

Combining pressure injury and incontinence-associated dermatitis prevalence surveys: An effective protocol?

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ABSTRACT

Incontinence-associated dermatitis (IAD) is a largely preventable skin injury that can occur following chronic skin exposure to urine and faeces as a result of incontinence. Limited data is available about the prevalence of IAD in the Australian acute care setting. In 2011, the facility combined the annual pressure injury (PI) prevalence survey with a survey to determine the prevalence of IAD. This paper examines the PI and IAD prevalence results from surveys before and after the introduction of the combined survey protocol. The surveys were conducted in a major acute care Australian hospital between 2009 and 2013, with PI only surveys conducted between 2009 and 2010, and the combined PI and IAD surveys undertaken from 2011 to 2013. Overall, PI point prevalence decreased from 12.8% ($n = 500$) in 2009 to 6.3% ($n = 444$) in 2013. IAD prevalence was first reported in the 2011 survey. IAD prevalence decreased from 10% ($n = 376$) in 2011, to 2.7% ($n = 444$) in 2013. Combining the PI and IAD survey protocols provided valuable and previously unknown IAD data. In addition, combining the surveys was accomplished without increased financial or staff resources, nor increased survey participation burden for patients. Key aspects of the combined protocol have subsequently been adopted by the facility as standard procedures for ongoing PI prevalence surveys.

Keywords: Incontinence-associated dermatitis, incontinence, pressure injury, prevalence

INTRODUCTION

Pressure injuries (PIs) are localised injuries to the skin and/or underlying tissue, usually over a bony prominence resulting from sustained pressure (including pressure with shear). Largely preventable, PIs, if sustained while in hospital care, are considered to be nosocomial skin injuries¹. Prevalence surveys are a common and well-established method for determining the number of existing PIs in the acute care setting². Prevalence data provides a snapshot of the burden of a condition at the time of the survey, and can provide data to assist in evaluating clinical and preventative practices, benchmarking, and resource allocation²⁻⁵. Incontinence-associated dermatitis (IAD) is skin injury that can occur following chronic skin exposure to urine and faeces as a direct result of incontinence⁶⁻⁸. Therefore, the primary risk

factor for IAD is incontinence⁹. Moreover, IAD can predispose patients to serious complications such as superficial PI and/or superimposed infections^{6,9,11-13}. Like PIs, IAD is largely preventable. IAD and PIs commonly co-exist, are often co-located, and are frequently misclassified by clinicians^{9,14}. If misclassification occurs within the context of a PI prevalence survey, it is possible that IAD may be classified as a stage I or II PI, thereby erroneously increasing PI prevalence^{2,9}. Patients at risk of skin injury due to pressure and shear are also likely to be vulnerable to injury from moisture, friction, and irritants found in urine and/or faeces^{12,14-16}. Unlike the extensive understanding of PI prevalence in the acute care setting, there is a gap in the understanding of IAD prevalence in this setting. Furthermore, established protocols or agreement on the ideal methods to conduct prevalence surveys are lacking^{9,15}. Given the potentially serious complications of IAD, understanding the scope of this condition in the acute care setting is imperative for maintaining skin integrity and the broader mandate of patient safety¹⁷.

In Australia, the prevalence of PIs in the acute care setting has decreased steadily over the last decade from 26% in 2003 to 2.5% in 2012¹⁸⁻²¹. Internationally, PI prevalence has also declined over the last decade. Prevalence in the United States ranged from 13% in 2003 to 11% in 2009²². An appreciation of incontinence is required to understand IAD²³, with the prevalence of incontinence providing a guide as to the proportion of patients at risk of IAD²⁴. The prevalence of IAD in the acute care setting is reported to range between 20% and 42%^{13,23,25}. A 2014 Australian study²³ found the prevalence of incontinence to be 24%, with 42% of those incontinent patients having IAD, reflecting the significant extent of the condition in this setting.

Awareness of the importance of IAD as a significant skin injury has been growing over the last decade^{8,15}. One of

the challenges that persists in regard to IAD is the difficulty clinicians face in accurately differentiating between IAD and PI^{5,14,26,27}. Several factors may contribute to this difficulty. Firstly, while there is an agreed categorisation system for PIs¹, at the time of the study, there was no internationally agreed categorisation system for IAD. PIs are classified or staged according to a classification system that includes stage I-IV injuries, as well as unstageable and suspected deep tissue injury categories¹. While several IAD severity categorisation systems have been proposed^{9,28-30}, use of these categorisation systems in clinical practice is limited. This may, in part, be due to the lack of evidence regarding improvements to clinical decision making and care when these systems are used⁹. Secondly, accurate classification is complicated by similarities in clinical presentation and location of PIs and IAD (Table 1), with particular challenges found in differentiating IAD from category/stage I and II PI⁹.

