

# Cost-Effectiveness of Online Cognitive Behavioural Therapy for Children with Chronic Fatigue Syndrome/ Myalgic Encephalomyelitis: FITNET-NHS

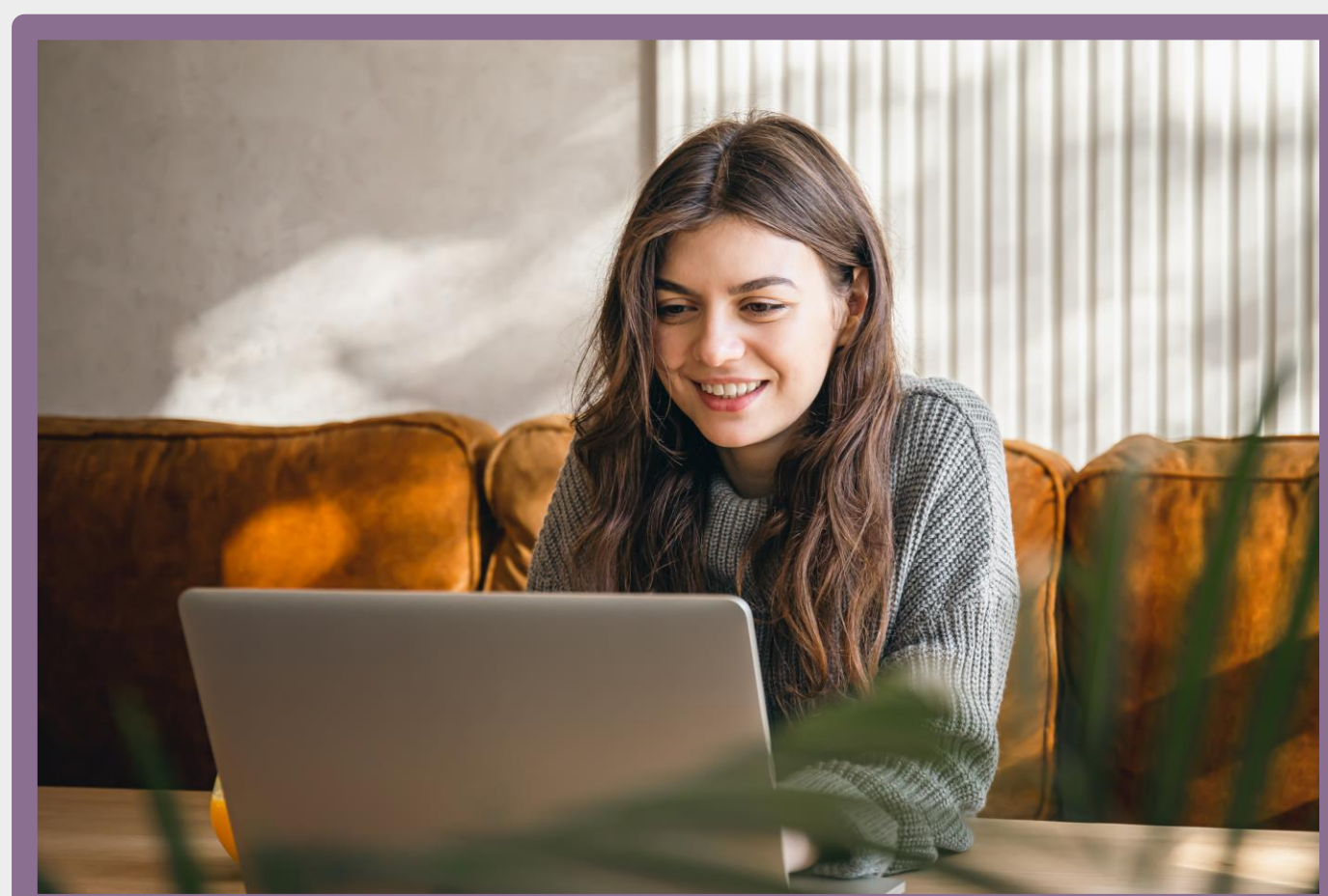
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## Introduction

In the UK, 0.5% of children are estimated to have Chronic Fatigue Syndrome/ Myalgic Encephalomyelitis (CFS/ ME) (1). Most children with CFS/ ME do not have local access to specialist care (2). More than a third of children with CFS/ ME have comorbid anxiety/ depression.



