

# Ambulight PDT for the Treatment of Non-Melanoma Skin Cancer: Cost Update

## 1. INTRODUCTION

The National Institute for Health and Care Excellence (NICE) regularly reviews its existing guidance to determine whether the guidance is either still relevant or needs updating. Whilst reviewing medical technology guidance 6 regarding Ambulight PDT for the treatment of non-melanoma skin cancer, the Medical Technologies Evaluation Programme (MTEP) team deemed that the costs within the existing cost model should be updated by an External Assessment Centre (EAC). This has been conducted by the Newcastle and York EAC. Information around the original assessment and guidance is available on the NICE website [1]. The objectives of the current report are to:

- Update the original cost model for Ambulight PDT with 2016 prices, focussing on the base case analysis and covering any different versions of Ambulight PDT currently in use within the NHS;
- Summarise how the results of the cost model have changed compared to the original results of the model.

This report is structured such that in the methods section the update of each cost input is reported and in the results section the results for each setting are reported, broken down by type of cost. The original results are also provided. Finally, in the discussion section, a comparison is made between the original and updated results. Throughout this report, the 'original' results refer to those generated by the EAC during the initial assessment period.

## **2. METHODS**

The original cost model compared the use of Ambulight PDT in a number of settings (general practice, specialist skin cancer centre, secondary care or community) with static photodynamic therapy (PDT) lamps used in secondary care. As such, the results reported during the initial analysis were a range, rather than a point estimate. Many of the cost inputs within the model are utilised in various calculations for alternate settings. However, each cost input is described only once within this section. The original model did not report costs from a consistent cost year, rather identified the majority of costs from sources reporting 2008/09 prices, but also used costs from older cost sources which were not inflated. The updated EAC report uses 2016 prices.

### **Ambulance Travel**

The cost of ambulance travel to or from hospital or clinics was updated from £58 to £96.35 [2]. Both costs are taken from NHS Reference Costs, with the updated costs being taken from the most recent database (2014/15). Within the original model it was assumed that all patients required ambulance transport for their outpatient appointment. In order to be eligible for patient transport, patients must have a medical condition that requires the skills or support of healthcare professionals on or after their journey or have a medical condition that impacts on their mobility such that they would be unable to access healthcare otherwise [3]. The EAC judged that the vast majority of patients with non-melanoma skin cancer are unlikely to require patient transport, thus this cost is assumed to be £0 in the update of the cost model.

### **Lesion Assessment (Clinician)**

In the original model, each lesion assessment was assumed to take 0.1 hours of a medical consultant's time, with each patient requiring 2 assessments. Within the original cost model, the cost per hour of patient contact including qualifications was used. The updated costs do not include qualification costs given that these are not usually incurred by the NHS. Further, Personal Social Services Research Unit (PSSRU) no longer reports a patient contact cost for medical consultants. Therefore, the contract cost per hour (without qualification costs) of £105 (2014/15 prices) [4] has been used and inflated to 2016 prices using the NHS Agenda for Change pay scale increase of 1% [5]. This results in a cost per hour of clinician time of £106.05 and a cost per lesion assessment of £10.61, lower than the original cost of £33.40, equivalent to £21.21 per patient.

### **Room Hire**

Within the original analysis, room hire of £100 for lesion preparation and £100 for lesion illumination was included (both per patient). No information on where this cost was derived from or the assumptions on which it is based was provided in any of the original documents [1]. Hence, this cost has been inflated to 2014/15 prices using the Hospital & Community Health Services (HCHS) index [4]. It has then been further inflated to 2016 prices using the forecast retail price index (RPI) of 2% [6]. An updated value of £108.05 per treatment has been estimated, equivalent to £216.09 per patient. Within the results presented in Table 3.1, the room hire is broken down into the cost for lesion preparation and the cost of lesion assessment.

## Nurse Cost

The original model assumed that the comparator required nurse time per treatment for the following: communication/education of patient (0.3 hours); lesion debridement (0.3 hours); cream application (0.1 hours) and illumination of lesion (0.5 hours). The updated cost has been taken from the 2014/15 edition of PSSRU which reports an hour of nurse time for patient contact excluding qualifications of £88 for a band 5 nurse [4]. This has been inflated to 2016 prices using the Agenda for Change pay scale, resulting in a cost of £88.88 per hour [5]. This is higher than the £45 used within the original analysis. The costs per treatment and per patient for each element are shown in Table 2.1.

