A Quality Improvement (QI) project: Introducing a prophylactic foam dressing to prevent Medical Device Related Pressure Ulcers (MDRPU) in paediatric care settings.

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Introduction

Pressure ulcers (PU) are defined as "localised damage to the skin and/or underlying soft tissue usually over a bony prominence or related to medical or other devices, caused by sustained pressure. The injury can present as intact skin or an open ulcer and may be painful" (NHSI 2019).

The incidence and prevalence of PU has been found to be significantly higher in children than the adult population (Zhang et al., 2022). Any child can get a PU, but some children are more likely to develop them than others. For example, but not limited to, children who:

- have reduced mobility
- have circulatory or respiratory conditions that affect their blood flow
- have increased moisture due to incontinence or sweat resulting in 'nappy rash'
- are seriously ill or undergoing surgery (Public Health Agency 2020)
- use medical equipment/devices that limit their mobility.

More than 50% of pressure ulcer developed in neonates are associated with medical device use (Ness et al., 2013).

Reducing harm from PU is high on the Trust's agenda and the responsibility for reducing this type of injury sits with every healthcare worker. As part of their ongoing efforts to improve patient care and outcomes, the Tissue Viability Team initiated a Quality Improvement (QI) project to lower the number of MDRPU in the trust. QI can be defined as "a systematic approach that uses specific techniques to improve the quality of care" (The Health Foundation, 2013).

To prevent PU formation, particularly those associated with medical devices, it is crucial to address local pressure, shear, and skin microclimate. (Kottner, Jan et al., 2018). Recently, modern foam-based wound dressings have been used to protect vulnerable but intact skin to reduce the potential risk of skin breakdown (Gefen, 2022). The main requirements for a prevention dressing include:

- **Adequate skin protection** - reducing pressure/shear forces exerted on vulnerable areas of skin
- **Gentle, but strong adhesion** - and to be repositionable to allow for the skin to be routinely inspected
- **Effective fluid handling** - to manage the moisture and microclimate of the skin.

Method

A Plan, Do, Study, Act (PDSA) cycle method was chosen, it enabled the Tissue Viability Team to accurately identify the current issue/s and specific area of improvement needed *'Identified increased incidence of Medical Device Related Pressure Ulcers (MDRPU) in 2 care settings areas PICU and Orthopaedics, resulting in longer hospital stays for wound care and follow up treatment, and increased pressures for the Tissue Viability Team and community nursing team to provide continuous wound care after discharge from hospital'.* Plan a SMART aim, engage with key stakeholders, test out changes on a small scale and study the data collected from the measurable outcomes agreed before starting out full implementation.

Aims of the Quality Improvement Project

- Reduction in overall hospital acquired MDRPU
- Daily risk assessment & aSSKINg skin bundle completion
- Early Identification of pressure ulcer
- Reliable clinical governance reporting
- Reduction in incidence of Deep Tissue Injury and therefore evolution into category 2,3 & 4
- Improved utilisation of pressure relieving products, such as prophylactic dressings.

As part of the 'Do' element of the PDSA Cycle several actions were developed:

- Changes made on clinical reporting system to support accurate data collection
- All Incident reports were reviewed/updated on daily basis.
- Daily TVN ward rounds were carried out on PICU and other high-risk departments
- Initiate the use of a polyurethane foam dressing incorporating Hydrofiber® Technology, which were applied to the skin directly under medical devices
- Meet with the Orthopaedic Consultants to highlight current concerns, discuss PU incidence date and propose the use of prophylactic dressings on high pressure areas under plaster casts and special boots & bars (i.e., Ponseti Boots and Bars)
- Orthotics team and Physio teams informed and educated on the project aims and importance of prophylactic dressing for the prevention of MDRPU
- Risk assessment and aSSKINg skin bundle become mandatory on daily basis
- Medical photography team informed supporting regular photos for monitoring purpose.

Results

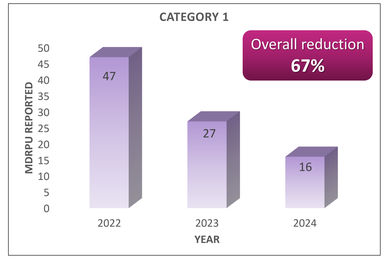
For the 'Study' element of the PDSA cycle, data was collected and analysed on all reported MDRPU in the pilot areas, as discussed in the methodology as part of the 'Do' element of the PDSA cycle. Analysis included validation of the accuracy of the reported tissue damage and root- cause analysis to determine the incidence of preventable harms *and* non-preventable harms. For transparency all reported and confirmed pressure ulcers were included in the data. Incidence data from Jan 2022 - Sept 2024 was analysed. Data was collected and re-measured the same way consecutively to be able to make a fair comparison year to year. Doing this provided the team robust data to be able to judge whether the change implemented had a positive impact on reducing the number of MDRPU.

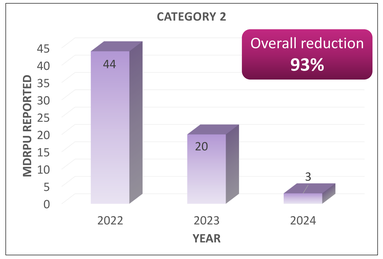
From January to December 2022, a year prior to the QI project commencing there was a total of 92 MDRPU reported in the pilot sites. Over the next 19 months, following the use of prophylactic foam dressings with Hydrofiber® Technology, there was a noticeable reduction reported, which represented an **80% decrease**. The annual prevalence of MDRPU from January 2022 to September 2024 for the pilot sites are summarised in Table 1:

	Category 1	Category 2	Category 3	Category 4	Unstageable	DTI	TOTAL
2022	47	44	1	0	0	0	**92**
2023	27	20	0	0	0	12	**59**
2024	16	3	0	0	0	0	**19**

Results continued

The most significant decrease in MDRPU was observed for the development of Category 1 & 2 (superficial) skin damage, representing a reduction of 67% and 93%, respectively.





Discussion

Evidence for the use of modern wound dressings for preventing pressure ulceration is growing. As is the agreement on the key design features of a dressing to be effective in this area, such as:

- reduction of shear forces,
- management of the skin microclimate, and
- to be repositionable to allow for regular skin inspection.

The relief of localised, sustained tissue pressure, and microclimate management are the most significant attributes for materials used for PU prevention, such as in prophylactic dressings or padding. The potential role of dressings in reducing direct forces and 'cushioning' is debated, as dressings alone have a limited role in reducing the level of static pressure when compared to the effects of patient re-positioning or devices, such as pressure-relieving mattresses or off-loading devices. The National Pressure Ulcer Advisory Panel (NPUAP) advises the consideration of applying a prophylactic dressing to bony prominences in areas of the body that are subjected to friction and shear.

Conclusion

QI methodology allows for a structured, systematic approach to identify the actual key issues and initiate a justifiable change. Following a PDSA cycle and utilising a multidisciplinary approach, the introduction of a prophylactic foam dressing with Hydrofiber® Technology had the desired clinical outcomes, ultimately reducing the incidence of Medical Device Related Pressure Ulcers developing in a paediatric care setting where the Tissue Viability Team had identified as problematic. Presentation of findings and replication of the test of change will help with the sustainability of the improvements and support further quality improvements.

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