In 2011, as a result of a growing appreciation of the significance of IAD as nosocomial skin injury, the role of IAD and incontinence as risk factors for PI, and the imperative for accurate and reliable PI data, the facility conducted a combined PI and IAD prevalence survey. This combined prevalence survey was a facility-wide quality improvement activity, and also formed a component of the first author's higher research degree, (results of the research have been published elsewhere)²³. Combining PI and IAD prevalence surveys into a single protocol is not routine practice in most facilities. The potential benefits of combining PI and IAD surveys may include: improved PI data accuracy as a result of improved surveyor education; access to new and valuable IAD and incontinence data, allowing for a more comprehensive understanding of skin integrity risks and injuries within the facility; and, importantly, value adding to costly PI surveys by means of simultaneously capturing IAD and PI data at minimal or no extra cost to the facility, or

Table 1: PI and IAD differentiation. Reproduced with permission from Beeckman *et al.*, 2015

Parameter	IAD	Pressure injury
History	Urinary and/or faecal incontinence	Exposure to pressure/shear
Symptoms	Pain, itching, burning, tingling	Pain
Location	Affects perineum, perigenital area; buttocks; gluteal fold; medial and posterior aspects of upper thighs; lower back; may extend over bony prominence	Usually over bony prominence or associated with location of a medical device
Shape/edges	Affected area is diffuse with poorly-defined edges/may be blotchy	Distinct edges or margins
Presentation/depth	Intact skin with erythema (blanchable or non-blanchable), with/without superficial, partial thickness skin loss	Presentation varies from intact skin with non-blanchable erythema to full-thickness skin loss. Base of wound may contain non-viable tissue
Other	Secondary superficial skin infection (e.g. Candidiasis) may be present	Secondary soft tissue infection may be present

burden to all stakeholders, including ward routine and clients being surveyed.

Poor understanding of the prevalence of both PIs and IAD, as well as lesion misclassification can have implications for patient outcomes, delivery of quality care, resource allocation, PI prevalence data accuracy and skin integrity benchmarking^{1,2,9,15}. An opportunity exists to improve the understanding of these skin injuries in the acute care setting, by way of combining PI and IAD prevalence surveys and simultaneously obtaining valuable PI and IAD prevalence data.

OBJECTIVE

The objectives of this paper were to review PI prevalence before (2009–2010) and after (2011–2013) the commencement of the protocol combining PI and IAD surveys, and to review IAD prevalence data after the commencement of the protocol combining PI and IAD surveys (2011–2013).

METHODS

Design

PI prevalence results from surveys conducted between 2009 and 2013 were examined. IAD prevalence results from surveys conducted between 2011 and 2013 were examined.

Setting and sample

This study was conducted at a 929-bed major acute care teaching hospital in Australia. Hospitalised adults aged 18 years or older admitted to the facility on the days of the surveys were eligible for inclusion. Patients were surveyed from Internal Medicine, Surgery, Critical Care, Cancer Care, and Women's and Newborns admitting services (only non-obstetric patients were included from Women's and Newborns admitting service). Patients from the Mental Health admitting service were excluded from the surveys as per the standard facility PI prevalence survey protocol.

PI and IAD prevalence formulae

PI prevalence was calculated as the total number of participants with one or more PIs detected on skin inspection on the survey day, divided by the total number of participants. In 2011, the prevalence of IAD amongst incontinent patients was calculated as the total number of IAD cases in the sample divided by the total number of incontinent participants as per the protocol for the research conducted in 2011 by the first author²³. In 2012 and 2013, incontinence prevalence was not calculated, as the prevalence of incontinence was not recorded in these surveys. Therefore, for these years, the prevalence of IAD was calculated by the total number of IAD cases in the sample, divided by the total number of participants in the sample.

MEASURES

PI classification

All PIs were staged according to the PI staging guidelines accepted for use in Australia at the time of each survey^{31,32}.

