

# Negative Pressure Wound Therapy

*for wound management in patients with diabetes (type 1 and 2)*

Technology Guidance from the MOH Medical Technology Advisory Committee (MTAC)

## Guidance Recommendations

The Ministry of Health's MTAC has recommended subsidy for:

- ✓ Negative pressure wound therapy (NPWT) for wound management in patients with diabetic foot wounds and ulcers after debridement as suggested by a multidisciplinary foot care service team, taking into consideration of clinical assessment of the wound (i.e. depth, size, position and state), patient compliance, and use of devices and dressings appropriate to clinical circumstances.
- ✓ Where deemed clinically necessary, in addition to using NPWT post-surgical intervention, patients should be offered any of the following as adjunctive therapies e.g. offloading, antimicrobial therapy, and evaluation and management of vascular insufficiency. In special cases, NPWT may be used without prior surgical intervention.
- ✓ The multidisciplinary foot care service team may include, but is not limited to, podiatrists, orthopaedic surgeons, vascular surgeons, and wound care nurses.

### Subsidy status

The use of NPWT is recommended for subsidy for the abovementioned indication(s) only. Single-use NPWT systems (e.g. PICO-NPWT) are not recommended for subsidy in the abovementioned indication(s).

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## Factors considered to inform the recommendations for subsidy

### Technology evaluation

- 1.1 The MOH MTAC (“the Committee”) considered evidence presented for the technology evaluation of NPWT in patients with diabetic foot wounds and ulcers. The evaluation was conducted in consultation with clinical experts in wound management from the public healthcare institutions.
- 1.2 The evidence was used to inform the Committee’s deliberations around five core decision-making criteria:
  - Clinical need of patients and nature of the condition;
  - Overall benefit of the technology to the patient and/or the system;
  - Cost-effectiveness (value for money), which covers the incremental benefit and cost of the technology compared to existing alternatives;
  - Estimated annual technology cost and the number of patients likely to benefit from the technology;
  - Organisational feasibility, which covers the potential impact of adopting technology, especially barriers for diffusion.
- 1.3 Additional considerations, such as ethical or social issues related to adoption of the technology, may also inform the Committee’s deliberations.

### Clinical need

- 2.1 In patients with diabetes, foot ulcers that are slow to heal and prone to infections often occur as a result of hyperglycaemia, neuropathy and peripheral vascular disease. The lifetime risk of diabetic foot ulcer (DFU) is up to 15%, with a high recurrence rate of 50% to 70% in the subsequent five years. DFU increases the risk of lower extremity amputations due to complications associated with infection, osteomyelitis and cellulitis. DFU accounts for about 85% of all non-traumatic lower extremity amputations. In Singapore, about 1,500 patients with type 1 and 2 diabetes undergo a lower extremity amputation annually.

- 2.2 The Committee noted that standard wound care (SWC) is the current management strategy. It may include debridement and various conventional wound dressings, contingent on the patient's individual needs. SWC may not be effective in some patients with diabetes due to multiple co-morbidities, wound-related, physiological or social factors that may lead to prolonged healing times and subsequent ulcerations.
- 2.3 NPWT is a non-invasive, occlusive adjunctive wound dressing that promotes wound healing by applying continuous or intermittent sub-atmospheric pressure. NPWT systems are powered by a main electrical source to apply negative pressure on the wound with exudate from wounds collected in a canister. The pressure can be adjusted and applied either continuously or intermittently. NPWT is commonly used in acute care facilities for the treatment of various wound types.
- 2.4 Recently, single-use NPWT systems (e.g. PICO-NPWT, SNAP-NPWT) have become available. These systems are battery-powered and canister-free, relying on fluid removal through evaporation with a specially made proprietary dressing that is most suitable for wounds with low to moderate exudate, e.g. closed surgical incisions. With these, pressure is applied continuously and may not be adjusted. Single-use NPWT systems are rarely used in patients with diabetic foot wounds and ulcers and was not considered in this guidance.

