

National Green Theatres Programme

Prògram Nàiseanta Lannsaireachd Uaine

**Replacing single-use analgesia
pumps: Delivering 91% waste
reduction and 53% cost savings in
NHS Highland**

About

The purpose of this case study is to raise awareness of replacing single use analgesia pumps. Whilst there is no formal requirement to report on this action through the National Green Theatres Programme, Health Boards are encouraged to consider whether they could adopt a similar change to their own service.

Background

An anaesthetic infusion pump delivers precise, continuous amounts of anaesthesia or pain-relieving medication directly into the epidural space, surgical site or perineural space. In NHS Highland, the Bodyguard 545 infusion pump had been the established device for delivering epidural analgesia in obstetrics during labour, as well as in theatres and critical care following major surgery or trauma.

However, the device is no longer supported though the National Procurement frameworks, creating a clear need to identify a suitable replacement to maintain the safe and effective analgesia delivery. This also provides an opportunity to review wider reliance on single-use devices.

Alongside this, NHS Highland used a single-use pump, CareVis VariO, for other forms of continuous regional analgesia. While effective in certain settings, it was not suitable for epidural analgesia due to limited flexibility in dosing regimens. As a single use device, it was also costly and generated large volumes of plastic waste.

Rather than just focusing solely on replacing the Bodyguard 545, NHS Highland undertook a whole system review of its analgesia infusion devices. Through this process, a new solution was identified: BD Pain Manager*. This multi-use device can support epidural analgesia with tailored dosing regimens and offers flexibility for future changes in practice. It can deliver continuous infusion rates with additional bolus options for ward-based analgesia.

Importantly, analysis indicated that adopting this device could reduce single-use plastic by 91%, delivering both environmental and financial benefits.

*Disclaimer – that there are other brands or equivalent devices, which would also be suitable.

Proposed change

The NHS Highland team, led by Dr Jayne Halcrow, presented an SBAR (Appendix 1) to its Acute Senior Leadership Team (ASLT), outlining the proposal to introduce BD Pain Manager as a replacement for both the Bodyguard 545 and CareVis VariO. The proposal included a phased implementation over 2 financial years.

Challenges

Several challenges were identified during implementation. The pumps were initially perceived as being less portable than the single use device. To address this and support patient mobility while reducing the risk of damage, the battery-operated BD Pain Manager were mounted on drip stands, allowing patients to move while remaining connected to the device.

For epidural use, the pumps can be used with an opioid in the epidural solution, requiring the introduction of lockboxes to ensure safe and secure use.

The device offers auto-bolus and patient controlled regional bolus options within a single system, which requires additional staff training to ensure safe and effective use.

There were also concerns about high-pressure alarms, which had the potential to disrupt patient sleep and contribute to noise levels in busy wards. However, these alarms were recognised as an important safety feature.

Outcome/results

Overall, the transition to BD Pain Manager has been positive, with the device reported to be intuitive across all staff groups. Training focused on developing understanding of dosing protocols to support safe programming of the pumps, alongside updates to relevant guidance and prescription charts to reflect the new delivery modes. This was complemented by hands-on training for clinical staff.

NHS Highland ensured that the manufacturer's quick reference guide was accessible via hospital IT systems, and the prescription chart to include guidance on recognising and managing signs of toxicity, as well as how to access support.

Over the expected 10-year lifespan of the pump, and including associated consumables, NHS Highland estimates a 53% reduction in costs, with a return on investment achieved in 4.7 years. This is alongside a 91% reduction in single use plastics.

Learning

Key learning points from implementation include a strong focus on education and engagement across clinical teams. The Specialist Pain Nursing team delivered training to ward nurses ahead of introducing the device for nerve block use.

The lead consultant also presented to the Anaesthetic and Critical Care department, outlining the rationale for the change and highlighting additional benefits, including intermittent bolus capability and paediatric weight-based programming.

Theatre staff were supported through a combination of drop-in sessions and a dedicated session at the monthly Continuing Medical Education (CME) event.

