Reducing the Pressure of Pressure Ulcers:

Trillium Health Centre's Focus on New Solutions to an Old Problem

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Abstract

The development of a pressure ulcer and the resultant wound care are considered a needless harm as ulcers are often avoidable if adequate detection and prevention measures are applied. In Ontario, it is estimated that excess costs of $481 million annually are attributable to adverse events, representing 2.8% of the province's total hospital expenditure. Trillium Health Centre, one of Canada's largest academically affiliated tertiary care hospitals, constantly strives to improve safety, quality of care and the overall patient experience through the translation of best evidence into practice. This article outlines Trillium's success in reducing its organization-wide 2009 pressure ulcer prevalence of 17.9% and incidence of 14.8% to 9.6% and 5.2%, respectively, in 2011. Improvements were based on the collaborative practice of an interprofessional team, a corporate partnership with 3M and commitment across Trillium's community. The strategic focus and use of in-house knowledge and expertise were key factors in this skin and wound care initiative. Distinct from many other initiatives, partnerships were built around strengthening the structures, processes and outcomes within Trillium. This methodology promotes knowledge translation and ensures the sustained application of learned tools and techniques throughout the organization.

Introduction

The costs of wound care to both patients and healthcare organizations continue to mount due to the complexity and acuity of hospitalized patients, the aging population and the escalating incidences of diabetes in young adults. The impact of chronic wounds – with respect to infection, mortality, quality of life, limb amputation, pain and healthcare costs – means that the assessment, protection and support of skin integrity should be priorities.

The development of a pressure ulcer is considered needless harm, as it is often avoidable if adequate detection and prevention measures are applied. Pressure ulcers cause pain and suffering, and can delay recovery and return to activities of daily living. They increase the likelihood of infection and lengthen hospital stays. An estimated 900,000 patients develop a pressure ulcer each year,[1] with 60,000 patients dying from complications of facility-acquired pressure ulcers.[1] In 2000 and 2001, pressure ulcers were cited as 1 of the top 3 in-hospital errors that led to patient deaths.[2] In 2010, Wardle calculated that hospitals yield a provincial estimate of $481 million in annual excess costs attributable to adverse events, representing 2.8% of Ontario's total hospital expenditure.[3] The excess cost associated with a pressure ulcer was estimated at $66,412 for each occurrence.[3]

The Ontario Case Costing Initiative database includes patient-specific cost data for all inpatient discharges and ambulatory surgeries from a sample of Ontario acute care hospitals. These data show that a patient with a Stage III pressure ulcer has an average length of hospital stay of 18.8 days, with an estimated total cost to treat of $19,213. The respective figures are 27.7 days and $29,208 for Stage IV pressure ulcers, and 73.1 days and $85,436 for Stage X pressure ulcers

What is a pressure ulcer?

A pressure ulcer is a localized injury to the skin and/or underlying tissue, usually over a bony prominence. It occurs as a result of pressure, or pressure in combination with shear, friction or moisture.

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with bone and necrotic tissue involvement. Patients with pressure ulcers had the highest unadjusted total 90-day costs ($117,578) and the highest 90-day readmission costs ($3,127).[3]

Trillium Health Centre is one of Canada's largest academically affiliated tertiary care hospitals, providing acute, rehabilitation and complex continuing care services. Created in 1998 and operating sites in Mississauga and West Toronto, Trillium has a primary catchment area of more than 1 million people. Trillium has more than 800 inpatient beds and served the healthcare needs of more than 700,000 people in 2009 alone. Trillium constantly strives to improve safety, quality of care and the overall patient experience through the application and translation of best evidence into practice.

Trillium succeeded in reducing its organization-wide 2009 pressure ulcer prevalence of 17.9% and incidence of 14.8% to 9.6% and 5.2%, respectively, in 2011. Improvements were based on the collaborative practice of an interprofessional team, a strategic commitment across Trillium's community and a corporate partnership with 3M. Since 2002, Trillium and 3M have partnered in projects to share knowledge and expertise in evaluating and improving targeted healthcare processes and services.

