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✚ Evidence in focus

Prophylactic use of PICO◊ Single Use Negative Pressure Wound Therapy System (sNPWT) following cardiac surgery: positive impact on clinical and health economic outcomes of risk assessment based implementation

✚ Plus points

A quality improvement audit at a major UK cardiac centre that compared standard dressings (baseline audit) with use of PICO sNPWT in medium- and high-risk patients showed:[1,2]

PICO sNPWT can be successfully implemented after cardiac surgery using a **risk-based approach**[1,2]

50% **relative reduction** in surgical site infections (SSIs) in coronary artery bypass graft (CABG) patients after implementation of PICO sNPWT[1,2]

£83,271 **total cost savings** from reducing SSI incidence using this PICO sNPWT pathway[1,2]

The problem of SSIs

#2
SSIs are the second most frequent healthcare-associated infection in Europe and the USA[3]

Up to £24,683*
additional cost due to developing an SSI in Europe[4]
(depending on surgery type)

In the UK, the **cost of treating cardiac SSIs is higher** than treating SSIs for most other surgery types[5]

The Bristol Heart Institute (UK) undertook a **quality improvement project to help reduce SSIs** in CABG and non-CABG patients (January to March 2018)[1,2]

*This figure has been converted from $USD to £GDP using currency conversion rate 0.73 in April 2021

A quality improvement audit to reduce SSIs

- Baseline SSI incidences were determined at the unit in CABG (n=148) and non-CABG patients (n=161)[1,2]
- A new pathway was then introduced using the Brompton and Harefield Infection Score (BHIS) to help decide which patients were eligible for prophylactic use of PICO sNPWT[1,2]

Bromptom and Harefield Infection Score (BHIS)
Predictive score for SSIs with CABG (±additional procedures)

Level, score (patients, %)	SSI risk
Low, 0–1 (66%)	2.6%
Medium, 2–3 (26%)	6.0%
High, ≥4 (8%)	16.0%

- Diabetes, 1 point
- Left ventricular ejection fraction (LVEF) <45%, 1 point
- BMI ≥35kg/m^2, 2 points
- Female, 2 points
- Emergency, 2 points
- HbA$_{1c}$ >7.5%, 3 points

Bristol Heart Institute PICO sNPWT pathway

Cardiac surgery pre-assessment

- **Low risk** BHIS 0–1 → **Standard post-operative dressings**
- **Medium risk** BHIS 2–3, or revision surgery → **Consider PICO sNPWT** (surgeon discretion)
- **High risk** BHIS ≥4 → **Implement PICO sNPWT**

Results

Utilising risk assessment to determine which patients received PICO sNPWT or standard dressings showed:[1,2]

- A **50% reduction in the incidence of SSIs** in 148 CABG patients (Figure 1)
- A slight increase in SSI incidence in 153 non-CABG patients (from 3.1% at baseline to 5.2% after implementation)
  - Not all patients had risk assessments, which may have affected the results in non-CABG patients[1,2]

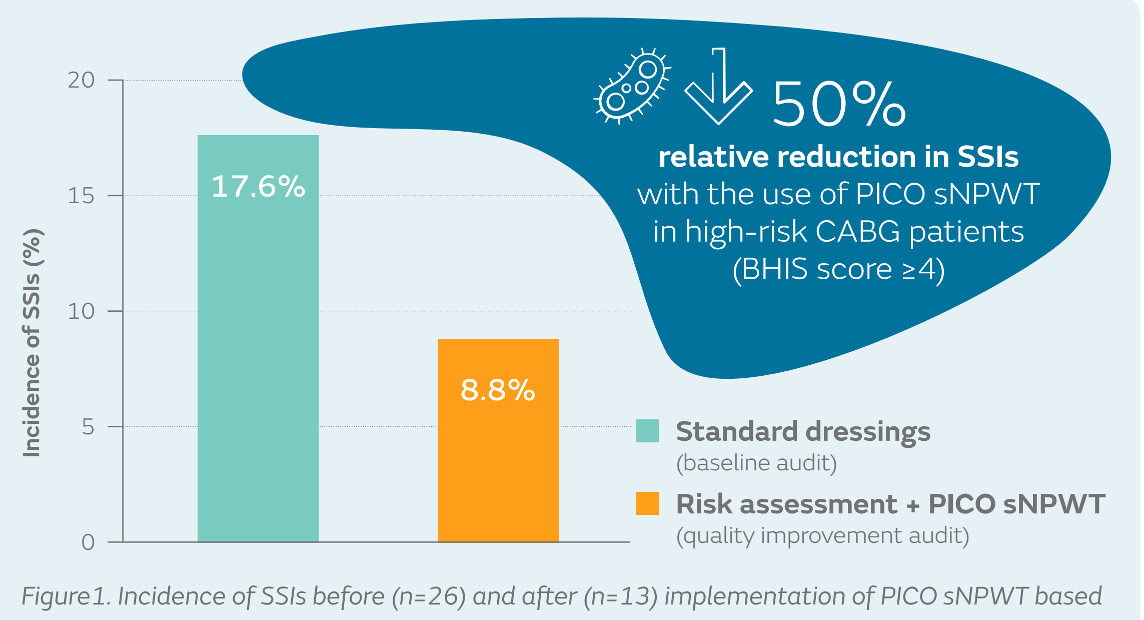
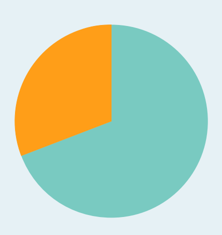


