To freeze or not to freeze: a cost-effectiveness analysis of wart treatment

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Home-based and primary care treatments for cutaneous warts were compared with the baseline strategies of "spontaneous resolution" (i.e. a do nothing strategy) and basic advice from the general practitioner (GP) without treatment. The home treatments included over-the-counter salicylic acid, duct tape and over-the-counter ethylene glycol cryotherapy. The primary care treatments included GP-prescribed salicylic acid and cryotherapy.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The hypothetical population comprised patients initially starting with wart(s).

Setting
The setting was outpatient and primary care. The economic study was performed in the UK.

Dates to which data relate
The effectiveness data came from studies published from 1976 to 2002, and some reported unit costs were from 2003. The price year was not reported.

Source of effectiveness data
The only clinical effectiveness estimates included in the model were the cure probabilities for the different strategies.

Modelling
A Markov model that followed patients on a weekly basis over an 18-week period was programmed. The two health states modelled include having wart(s) or being free of wart(s). Treatment pathways were informed by a combination of expert opinion, patient survey, structured observation of practice, and focus group discussion with patients, health professionals and pharmacists. The model ran until the wart was cured or spontaneously resolved. To adapt the results of the trial to the weekly cycle of the model, the proportion cured was apportioned equally across the number of weeks for which the treatments were applied. More details of the model and its assumptions are given elsewhere (Thomas et al. 2006, see 'Other Publications of Related Interest' below for bibliographic details).

Sources searched to identify primary studies
The clinical effectiveness data came from a systematic review of the literature (Gibbs et al. 2003, see 'Other
Publications of Related Interest' below for bibliographic details).

**Methods used to judge relevance and validity, and for extracting data**
The inclusion criteria specified clinical trials reporting the numbers of patients cured. In the meta-analysis, the average cure rates were weighted by the sample size of each trial.

**Measure of benefits used in the economic analysis**
The measure of benefit used was expressed in natural units (warts cured).

**Direct costs**
Health care and patient costs were included. The health-related costs included were those of the treatments (both home treatments and primary care-based therapies). The non-health-related direct costs included were for patient travel (to the GP, pharmacy or shop). Treatment pathways were informed by expert opinion, patient survey, structured observation of practice, and focus groups conducted with patients, health professionals and pharmacists. Resources quantities and sources of the costs were partially reported. The price year was not reported. Discounting was not relevant because of the short-term study horizon.

**Statistical analysis of costs**
The data were deterministic, thus no statistical analysis was performed.

**Indirect Costs**
Productivity costs were not included.

**Currency**
UK pounds sterling ()

**Sensitivity analysis**
A sensitivity analysis of the treatment cure probabilities was performed in order to determine threshold values at which the choice of treatment would change. However, no further details of the rationale for the parameter ranges selected were provided. The authors stated that details were given in Thomas et al. 2006.

**Estimated benefits used in the economic analysis**
At 18 weeks, the cure rates with the modelled home strategies were:

- 45.92% for do nothing,
- 64.22% for over-the-counter salicylic acid,
- 69.51% for over-the-counter cryotherapy, and
- 88.27% for duct tape.

At 18 weeks, the cure rates with the modelled primary care strategies were:

- 45.92% for advice only,
- 64.22% for GP-prescribed salicylic acid,
52.27% for 1 application of cryotherapy, 64.85% for 2 applications and 69.51% for 3 applications,
69.51% for nurse cryotherapy,
80.00% for salicylic acid then cryotherapy,
80.13% for cryotherapy then salicylic acid, and
69.51% for combined salicylic acid and cryotherapy.

Cost results
At 18 weeks, the costs of the modelled home strategies were:

0 for do nothing,
20.47 for over-the-counter salicylic acid,
17.90 for over-the-counter cryotherapy, and
9.40 for duct tape.

At 18 weeks, the costs of the modelled strategies were:

26.90 for advice only,
40.30 for GP-prescribed salicylic acid,
44.80 for 1 application of cryotherapy, 59.41 for 2 applications and 70.67 for 3 applications,
49.27 for nurse cryotherapy,
66.33 for salicylic acid then cryotherapy,
80.01 for cryotherapy then salicylic acid, and
82.32 for combined salicylic acid and cryotherapy.

