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Measuring hospital-acquired pressure injuries: A surveillance programme for monitoring performance improvement and estimating annual prevalence

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ABSTRACT

Aims: To describe a surveillance approach for monitoring the effect of improvement initiatives on hospital-acquired pressure injuries and findings arising from that surveillance.
Methods: Random sampling of patients on the same day of each successive month from a campus of child and adult hospitals using a standard audit tool to identify presence of hospital-acquired pressure injury. Where multiple pressure injuries were present, the most severe grade injury contributed to prevalence. Statistical process control charts were used to monitor monthly performance and Maximum Likelihood Estimation to determine timing of step change.
Results: 8274 patients were assessed over 3 years from an eligible population of 32,259 hospitalised patients. 517 patients had hospital-acquired pressure injuries giving an overall prevalence of 6.2% (95% CI 5.7–6.8%). Annual prevalence was 8.4% (95% CI 7.4–9.5%) in the first year, falling to 5.6% (95% CI 4.7–6.4%) in the second year and 4.8% (95% CI 4.0–5.6%) in the third year. A step change was signalled with mean prevalence up to July 2013 being 7.9% (95% CI 7.1–8.8%) and mean prevalence thereafter 4.8% (95% CI 4.2–5.4%). Hospital-acquired pressure injuries were found in all age ranges, but were more frequent in children up to 14 years (17.4%) and those aged 75 years or older (38.7%).
Conclusion: Monthly random sampling of patients within clinical units can be used to monitor performance improvement. This approach represents a rational alternative to cross-sectional prevalence surveys especially if the focus is on performance improvement.

What is already known about the topic?

- Pressure injury prevalence is commonly measured using infrequent large cross-sectional hospital surveys.
- Process improvement requires frequent measurement to monitor for change.

What this paper adds

- Frequent measurement using suitably powered sample sizes can serve to monitor for process improvement and may estimate annual prevalence.
- While most common in older people, the age-related distribution of hospital-acquired pressure injury is

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J-shaped with increased frequency in children, falling to age 44 and raising thereafter.

1. Introduction

Pressure injuries result from unrelieved pressure orshearing forces over bony prominences, and are generally associated with immobility or inability to alter position (National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel, and Pan Pacific Pressure Alliance, 2014). They are also called pressure ulcers, bedsores and decubiti. Pressure injuries range in severity from non-blanching erythema to lesions exposing underlying structures (National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel, and Pan Pacific Pressure Alliance, 2014). Pressure injuries adversely affect hospitalised patients' quality of life, with decreased comfort, increased pain, restrictions on basic everyday activities, and lifestyle adaptations being necessary (Hopkins et al., 2006; Spilsbury et al., 2007). Acute hospital patients with any grade of pressure injury have significantly lower health-related quality of life scores (measured with Short Form 36) on physical and mental health domains than those without pressure injuries, even after adjustment for age, sex and co-morbidity (Essex et al., 2009).

Pressure injuries are either hospital-acquired or present on admission to a hospital provider; thus incident and prevalent pressure injuries are distinguished. Recent cost modelling suggested the societal cost of all grades of pressure injuries in New Zealand was $694 million per annum across all healthcare sectors (KPMG, 2015). This cost is similar to cross-sectoral modelling in other countries when population size and different economic perspectives are considered; for instance the direct care costs of pressure injuries for Australian hospitals and residential care facilities was estimated to be more than US$ 1.65 billion in 2012 terms (Graves and Zheng, 2014). Thus there is an economic imperative for large scale improvement efforts to reduce harm from pressure injuries.

Pressure injury surveillance is required for monitoring improvement activity, but poses particular problems. Pressure injury measurement often appears to be epidemiological in purpose e.g. annual prevalence surveys and thus relatively infrequent (Gunningberg et al., 2012), whereas more frequent monitoring is required for measuring improvement. Frequent monitoring can draw on incident reporting systems or electronic health records, but both rely on self-reporting that has been shown to be inaccurate (Gunningberg et al., 2008). Furthermore, estimates of pressure injury prevalence in hospitals will vary without standardised case definition (e.g. inclusion or not of less severe pressure injuries), study design, and whether the measurement focus is hospital-acquired pressure injuries or all pressure injuries (Baharestani et al., 2009).

Auckland District Health Board (ADHB) was one of four New Zealand public hospital providers that created and contributed to a large regional collaborative (www.firstdonoharm.org.nz) with pressure injuries a target for improvement. A whole-of-campus prevalence survey in December 2011 suggested pressure injury prevalence was 8.8%, although the survey was not limited to hospital-acquired pressure injuries. ADHB thereafter established a monthly surveillance programme in March 2012. The purpose of this surveillance was three-fold. First, we wanted to establish an accurate baseline while we were developing the improvement initiatives for implementation across the hospital campus. Second, we wanted to be able to monitor organisational performance for the effect of improvement initiatives. Third, we wanted to estimate the annual prevalence of hospital-acquired pressure injuries with a known accuracy and be able to describe the nature of these injuries. The purpose of this paper is to detail measurement solutions that were used to monitor for change in pressure injury prevalence and to describe the findings arising from that measurement.

2. Methods

2.1. Setting

Auckland District Health Board operates a campus of teaching hospitals that includes Auckland City Hospital, Starship Children's Hospital, and an acute mental health hospital. The campus provides secondary, tertiary and quaternary services to adults and children. The range of services for adults includes acute assessment and rehabilitation of older people, cardiothoracic, cardiology, vascular, general medical and surgery, renal, respiratory, otorhinolaryngeal, transplant, neurological, neurosurgery, trauma, psychogeriatric, women's, and maternity specialties. There is a similar range of specialty services for children.

2.2. Measurement approach

We randomly sampled patients from every qualifying clinical unit from March 2012 to February 2015 to participate in the audit. Our approach was pragmatic requiring the audit to be completed by a suitable staff member on the morning of the audit, supported by senior nursing staff such as the nurse educator. The skin assessment was to be incorporated into normal clinical care where possible. All inpatient clinical units participated in the audit, with the exception of acute mental health units (adult and child), emergency departments (adult and child), and delivery suites. At 0600 on the first Wednesday of each month, a list of randomly selected patients on each unit was generated from the midnight census by an SQL application. A summary list of the selected patients (three if the unit had fewer than 11 beds, seven if the unit had 11–30 beds and 14 if the unit had more than 30 beds) and individual audit forms, pre-populated with patient information, were automatically generated at a nominated printer for each clinical unit within the campus. The units were required to audit the first five consecutive patients on their summary list (10 if the unit had more than 30 beds) of seven patients (14 if the unit had more than 30 beds), and to use the first available alternate if a patient was not present or eligible (not present on the unit, declined audit, or was judged unsuitable for clinical reasons).