I.7 Phototherapy

Koek MB, Sigurdsson V, van Weelden H et al. Cost effectiveness of home ultraviolet B phototherapy for psoriasis: economic evaluation of a randomised controlled trial (PLUTO study). Br Med J. 2010; 340(c1490) Ref ID: KOEK2010{Koek, 2010 KOEK2010 /id}				
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost effectiveness**
Economic analysis: CEA/CUA **Study design:** Within RCT analysis **Approach to analysis:** Pragmatic trial design; conducted from a societal perspective; outcomes measured immediately after completion of phototherapy and 12 months afterward; only first 105 of 196 trial	**Population:** Patients over 18 years with psoriasis considered eligible for phototherapy **Cohort settings:** Mean age = 41.2 / 45.0 M = 67% **Intervention 1:** Narrowband UVB (TL-01) delivered 2-3 times weekly in outpatient setting **Intervention 2:**	**Total costs* (mean per patient):** **Upon completion of phototherapy:** Intvn 1: £321 Intvn 2: £503 Incremental (2-1): £182 (CI £38 to £225, ; p=NR) **At 12m after phototherapy:** Intvn 1: £597 Intvn 2: £796 Incremental (2-1): £198 (CI £35 to £362, ; p=NR) *Indirect costs excluded from	**Primary outcome measure:** QALYs (mean per patient) **Upon completion of phototherapy:** Intvn 1: 0.0298 Intvn 2: 0.2960 Incremental (2-1): 0.0052 (CI -0.0244 to 0.0348; p=NR) **At 12m after phototherapy** Intvn 1: 1.1261 Intvn 2: 1.1528 Incremental (2-1): 0.0267 (CI -0.024 to 0.078; p=NR)	**Primary ICER (Intvn 2 vs Intvn 1):** ICER upon completion of phototherapy: £34,967 per QALY gained ICER at 12m after phototherapy: £7,432 per QALY gained Probability cost-effective: Not reported for results with direct medical costs only **Other:** £33 per addition day experiencing SAPASI 50 £12 per additional day experiencing SAPASI 75

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participants were followed up for 1 year; EQ-5D and SF-6D values were measured at baseline and upon completion of phototherapy and were calculated based on SAPASI, gender and employment status at 1-year follow up. **Perspective:** Dutch society **Time horizon:** After completion of phototherapy (approx 3 months); 12 months after phototherapy **Study follow-up:** 12 months following completion of phototherapy **Discounting:** Costs: none; Outcomes: none	Narrowband UVB (TL-01) delivered 3-4 times weekly at home	these results **Currency & cost year:** 2003 Dutch Euros (presented here as 2003 UK pounds‡) **Cost components incorporated:** Phototherapy, consultations with dermatologist, consultations with GP, medication	**Other outcome measures** at 12m after phototherapy **(mean):** Days experiencing SAPASI 50: Intvn 1: 210.4 Intvn 2: 216.5 Incremental (2-1): 6.1 days (CI -41.1 to 53.2; p=NR) Days experiencing SAPASI 75: Intvn 1: 111.1 Intvn 2: 127.6 Incremental (2-1): 16.5 days (CI -27.3 to 60.2; p=NR)	**Subgroup analyses:** none **Analysis of uncertainty:** Uncertainty around base case ICERs estimated using bootstrapping (1000 replications); however, the results are not presented here as they include non-medical and indirect costs 2 relevant scenario analyses performed: Using SF-6D values instead of EQ-5D: no change from base case Using invoice prices (payer perspective): intervention 1 is dominated
Data sources				
Health outcomes: The economic evaluation was conducted alongside the PLUTO study, a randomised controlled trial by Koek and colleagues{Koek, 2009 KOEK2009 /id}. Outcomes included in the economic evaluation were observed in the trial. **Quality-of-life weights:** EQ-5D and SF-6D scores were measured at baseline, after 23 irradiations and at the end of phototherapy. Utility scores were not measured during the 12 months follow-up. The authors estimated these missing scores using linear multilevel models, estimating the utility score from patients' SAPASI score, sex and employment status: EQ-5D * 100 = 89.843 – (1.428 * SAPASI) – 10.339 (only for women) + 8.341 (only when employed)				