IAD classification

IAD was classified in 2011 according to the Skin Assessment Tool³⁰. This tool was designed to provide a cumulative IAD severity score and was used for the research component of the project. In the 2012 and 2013 surveys no IAD severity instrument was used; IAD was reported as present or absent. The presence of superimposed fungal infection was not recorded in the 2012–2013 surveys.

PROCEDURES

PI prevalence survey methodology used by Queensland Health for the surveys 2009–2013, was based on methodology developed by Prentice, Stacey and Lewin in 2003³³. IAD prevalence survey methodology followed best practice guidelines available at the time^{13,26,33–35}.

Prior to data collection surveyors (registered nurses, occupational therapists, physiotherapists and medical practitioners seconded from the facility) were trained in the use of the survey instruments, skin inspection procedures, and assessment and classification of PIs. In the 2011–2013 surveys, surveyor education was expanded to include accurate differentiation between IAD, clinical presentation of fungal infections, as well as identification and staging of PIs. Inter-rater reliability was established at the conclusion of all education sessions by scores on written multiple-choice tests, and tests using clinical photographs. The surveys conducted between 2009 and 2010 included photographs of a variety of PIs. The surveys conducted between 2011 and 2013 included clinical photographs of IAD, fungal infections and a variety of PIs. The tests required participants to accurately identify and stage PIs (for the tests conducted for the 2009–2010 surveys), and differentiate between IAD, clinical evidence of fungal infection and PI, as well as accurately stage PIs (for surveys conducted in 2011–2013). In all years, surveyors were required to achieve a score of 85% to participate in the survey. The use of photographs to test inter-rater reliability has been used previously^{5,36,37}.

The surveys were conducted over two days. Teams of two surveyors conducted skin inspections on all eligible, consenting patients. Any loss of skin integrity in the pelvic region was classified as either PI or IAD. PI risk assessment, skin integrity documentation, the use of pressure redistributing equipment and demographic data were collected for all participants. In 2011 (as a component of the first author's research), data were collected on continence status, stool frequency and quality, and IAD severity. When patients were off the ward at the time of data collection, the surveyors returned later to collect data for those patients where possible. To ensure accuracy, expert skin integrity nurses conducted independent skin inspections on the same day, on all patients reported by the surveyors to have a PI, IAD or clinical evidence of a fungal infection.

RESULTS

Between 2009 and 2013, 2126 patients participated in the facility-wide PI prevalence surveys (Table 2). Overall,

Table 2: Pressure injury survey data summary, 2009–2013

	September 2009	June 2010	November 2011	November 2012	October 2013
Total number of patients in the sample	500	450	459	273	444
Total number of patients with one or more PI (n, %)	64 (12.8)	68 (15.1)	43 (9.4)	23 (8.4)	28 (6.3)
Number of patients with one or more hospital-acquired PI (n, %)	50 (10)	57 (12.7)	30 (6.5)	15 (5.5)	18 (4.0)
Number of patients with one or more community-acquired PIs (n, %)	15 (3.0)	12 (2.6)	15 (3.3)	8 (2.9)	10 (2.2)

PI point prevalence decreased from 12.8% in September 2009 to 6.3% in October 2013 (Figure 1). Hospital-acquired PI point prevalence decreased from 12.7% in June 2010 to 4.0% in October 2013, with the community-acquired PI point prevalence ranging from 3% to 2.2% over the period (Table 2 and Figure 1). No IAD or incontinence data were recorded in 2009 and 2010. The research component of the project was conducted in 2011, with fewer patients consenting to participate in the research than participated in the PI prevalence survey. This explains the difference in the denominator between the IAD data and the PI data for 2011 (Table 2). In 2011, the prevalence of incontinence was 24% ($n = 376$) and the prevalence of IAD for the entire sample was 10% ($n = 376$), with the prevalence of IAD for incontinent patients being 42% ($n = 91$)²³. The prevalence of IAD in 2012 was 3.6% ($n = 273$) and in 2013, 2.7% ($n = 444$).

