National Guideline Alliance

Version 1.0

Eating disorders: recognition and treatment of eating disorders

Appendix S - The Cost Effectiveness of interventions for adults with bulimia nervosa and binge eating disorder

NICE Guideline

Methods, evidence and recommendations

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Contents

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Abbreviations

BED	binge eating disorder
BN	bulimia nervosa
BT	behavioural therapy
CBT	cognitive behavioural therapy
CBT-ED	cognitive behavioural therapy specific to eating disorders
CEAC	cost effectiveness acceptability curve
CrI	credible intervals
CT	cognitive therapy
EQ-5D	EuroQol five dimensions questionnaire
GC	Guideline Committee
GP	general practitioner
HRQoL	health related quality of life
ICER	incremental cost-effectiveness ratio
IPT	interpersonal psychotherapy
ITT	intention to treat analysis
N	number of participants
NHS	National Health Service
NMA	network meta-analysis
OR	odds ratio
PSS	Personal Social Services
QALY	quality adjusted life year
RCT	randomised controlled trial
SF-36	the 36-Item Short Form Health Survey

Appendix S: Economic modelling interventions for people with bulimia nervosa

S.1 Introduction – objective of economic modelling

The cost effectiveness of interventions for adults with bulimia nervosa (BN) was considered by the committee as an area with likely significant resource implications.

Existing economic evidence on the cost effectiveness of psychological therapies for adults with BN was limited to 1 US study that is not directly applicable to the UK setting and did not assess the whole range of treatments available in the UK. Therefore, an economic analysis was undertaken to assess the cost effectiveness of treatments for adults with BN.

S.2 Economic modelling methods

S.2.1 Interventions assessed

The choice of treatments assessed in the economic analysis was determined by the availability of respective clinical data included in the guideline systematic literature review. The economic analysis considered effective treatments, as demonstrated by the systematic review of clinical evidence, that were deemed appropriate by the committee as treatment options for people with BN in the UK. The following treatments were assessed in the economic analysis: self-help with support and cognitive behavioural therapy specific to eating

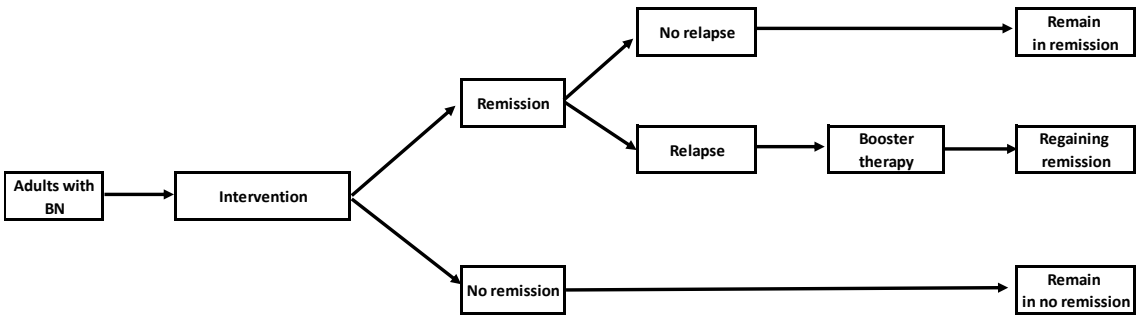
disorders (CBT-ED) individual. The model also considered no treatment (wait list) as a comparator.