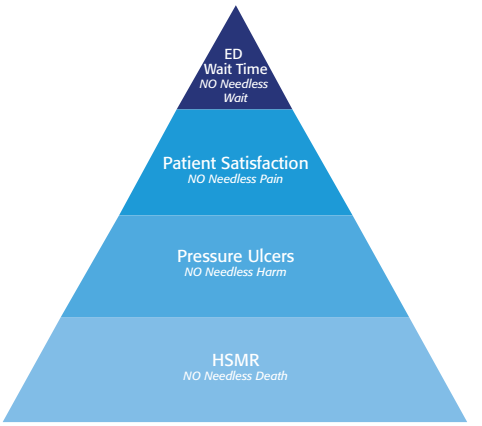
In 2007, Trillium made the decision to focus on skin and wound care in relation to pressure ulcers. A nurse clinician/enterostomal therapist (ostomy/skin and wound) was hired to develop a skin, wound and ostomy program. This incentive received further support when the incidence of hospital-acquired pressure ulcers was identified as a "big dot" measure. Specifically, suspected deep-tissue injury Stages II–IV and unstageable were targeted for improvement.

"Big dot" measures

The Ontario Excellent Care for All Act assigns responsibility for quality of care and improving the patient experience to hospital boards.[4,5] Using the Institute for Healthcare Improvement's "No Needless List,"[6–8] Trillium identified 4 comprehensive "big dot" quality indicators to focus improvement efforts from the board to the front line. Big dots are whole-system/institution-wide outcome-driven measures used to evaluate overall performance and the effectiveness of an organization's strategies. A big dot is a measure of the overall success of specific processes. For each big dot, a corollary "driver diagram" was developed, aimed at helping the board understand and measure the organization's quality-improvement plans, efforts and results. Trillium's 4 specialized driver diagrams are key elements in its knowledge translation and institutional-change efforts aimed at facilitating quality improvement.

FIGURE 1

Big dot indicators and corresponding measures



Trillium's Quality by Design Framework positions the 4 big dots – no needless death, harm, pain and wait – in ascending order of importance to patients (Figure 1). In the driver diagram's structure, measurable outcomes depict the projects that influence drivers, which in turn achieve the aim to move the big dot. This means that the driver diagram links individual and team performance to results, shows the areas that need more attention or resources and, in areas of sustained high-performance levels, sheds light on where to maintain efforts. The second big dot indicator, "no needless harm," focuses on measuring the incidence of hospital-acquired pressure ulcers (specifically, suspected deep-tissue injury Stages II–IV and unstageable). The driver diagram for this big dot received approval in March 2010.

"No needless harm" focuses on measuring the incidence of hospital-acquired pressure ulcers through risk assessment, minimization of moisture and incontinency, minimization of pressure, transparency of information, implementation of nutritional support, mobilization, best practice skin and wound care, health-provider knowledge in pressure ulcer prevention and management, and patient and family education. These drivers roll up into the 3 categories of detection, prevention and mitigation.

Methods

In 2009, a benchmark survey was conducted that revealed a hospital-acquired pressure ulcer incidence of 14.8% among acute care patients; the national pressure ulcer prevalence was 12.3%. That same year, Trillium's Skin and Wound Committee oversaw the

Prevalence of pressure ulcers

Prevalence is defined as a cross-sectional count of the number of cases at a specific point in time, or the number of persons with pressure ulcers who exist in a patient population at a particular moment in time.[13]

Incidence of pressure ulcers

Incidence is defined as the number of persons who develop a new pressure ulcer within a particular time period in a particular population.[13]

development and implementation of a proactive, hospital-wide pressure ulcer prevention and treatment program. The ultimate long-term goal of the Skin and Wound Care Program is to deliver consistent, sustainable, evidence-based wound care, thereby improving patient outcomes and reducing costs. To improve outcomes for patients with wounds, education for clinicians providing wound care is essential. The Advanced Wound Care Program had the key objective of developing a supplemental wound care education program. The overall goals were to maintain or improve patient wound care outcomes, achieve cost reductions and increase nursing-staff knowledge and satisfaction. The advanced wound care product standardization process, coupled with a comprehensive educational program, has allowed Trillium to achieve significant cost savings without sacrificing access to care.

The principal elements that were operationalized to realize these goals included: engagement and education of staff, patients and families; establishment of structures and processes to enable the skin and wound program; and development and implementation of a partnership model.

Quality boards displaying safety crosses

Coinciding with the introduction of driver diagrams, individual patient units implemented quality boards with safety crosses to display key quality metrics (e.g. hospital-acquired pressure ulcers, patient falls, *Clostridium difficile* infections, and surgical-site infections). Modelled on the UK's Releasing Time to Care program, the safety crosses employ a unique 4-quadrant design. The quality boards are displayed on each unit in high-traffic areas, usually by the nursing station, so they are immediately visible to staff, patients and families. Information is updated on a daily basis. For ease of interpretation, it is displayed on a graph and pictorially on colour-coded charts.