DISCUSSION

The requirement for accurate, valid and reliable skin integrity prevalence data within the acute care setting is essential for understanding the scope of a problem³⁸, for evaluation of skin injury prevention protocols, and increasingly prevalence data is being used as an indicator of quality care². The survey data demonstrate a sustained decrease in PI prevalence from the 2010 survey through to 2013 inclusive of the 2011 survey, where the PI and IAD prevalence surveys were combined into a single procedure. The facility PI prevalence is consistent with national and international downward trends, including hospital-acquired PI prevalence^{19-22,39-41}. Survey data also demonstrated a sustained decrease in IAD prevalence. The downward PI prevalence trend from 2011 may be explained in part by improved differentiation of PI and IAD as a result of more comprehensive surveyor education, which may ultimately improve prevalence data accuracy and result in lower PI prevalence. However, the effect of the combined survey protocols on PI prevalence cannot be quantified. Other factors that may have contributed to the downward PI prevalence trend during that period include: PI education programs for clinicians; ongoing utilisation of pressure injury prevention champions in clinical areas; and the introduction of a system whereby financial penalty was applied to Queensland hospitals by the Queensland Department of

Health if a patient developed a preventable stage III or IV hospital-acquired PI⁴². Improved surveyor education, effective collection of data without the need to increase personnel, material or financial resources and, importantly, no increased survey participation burden experienced by patients demonstrated the utility of combining the surveys.

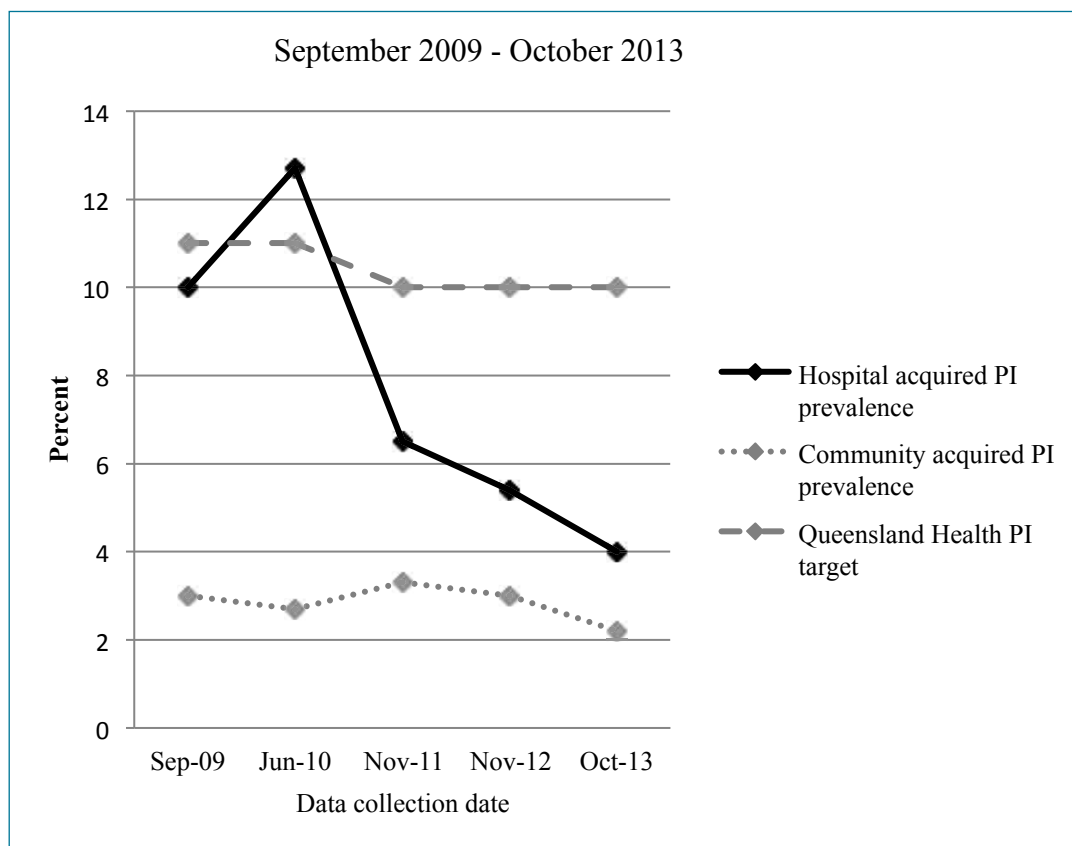
Overall, the unique surveys provided important data on both PI and IAD prevalence. Subsequently, key aspects of the combined protocol, that is, enhanced surveyor education and recording the presence of IAD as a component of data collection was adopted as standard practice for ongoing PI prevalence surveys within the facility.