In the Netherlands, Fatigue in Teenagers on the InterNET (FITNET), an online Cognitive Behavioural Therapy (CBT) intervention was found to be effective for children with CFS/ ME (3).

## Objectives

**Primary objective:** From a UK National Health Service (NHS) perspective we assessed the cost-effectiveness of delivering online CBT in the NHS (FITNET-NHS) for children with CFS/ ME and their parents.

**Secondary objectives:** We conducted a subgroup analysis for children with and without mild/ moderate comorbid anxiety/depression. We also assessed cost-effectiveness from a wider perspective incorporating parent/carer costs and education impacts.

## Methods: Primary Analysis

**Trial design:** 314 children aged 11 to 17 years old with no local access to specialist CFS/ ME care were recruited to a two-arm randomised controlled trial via their GP.

**Intervention:** FITNET-NHS was delivered online via email consultations. It comprised of 19 psycho-educational and CBT online chapters for children and a parallel programme for parents.

**Comparator:** Activity Management, an approach recommended in national guidelines, was delivered online via videocall (Skype/ Zoom). Children were supported to understand their baseline activity and to increase their activity amount each week.



**Costs:** Treatment delivery and secondary care costs were captured via electronic health records. Primary and community care, prescribed medications, productivity loss, parent/carer out-of-pocket costs and education impacts were captured via an online resource use questionnaire completed by parents at 3-, 6- and 12-months.

**Outcome:** The EQ-5D-5Y was collected at baseline, 3, 6 and 12 months using an online questionnaire completed by the child. A proxy EQ-5D-Y value set derived for the German population was used to calculate utility scores (4). Quality-adjusted life years (QALYs) for each child were calculated from utility scores using the area under the curve approach.

**Primary analysis:** A within-trial cost-utility analysis was conducted over a 12-month time horizon. Seemingly unrelated regression and multiple imputation by chained equations were used to estimate mean incremental differences in costs and QALYs. Incremental net monetary benefit (INMB) was calculated to assess cost-effectiveness at the UK's thresholds of £20,000 per QALY.

## Methods: Secondary Analyses

**Subgroup analysis:** We explored the interaction between comorbid anxiety/ depression disorder and cost-effectiveness of FITNET-NHS. **Sensitivity analyses:** Complete case analysis; missing not at random analysis; and exploring uncertainty in the selected unit costs and valuation set.

## Results: Primary Analysis

Online FITNET-NHS had a small gain in mean QALYs (0.002) and substantially higher mean costs (£1048) compared to online Activity Management (Table 1). At a threshold of £20,000 per QALY the INMB was negative. FITNET-NHS was unlikely to be cost-effective (Table 2).

Table 1. Mean costs and QALYs per arm\*

Arm	n	Costs (95% CI)	QALYs (95% CI)
FITNET-NHS	155	£2826 (£2525 to £3126)	0.532 (0.501 to 0.564)
Activity Management	159	£1778 (£1481 to £2075)	0.530 (0.501 to 0.558)

\*Adjusted for age and gender. In addition, baseline utility for QALYs; CI: Confidence Intervals. 2019/20 prices.

Table 2. Incremental mean difference and net monetary benefit

Costs (95%CI)	QALYs (95%CI)	ICER	INMB (95% CI)
£1048 (£625 to £1470)	0.002 (-0.041 to 0.045)	£457,721	£-1002 (£-2041 to £38)

ICER: Incremental Cost-Effectiveness Ratio; INMB: Incremental Net Monetary Benefit; CI: Confidence Intervals. 2019/20 prices

The wide confidence intervals (Tables 1 and 2) and cost-effectiveness acceptability curve (Figure 1) illustrate the uncertainty in our estimates. Across a range of willingness-to-pay thresholds there was a low probability that FITNET-NHS is cost-effective compared to Activity Management.

