The clinical and economic outcomes of an integrated care bundle using a three-layer silicone adhesive foam dressing for exudate management of chronic wounds: a retrospective cohort analysis

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ABSTRACT

Introduction The aim of this retrospective, real world, cohort analysis is to report the clinical and economic outcomes of an Integrated Care Bundle (ICB) that used a 3-layer silicone adhesive foam dressing for exudate management across multiple chronic wound types within a community setting in Canada.

Methods Analysis of the safety and effectiveness of the introduction of wound centered ICBs, adopted to improve the management of chronic wounds, from March 2016 to December 2018. Outcomes were compared between patients who received a 3-layer silicone foam adhesive dressing alongside an ICB and those that did not, as part of their care.

Results Patients who received care with an ICB and the dressing (n=6612) experienced improved clinical outcomes, compared with those who did not (n=2242). Including faster time to healing (12.7 vs 25.4 weeks, respectively) and longer time between dressings changes (3.5 vs 1.8 days, respectively). There were reduced number of nursing visits in the ICB cohort which led directly to reduced resource costs, compared to the patients in the non-ICB cohort (CAD$1736 vs $6488, respectively).

Conclusions This real-world cohort analysis demonstrated the adoption of an ICB that included treatment with a three -layer silicone adhesive foam dressing improved clinical outcomes, reducing chronic wound healing times and the frequency of wound dressing changes.

Implications for clinical practice Delivering wound care as part of an Integrated Care Bundle may improve health and economic outcomes for patients with chronic wounds.

Keywords wound care, care bundle, health outcomes, economic outcomes, wound healing, silicone dressing

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KEY MESSAGES

- Chronic wound management poses a significant challenge worldwide. To successfully treat and manage chronic wounds, it is fundamental to plan how care is delivered to reduce the risk of complications to the patient and, furthermore, to ensure a cost-effective approach to care.
- Integrated Care Bundles (ICBs) can provide a guideline for clear evidence-based interventions that, when incorporated together and performed collectively and reliably, result in an improvement in overall wound management, clinical, patient and economic outcomes.
- The aim of this retrospective cohort analysis is to report the clinical and economic outcomes of a ICB that used a 3-layer silicone adhesive foam dressing for exudate management across multiple chronic wound types within a community setting.
- The analysis of patients with chronic wounds, being treated with an ICB, resulted in wound healing being achieved in a statistically significant shorter time, significant cost and resource reductions and fewer dressing changes, when compared to those who did not receive wound care as part of ICB treatment.

INTRODUCTION

The process of wound healing is multifaceted, requiring a series of intricate interactions between several highly controlled and synchronised stages. The timeframe for a wound to heal can vary depending on size, depth, location, and patient factors.[1,2] Most wounds follow the expected pathway to healing, however those that do not progress through a normal healing trajectory, usually stall in the inflammatory stage[3] and are therefore considered non-healing or chronic.[4] A wound can become chronic due to numerous systemic and/or local factors including long term medical

conditions, smoking, medications, peripheral vascular disease and neuropathy, infection, or unsuitable wound environment.[1] Nearly all chronic wounds have a diagnosed etiology and can usually be categorised into one of three clinical classifications: leg ulcers (arterial ulcer [ALU] or venous ulcer [VLU], which occur as a result of arterial or venous insufficiency; diabetic foot ulcers (DFUs); or pressure ulcers/injuries (PU/PI's).[5]

Chronic wounds have significant human and economic challenges, including quality of life[6] and at a healthcare organisational level (time and resource costs attributed to the treatment provision). The impact on quality of life reflects certain aspects of health including physical and psychological and is often evaluated in health economic studies to explore and understand the burden to the patient suffering from a chronic wound.[7] The costs related to chronic wounds are substantial, comprising of increased medical and healthcare costs and a reduction in productivity losses due to sick leave or early retirement from the workforce.[6] Approximately 1–3% of total healthcare spend in developed countries is attributed to treatment costs for chronic wounds.[4,8] In the United States (US) an estimated 8.2 million Medicare patients have a chronic wound, costing an approximated $28–32 billion per year.[9] Within the National Health Service (NHS) in the United Kingdom (UK), total annual cost for wound management was estimated to be £8.3 billion, with £5.3 billion of these costs spent on chronic wound groups.[10] In Canada, over $11 billion of total health care spend ($362 billion) is attributed to the cost of wound care.[11] Much of the literature available describes the underreported cost and prevalence of chronic wounds worldwide,[6,10,11] and highlight that these wounds are a major challenge to healthcare systems worldwide.