Engagement

The engagement elements included the following:

- Active engagement of physicians and allied health professionals in the prevention of as well as intervention with pressure ulcers.
- Consultation and involvement of Trillium's dietitians in wound healing, with the implementation of the Med Pass Program on key nursing units. Med Pass provides patients with nutrient-rich drinks to accompany their medications.
- The addition of a 0.5 full-time-equivalent nurse clinician/enterostomal therapist.
- Focused attention on high-risk areas, including the critical care, emergency and medical units.
- Identification and education of skin and wound "champions" within the medical health system.
- Daily unit-based nursing huddles that include discussion around patient care, skin care issues, ulcer prevention and any newly acquired pressure ulcers on the individual units.
- Quality boards that display safety crosses (see sidebar) capture and document unit-acquired pressure ulcers as well as unit-acquired nosocomial infections and falls.

Education

Monthly education sessions were initiated at level I (basic) and level II (advanced). Topics included risk assessment and prevention, instruction on mobility and toileting, pressure ulcer staging, wound documentation and intervention strategies (including appropriate product use).

E-learning modules were made available through 3M. These interactive modules are designed to augment existing educational sessions. The modules have been used not only by nursing staff, but also by members of the multidisciplinary team.

In addition:

- advanced skin and wound education sessions were held for advanced practice leaders;
- educational materials were developed outlining methods to maintain healthy skin while in a hospital environment, and made available to nursing staff, patients and family members; and
- documentation sessions were conducted using case studies.

Supporting structures and processes

A preventive heel ulcer program was implemented, and downloading heel boots were purchased for at-risk patients. The Prevalon heel-protector boot by Sage was introduced to the nursing units in January 2010, with

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the goal of eradicating hospital-acquired heel ulcers. If used correctly, the boot completely eliminates heel pressure. An algorithm was also designed to help nurses identify patients at risk for developing heel ulcers.

Several other tools and initiatives were also implemented:

- re-addressing "aids" (e.g. pillows, foam wedges, seating cushions, pressure-relieving mattresses) within the hospital, including in the emergency department;
- a hospital-wide preventive bed-maintenance program and mattress replacement (in progress);
- incontinence/immobility review;
- digital wound photography embedded within patient's medical record, enabling accurate and consistent documentation of wound-healing status;
- notification to the nurse clinician/enterostomal therapy nurses of "at-risk" patients, documentation of preventive skin care strategies and identification of patients with newly acquired pressure ulcers;
- annual product review, evaluation and usage reports of the advanced skin and wound care line; and
- annual organization-wide prevalence study and more frequent "mini-prevalence" studies in selected high-risk areas.

Partnership model with vendor

Many healthcare facilities struggle with making their available resources meet the growing healthcare needs of their communities. Trillium was faced with escalating costs for wound care products, approaching $500,000 annually. This was due in part to the availability of multiple lines of wound care products, coupled with a lack of wound care education. Clinicians were confused as to which wound care product to employ, often leading to overuse and misuse. Many studies and best practice guidelines have shown that a standardized approach to wound care can lead to cost savings for healthcare facilities.[4,9–12] Standardization should be evidence-based and take into account the objectives and desires of multiple stakeholders, including clinicians.

A partnership with 3M was established to facilitate activities such as product reviews, customized posters, educational "lunch and learn" sessions and e-learning modules. These interventions ensured a consistent and appropriate approach to skin and wound care, and standardized product use throughout the facility. Successes (both clinical and economic) of the standardization process included the collaborative partnership approach to product needs assessments, product analysis with purchasers and vendors, and the partnership with the chosen vendor supporting education.

A comprehensive and rigorous product review project was completed as part of the partnership model, aimed at streamlining and simplifying choices without eliminating product classifications. The use of wound care products was audited on each unit and significantly streamlined. Wound care products were then meticulously matched to specialty-area needs. This alone resulted in significant cost savings and reduced inventory.

Results

Engagement and education

Education for clinicians providing wound care is essential to improve patient outcomes. Education and care plans at Trillium are evidence-based and incorporate best practice standards. More than 20 nurses have been identified as skin and wound "champions" for the medical health system. They meet every month for 4 hours to address, identify and strategize issues and concerns on their individual units. Their primary roles as "change champions" are to help their colleagues in the transfer of knowledge to the bedside and ensure best practices are being followed as they relate to skin and wound care. To engage and educate healthcare professionals, biannual skin and wound newsletters are distributed; furthermore, "Skin and Wound Week" was celebrated in November 2011.