PI AND IAD PREVALENCE

The sustained decrease in the facility's PI prevalence demonstrated in the surveys is consistent with downward national and international PI prevalence trends. Wound prevalence surveys conducted in Western Australian public hospitals between 2007 and 2011²¹ found PI prevalence ranged between 12% and 9%, with hospital-acquired PI prevalence ranging between 7% and 9%. In Victoria, Australia, statewide PI prevalence surveys conducted in 2003, 2004 and 2006 found the prevalence of PIs ranged between 26% and 18% respectively, with approximately two-thirds of PIs sustained in hospital in all three surveys¹⁹. Surveys conducted at a metropolitan hospital in Queensland²⁰ reported hospital-acquired PI prevalence rates ranging from 8% in 2009, 4% in 2012, with overall PI prevalence ranging from 12% in 2009 to 6% in 2012.

Internationally, a large American study, conducted over eight years³⁹, reported PI prevalence data from 78 acute care hospitals (nearly 260,000 patients). This study found the hospital-acquired PI rate decreased from 10% in 2003 to 2% in 2010. Another study²² in the United States found PI prevalence in acute care hospitals in 2008–2009 to be 13% and 12% respectively, with the hospital-acquired prevalence being 6% and 5% respectively. A Belgian study⁴¹ found PI prevalence of 12% in 143 hospitals. Consistent with the national and international downward PI prevalence trends, the facility data demonstrates continuing reductions in PI and hospital-acquired PI prevalence.

Figure 1: Pressure injury prevalence 2009–2013



It can be speculated that a portion of the PI prevalence reduction between 2011 and 2013 may be attributed to improved surveyor accuracy regarding differentiation of PIs and IAD as a result of the more comprehensive surveyor education provided prior to participation in these surveys. Traditionally, PI surveys focused on establishing inter-rater reliability with regard to accurate identification and staging of PIs only. While difficulty with differentiating between PI and IAD is recognised^{5,36,37}, the impact of misclassified lesions on PI prevalence data has not been reported in the literature, nor quantified in the facility.

The majority of published IAD data comes from the aged care or critical care environment. The IAD prevalence in critical care is reported to be 36%²⁵, with the prevalence of IAD ranging between 6% and 22% in aged care^{43,44}. The 2011 IAD survey (detailed results published elsewhere²³), found that 24% of participants were incontinent and of those who were incontinent, 42% had IAD²³. A 2007 study conducted in the acute care setting in the United States reported the prevalence of incontinence to be 19%, with IAD present in 20% of those who were incontinent. IAD trend data is not available nationally or internationally to enable comparison with the facility IAD data. The facility downward IAD prevalence trend between 2011 and 2013 may be due to the comprehensive surveyor education requiring accuracy in differentiation between PI, IAD and fungal infections as well as facility-wide ongoing education for clinicians regarding IAD. Similar to PI prevalence

data, prospective IAD data is necessary for benchmarking and tracking quality care over time.

DRIVERS FOR COMBINING SURVEYS

The impetus for combining the PI and IAD prevalence surveys into a single procedure in 2011 was based on the facility's need to understand the prevalence of incontinence and IAD in its population. Parallels between PI and IAD survey procedures such as common patient populations, the requirement for comparable surveyor education, establishment of inter-rater reliability and the requirement for participants to undergo a pelvic skin inspection^{1,13,23,45}, meant that combining the survey protocols was straightforward. In addition, the logistical requirements for an IAD prevalence survey are almost identical to the requirements for the routine PI survey conducted each year in the facility.

It is accepted that direct skin inspection is the gold standard for obtaining PI prevalence data, with the caveat that surveyors have adequate skill in classifying PIs and differentiating them from other lesions such as IAD^{2,46,47}. The rationale for the recommendation of skin inspection as the primary data source is based on the understanding that documentation in regard to PI is often inadequate². It would therefore be consistent that data obtained from direct skin inspection would also be the gold standard practice for IAD prevalence survey methodology. In light of the fact that a thorough pelvic skin inspection is required for both PI

and IAD prevalence data collection, combining the survey protocols does not result in any further survey participation burden for the patient.

PIs and IAD have different aetiologies and as such require different prevention and management strategies. Subsequently, misclassification can have a significant impact on patient outcomes, data accuracy, benchmarking, and resource allocation^{9,14,26,27}. In 2007, the NPUAP⁴⁸ issued a statement with the description of stage II PI, stating that this category should not be used to describe “skin tears, tape burns, perineal dermatitis, maceration or excoriation” (p. 40). This raised awareness of the fact that until that time most superficial pelvic lesions were classified as a stage II PI¹⁶. At the time the surveys were conducted, if a patient developed a stage III or IV PI, a funding penalty was applied to hospitals by the Queensland Department of Health. This meant that a stage III hospital-acquired PI incurs a funding penalty of \$30,000, and a stage IV hospital-acquired PI incurs a penalty of \$50,000⁴². Accordingly, a misclassified pelvic lesion (for example IAD erroneously classified as a stage III PI) has the potential to attract a penalty of \$30,000 for the health care provider. Accurate differentiation of PIs and IAD is, therefore, of utmost importance for patients and health care providers alike.