Many chronic wounds are associated with and develop due to underlying health conditions, including venous insufficiency, diabetes, pressure damage and vascular disease.[12] Chronic wound management is multifaceted requiring management of, not only the wound, but other patient factors to facilitate an optimal chance of healing. If chronic wounds are not managed appropriately, they are at a higher risk of developing complications, often secondary to underlying patient co-morbidities. One of the most common complications of chronic wounds is the development of infection, which can result in longer healing times, increased health interventions as well as increased incidence of hospital admission.[13] Wound complications result in significant economic costs and are likely to have a detrimental effect on the quality of life of patients, their families and care givers.[4]

To successfully treat and manage chronic wounds, it is fundamental to plan how care is delivered to reduce the risk of complication to the patient and, furthermore, ensure there is a cost-effective approach to care. Incorporating a holistic, collaborative and multifaceted approach is essential to optimise the provision of best practice in wound management[13] and reduce practice variation.[14] Wound assessment tools have evolved over the years from being a focused description of the wound to enabling holistic assessment and management.[14] One of the most commonly used wound assessment tools, that incorporates a holistic approach is the Tissue; Infection, inflammation or biofilm; Moisture balance; Edge of wound (TIME) Clinical Decision Support Tool,[14] which includes relevant patient- and wound-related factors.[2] Many wounds are treated and managed by generalist clinicians, or those who do not have a specialist knowledge of wounds, therefore the adoption of wound assessment tools, such as TIME, ensures that there is a standardised approach to care; reducing variation in assessment and treatment provision and enabling patients have access to evidence-based best practices.

To support health care professionals to reliably deliver a high standard of wound care, Integrated Care Bundles (ICB) were developed. The purpose of ICB's is to provide a guideline for clear evidence-based interventions that, when incorporated together and performed collectively and reliably, result in an improvement in overall wound management, clinical, patient and economic outcomes. There are several benefits with ICB's which include reducing variation in clinical practice while also directing generalist nurses when to escalate wound complications to a specialist practitioner for support, thus encouraging a multi-disciplinary approach to care provision. In a 2013 report by Kim et al,[15] there was a 50% improvement in patient outcomes, including reduction in complications and amputations, following a multi-disciplinary approach to care.

The objective of this work is to report the clinical and economic outcomes of an ICB, designed to standardise treatment protocols based on research evidence, that used a 3-layer silicone adhesive foam dressing for exudate management across multiple chronic wound types within a community setting in Canada.

METHOD

Design

This retrospective, real world cohort analysis was collected from anonymised patient information from two large community care centers. These centers consisted of a home and community care organisation, operating across a region of Ontario, Canada. The centers provide an in-person wound management service as part of a full range of services, either in the patient's home or community clinic, by contracted nursing agencies. In December 2015 a comprehensive wound care program was implemented, this was completed in March 2016. The program was coordinated by a contracted provider (Toronto, Canada), who maintained a real time electronic database of patient information as the project was undertaken. Reporting of the analysis was carried out in line with the STROBE guidelines.[16] Ethics approval was requested and received from the Institutional Review Board (IRB) of D'Youville University before conducting the analysis.

The program extended along the entire continuum of care for patients diagnosed with common chronic wounds, including diabetic foot ulcers, venous leg ulcers, pressure ulcers, surgical wounds and burns. There was a two-year period of the implementation, from December 2015 to March 2018. This timescale, and therefore the number of patients with eligible data, was dictated by the fixed duration of the contract of services. Patients with open chronic wounds were followed from presentation until complete wound healing or closure was achieved. The patients who did not receive an ICB, were recorded within the database and this enabled a comparison analysis to be conducted between ICB and non-ICB patients.