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SF-6D * 100 = 82.499 – (0.976 * SAPASI) – 7.939 (only for women) + 6.471 (only when employed) – (0.488 * SAPASI) (only when employed)
Cost sources: Resource use estimated within the trial through diaries recording frequency and duration of irradiation as well as frequency of visits paid to dermatologist or GP until the end of phototherapy (approx 3 months). During 12-month follow-up, participants recorded frequency of dermatologist and GP visits and occurrence and duration of newly started phototherapy in a bimonthly questionnaire. Concomitant use of psoriasis drugs (topicals and systemic therapies) was retrieved retrospectively from the participants' pharmacists. Costs of dermatologist and GP consultations were taken from the Dutch healthcare insurance board manual for costing (Oostenbrink et al. 2004). Invoice tariffs from two home care organisations were used to cost phototherapy delivered in the home. The authors note that the invoice tariffs may overestimate the real cost of home phototherapy. Costs of concomitant drugs were taken from the Dutch medication guide (Dutch Healthcare Insurance Board 2003).
Comments
Source of funding: Netherlands Organisation for Health Research and Development
Limitations: The costing perspective is one of Dutch society, thus including non-medical and indirect costs. The results presented here reflect only direct medical costs, and are therefore only a subset of those reported in the study. The time horizon is sufficient to capture health benefits of phototherapy, but it does not capture the estimated resource use or consequences for people not responding to phototherapy. The method used to estimate QALYs following completion of phototherapy is potentially less robust than having collected EQ-5D or SF-6D valuations directly from participants at 12-months follow-up.
Other:
Overall applicability*: Partially applicable **Overall quality**:** Potentially serious limitations

Abbreviations: CEA = cost-effectiveness analysis; CI = confidence interval; CUA = cost-utility analysis; ICER = incremental cost-effectiveness ratio; NR = not reported; EQ-5D = EuroQol; SF-6D = Short Form 6 dimensions ‡ Converted using 2006 Purchasing Power Parities Organisation for Economic Co-operation and Development (OECD). OECD Stat Extracts: purchasing power parities for GDP. http://stats oecd org/Index aspx?datasetcode=SNA_TABLE4 [2010 [accessed2011 Feb 24]

** Directly applicable / Partially applicable / Not applicable; ** Minor limitations /Potentially serious Limitations / Very serious limitations*

Marchetti A, Feldman SR, Kimball AB et al. Treatments for mild-to-moderate recalcitrant plaque psoriasis: expected clinical and economic outcomes for first-line and second-line care. Dermatol Online J. 2005; 11(1) Ref ID: MARCHETTI2005{Marchetti, 2005 MARCHETTI2005 /id}				
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost effectiveness**
Economic analysis: CEA **Study design:** Decision analytic model	**Population:** Patients with mild to moderate psoriasis **Cohort settings:**	**Total costs (mean per patient):** Intvn 1: £2,954 Intvn 2: £3,164 Incremental (2-1): £210	**Primary outcome measure:** Remission days (mean per patient) Intvn 1: 189.5 Intvn 2: 199.8	**Primary ICER (Intvn 2 vs Intvn 1):** ICER: £20 per additional remission day CI: NR **Other:** None

