

# NEGATIVE PRESSURE WOUND THERAPY FOR THE CHRONIC WOUNDS HEALING: TOWARD A REGIONAL CONSENSUS FOR HEALTHCARE ORGANISATION SERVICES

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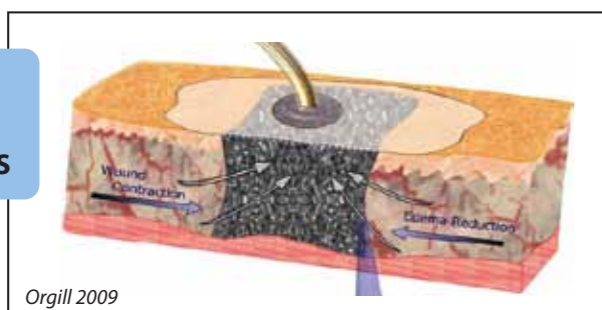
## BACKGROUND

Chronic wounds are a major source of morbidity and mortality and have an important impact on public healthcare expenses. This regional project was aimed to evaluate clinical effectiveness, safety, healthcare organisation and costs associated with the use of negative pressure wound therapy (NPWT) in wound healing compared with other conventional therapies (Figure 1).

### Research question:

Does the Agency for Health and Social Services of the Capitale-Nationale should increase its inventory of NPWT pumps?

Figure 1. NPWT mechanisms



## METHODS

Literature search strategies were conducted (Table 1). Primary outcomes for this study were complete wound closure and time for complete wound closure. Secondary outcome was hospital duration.

A multidisciplinary working group of 15 experts was established. A survey was conducted to get information from hospitals and health social service centres on the current clinical practices regarding the management of complex wounds. Cost estimation using different treatment options was performed.

Table 1. Literature search strategies

	EFFECTIVENESS	RCT UPDATE (EFFECTIVENESS)	QUALITY OF LIFE	SAFETY	HEALTHCARE ORGANISATION	GUIDELINES	COST
STUDY DESIGNS INCLUDED	• HTA* • SR* • Meta-Analysis	• RCT*	• No restriction	• No restriction • Databases of complications reported	• HTA • SR • RCT • Meta-Analysis • Guidelines • Grey literature	• HTA • SR • RCT • Meta-Analysis • Guidelines • Grey literature	• HTA • SR • RCT • Meta-Analysis • Grey literature
DATABASES	• Pubmed • Embase • Grey literature	• Pubmed • Embase	• Pubmed • Embase • CINAHL	• Pubmed • Embase • Grey literature • MAUDE†	• Pubmed • Embase • WOS • CINAHL	• Pubmed • Embase	• Pubmed • Embase
SELECTION	325 publications 2 reviewers	37 publications 2 reviewers	26 publications 2 reviewers	511 publications 1 reviewer	204 publications 2 reviewers	44 publications 2 reviewers	116 publications 2 reviewers
EVALUATION	37 publications 2 reviewers	6 publications 2 reviewers	8 publications 2 reviewers	95 publications 1 reviewer	17 publications 2 reviewers	Not evaluated	3 publications 2 reviewers
EXTRACTION	12 publications 2 reviewers	1 publication 2 reviewers	2 publications 2 reviewers	17 publications †† 1 reviewer	10 publications 1 reviewer	20 publications 1 reviewer	3 publications 2 reviewers
PERIOD	Until July 2009	Until August 2009	Until November 2009	Until August 2009; MAUDE until October 2009	Until November 2009	Until August 2009	Until August 2009

\* HTA: Health Technology Assessment Report; SR: Systematic Reviews; RCT: Randomized controlled trials  
† Manufacturer and User Facility Device Experience database (Food and Drug Administration). Data of adverse events involving medical devices  
†† 78 articles already included in AHRQ report, 17 articles not included and extracted

## RESULTS

### Effectiveness

Twelve systematic reviews (SRs) and one randomized controlled trial (RCT) were included. Paucity of high quality RCTs was observed for any etiology of wounds. In comparison with conventional and modern dressing, there is little evidence of the effectiveness of NPWT for wound healing in diabetic patients (amputation and ulcers) and no evidence for other wound types.

Table 2. Primary studies included in SRs and author's conclusions

Authors	RCT	Non RCT	Case studies	Author's conclusions
<b>DIABETIC WOUNDS</b>				
Pham 2006	2		1	+
Ubbink 2008b	4			+/-
Gregor 2008	2	2		+/-
Vikatmaa 2008	4			+
Noble Bell 2008	4			+/-
Hinchcliffe 2008	3			+/-
Blume 2008 (update)	1			+
<b>PRESSURE ULCERS</b>				
Pham 2006	3		1	-
Van den Boogard 2008	5			-
<b>BURNS</b>				
Wasiak 2007	1			-
<b>INFECTED STERNAL WOUNDS</b>				
Pham 2006		3	1	+
<b>CHRONIC AND ACUTE WOUNDS</b>				
Pham 2006	3		2	+
Samson 2004	6			-
Costa 2005	6	7		-
OHTAC 2006	6			-
Ubbink 2008a	7			-
Gregor 2008	7	10		+/-
Ubbink 2008b	4			-
Vikatmaa 2008	6			+
<b>SKIN GRAFTS</b>				
Pham 2006	4	1	2	+
Vikatmaa 2008	2			+
<b>ABDOMINAL WOUNDS</b>				
Gregor 2008		1		+