The ICBs were used to guide clinicians in the choice of a wide range of available advanced wound management dressings and devices, that could be selected by the attending

clinician according to each wound's clinical circumstances. The ICB's included guidance on specific wound indication treatment pathways, for example, leg ulcer assessment to guide diagnostics and treatment, when to refer to a more specialist clinician or a wider multi-disciplinary team for advice and infection and/or exudate management pathways to guide appropriate dressing selections. The content of the ICBs was designed to best support the clinical profile, particular needs of the patients and wound indications. All registered nurses received education on the ICBs and the products available within the ICB formulary. Chronic wound management is complex and often requires a range of treatment options. All products and treatments should be safe and efficacious, promote wound healing trajectories, support positive patient outcomes and provide a cost-effective option for treatment.

This analysis focused on the use of a three- layer silicone adhesive foam dressing (ALLEVYN™ GENTLE BORDER, Smith and Nephew, Hull, UK) to help assess its performance within an ICB. This three-layer silicone adhesive foam dressing has a triple-layered construction that combines an absorbent hydro-cellular pad sandwiched between a perforated soft silicone gel adhesive wound contact layer and a highly permeable waterproof top film.[17] This silicone adhesive foam dressing was listed among a range of other silicone adhesive foam dressings in a portfolio of advanced tools and practices available to clinicians in ICBs, all of which were appropriate for use.

All patients had access to care under an ICB, however, the patients who were not were either under the care of a physician or surgeon who had stipulated set treatment directives (for example, daily dressings with Betadine and gauze) and did not wish for patients to be cared for within an ICB or, the patients had expressed that they did not accept treatment regimens, as part of the ICB. In these circumstances the registered nurses continued with treatment care plans as directed outside of the ICB. Outcomes from patients who received care with an ICB that included the use of the silicone adhesive foam dressing as part of their treatment were compared with patients who were not treated with an ICB. Patients were followed until wound healing or closure was achieved. They were not followed up beyond healing.

Patient cohort

Patients with a chronic, open wound, defined as: a wound healing by secondary intention that has not followed a normal healing trajectory and who presented after March 2016 and whose wound had healed before March 2018 were eligible for inclusion in the analysis. The wound types included within this population included pressure ulcers/injuries, diabetic foot ulcers, venous leg ulcers, surgical wounds, skin tears, donor sites, malignant/fungating wounds and non-complex burns. Patients were excluded if they were under the age of 18, taking immunosuppressant medications, receiving palliative care, those with an active infection, positive for human immunodeficiency virus (HIV) or were scheduled to receive chemotherapy.

The electronic medical records (EMR) of all the patients treated within the ICB were reviewed; data relating to those who received treatment with the silicone adhesive foam dressing as component of the ICB were grouped for the analysis. Data from patients who did not receive care with an ICB and did not receive treatment with the silicone adhesive foam dressing were also identified and grouped as a cohort. The sample reflected real world use, therefore there were no methodological steps taken to ensure heterogeneity. Data from all eligible patients, with complete data records, were included in the analysis, to minimise selection bias.

Data and outcome analysis

Data was collated every three weeks during any routine wound related nursing visits, or weekly, in cases where the wound was not making expected progress. These visits were all captured electronically. Only complete data sets were included, reviewed, and analysed retrospectively from the patients' EMRs; all data collection and processing of data ensured patient confidentiality.

Key patient characteristics were captured and included comorbidities such as diabetes mellitus (DM), smoking, renal and cardiac conditions. These were quantified using the Charlson comorbidities index,[18] which is used widely in assessing the presence of chronic diseases,[19] as many of these are known to affect or influence wound healing. Other captured demographics included age and gender. The Bates-Jensen Wound Assessment Tool (BWAT) was used as a baseline assessment of wound severity. The BWAT consists of 13 wound characteristics: size, visible depth, wound edges, undermining and tunneling processes, necrotic tissue type and amount, exudate type and amount, surrounding skin discoloration, peripheral tissue edema, peripheral tissue induration, granulation tissue and epithelialisation.[20] Nine characteristics are subjectively rated on a one to five scale, with a value of one indicating the healthiest attribute and a value of five indicating the least healthy attribute of the characteristic. The remaining four characteristics (size, depth, edges, undermining) are rated from 0–5 with a value of zero indicating "none present" and scored for wounds that have resolved. The 13 wound characteristic item scores can be summed (with no weighting) for a total score ranging from nine to 65 (profound tissue degeneration).[20] Therefore, a higher score signifies poorer wound status.

