

Appendix H: Health economic evidence tables

Study	Isetta 2015 ¹⁹			
Study details	Population & interventions	Costs	Health outcomes	Cost effectiveness
<p>Economic analysis: Cost-utility analysis</p> <p>Study design: Approach to analysis: Within trial analysis (RCT)</p> <p>Perspective: Spanish provider perspective ^(a)</p> <p>Follow-up: 6 months</p> <p>Treatment effect duration:^(b) 6 months</p> <p>Discounting: Costs = NR Outcomes = NR</p>	<p>Population: Patients requiring CPAP after an overnight sleep study.^(c)</p> <p>Cohort settings: Mean: 49 N = 139 Drop out: 16 (11.5%)</p> <p>Intervention 1: <u>Hospital-based follow-up</u> Received standard face-to-face follow-up with visits at months 1, 3 and 6, and extra visits if needed.</p> <p>Intervention 2: <u>Telemedicine-based follow-up</u> Patients received their follow-up at home supported by website which included information about OSA and CPAP. Patients would also complete biweekly six-item questionnaire about their status, physical activity, sleep time, CPAP use and treatment side effects. Staff would monitor responses and</p>	<p>Scenario 1: Total costs (mean per patient) including GP visits, emergency visits and medication: Intervention 1: £117 Intervention 2: £127 Incremental (2-1): £10 (95% CI: NR; p=NR)</p> <p>Scenario 2: Total costs (mean per patient) excluding GP visits, emergency visits and medication: Intervention 1: £80 Intervention 2: £82 Incremental (2-1): £2 (95% CI: NR; p=NR)</p> <p>Currency & cost year: 2013 euros (presented here as 2013 UK pounds ^(d))</p> <p>Cost components incorporated: Scenario 1 includes follow-up visit time (month 1, 3 and 6), mask changes, extra visits by physician or nurse, plus <u>GP visits</u>,</p>	<p>QALYs (mean per patient): Intervention 1: 0.0120 Intervention 2: 0.0108 Incremental (2-1): - 0.0012 (95% CI: -0.0500 to 0.0474 NR; p=NR)</p>	<p>ICER (Intervention 2 versus Intervention 1) ^(e): Intervention 2 is dominated by intervention 1 in both costing scenarios.</p>

	communicate with patients through the websites messaging tool. Skype calls were undertaken at months 1 and 3.	<u>emergency visits and medications.</u> Scenario 2 includes follow-up visit time, mask changes and extra visits only.		
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Data sources

Health outcomes: Health-related quality of life (EQ-5D) reported directly from patients **Quality-of-life weights:** EQ-5D tariff used is not explicitly stated, though a reference to the Spanish version of the EQ-5D is made. **Cost sources:** Unit costs calculated by the administrative departments of one of the participating hospitals.

Comments

Source of funding: Spanish Society of Pneumology and Thoracic Surgery **Limitations:** Table 4 lists the costing inputs which should sum to the total mean costs (table 5). However, the sum of the costs in table 4 does not equate to the total mean costs reported in the study in table 5 and the difference is too large to be due to rounding. This indicates either a summing error or lack of transparency of other costs which were incurred that have not been reported. The authors have included patient and provider costs, therefore the patient costs were deducted by the NGC to conform to the NICE reference case. Furthermore, the authors have included costs for GP visits, emergency visits and medications without providing clarity as to whether these costs were related to the patient's OSA or another condition. To overcome this limitation two costing scenarios have been reported by the NGC: scenario 1 includes these additional costs, scenario 2 excludes these costs. Another limitation of the study is that the authors state that for hospital-based follow-up visits were arranged at months 1, 3 and 6. For the telemedicine-based follow-up only the appointments at month 1 and 3 are explicitly stated. It is unclear whether a skype meeting also took place at 6 months.

Overall applicability: Partially Applicable ^(f) **Overall quality:** Potentially serious limitations ^(g)

Abbreviations: 95% CI= 95% confidence interval; CUA= cost-utility analysis; EQ-5D= Euroqol 5 dimensions (scale: 0.0 [death] to 1.0 [full health], negative values mean worse than death); ICER= incremental cost-effectiveness ratio; NGC=National Guideline Centre; NR= not reported; pa= probabilistic analysis; QALYs= quality-adjusted life years

- (a) The study also presented patient costs therefore all costs and ICERs were recalculated to report a provider perspective only.
- (b) It is unclear whether the telemedicine-based follow-up lasted for the whole 6 months – see limitations.
- (c) It is unclear if the study included participants <18 years.
- (d) Converted using 2013 purchasing power parities ³⁰. The within trial study lasted from 2011 to 2013, as the costs in individual years have not been reported, the UK costs in 2013 has been calculated.
- (e) A probabilistic sensitivity analysis (PSA) has been conducted; however the analysis was completed on input parameters which included patient perspective costs. For this reason, the results of the PSA have not been reported here.
- (f) Directly applicable / Partially applicable / Not applicable
- (g) Minor limitations / Potentially serious limitations / Very serious limitations