**Table 2.1: Nurse costs for patients undergoing treatment with static lamps**

Cost element	Cost per treatment	Cost per patient
Communication/Education of Patient (0.3 hours per treatment)	£26.66	£53.33
Lesion Debridement (0.3 hours per treatment)	£26.66	£53.33
Cream Application (0.1 hours per treatment)	£8.88	£17.78
Illumination of lesion (0.5 hours per treatment)	£44.44	£88.88

## Cream

A photosensitive cream must be applied to the lesion before treatment with either Ambulight PDT or a static PDT lamp. The company confirmed via communication with the EAC that the cream used remains Metvix. Within the original submission an alternative cream, Ameluz, was also considered. The EAC has sourced the costs of both creams from MIMS, whereby costs of £175.10 for Metvix (2 grams) and £184.00 for Ameluz (2 grams) are reported [7]. Given that the same volume of cream is required in both arms of the model, in Section 3 the cost for Metvix only is used. Within the original analysis, each patient uses 2 grams of cream in total; therefore, the update cream cost is £175.10 per patient compared with £175.14 in the original analysis.

## Consumables

A cost for consumables has been included within both arms of the model. The original cost was taken from Morton *et al.* (2002) where a cost of £5 for “dressings, local anesthesia etc.” was included [8]. Given the limited information available, this cost has been inflated from 2002/03 prices to 2014/15 prices using the HCHS index [4]. It has then been further inflated to 2016 prices using the forecasted RPI [6]. A cost of £6.99 per treatment and £13.99 per patient has been derived.

## Static Lamp Cost

The updated cost of a static PDT lamp of between £12,000 and £14,000 was provided by the company, who advised a life time of 5 years was appropriate. Further information on these costs was obtained from a submission to the Scottish Health Technologies Group (SHTG) provided to the EAC by the company. [REDACTED]

[REDACTED]. Further, the company advised the EAC and SHTG that these devices can be used 1,000 times within their lifetime. In the previous guidance, it was assumed that the static lamps were used 100 times per year over their 5 year lifetime based upon Morton *et al.* (2002) [8].

When updating the cost, the EAC used a cost of £12,000 with 1,000 uses distributed uniformly over the 5 year lifetime of the device and a 3.5% discount rate. The annuitized per treatment cost of the device was therefore £12.84, equivalent to £25.68 per patient.

## GP Costs and Overheads

Within the original cost model for Ambulight PDT, GP costs and overhead costs in each setting were derived from NICE guidance on improving outcomes for people with skin tumours [9]. As part of this guidance an economic analysis was conducted on the skin cancer treatment service delivery. A survey was conducted in 2004 of primary care trusts to determine the cost per patient of the contracts in place for skin cancer service provision. The NICE guidance was partially updated in 2011, but this update did not include the economic section.

In order to update these costs the EAC conducted a pragmatic search for updated NHS service pathways or costs, but none were identified. Therefore, the EAC inflated the original costs per patient from 2004/05 prices to 2014/15 prices using the HCHS index and further inflated these costs to 2016 prices using the Agenda for Change inflation level for GP costs and the RPI for overheads [4-6]. The original and inflated costs per patient for each scenario are shown in Table 2.2.

**Table 2.2: GP service provision costs per patient**

Cost element	Updated cost	Original cost
<b>GP operating in their own practice – Accounting model A</b>		
GP costs	£127	£100
Overheads	£772	£600
<b>GP operating in their own practice – Accounting model B</b>		
GP costs	£29	£23
<b>GP operating in a specialist centre – Accounting model A</b>		
Overheads	£605	£470
<b>GP operating in a specialist centre – Accounting model B</b>		
GP costs	£158	£124
<b>GP operating in a specialist centre – Accounting model C</b>		
Overheads	£56	£43
<b>GP operating in a specialist centre – Accounting model D</b>		
Overheads	£36	£28
<b>GP operating in secondary care – Accounting model A</b>		
GP costs	£38	£30
Overheads	£17	£13
<b>GP operating in secondary care – Accounting model B</b>		
Overheads	£22	£17

### **Ambulight PDT**

The EAC contacted the company to update the costs of Ambulight PDT and was informed that Ambulight PDT has been replaced by Ambulight Multi PDT. Whilst the original device was single use, the updated version has single use and multi-use components. Ambulight Multi PDT comprises a multi-use controller containing 1,000 illuminations costing £500 and single-use light emitting heads costing £50 per head. The cost of the controller has been annuitized over 5 years based on 1,000 uses, resulting in a cost per use of £0.53, equivalent to a cost per patient of £1.06 as 2 heads are required. The cost per treatment is thus £50.53 and per patient £101.06.