For the purposes of comparing outcomes between groups, at baseline, mean BWAT scores were calculated. In terms of clinical outcomes, time to healing and number of nursing visits to healing were expressed as the mean, per patient. The incidence of systemic infections, hospital admissions and product-related adverse events (AE) were also derived from electronic records and expressed as the proportion of each group that experienced these events. Each dressing change required a visit to a patient's home or within a community care setting by registered nurses. Costs associated with visits, were derived from a mean per visit cost of $68 (CAD); this represents the direct payment made to the nursing agencies per nurse visit, excluding the cost of any consumables used. This was assumed to cover the nursing time required for travel and clinical care per nursing visit.

Data was managed and analysed using Microsoft Excel 2010. Statistical analysis was carried out using SPSS version 22 (Chicago, IL). All variables were described using descriptive statistics and statistical significance was denoted as $p<0.05$. Comorbidity index and healing time by wound type were expressed as a mean with standard deviation. No sensitivity analyses were performed.

RESULTS

Demographics

A total of 6612 patients were treated for chronic open wounds using an ICB which included the 3-layer silicone adhesive foam dressing for exudate management. There were an additional 103 patients with skin tears and 19 patients with fungating/malignant wounds that were not included as part of this analysis, due to the limited outcome measures captured for these wound types. A further 2242 patients did not receive an ICB to treat their chronic wound, therefore enabling a comparison. The patients not receiving care with an ICB were treated with standard, non-advanced wound care treatments; with the primary reason being clinician choice/preference for a less advanced option. Table 1 reports the patient demographics, mean co-morbidity index, smoking incidence, and gender, across all wound types, for patients receiving an ICB and for the patients who did not.

In summary, patients treated with the ICB were slightly older (57.78 years vs 56.67 years), and more were female (47.8% vs 44.69%). A very small number of patients were smokers (1.7% vs 2.59%, respectively). The ICB patients had a marginally higher mean co-morbidity index score (2.69 vs 2.4) compared to those who didn't receive care as part of an ICB, however the BWAT score was less in patients with the ICB (27.44 vs 33.2, out of maximum score of 65). There was variation in wound types between the ICB and non-ICB cohorts, however the most prevalent wound type receiving care with and without an ICB was open surgical wounds (n=2666; 40.32% vs n=1019; 45.45%, respectively), followed by VLU's (n=1707; 25.82% vs n=708; 31.58%).

Clinical and economic outcomes

Wound related clinical outcomes across all indications, per ICB and Non-ICB cohort are presented in Table 2. Patients treated with the 3-layer silicone adhesive foam dressing ICB had a shorter time to wound healing than those who did not receive an ICB (12.77 weeks vs 25.49 weeks). In addition, the ICB cohort required fewer nurse visits (3.50 vs 1.87 days). These dressing change values can be translated as two dressing changes per week for those in the ICB cohort compared to 3.5 dressing changes per week for those not receiving ICB care. Reduced dressing changes alongside shorter healing times resulted in reduced overall costs to time of healing associate with nursing visit/time when treated as part of the ICB ($1736 CAD vs $6488 CAD).