Acknowledgements

The Centre for Sustainable Delivery (CfSD) would like to acknowledge the time and commitment of everyone involved in the rollout of this project at NHS Highland, in particular Dr Jayne Halcrow, Louise Reid, Emma Stratton and Claire Wright.

Appendix 1 – NHS Highland SBAR NHS Highland

Meeting: ASLT
Title: Replacing: Bodyguard 545
Report Author: Louise Reid / Claire Wright / Jayne Halcrow

1 Purpose

This is presented to ASLT for:

- Decision

This report relates to an:

- Emerging issue

This report will align to the following NHS Scotland quality ambition(s): **Safe, Effective and Person Centred.**

2 Report summary

2.1 Situation

- Bodyguard 545 infusion devices currently used for epidural analgesia require replacement.
- Disposable, single use devices (CareVis VisiO) are used for all other forms of continuous regional analgesia.
- BD Pain Manager Pumps offer a single solution to replace both the Bodyguard 545 and CareVis VisiO devices, providing greater flexibility and future-proofing service delivery.

2.2 Background

- Bodyguard 545 infusion devices are currently used to deliver epidural analgesia in obstetrics during labour, as well as in theatres and critical care following major surgery or trauma. However, support for these devices will end on 30 April 2025, and a suitable alternative is required to maintain safe delivery of epidural analgesia.
- CareVis VariO single use devices are used for other forms of continuous regional analgesia. These devices are costly, generate high volumes of plastic waste, cannot be used for epidural analgesia, and lack flexibility in dosing regimens, which may limit effective pain management for some patients. Over the past decade, the use of epidurals in major surgery and trauma has declined, while the demand for other forms of continuous regional analgesia has increased significantly. However, the use of epidural analgesia in obstetric settings remains high.

BD Pain Manager pumps can replace both the Bodyguard 545 and CareVis VisiO devices, offering a more flexible and sustainable solution. Benefits include improve pain management through tailored dosing options, a 91% reduction in non-recyclable plastic clinical waste, cost savings, and greater adaptability for future changes in clinical practice.

2.3 Assessment

Bodyguard 545 devices have provided a reliable service for the past 14 years, however, they now require replacement.

The BD Pain Manager represents a suitable successor epidural analgesia. Given that it can also support other forms of regional analgesia, it is appropriate to review the continued use of CareVis VariO devices at the same time.

A. Do nothing

This is not a viable option, as the Bodyguard 545 devices must be replaced.

B. Replace Bodyguard 545 only (6 BD Pain Manager Pumps for epidurals only)

There are currently 16 Bodyguard 545 devices in use. Due to reduced demand for epidurals, 6 replacement devices would meet current requirements. This option would retain the use of single-use CareVis VariO devices for other forms of continuous regional analgesia.

Savings: None

CareVis VisiO devices currently cost £15,783 per year. Choosing this option would result in missed savings of £83,756 over 10 years (compared to option C). This approach represents a missed opportunity to modernise the provision of regional analgesia, achieve cost savings and significantly reduce plastic clinical waste. Additionally, some patients may continue to have inadequate pain relief.

C. Replace Bodyguard 545 and CareVis VisiO devices with BD Pain Manager

This option involves purchasing 20 BD Pain Manager devices to replace both systems, approximately 6 for epidural use and 14 for other forms of continuous regional analgesia. As the pumps can be programmed for different applications, they can be deployed flexibly based on demand.

Cost comparison

- **Single-use devices (CareVis VariO)**
 - Annual cost (340 procedures): £15,783.40 (includes device, giving sets and accessories)
 - 10-year cost (3,400 procedures): £157,834
- **Reusable devices (BD Pain manager)**
 - Equivalent annual cost (340 procedures): £7,407.80 (including devices, giving sets, accessories, maintenance, and servicing)
 - 10-year cost: £74,078
- Projected savings over 10 years: £83,756
- Return on investments: 4.7 years



In addition to delivering significant cost savings, this option would improve patient outcomes through more flexible, individualised dosing regimens. It would also deliver environmental benefits, including a 91% reduction in plastic clinical waste, while providing greater flexibility to support future changes in clinical practice.

3 Recommendation

- **Immediate decision:** approve option C and authorise the purchase of BD Pain Manger devices.