### Quality of life

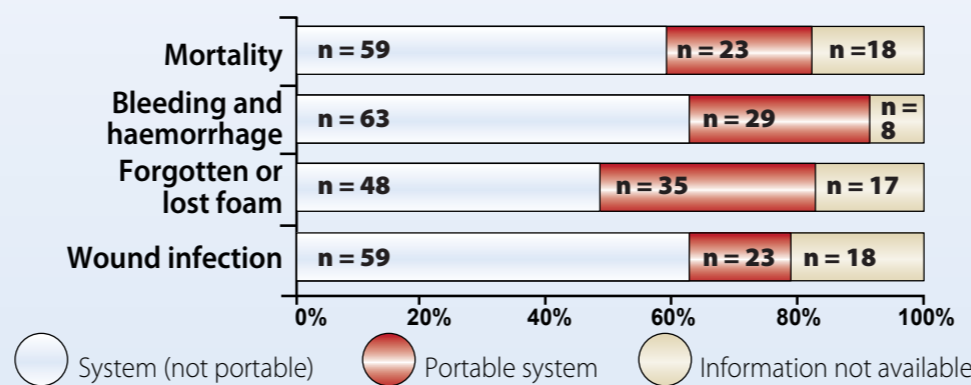
Authors	RCT	Author's conclusions
Mendonca 2007	Traumatic wounds	-
Ozturk 2009	Fournier's Gangrene	+

The authors declare non conflict of interest

### Safety

- Major complications have been reported with NPWT use including bleeding, infections, and mortality. One RCT reported anxiety (Keskin 2008).
- Complication rates are more frequent with the portable system.

Figure 2. Complication rates for portable or non portable systems (MAUDE database, FDA, 1997 to October 2009)



### Healthcare organisation

#### Key factors of successful models identified in the literature:

- Organizational structure
- Therapeutic options
- Outcome measurement
- Good clinical practice
- Patient centered practice

#### The service organisation was compared to models

- 13 healthcare organisations have participated for the survey
- Heterogeneity was observed: health staff resources, clinical practice guidelines, training, costs to patients and healthcare organisation
- The comparison of survey data with the successful models have showed many discrepancies
- NPWT is used as a first line treatment

### Guidelines

#### Three types of publications

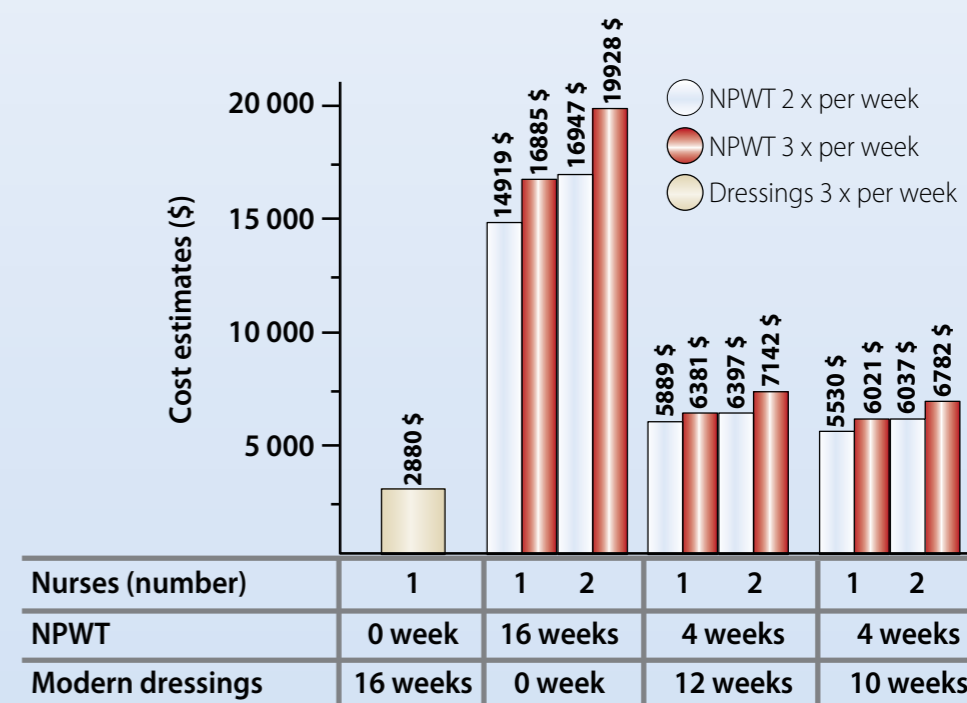
- Prevention and treatment of all types of wounds
- Dedicated to a patient or a specific wound
- Oriented towards the use of NPWT (funded by the manufacturer)

According to most guides, NPWT should be considered as a second line treatment

### Cost

NPWT appeared to be five to seven times per day more expensive than other modern wound treatments.

Figure 3. Costs estimation



## CONCLUSION

NPWT has not been proven to be more effective, presents risks to the patient and is more expensive than other modern wound treatments. These considerations lead to re-evaluate the regional organisation of services for the treatment of complex wounds. Optimal use of NPWT requires taking into account wound and patient's characteristics as well as the clinical available resources. (Figure 4)

#### References

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Figure 4. Different components to take into account in complex wound treatment