Marchetti A, Feldman SR, Kimball AB et al. Treatments for mild-to-moderate recalcitrant plaque psoriasis: expected clinical and economic outcomes for first-line and second-line care. Dermatol Online J. 2005; 11(1) Ref ID: MARCHETTI2005{Marchetti, 2005 MARCHETTI2005 /id}				
Approach to analysis: **Perspective:** US third party payer **Time horizon:** 1 year **Treatment effect duration:** Intervention specific treatment effect duration Broadband UVB: 3m PUVA: 5.5m **Discounting:** Costs: NA; Outcomes: NA	Start age = not reported M = not reported **Intervention 1:** Broadband UVB (2 times/wk for 8 wks followed by once every 3 wks for 12 wks) **Intervention 2:** PUVA (2 times/wk for 14 wks followed by once every 3 wks for 22 wks)	(CI NR; p=NR) **Currency & cost year:** 2003 US dollars (presented here as 2003 UK pounds‡) **Cost components incorporated:** Acquisition cost of intervention, administration costs, follow-up costs, cost of adverse events	Incremental (2-1): 10.3 (CI NR; p=NR) **Other outcome measures (mean):** None	**Subgroup analyses:** None **Analysis of uncertainty:** No sensitivity analyses were reported.
Data sources				
Health outcomes: Clinical outcomes were computed using published data on probabilities for superior response (defined as a ≥75% improvement in the physical signs and smptoms of disease) and probabilities of relapse as well as the duration of remission. Days spent in remission were the ultimate measure of effect. Single studies served as the source of effectiveness for each intervention. Iest and colleagues{Iest, 1989 IEST1989 /id} was used to inform the effectiveness of broadband UVB and Lauharanta and colleagues {Lauharanta, 1981 LAUHARANTA1981 /id} was used for PUVA. Koo and colleagues was used to inform the duration of treatment effect. Incidences of specific adverse events were taken from several different sources. **Quality-of-life weights:** NA **Cost sources:** Total costs for drugs were based on their wholesale acquisition cost from the *2003 Drug Topics Red Book*. Costs for clinical procedures such as administration of phototherapy and screening and monitoring were based on Medicare 2003 reimbursement rates (no reference cited).				
Comments				
Source of funding: NR **Limitations:** The study was based on clinical practice in the United States, and although costs were based on Medicare reimbursement rates, it is unclear how applicable this would be to practice in the UK NHS. The study used the outcome of mean total 'remission days' instead of the NICE preferred measure of QALYs. The treatment effect estimates were based on an unadjusted indirect comparison from an unsystematic review of the evidence instead of meta-analysis or network meta-analyses based on a systematic review. No sensitivity analysis was reported. There is no cost-effectiveness threshold for 'additional remission days' by which to judge the cost-effectiveness of interventions. **Other:**				

Marchetti A, Feldman SR, Kimball AB et al. Treatments for mild-to-moderate recalcitrant plaque psoriasis: expected clinical and economic outcomes for first-line and second-line care. Dermatol Online J. 2005; 11(1) Ref ID: MARCHETTI2005{Marchetti, 2005 MARCHETTI2005 /id}				
Overall applicability*: Partially applicable **Overall quality**:** Very serious limitations				

Abbreviations: CEA = cost-effectiveness analysis; CI = confidence interval; CUA = cost-utility analysis; ICER = incremental cost-effectiveness ratio; NR = not reported; ‡ Converted using 2006 Purchasing Power Parities Organisation for Economic Co-operation and Development (OECD). OECD Stat Extracts: purchasing power parities for GDP. http://stats oecd org/Index aspx?datasetcode=SNA_TABLE4 [2010 [accessed2011 Feb 24]