## Clinical effectiveness and safety

- 3.1 The Committee agreed that in patients with diabetic foot wounds and ulcers, the main comparator to NPWT was SWC.
- 3.2 The Committee noted that the available evidence base included a health technology assessment report, that was updated with recently published evidence: a systematic review of 23 systematic reviews with the largest published up-to-date summary of evidence on NPWT in patients with DFUs, and a systematic review of observational studies to supplement relevant real-world evidence.
- 3.3 The Committee noted that NPWT demonstrated a similar safety profile to SWC with no significant differences in treatment-related adverse events, including infection rates.

- 3.4 The Committee acknowledged that, when compared with SWC, NPWT was more effective and significantly reduced risk of major amputations by over four times. Additionally, when compared with SWC, NPWT significantly reduced time to healing and wound size, and significantly improved complete healing rate with shorter healing times. NPWT also improved patient reported quality of life and treatment satisfaction when compared with SWC. There were no differences in wound recurrence between NPWT and SWC.

## Cost-effectiveness

- 4.1 The Committee noted that no local economic analysis was conducted and the cost-effectiveness of NPWT for wound and ulcer management in patients with diabetes was based on five published economic studies.
- 4.2 The published evidence showed that NPWT was cost-effective, with potential for cost-saving in patients with diabetic foot wounds or ulcers. This suggested that the treatment with NPWT resulted in more quality adjusted life-years (QALYs) at lower costs when compared with SWC. The Committee acknowledged that, in patients with diabetic foot wounds and ulcers, NPWT was likely to be less costly and more clinically effective when compared with SWC under most circumstances.

## Estimated annual technology cost

- 5.1 Based on the projection, up to 6,000 patients with diabetic foot wounds and ulcers may benefit from Government subsidy, if available, for NPWT annually. The Committee estimated that providing the service could result in cost savings of about >\$5 million annually.

## Organisational feasibility

- 6.1 The Committee noted that NPWT is currently available for inpatient and outpatient use in Singapore for the treatment of acute and chronic wounds.
- 6.2 The Committee noted that NPWT services are currently provided by public health institutions through commissioned vendors, hence any potential increase in its use is unlikely to have any major impact on the current workflow when used only in patients with specific indications.

## Additional considerations

- 7.1 Aligned with local clinician experts and reference HTA agencies reports, single-use NPWT systems are primarily used for other indications excluding diabetic foot wounds and ulcers, i.e. for closed small incisional wounds. Hence, single-use NPWT systems are outside the scope of subsidy consideration in patients with diabetic foot wounds or ulcers.
- 7.2 Aside to the treatment of diabetic foot wounds and ulcers, NPWT is also used in patients with other non-diabetic wound types including patients with closed surgical incisions at high risk for infection, or ulcers caused by injury. NPWT for these non-diabetic indications was not considered by the Committee for subsidy.

## Recommendation

- 8.1 Based on the evidence presented, the Committee recommended subsidy for NPWT for wound management in patients with diabetic foot wounds and ulcers after debridement as suggested by a multidisciplinary foot care service team, taking into consideration of clinical assessment of the wound (i.e. depth, size, position and state), patient compliance, and use of devices and dressings appropriate to clinical circumstances.
- 8.2 Where deemed clinically necessary, in addition to using NPWT post-surgical intervention, patients should be offered any of the following as adjunctive therapies e.g. offloading, antimicrobial therapy, and evaluation and management of vascular insufficiency. In special cases, NPWT may be used without prior surgical intervention.
- 8.3 The multidisciplinary foot care service team may include, but is not limited to, podiatrists, orthopaedic surgeons, vascular surgeons, and wound care nurses to determine patients' suitability to NPWT treatment.

## About the Agency

The Agency for Care Effectiveness (ACE) was established by the Ministry of Health (Singapore) to drive better decision-making in healthcare through health technology assessment (HTA), clinical guidance, and education.

As the national HTA agency, ACE conducts evaluations to inform government subsidy decisions for treatments, diagnostic tests and vaccines, and produces guidance for public hospitals and institutions in Singapore.

This guidance is based on the evidence available to the MOH Medical Technology Advisory Committee as at 3 November 2021. It is not, and should not be regarded as, a substitute for professional or medical advice. Please seek the advice of a qualified healthcare professional about any medical condition. The responsibility for making decisions appropriate to the circumstances of the individual patient remains with the healthcare professional.

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