4 weeks after treatment.

5.58 points). The proportion of respondents who gave responses of either Agree or Strongly agree varied across items from 13 to 17 out of 19 (68% to 89%). The tool continued to be most highly rated in the item assessing its aid in the identification of tissue type; and least useful in aiding the identification of epithelialising wounds. Week 4 responses are summarised in Figure 6.

The change in mean assessment scores over time indicates a consistently positive response to the tool, with time-dependent changes small and non-significant [Figure 7]. This reflects the consistency of responses to individual items as noted above.

Qualitative findings and discussion

This study aimed to understand non-wound care

specialists, with varying levels of experience in healthcare, experiences of using the T.I.M.E. CDST and how adopting an 'ABCD and E' approach to wound care management can facilitate wound assessment of patients in their care. The respondents had varied levels of experience in health care. The tool was consistently rated well by the respondents, with most reporting how the tool aided identification of tissue type, wound deterioration or signs of infection. Furthermore, the proportion of non-specialists who agreed or strongly agreed with the statements in the questionnaire were consistently over 60% and up to 95% in some cases, suggesting the tool is a useful method of providing a structured approach to wound management, encouraging reliable holistic wound assessments that can reduce variations in practice and promote consistency of care. Indeed, many described the T.I.M.E. CDST as being easy to use and understand and supported their wound assessments through reinforcing treatment choices that they may have otherwise been uncertain about.

"I feel I am better able to identify wound deterioration and escalate to health care professional without requiring assistance from my consultant"

Many respondents described how using the tool supported and encouraged their own decision making, empowering them to make clinical decisions around a patient's treatment plan, without reliance on more senior or experienced clinicians for reassurance or support. The T.I.M.E. CDST framework therefore, provides an evidence base for enabling clinicians to feel competent and confident in their ability to make informed decisions to determine a patient's treatment trajectory, potentially improving

wound healing and facilitating positive patient outcomes. Some staff reported how the tool enabled them to recognise the clinical changes associated with wound healing, which supported their decision making by enabling them to feel 'confident in identifying tissue type and indicators of infection'. This supports previous research by Dowsett (2009) who found favourable outcomes on clinicians' knowledge of wound care when using the TIME framework, combined with structured education.

"I feel I am better able to identify non-viable tissue or presence of infection without the need of consultant review."

"I am more confident in assessing for signs of infection and knowing when to escalate."

Some non-specialists used the tool to reinforce their decision-making skills and practices, suggesting it provided a source of support and knowledge-building for encouraging practitioners to be pragmatic about their treatment choices, rather than continuing with habitual clinical practices such as over-reliance on more senior colleagues for support, or continuing with the same traditional dressing. Blackburn et al (2019) found that limited knowledge on wound dressings resulted in ritualistic practices, with nurses choosing their preferred or usual dressing over a dressing that might have been more clinically effective for treating a specific wound. The findings in this study suggest that the T.I.M.E. CDST could facilitate practitioners' knowledge around wound care, potentially limiting the extent of ritualistic practice they engage in when treating patients through enhancing their confidence to undertake wound assessments and to identify the signs and symptoms of infection.

"Following the guidelines provided reassurance that correct dressing choices were made."

"As there are new signs of infection the tool has helped me identify the need for a change in dressing."

"[helped me to] Identify areas of concern and helped me understand what the best dressing would be."

Despite many of the respondents reporting

favourably on the tool's ability to support and enhance wound assessment, there were also some who felt the T.I.M.E. CDST did not facilitate wound assessments or enhance their knowledge of clinical practice. For example, one respondent described the tool as being 'difficult to use' and did not 'assist in assessing wound'. Others felt that their knowledge did not improve through using the framework and local access to available wound dressings meant that some practitioners were unable to employ the frameworks recommendations. Indeed, the least highly rated item in the questionnaire was assessing the tools aid in identification of epithelialising wounds and for some, knowledge was not improved through using the T.I.M.E. CDST in their practice.

"I still don't know what epithelialisation is."

"We have different dressings from what is recommended."

Whilst the T.I.M.E. CDST may have supported knowledge and confidence for some practitioners, others may have benefitted from complementary education or training to strengthen their decision making skills and improve their ability to identify or understand the signs and symptoms of wound healing, to support them to recognise when alternative treatment methods should be applied.

The results identified only very small changes in assessments using the T.I.M.E. CDST over time demonstrating that respondents were consistent in their ratings. Although many staff felt the tool helped with their decision making, some felt it could provide more in-depth information (for example, detailed pictures and treatment options). Others described difficulties using the tool when making treatment choices based on the intervention options provided, with some respondents describing how the choices of dressing were 'a bit hard' and the choices 'minimal' for each component of TIME. Indeed, the tool appeared to be most effective where the product-specific version could be used with the availability of named products, reflecting the fact that categorisation of products can be confusing for non-specialists, particularly when dressings that are in the same category may have differing performance properties or clinical caveats (Green, 2013). Indeed, local wound care formularies typically provide products that are considered clinically and cost effective and provide non-specialist nurses with a useful framework for choosing dressings for their patients (Hampton, 2015).

Conclusion

This study has demonstrated that the T.I.M.E. CDST has largely been shown to provide a structured holistic wound management approach to support non-wound care specialists in choosing the most appropriate intervention for their patients, encouraging consistency of care and a methodological approach to wound management. Through supporting clinicians to adopt consistent, operational decision making, the tool has been shown to increase knowledge and competence in wound management, whilst also enhancing the confidence of staff to trust their own judgements, enabling them to make more appropriate and timely referrals to more senior staff. Whilst some clinicians may benefit from additional complimentary education, the T.I.M.E. CDST has been shown to provide a foundation to support wound assessment and clinical decision making and provide a more structured, evidence-based approach to improve patient outcomes and experiences of care.

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