Table 1 Patient demographics and wound characteristics

	Patients treated with an ICB including 3-layer silicone adhesive foam dressing (n=6612)						Patients not treated with an ICB (n=2242)					
	n (%)	Age, mean years	Female n (%)	Smoker n (%)	Co-I, mean (SD)	BWAT score, mean	n (%)	Age, mean years	Female n (%)	Smoker n (%)	Co-I, mean (SD)	BWAT score, mean
All Wounds	6612 (100%)	57.78	3134 (47.8%)	115 (1.7%)	2.69 (1.84)	28.73	2242 (100%)	56.67	1002 (44.69%)	58 (2.59%)	2.40 (1.80)	33.20
Burns	89 (1.35%)	58.79	35 (39.3%)	3 (3.3%)	2.79 (2.11)	25.02	27 (1.2%)	54.93	10 (37.0%)	0 (0.00%)	2.48 (1.84)	40.20
DFU	1233 (18.65%)	61.37	653 (52.9%)	27 (2.18%)	3.24 (1.84)	35.00	179 (7.98%)	59.44	82 (45.8%)	9 (8.3%)	3.82 2.16)	32.40
PU	917 (13.87%)	61.48	546 (59.5%)	14 (1.5%)	3.05 (1.77)	29.65	309 (13.78%)	61.51	131 (42.3%)	8 (5.2%)	2.72 (1.81)	34.00
Open Surgical Wounds	2666 (40.32%)	53.54	1043 (39.1%)	58 (2.17%)	2.24 (1.91)	23.95	1019 (45.45%)	52.17	406 (39.8%)	22 (6.6%)	1.92 (1.79)	35.20
VLU	1707 (25.82%)	59.75	857 (50.2%)	13 (0.7%)	2.79 (1.56)	31.34	708 (31.58%)	60.4	373 (52.6%)	8 (2.7%)	2.58 (1.44)	36.90

ICB = integrated care bundle; BWAT= Bates Jensen Wound Assessment Tool; Co-I = comorbidity index; DFU = diabetic foot ulcer; PU = pressure ulcer; VLU = venous leg ulcer.

Table 2 Clinical and economic outcomes for all wound types

	Patients treated with an ICB including 3-layer silicone adhesive foam dressing (n=6612)	Patients not treated with the ICB (n=2242)	p-values
Weeks to healing, mean (SD)	12.77 (10.69)	25.49 (18.59)	<0.001
Mean number of days between dressing changes	3.5	1.87	<0.001
Labour cost to healing, mean (CAD)	1736	6488	<0.001

Mean cost to healing was derived in CAD, as follows; labor cost to healing = (mean healing time [weeks] x 7 [days per week]/mean number of days between dressing changes) x $68 (cost per visit).

Figure 1 shows the average time to healing for each wound indication. In all wound indications treated with the 3-layer silicone adhesive foam dressing ICB, there was a faster time to wound healing (weeks), compared with those that were not treated with the ICB.

Figure 2 shows the mean duration between dressing changes for the different wound indications. All of the wound indications that received care with the 3-layer silicone adhesive foam dressing ICB were associated with reduced number of dressing changes, compared with those that did not receive care with an ICB.

SAFETY REPORTING

The incidence of adverse events, including product-related, systemic infection and hospital admission, for patients treated with an ICB including the silicone adhesive foam dressing and for patients not receiving an ICB, are reported in Table 3. There were lower rates of systemic infection and hospital admissions in the patients treated with an ICB, compared to those that were not. No product related adverse events (AE) were reported in the patients treated with the 3-layer silicone adhesive foam dressing ICB; conversely there were 12 product related AE in the patients that were not treated with an ICB.

DISCUSSION

The healing time for chronic wounds varies significantly depending on factors such as wound type, underlying health conditions, and varying treatment approaches. Variation in the management of chronic wounds is significantly further influenced by factors such as healthcare settings, clinician expertise, and available resources. Variation can lead to different outcomes in wound healing, including extended time to heal, secondary complications, such as hospital admission or the development of infection and ultimately, patient satisfaction.[21] Not all clinicians adhere strictly to evidence-based guidelines due to varying levels of awareness, training, or disagreement with the recommendations. These variations highlight the importance of standardised care protocols and ongoing education for healthcare providers to improve outcomes for patients with chronic wounds. In 2015 Guest et al[22] identified the need to reduce unwarranted practice variation in the assessment and treatment of wounds across a patients' pathway.