Figure1. Incidence of SSIs before (n=26) and after (n=13) implementation of PICO sNPWT based on risk score[1,2]

During the audit, **total cost of managing SSIs was reduced** from £268,745 to £185,474 (Figure 2)[1,2]

- Use of PICO sNPWT resulted in an overall cost saving, despite being more expensive than standard dressings



31% **reduction in total cost** of SSIs versus baseline (£83,271)

Figure 2. Reduction from baseline (n=31) in total costs of managing SSIs using this PICO sNPWT pathway (n=21)[1,2]

PICO sNPWT can help to reduce SSI incidence with cost savings

The UK National Institute for Health and Care Excellence (NICE) **recommends PICO sNPWT** as an option to help reduce the incidence of SSIs **in high-risk patients**[6]

> "The outcomes from our study highlight the clinical effectiveness of both PICO and the NICE recommendations, which benefitted both patients and our hospital Trust."[7]
>
> Sarah Battaglia
> *Clinical Nurse Specialist, Bristol Heart Institute, UK*

Accurate identification of appropriate patients, based upon a **pre-operative risk assessment**, can drive best practice with PICO sNPWT, help to reduce the incidence of SSIs and reduce costs[1,2]

For detailed product information, including indications for use, contraindications, precautions and warnings, please consult the product's applicable Instructions for Use (IFU) prior to use.

References: 1. Battaglia S. Implementation of the Brompton and Harefield Infection Score (BHIS) and PICO◊ Single-Use Negative Pressure Wound Therapy (sNPWT) pathway at the Bristol Heart Institute. Poster presented at the Wounds UK Annual Conference, 5–7 November 2018. Available at: https://www.nice.org.uk/sharedlearning/university-hospitals-bristol-implementation-of-pico-incision-management-negative-pressure-wound-therapy-in-the-high-risk-cardiac-surgery-patient-group Accessed 12 November 2020. **2.** NICE shared Learning Database. University Hospitals Bristol Implementation of PICO Incision Management Negative Pressure Wound therapy in the high-risk Cardiac Surgery Patient Group. Available at: https://www.nice.org.uk/sharedlearning/university-hospitals-bristol-implementation-of-pico-incision-management-negative-pressure-wound-therapy-in-the-high-risk-cardiac-surgery-patient-group Accessed 12 November 2020. **3.** World Health Organization. Global guidelines on the prevention of surgical site infection. November 2016. Available at: https://www.who.int/gpsc/ssi-guidelines/en/ Accessed 12 November 2020. **4.** Monahan M, Jowett S, Pinkney T, *et al*. Surgical site infection and costs in low- and middle-income countries: A systematic review of the economic burden. *PLoS One*. 2020;15(6):e0232960. **5.** Jenks PJ, Laurent M, McQuarry S, Watkins R. Clinical and economic burden of surgical site infection (SSI) and predicted financial consequences of elimination of SSI from an English hospital. *J Hosp Infect*. 2014;86(1):24–33. **6.** NICE Guidance. PICO negative pressure wound dressings for closed surgical incisions. Medical technologies guidance [MTG43]. May 2019. Available at: https://www.nice.org.uk/guidance/MTG43 Accessed 12 November 2020. **7.** Dowling R. SSI prevention: how can we strive for zero? *Clinical Services Journal*. October 2020; 71–4.

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