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Pearce DJ, Nelson AA, Fleischer AB et al. The cost-effectiveness and cost of treatment failures associated with systemic psoriasis therapies. J Dermatol Treat. 2006; 17(1):29-37. Ref ID: PEARCE2006{Pearce, 2006 PEARCE2006 /id}				
Study details	**Population & interventions**	**Costs**	**Health outcomes**	**Cost effectiveness**
Economic analysis: CEA **Study design:** Simple decision model **Approach to analysis:** Performed an unadjusted indirect comparison to estimate the mean effectiveness (defined as the proportion of patients achieving a PASI75 or total body clearance) of interventions; calculated costs for each intervention; combined costs and outcomes into a cost per additional 1% achieving PASI 75	**Population:** Patients with moderate to severe psoriasis **Cohort settings:** Mean age range = 41 to 46 yrs M percent range = 61% to 83% **Intervention 1:** Acitretin (25 mg/day) **Intervention 2:** Cyclosporine (400 mg/day) **Intervention 3:** Methotrexate (15 mg/week) **Intervention 4:** Narrowband UVB(3 times/wk) **Intervention 5:** PUVA (3 times / wk; 40 mg methosoxalen with each	**Total costs (mean per patient):** Intvn 1: £910 Intvn 2: £1,580 Intvn 3: £280 Intvn 4: £1,704 Intvn 5: £2,514 **Currency & cost year:** 2003 US dollars (presented here as 2003 UK pounds‡) **Cost components incorporated:** Acquisition cost of intervention, administration costs, screening and monitoring costs	**Primary outcome measure:** Proportion achieving PASI75 or total body clearance Intvn 1: 52% Intvn 2: 83% Intvn 3: 70% Intvn 4: 72% Intvn 5: 84% **Other outcome measures (mean):** None	**Primary ICER** **Intvn 2 vs Intvn 3** (Cyclosporine vs Methotrexate)**:** £100 per additional 1% achieving PASI 75 or total body clearance **Intvn 5 vs Intvn 2** (PUVA vs Cyclosporine)**:** £934 per additional 1% achieving PASI75 or total body clearance Acitretin was dominated by Methotrexate and Narrowband UVB was dominated by Cyclosporine. **Other:** None **Subgroup analyses:** None **Analysis of uncertainty:** The authors performed a deterministic sensitivity analysis varying efficacies by a factor of ± 5%. The results of this sensitivity analysis are not reported in such a way as to determine their

Pearce DJ, Nelson AA, Fleischer AB et al. The cost-effectiveness and cost of treatment failures associated with systemic psoriasis therapies. J Dermatol Treat. 2006; 17(1):29-37. Ref ID: PEARCE2006{Pearce, 2006 PEARCE2006 /id}				
Perspective: US third-party payer **Time horizon:** 12 weeks **Treatment effect duration:** NA **Discounting:** Costs: NA; Outcomes: NA	treatment)			likely effect on the basecase results.

Data sources

Health outcomes: Effectiveness for each intervention (defined as the percentage of patients achieving PASI75 for systemic therapies or total body clearance for phototherapy) was estimated through a systematic review of randomised trial evidence. A weighted average proportion was calculated for each intervention by pooling the results of relevant trial arms (e.g. an unadjusted indirect comparison).

Quality-of-life weights: NA

Cost sources: Total costs for drugs were based on their wholesale acquisition cost from the *2003 Drug Topics Red Book*. Costs for clinical procedures such as administration of phototherapy and screening and monitoring were based on Medicare 2003 reimbursement rates (no reference cited). For drugs prescribed based on weight, the authors assumed a patient weight of 80 kg.

Comments

Source of funding: Galderma Laboratories

Limitations: The study was based on clinical practice in the United States, and although costs were based on Medicare reimbursement rates, it is unclear how applicable this would be to practice in the UK NHS. The study used the outcome of proportion achieving a PASI75 or total body clearance instead of the NICE preferred measure of QALYs. The treatment effect estimates were based on an unadjusted indirect comparison instead of meta-analysis or network meta-analyses. The time horizon of the analysis is 12 weeks, potentially too short to observe the full effectiveness of some interventions and insufficient to judge the longer term outcomes of treatment. Costs associated with treatment failures are ignored. There is no cost-effectiveness threshold for 'additional 1% achieving PASI75 or total body clearance' by which to judge the cost-effectiveness of interventions. The study was funded by Galderma Laboratories, but they are not makers of any of the compared interventions.

Other:

Overall applicability*: Partially applicable **Overall quality**:** Very serious limitations

Abbreviations: CEA = cost-effectiveness analysis; CI = confidence interval; CUA = cost-utility analysis; ICER = incremental cost-effectiveness ratio; NR = not reported; ‡ Converted using 2006 Purchasing Power Parities Organisation for Economic Co-operation and Development (OECD). OECD Stat Extracts: purchasing power parities for GDP. http://stats oecd org/Index aspx?datasetcode=SNA_TABLE4 [2010 [accessed2011 Feb 24]

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