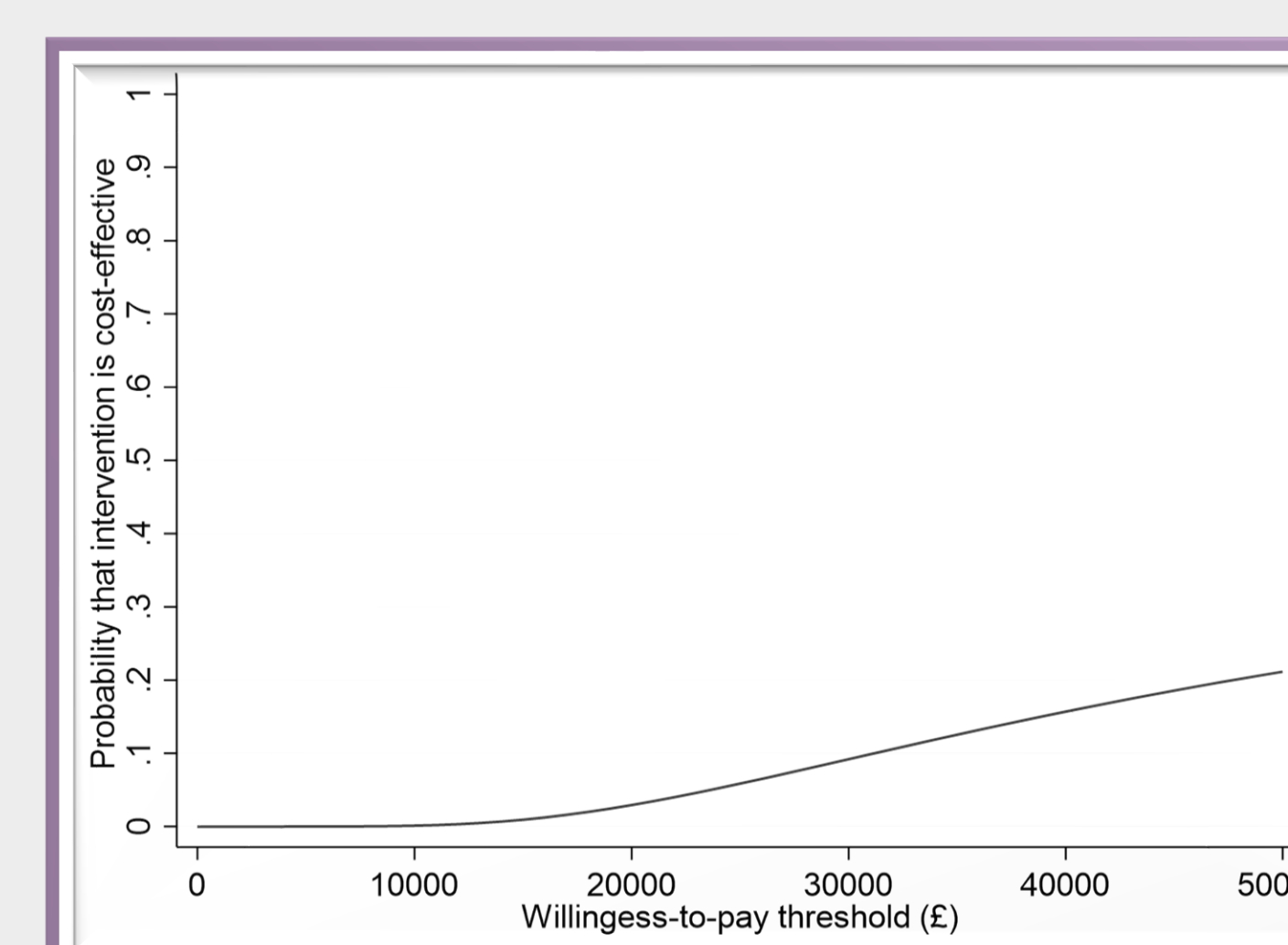


Figure 1. NHS perspective with multiple imputation (n=314)

## Results: Secondary Analyses

The subgroup analysis indicated that there is a higher probability of FITNET-NHS being cost-effective for children with comorbid anxiety/depression. However, there is considerable uncertainty in these findings. Overall, the results from our range of sensitivity analyses did not change our interpretation of our main findings. In all additional analyses FITNET-NHS was unlikely to be cost-effective.

## Conclusion

FITNET-NHS (online CBT) is unlikely to be cost-effective compared to online Activity Management within the first 12-months. Our study makes a novel contribution to the CFS/ME literature. To our knowledge, it is the first study to assess cost-effectiveness of online CBT for children with ME/ CFS, as well as being the first study to assess cost-effectiveness of CFS/ ME treatment for children with comorbid anxiety/ depression (5).

## References

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