The results of best practice education include:

- skin and wound assessment with documentation in the emergency department;
- skin assessment and documentation upon admission and daily thereafter;
- risk assessment (Braden) and documentation within 24 hours of admission and every Sunday thereafter, or sooner if a patient's condition changes; and
- implementation and documentation of preventive skin care measures for patients who score 15 or less on the Braden scale.

Supporting structures and processes

In all non-critical care units, wound care documentation occurs online using a new wound documentation tool. Full documentation using the same tool is completed weekly. Roll-out of online documentation in critical care units is currently in progress.

A wound care plan designed for the Kardex has been developed by nursing staff and is available to the nursing units. Wound care planning is essential for wound care consistency.

A cost savings was recognized when the skin and wound care product line was first standardized. In the third usage report, an overuse of 3 products was identified and eliminated for additional significant cost savings. Annual usage reports are completed to determine the appropriate use of products and identify

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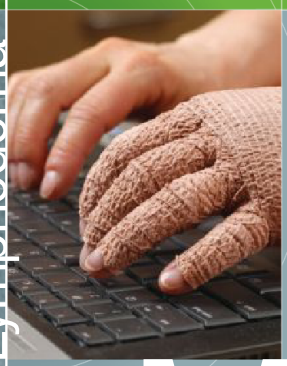

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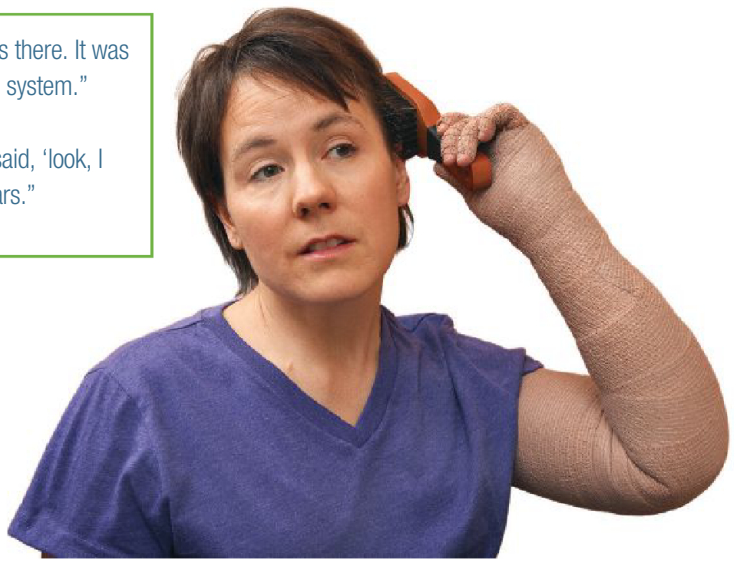

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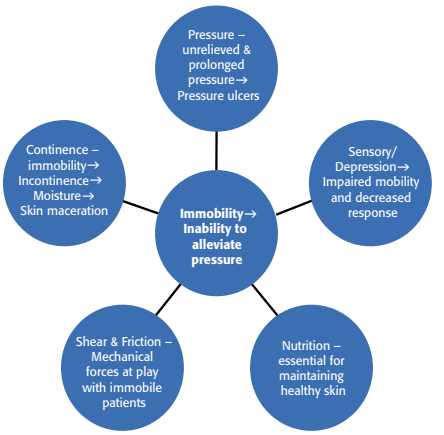
FIGURE 2

Immobility risks and issues



areas where overuse or misuse are occurring.

Implementation of the preventive heel ulcer program resulted in a dramatic reduction in heel ulcer prevalence, from 57 patients in 2009 (431 patients surveyed) to 15 patients in 2010 (424 patients surveyed) and 5 patients in 2011 (460 patients surveyed).

In 2010, corporate funding was released to review and update all the surfaces and frames in the critical care environment. A proposal is being submitted to address a hospital-wide bed maintenance program.