The introduction of ICB's is one way of adopting and ensuring evidence-based practice is followed. This real-world cohort analysis shows that patients with various types of chronic wounds, receiving care with an ICB including a silicone foam

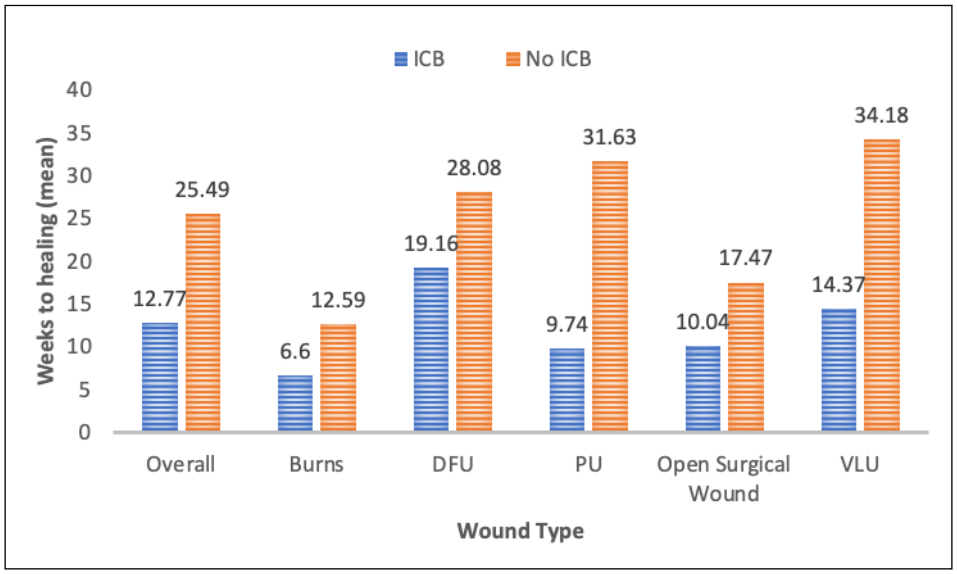

Figure 1. Mean time to healing by wound indication

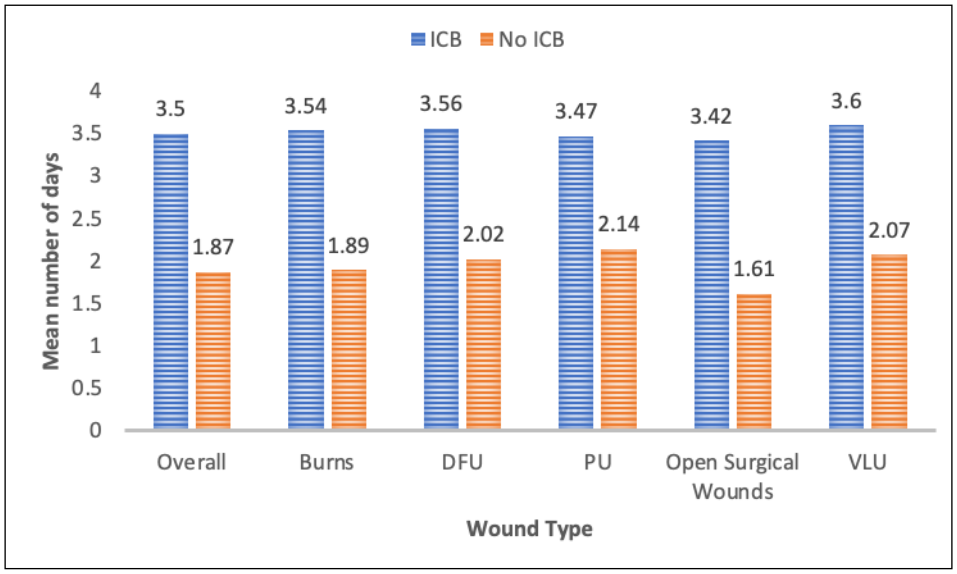

Figure 2. Mean dressing change by wound indication (days)

adhesive benefited from two times faster healing rates and improved outcomes, compared to patients who did not receive the same ICB treatment. The overall impact of these results highlighted two main factors:

- Patients being treated with an ICB, resulted in wound healing being achieved in a statistically significant shorter time, when compared to non-ICB treatment.
- The management of wounds treated with an ICB resulted in statistically significant cost and resource reductions, due to reduction in the number of dressing changes.

These clinical and economic outcomes represent real world treatment modalities for multiple chronic wound types, while also highlighting the value of evidence based, ICBs within routine care.