Synthesis of costs and benefits
Incremental cost-effectiveness ratios (ICERs) comparing all non-baseline strategies with the two baseline comparators ("do nothing" and "advice only") were reported.

Compared with "do nothing", the ICERs in primary care ranged from 1.95 per patient cured with salicylic acid then cryotherapy, to 7.06 per patient cured with 1 application of cryotherapy.

The effect of using the "advice only" baseline instead of the "do nothing" baseline was to reduce all ICERs because of the additional cost of the GP consultation without an added effect (ICER range: 0.73 to 2.82). Using the former baseline also reversed the ranking of self-administered and nurse-administered cryotherapy.

A figure showing the costs and effects of each strategy in the cost-effectiveness plane was produced for each baseline comparator. This showed that duct tape was the most cost-effective strategy when compared with do nothing (dominating all other treatments).

Of the single treatments in primary care, cryotherapy administered by a nurse for three sessions was the most cost-effective option, followed by salicylic acid prescribed by a GP.
When trying to represent usual clinical practice and comparing the GP-administered treatments with a GP-administered "advice only" baseline, all the ICERs for alternative treatments decreased substantially. The most favourable ICER was for GP-prescribed salicylic acid, closely followed by 3 sessions of nurse cryotherapy.

A one-way sensitivity analysis of the treatment cure probabilities was performed. For example, GP-prescribed salicylic acid would require a cure rate of only 44% to be more cost-effective than GP-administered cryotherapy, and a cure rate of 52% to be more cost-effective than nurse-administered cryotherapy.

**Authors' conclusions**
If rigorous studies verified the effectiveness of duct tape, it could be adopted as the primary treatment for cutaneous warts. Nurse-administered cryotherapy is likely to be more cost-effective than general practitioner (GP)-administered cryotherapy.

**CRD COMMENTARY - Selection of comparators**
A wide range of comparators were included in the study. The comparators, which were reported clearly, ranged from over-the-counter therapies to nurse- or GP-led treatment. These represented the available approaches in a UK setting.

**Validity of estimate of measure of effectiveness**
The effectiveness was derived from a single published systematic review (a "recently updated Cochrane review"). A few inclusion criteria, but not the search strategy, were reported. It was unclear if important sources were missing. The authors stated that the evidence for the effectiveness of duct tape was not the highest quality, but the study design that provided it was not described.

**Validity of estimate of measure of benefit**
Cure rates, which were the primary outcome, were derived from the systematic review (Gibbs 2003). Nevertheless, in order to derive weekly cure probabilities, the proportions of cures were apportioned equally across the number of weeks for which the treatments were applied. No explicit justification for this approach was given.

**Validity of estimate of costs**
From the perspectives stated (that of the NHS and the patient), all the relevant cost categories appear to have been included. Nevertheless, the sources of the costs and resource use data were only partially referenced, which limits their detailed evaluation. In the case of resource use, the authors stated that the data were based on a combination of expert opinion, patient survey, structured observation of practice, and focus group discussion with patients, health professionals and pharmacists, but no further details were provided. The price year was not reported, which will hinder future reflation exercises. No discounting was used, but this was appropriate given the short time horizon of the study. The data were treated deterministically and no sensitivity analyses of the costs were performed.

**Other issues**
The authors made few comparisons with the results from other studies. They acknowledged that the study reflected "best practice" using optimum treatment applications that tend to be used in clinical trials. The authors do not appear to have presented their results selectively, although they reported few analyses on the uncertainty of the results.

**Implications of the study**
Although cutaneous warts constitute a low morbidity problem, they require the use of significant primary care resources and their treatment should be guided by further high-quality randomised trials. The authors recommended the conduct of two clinical trials in primary care settings to fill important evidence gaps. One trial should look at led cryotherapy versus salicylic acid in primary care, while the other should compare three patient-administered treatments (over-the-counter salicylic acid, duct tape and over-the-counter cryotherapy).
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Other publications of related interest
Because readers are likely to encounter and assess individual publications, NHS EED abstracts reflect the original publication as it is written, as a stand-alone paper. Where NHS EED abstractors are able to identify positively that a publication is significantly linked to or informed by other publications, these will be referenced in the text of the abstract and their bibliographic details recorded here for information.


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