Study	Turino 2017 ⁴²																
Study details	Population & interventions	Costs	Health outcomes	Cost effectiveness													
<p>Economic analysis: Cost-utility analysis</p> <p>Study design: Within trial analysis (RCT)</p> <p>Approach to analysis: Mean costs and mean QALYs compared over the duration of the study period (3 months).</p> <p>Perspective: Spanish provider perspective</p> <p>Follow-up: 3 months</p> <p>Treatment effect duration: 3 months</p> <p>Discounting: Costs = NR Outcomes = NR</p>	<p>Population: Adult patients (18>) with newly diagnosed OSA (AHI>15events/hr) requiring treatment with CPAP.</p> <p>Cohort settings: Mean age: 54 N = 100 Drop out: NR</p> <p>Intervention 1: <u>Standard Care</u> (1) Patients are fitted with a mask, given a CPAP device and provided a leaflet on how to use it. A short instruction session is also provided to patients and their partners in the sleep unit by a trained nurse to demonstrate how put on the mask, correct management and cleaning of device. When machine is delivered to patients, advice on how to turn the device on and was given by the homecare provider. (2) All patients visited after 1 month of treatment by the specialist nurse at the sleep unit. Data on: CPAP pressure, compliance and adherence (CPAP use ≥4hrs/day), residual respiratory events and leaks. (3)Additional visits and calls where appropriate.</p> <p>Intervention 2: <u>Telemonitoring</u></p>	<p>Total costs (mean per patient): Intervention 1: £170 Intervention 2: £125 Incremental (2-1): saves £45 (95% CI: NR)</p> <p>Currency & cost year: 2015 euros (presented here as 2015 UK pounds ^(a))</p> <p>Cost components incorporated: Telemonitoring including 2G (GSM/GPRS) daily data transfer and alarm management, sleep unit visits and consultations, home visits and consultations and costs associated with changes in CPAP device components.</p>	<p>QALYs (mean per patient) reported in study: Intervention 1: 0.060 Intervention 2: 0.057 Incremental (2-1): -0.003 (95% CI: NR; p=NR)</p> <p>QALYs (mean per patient) recalculated^(b): Intervention 1: 0.015 Intervention 2: 0.014 Incremental (2-1): -0.001 (95% CI: NR; p=NR)</p>	<p>ICER (Intervention 1 versus Intervention 2) using <i>study</i> reported QALYs: £15,000 per QALY gained</p> <p>ICER (Intervention 1 versus Intervention 2) using <i>recalculated</i> QALYs: £45,000 per QALY gained</p> <p>Analysis of uncertainty: A deterministic sensitivity analysis was conducted which explored 25% and 50% increases in the CPAP provider costs.</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>New costs</th> <th>25%</th> <th>50%</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>£174</td> <td>£178</td> </tr> <tr> <td>2</td> <td>£137</td> <td>£148</td> </tr> </tbody> </table> <p>ICER (intervention 1 versus intervention 2) when provider costs are increased and <i>study</i> QALYs are used:</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tbody> <tr> <td>25%</td> <td>£12,333 per QALY gained</td> </tr> <tr> <td>50%</td> <td>£10,000 per QALY gained</td> </tr> </tbody> </table> <p>ICER (intervention 1 versus intervention 2) when provider</p>	New costs	25%	50%	1	£174	£178	2	£137	£148	25%	£12,333 per QALY gained	50%	£10,000 per QALY gained
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	<p>(1) Same as (1) in intervention 1. However in this instance, each CPAP device provided to patients was equipped with mobile 2G (GSM/GPRS) technology capable of sending daily information on: CPAP adherence, CPAP pressures, mask leak and residual respiratory events.</p> <p>(2) Data uploaded to a web database. Automatic alarms were generated in case of mask leak (>30L/min for more than 30% of night) or poor compliance (<4hr/night). In cases of alarm, specialist contacted patient to provide case-by-case problem solving.</p>			<p>costs are increased and <i>recalculated</i> QALYs are used:</p> <table border="1" style="width: 100%;"> <tr> <td style="width: 15%;">25%</td> <td>£37,000 per QALY gained</td> </tr> <tr> <td>50%</td> <td>£30,000 per QALY gained</td> </tr> </table>	25%	£37,000 per QALY gained	50%	£30,000 per QALY gained
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Data sources

Health outcomes: Health-related quality of life (EQ-5D) reported directly from patients. **Quality-of-life weights:** EQ-5D tariff used not stated. **Cost sources:** Resource use from within RCT; costs reported as the mean costs incurred per patient for the trial duration (January and July 2015) by Catalan Institute of Health.

Comments

Source of funding: Partially funded by ResMed Spain and Associacio Lleidatana de Respiratori (ALLER). **Limitations:** A key limitation of this study is that it has not reported its method for deriving QALYs. Based on the explanations provided, it appears the authors have equated improvements in quality of life measured by the EQ-5D to improvements in QALYs which is methodologically incorrect i.e. a 0.003 higher EQ-5D at 3 months is not the same as a 0.003 gain in QALYs. Instead, to calculate the correct QALY gains over the three month period the EQ-5D gains must be multiplied by 0.25 or else an assumption must be stated about how long the difference would be sustained. Another limitation of the study is the short follow-up and it is unclear whether a longer time horizon would have indicated that the telemonitoring group have greater compliance and therefore improved health outcomes. **Other:** If the QALYs reported in the study are accepted as the true QALYs, standard care would be cost-effective when compared to telemonitoring at the £20,000 threshold. However, if the recalculated QALYs are used, then the new ICER would indicate that standard care is not cost-effective at that threshold.

Overall applicability:^(c) Partially Applicable **Overall quality:**^(d) Potentially Serious Limitations

Abbreviations: CPAP=Continuous positive airway pressure; EQ-5D= Euroqol 5 dimensions (scale: 0.0 [death] to 1.0 [full health], negative values mean worse than death); ICER= incremental cost-effectiveness ratio; NR= not reported; pa= probabilistic analysis; QALYs= quality-adjusted life years; RCT = Randomised control trial

- (a) *Converted using 2014 purchasing power parities* ³⁰
- (b) *The authors have not clearly described their method of calculating QALYs, and based on their current explanation the authors may have overestimated the QALY gained. Further explanation is provided in the limitation section of the above table.*
- (c) *Directly applicable / Partially applicable / Not applicable*
- (d) *Minor limitations / Potentially serious limitations / Very serious limitations*