The utility of combining the PI and IAD surveys was persuasive. The combined survey used the same number of surveyors and support staff, meaning no increase in personnel or financial resources was necessary. In addition, the data collection was completed in the same time as the previous annual PI surveys, that is, over two days. Therefore, combining the PI and IAD protocols maximised value from the costly and resource-intensive annual PI prevalence survey. While a cost-effectiveness analysis was not undertaken in the 2011–2013 surveys, any minor cost increase as a result of extra time taken recording IAD data was offset by the benefits of access to the additional data. A further positive outcome is that, anecdotally, IAD awareness is improved for staff that participate as surveyors, and subsequently champion IAD awareness in their respective clinical areas. As a result of the combined protocol, valuable data regarding the burden of IAD and incontinence became available to the facility, enabling comprehensive understanding of the burden of these conditions.

Prevalence studies are difficult and costly to perform, and require a significant number of adequately trained personnel. In view of the high cost of conducting these studies, and the financial and clinical imperative that resultant data are accurate, it is logical to combine the PI and IAD surveys into a single protocol. Further, documenting and reporting of these valuable metrics is crucial given the appreciation of the association between incontinence and IAD as risk factors for PI development. Utilising protocols that aid in the understanding of the burden of incontinence and IAD in patients vulnerable to PI is surely the next logical step in quality improvement.

LIMITATIONS

As discussed, no international agreement exists as to an IAD prevalence survey methodology, or methodology combining PI and IAD surveys, which leads to study limitations. An IAD severity instrument was not utilised for the 2012 and 2013 surveys, rather, the presence or absence of IAD was reported. PI data were reported in all surveys by stage and location as individual totals. Therefore, it was not possible to report the prevalence of stage I or II pelvic PIs, or to investigate the prevalence of these PIs when IAD was included in data collection. An appreciation of incontinence is essential for understanding the epidemiology of IAD. The 2012 and 2013 surveys did not collect incontinence data; therefore IAD is reported as a percentage of the entire sample rather than a percentage of incontinent participants. Opportunities exist to improve collection and reporting of survey data, as well as reaching agreement in regard to survey protocols, particularly formulae for calculating the prevalence of IAD²³.

CONCLUSION

This paper has proposed a unique protocol for conducting combined PI and IAD prevalence surveys. The data from the combined surveys reveals downward trends in both PI and IAD prevalence. In addition, the combined protocol has been shown to be effective, practicable and achievable, without incurring additional costs to the facility, or placing additional burdens on patients to participate. The resultant IAD data is the first of its kind in Australia, and provides previously unknown IAD trend data for the acute care setting.

PIs and IAD are both largely preventable skin injuries. During the last decade, there is a wider appreciation of the potentially serious complications of IAD, particularly IAD as a risk factor for superficial PI¹². Therefore, from a patient safety perspective, understanding the prevalence of IAD and incontinence constitutes a vital component of maintaining skin integrity¹⁷. Prevalence studies are difficult and costly to perform and require a significant number of adequately trained personnel. In view of the financial burden to the facility in conducting these studies, and the financial as well as clinical imperative that resultant data are accurate, combining PI and IAD surveys into a single protocol has multiple benefits. While this research could not quantify the extent of the influence of the combined protocol on PI prevalence data, a sustained downward trend in PI prevalence was demonstrated. It is feasible, therefore, to attribute a portion of the reduction in PI prevalence to improved accuracy in the classification of pelvic lesions. Recommendations for future surveys include determining agreement as to the definition of incontinence for IAD surveys, agreement as to the minimum data set required for a combined PI and IAD survey protocol, formulae for calculating and reporting IAD prevalence and, finally, agreement as to an IAD severity classification instrument. Further research is required to evaluate PI and IAD prevention programs within the facility. In the future, PI prevalence surveys may evolve into broader, comprehensive skin integrity prevalence surveys, providing a

rich source of data that will ultimately inform and guide skin integrity care and outcomes in acute care patients.

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