Mobility and continence remain 2 major concerns for the aging Trillium population. Of the 424 patients assessed during the 2010 prevalence survey, 114 patients were between the ages of 70 and 79 years, and 124 patients were between the ages of 80 and 90 years. Overall, 80 patients were incontinent of urine, 84 required the use of a bladder catheter and 92 were incontinent of stool. The prevalence survey identified a significant overuse of briefs, plastic underpads and multiple layering. A total of 205 patients were classified as non-self-ambulating. Immobility dramatically impacts on nutrition, cognition, continence, pressure, shear and friction, all of which can lead to pressure ulcer development. Immobility risks and issues have been identified and shared with the Trillium staff and community. The message is clear: Patients need to mobilize! (Figure 2)

Annual prevalence

Annual prevalence surveys allow progress to be determined. In 2009, Trillium's pressure ulcer prevalence (excluding Stage I) was 17.9%, well above the national average of 12.3%. However, as a direct result of the above interventions the prevalence rate (excluding Stage I) was reduced to 11.8% in 2010, while the incidence of facility-acquired pressure ulcers (excluding Stage I) decreased from 14.8% in 2009 to 7.6% in 2010. In 2011, prevalence (excluding Stage I) was reduced to 9.6% and the incidence of facility-acquired pressure ulcers (excluding Stage I) to 5.2%. Figure 3 charts the incidence of hospital-acquired pressure ulcers, showing a clear downward trend.

Summary and conclusions

A facility-acquired pressure ulcer is an adverse event that results in harm to the patient and added costs for the healthcare system. Every organization and healthcare provider must take responsibility for ensuring that pressure ulcer prevention is a priority. At Trillium, the introduction and use of driver diagrams has enabled the organization to focus its quality efforts and simultaneously unite the contributions of patients, staff, physicians, management and the board toward the common goal of improving the health of the community. Driver diagrams support both accountability and transparency, while being an effective means of fostering staff engagement in quality initiatives.

Trillium's nurse clinician/enterostomal therapist attributes a good part of the success of the Skin and Wound Program to the creation and deployment of the "no needless harm" driver diagram: "Our ultimate goal in terms of hospital-acquired pressures ulcers – our big dot – is 0%," she says. "The 'no needless harm' driver

FIGURE 3

Prevalence of hospital-acquired pressure ulcers

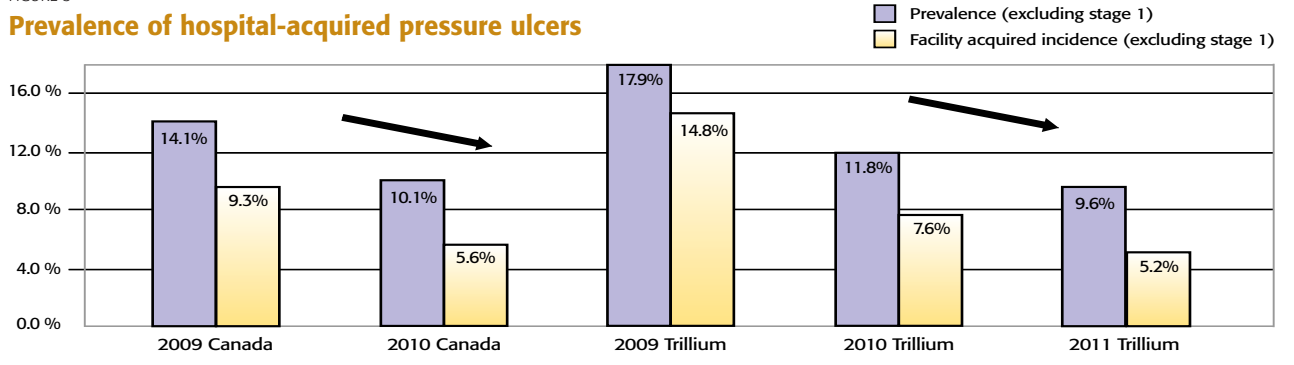


diagram means our goals are visible to staff, senior management and the board. We now know where we are and where we need to go."

The result of the most recent prevalence survey substantiates further progress to eliminating hospital-acquired pressure ulcers at Trillium. This survey, conducted in early 2011, revealed a 9.6% prevalence and 5.2% incidence (both excluding Stage 1). These results verify the successful spread and sustainability of the multiple efforts targeted at reducing hospital-acquired pressure ulcers. Trillium is committed to safe and effective high-quality care. While the successes to date are encouraging, the organization remains committed to achieving its ultimate goal of eliminating pressure ulcers by setting a hospital-acquired pressure ulcer target of rate of 4.5% for 2012.

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