The company informed the EAC that no maintenance costs or changes to service provision are incurred through the use of the Ambulight Multi PDT. [REDACTED]

[REDACTED]. Therefore, this cost has been added to the cost per patient of Ambulight Multi PDT in the updated cost model. The total cost per patient of Ambulight Multi PDT is therefore £104.46.

### **Community Nurse Cost**

The EAC has assumed that a community nurse would deliver the treatments in a patient's home, with the original model assuming this required 1.4 hours per patient. The cost of a community nurse was taken from PSSRU being £44 excluding qualifications (2014/15 prices) [4]. The cost per contracted hour rather than patient contact hour, has been used given that some of the 1.4 hours will be spent travelling. The cost was inflated to 2016 prices using the Agenda for Change inflation level, resulting in a cost of £44.44 per hour. This unit cost is very similar to the £45 per hour used in the original analysis.

## Transport for Nurse

The Ambulight PDT nurse model assumed nurses treat patients in their own homes. In the original model, the ambulance travel cost was applied for the nurse transport cost. It was stated that this cost was likely an overestimation. Before 2011, PSSRU provided a travel cost for community nurses. In 2010, this cost was reported as £1.50 per visit [10]. This has been inflated using the HCHS index to 2014/15 prices and further inflated to 2016 prices using the RPI resulting in a cost of £1.62 per treatment (visit) and £3.24 per patient. This cost is much lower than the £58 used previously.

## 3. RESULTS

The full results of the analysis by treatment and setting are presented in Tables 3.1 to 3.5 below, with a description of the cost and change in cost between the original and updated cost model provided.

**Table 3.1: Static PDT lamp per patient in secondary care 2016 prices (comparator)**

Cost element	Cost	Description
Ambulance to hospital/clinic	£0	No travel costs have been included (see Section 2)
Lesion Assessment (clinician)	£21	0.2 hours of medical consultant time
Room Hire - Lesion Preparation	£108	Original value (£100) inflated to 2016 prices
Communication/Education of Patient (Nurse)	£53	0.6 hours of nurse patient contact time
Lesion Debridement (Nurse)	£53	0.6 hours of nurse patient contact time
Cream Application (Nurse)	£18	0.2 hours of nurse patients contact time
Cream	£175	Cost for Metvix sourced from MIMS [7]
Illumination of Lesion (Nurse)	£89	1 hour of nurse patient contact time
Room Hire - Lesion Illumination	£108	Original value (£100) inflated to 2016 prices
Consumables (Curette, Gloves, Dressings)	£14	Original value (£100) inflated to 2016 prices
Lamp Cost	£26	Calculated based on cost of device (see Section 2)
Ambulance home	£0	No travel costs have been included (see Section 2)
<b>Total</b>	<b>£665</b>	Updated cost is lower due to lower cost of lamp (saving £80) and removal of travel costs (saving £116).
<b>Total from original model at original prices</b>	<b>£749</b>	

**Table 3.2: Ambulight multi PDT used by GP operating in their own practice per patient (2016 prices)**

<b>Cost element</b>	<b>Accounting model A: Cost</b>	<b>Accounting model B: Cost</b>	<b>Description</b>
GP Costs	£127	£29	Original value inflated to 2016 prices
Overheads	£772	£0	Original value inflated to 2016 prices
Cream	£175	£175	Cost for Metvix sourced from MIMS [7]
Consumables (Curette, Gloves, Dressings)	£0	£14	Original value inflated to 2016 prices
Ambulight PDT Multi cost	£104	£104	Calculated based on cost of device (see Section 2)
<b>Total</b>	<b>£1,179</b>	<b>£323</b>	Updated cost is reduced mainly due to a lower cost of Ambulight Multi PDT (saving £296)
<b>Total from original model at original prices</b>	<b>£1,275</b>	<b>£608</b>	

**Table 3.3: Ambulight multi PDT used by GP operating in a specialist centre per patient (2016 prices)**

<b>Cost element</b>	<b>Accounting model A: Cost</b>	<b>Accounting model B: Cost</b>	<b>Accounting model C: Cost</b>	<b>Accounting model D: Cost</b>	<b>Description</b>
Ambulance to hospital/clinic	£0	£0	£0	£0	No travel costs have been included (see Section 2)
GP Costs	£0	£158	£0	£0	Original value inflated to 2016 prices
Overheads	£605	£0	£56	£36	Original value inflated to 2016 prices
Cream	£175	£175	£175	£175	Cost for Metvix sourced from MIMS [7]
Consumables (Curette, Gloves, Dressings)	£14	£14	£14	£14	Original value inflated to 2016 prices
Ambulight PDT Multi cost	£104	£104	£104	£104	Calculated based on cost of device (see Section 2)
Ambulance home	£0	£0	£0	£0	No travel costs have been included (see Section 2)
<b>Total</b>	<b>£898</b>	<b>£451</b>	<b>£349</b>	<b>£329</b>	Updated cost is lower due to a lower cost of Ambulight Multi PDT (saving £296) and exclusion of travel costs (saving £116)
<b>Total from original model at original prices</b>	<b>£1,171</b>	<b>£825</b>	<b>£745</b>	<b>£729</b>	