Wound healing is a complex process that has several steps. Patient comorbidities can interfere with this process and can significantly affect wound healing.[23] Chronic wounds are more likely to develop and be difficult to heal in patients with comorbidities, which can lead to prolonged recovery times and increased risk of complications. The cohort of patients who received treatment as part of an ICB, had a slightly higher comorbidity index score at the start of treatment than those who did not receive an ICB. This suggests that this group of patients had a higher risk of delayed healing due to comorbidities. Receiving wound treatment with an evidence based ICB may have lessened the risk of prolonged healing attributed to their comorbidities. The patients receiving care with an ICB had, overall, a better wound status at the time of initial assessment which may have contributed to their improved healing rates. Patients who did not receive care as part of an ICB had a slightly less healthy wound status at baseline and ultimately took twice as long to heal. It is predicted that these less healthy wounds may well have progressed onto a more positive trajectory had they been managed under an ICB and received an evidence-based, standardised approach to wound care.

One of the challenges in treating chronic wounds is choosing a dressing that is comfortable, conformable and can manage exudate effectively. Consistent mismanagement of wound exudate can expose the wound and peri-wound skin to excess moisture from exudate. In the case of chronic wounds, exudate often contains cellular debris and enzymes,[24] which can be extremely corrosive to any intact skin surrounding a wound. Therefore, it is important to ensure that wound exudate does not pool in the wound bed or meet the surrounding skin causing further damage or deterioration.[25] In context to these cohorts, it is important to highlight that there were no product related AEs for patients treated with the silicone adhesive foam dressing ICB. A previous study has shown that these foam dressings provided excellent exudate management, comfort, and conformability.[26] The results were supported by the findings that clinicians rated the performance of this dressing at 97.3%, and 100% of clinicians advised it was easy to apply and remove.[26]

There are a wide variety of dressings available to clinicians and many of these require an adhesive element, or secondary retention dressing (such as bandages) to secure them into place and prevent migration away from the wound area. If a dressing incorporates a very strong adhesive, tissue damage may occur on its removal, causing pain and discomfort to the patient and this can lead to prolonged healing outcomes.[27] It is essential to balance a level of adhesion with the need for dressing security and patient comfort. Soft silicone dressings are tacky,[28] allowing them to conform and stick well to dry surfaces, however these dressings do not stick to the moist wound bed but will adhere gently to the surrounding skin. While other types of dressings or adhesives do not necessarily come into contact with the wound bed, consistent and repeated adhesion and removal can damage the outer layers of the skin, particularly if the patient has fragile skin,[29] causing trauma to the skin and often pain on removal of the dressing. Conversely, soft silicone dressings minimise trauma on removal, reduce pain at dressing removal[29] and do not leave an adhesive residue on the skin.[28] The silicone adhesive foam dressing used within the ICB has an absorbent layer, allowing a gentle adhesion between the dressing and the wound/peri-wound skin while ensuring that wound exudate is absorbed by the dressing and does not escape back into the wound or onto the skin, promoting an optimal wound healing environment.

Effective exudate management alongside a gentle, but strong adhesive supports the reduction in the number of dressing changes without compromising improved healing outcomes. Indeed, this is reflected in the cohort of patients receiving care with the foam dressing alongside the ICB who required fewer dressing changes than the patients treated with other dressing types without the support of the ICB. Patients receiving care for the wound with the silicone foam dressing also benefited

Table 3 Incidence of systemic infection, hospital readmission and product related adverse events (AEs) by wound type

	Patients treated with an ICB including 3-layer silicone adhesive foam dressing (n=6612)				Patients not treated with the ICB (n=2242)			
Wound indication	**Number of patients n (%)**	**Product adverse event n (%)**	**Systemic infection n (%)**	**Hospital admission n (%)**	**Number of patients n (%)**	**Product adverse event n (%)**	**Systemic infection n (%)**	**Hospital admission n (%)**
All Wounds	6612	0 (0)	13 (0.19)	3 (0.04)	2242	12 (0.54)	70 (3.12)	12 (0.54)
Burns	89	0 (0)	0 (0)	0 (0)	27	3 (11.11)	0 (0)	1 (3.70)
DFU	1233	0 (0)	8 (0.64)	2 (0.16)	179	0 (0)	36 (20.11)	8 (4.47)
PU	917	0 (0)	3 (0.32)	0 (0)	309	1 (0.32)	1 (0.32)	1 (0.32)
Open Surgical Wounds	2666	0 (0)	2 (0.07)	1 (0.03)	1019	3 (0.29)	31(3.04)	1 (0.10)
VLU	1707	0 (0)	0 (0)	0 (0)	708	6 (0.85)	2 (0.28)	0 (0)