**Table 3.4: Ambulight multi PDT used by GP operating in secondary care per patient (2016 prices)**

Cost element	Accounting model A: Cost	Accounting model B: Cost	Description
Ambulance to hospital/clinic	£0	£0	No travel costs have been included (see Section 2)
GP Costs	£38	£0	Original value inflated to 2016 prices
Overheads	£17	£22	Original value inflated to 2016 prices
Cream	£175	£175	Cost for Metvix sourced from MIMS [7]
Consumables (Curette, Gloves, Dressings)	£0	£14	Original value inflated to 2016 prices
Ambulight PDT Multi cost	£104	£104	Calculated based on cost of device (see Section 2)
Ambulance home	£0	£0	No travel costs have been included (see Section 2)
<b>Total</b>	<b>£334</b>	<b>£315</b>	Updated cost is lower due to a lower cost of Ambulight Multi PDT (saving £296) and exclusion of travel costs (saving £116)
<b>Total from original model at original prices</b>	<b>£734</b>	<b>£718</b>	

**Table 3.5: Ambulight multi PDT used by nurse operating in the community per patient (2016 prices)**

Cost element	Accounting model A	
	Cost	Description
Transport for nurse	£3	Taken from PSSRU 2010 [10] and inflated
Nurse Costs	£62	1.4 hours of nurse time
Cream	£175	Cost for Metvix sourced from MIMS [7]
Consumables (Curette, Gloves, Dressings)	£14	Original value inflated to 2014/15 prices
Ambulight PDT Multi cost	£104	Calculated based on cost of device (see Section 2)
<b>Total (2016)</b>	<b>£359</b>	Updated cost is lower due to a lower cost of Ambulight Multi PDT (saving £296) and exclusion of travel costs (saving £55)
<b>Total from original model at original prices</b>	<b>£720</b>	

The incremental results are presented in Table 3.6, whereby a negative value indicates that Ambulight Multi PDT is cost saving. As shown in Table 3.6 the direction of the results has not changed in many of the scenarios modelled. However, the magnitude of the results has changed, such that the results are now more favourable for Ambulight Multi PDT.

**Table 3.6: Comparison of incremental results per patient**

Scenario	Incremental cost per patient (2016 prices)	Incremental cost per patient (2011 prices)
<b>Ambulight used in GP practice</b>		
Accounting model A	£513	£527
Accounting model B	-£342	-£140
<b>Ambulight used by GP in specialist centre</b>		
Accounting model A	£233	£423
Accounting model B	-£214	£76
Accounting model C	-£316	-£4
Accounting model D	-£336	-£20
<b>Ambulight used by GP in secondary care</b>		
Accounting model A	-£331	-£15
Accounting model B	-£350	-£31
<b>Ambulight used by nurse at patient's home</b>		
Accounting model A	-£306	-£29

#### 4. DISCUSSION

The costs associated with both Ambulight Multi PDT and its comparator are lower in the updated cost model than the original model. Whilst counterintuitive, this can be explained due to the lower device costs and reduction in travel costs within the updated analysis. The removal of travel costs to hospital often applied to both arms of the model; hence the impact on the result is limited in some scenarios. The cost of Ambulight Multi PDT is lower than the cost of its predecessor, Ambulight PDT, given that part of the device is now multi-use. Further, the cost of the comparator, static light, is also lower than one of the two outdated sources used previously. The reductions in the cost of Ambulight Multi PDT are greater than those related to the static lamp. Due to this, the incremental costs are now more favourable for Ambulight Multi PDT than previous. However, there remains uncertainty within the results with some scenarios suggesting cost savings may be generated and others suggesting the opposite.

There are a number of limitations with the analysis conducted, the objective of which was to update the cost inputs within the cost-minimisation model only. The clinical pathways were not updated to capture current practice and hence some cost components may no longer apply, whilst others have been omitted. Further, the original cost minimisation model assumed Ambulight PDT and static lamps were clinically equivalent. Future comparative evidence on efficacy and safety may demonstrate that there are differences between the devices which would have implications for patients' outcomes and costs. Should this be the case, the comparison between Ambulight Multi PDT and static lamps may require a new, more complex model to be developed.

## 5. REFERENCES

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