from an extra day of undisturbed wound healing. Frequent or unnecessary wound dressing changes can negatively impact wound healing: increasing the risk of wound infection and/or contamination; increasing the risk of pain on repeated removal and application of dressings; and consistently changing the local wound environment.[30] The benefits of reducing dressing change frequency (where clinically appropriate) have been well documented in the literature and include promoting undisturbed healing,[30] improving the patient's quality of life[31] and reduced overall costs and nursing time.[32]

The cost of wound dressings is often, perhaps mistakenly, considered to account for the largest expense in wound care. In 2020 Guest et al[10] contradicted this assumption, estimating that only 6% of overall wound costs can be attributed to wound dressing consumables. In fact, they highlight that nearly 50% of the total cost of wound care is due to resource costs associated with nursing time and clinical visits. Therefore, dressings that require frequent changes will ultimately result in increased overall resource costs.[25] Thus, it is sensible to consider adopting dressings that can be left in place, undisturbed, for longer periods to avoid unnecessary and potentially detrimental changes to the wound, but also to reduce unnecessary nursing visits that may contribute to rising costs of overall wound management. This is reflected in the cohort of patients who received treatment with the silicone foam dressing, as opposed to those that didn't, experiencing fewer dressing changes, less adverse events, faster time to healing and overall reduced costs.

STRENGTHS AND LIMITATIONS

The retrospective design of this work means that only information captured in the existing electronic records was available for analysis. One of the strengths of the approach was the effort taken throughout the implementation of the ICB within the two community care access centres to ensure completion of the electronic health records for the wounds being treated. This resulted in patient records that were complete, meaning very few data gaps. No power calculation was carried out to assess whether a specific sample size was required. This was justifiable as the purpose of this work was to show the use on ICBs within routine clinical practice and therefore a set sample size was not considered necessary. All patients within the two-year ICB integration period were eligible to be included in the cohort, allowing a large dataset to be reported across multiple wound types.

However, the authors acknowledge that there are limitations to retrospective analyses of this type and specific to this analysis. There are notably more patients whose wounds were managed using an ICB than those who were not (6612 vs 2242 patients) resulting in disparities in the number of wound types between groups. Although the patient pool is large, this imbalance in patient numbers cannot be ignored and results may have been different if more data had been available for wounds which were not treated using the ICB. In addition, the analysis is limited to the data collected and available for interrogation and could be subject to selection bias based on the restriction of this investigation to use of an ICB containing a specific silicone foam dressing compared with using a non-standardised treatment approach. The costs described within this analysis were limited to those associated with nursing visits. Although, as mentioned, nursing visits are a key contributor to the total cost of wound treatment,[10] the authors acknowledge that because no wider aspects of costs were considered, the costs reported in this analysis may underestimate the true costs associated with wound management. Finally, because the impact of a multi-component ICB was explored, it was not possible to derive the effect of any of the individual aspects of the bundle or attribute the use of an individual silicone foam dressing on overall outcomes. However, this analysis does support the safety and efficacy of the dressing as part of an ICB in the management of chronic wounds. Further analysis into the dressing types used for patients not treated as part of an ICB would be beneficial. Nonetheless, the main findings reflect that delivery of care via an ICB improves outcomes and remains valid.

CONCLUSION

This real-world cohort analysis demonstrated the adoption of an ICB that included treatment with a three-layer silicone adhesive foam dressing improved clinical outcomes, reducing chronic wound healing times and the frequency of wound dressing changes. The number of nursing visits was also less than the comparative group, which led to reduced nursing costs associated with treating the various chronic wounds within the community setting. The clinical and economic outcomes presented here show that an ICB including the silicone foam dressing is useable, effective and safe for clinicians to adopt across wound with various etiologies.

DISCLOSURES

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