S.2.2 Model structure

A decision-analytic model in the form of a decision-tree was constructed using Microsoft Office Excel 2013. The structure of the model was determined by the availability of clinical data. According to the model structure, hypothetical cohorts of people with BN were initiated on each of the 2 treatments assessed (self-help with support or CBT-ED individual) or no treatment (wait list). People initiated on the treatment were assumed to continue treatment for 16 weeks. Intention to treat (ITT) analysis was adopted when estimating full remission (that is, any one discontinuing for whatever reason was assumed to be a non-remitter). Consequently, discontinuation was not considered explicitly in the model. People at the end of treatment either achieved full remission or did not remit. Those who achieved full remission had regular visits with the therapist, GP visits and dental care over 1 year of follow-up. During 1 year follow-up, they either experienced a relapse or did not relapse. People not remitting after the initial treatment were switched to another treatment during the 1 year follow-up and incurred standard care costs, which given the lack of suitable data were modelled as an average of all available psychological treatments assessed in the economic analysis. They were assumed to remain in the no-remission health state for the duration of the model. People who relapsed were assumed to have booster sessions to re-establish remission. According to the guideline committee (GC) expert opinion all people following booster sessions would regain remission.

The time horizon of the analysis was 1 year and 4 months, based on the average duration of initial treatment (4 months) and follow-up (1 year). A schematic diagram of the decision-tree is presented in Figure 1.

Figure 1: Schematic diagram of the decision-tree constructed for the assessment of the relative cost effectiveness of interventions for people with BN



S.2.3 Costs and outcomes considered in the analysis

The economic analysis adopted the perspective of the National Health Service (NHS) and personal social services (PSS), as recommended by (NICE., 2014). Costs consisted of intervention costs (including contacts with healthcare professionals, such as psychologists and mental health nurses) and other health care costs incurred by people with BN in remission (such as contacts with the aforementioned healthcare professionals and dental care); and costs incurred by those not remitting following treatment or experiencing a relapse following full remission (including contacts with the aforementioned healthcare professionals and blood tests). The measure of outcome was the quality adjusted life year (QALY).

S.2.4 Clinical input parameters and overview of methods employed for evidence synthesis

Clinical input parameters consisted of the probability of full remission and the probability of relapse following full remission.

The guideline systematic review of the clinical literature on treatments identified 1 dichotomous outcome that could be utilised in the economic modelling: full remission (defined as cessation of BN-related symptoms over and above 2 weeks).

To take all trial information into consideration, network (mixed treatment comparison) meta-analytic techniques were employed to synthesise evidence on full remission (the methods used can be found in Appendix U). Network meta-analysis (NMA) is a generalisation of standard pair-wise meta-analysis for A versus B trials to data structures that include, for example, A versus B, B versus C and A versus C trials (Lu and Ades, 2004). A basic assumption of NMA is that direct and indirect evidence estimate the same parameter; in other words, the relative effect between A and B measured directly from an A versus B trial is the same with the relative effect between A and B estimated indirectly from A versus C and B versus C trials. Network meta-analytic techniques strengthen inference concerning the relative effect of two treatments by including both direct and indirect comparisons between treatments and, at the same time, allow simultaneous inference on all treatments examined in the pair-wise trial comparisons while respecting randomisation (Lu and Ades, 2004, Caldwell et al., 2005). Simultaneous inference on the relative effect of a number of treatments is possible provided that treatments participate in a single 'network of evidence', that is, every treatment is linked to at least one of the other treatments under assessment through direct or indirect comparisons.

The baseline probability of remission that was assigned to wait list and utilised in the NMA in order to estimate the probability of remission of the other 2 interventions was derived from a publication by Fairburn and colleagues (2000). In the study, 2 community-based cohorts were studied prospectively over a 5 year period. One of them comprised 102 participants with BN. All participants were female and aged between 16 and 35 years. The assessments were at 15 month intervals and addressed eating disorder features, general psychiatric symptoms, social functioning and also reported relapse rates. A 15 month cumulative probability of remission reported in the study was used to estimate the 16 week probability of remission, using exponential function, which was subsequently attached to wait list and was utilised in the NMA.

Details on the methods, clinical data utilised, and the full findings of the NMA that was undertaken to estimate full remission for each treatment option considered in the economic analysis are presented in Appendix U. Inconsistency checks are presented in the Appendix Q. The summary of the findings of the NMA are discussed in the next sub-section.

The probability of relapse following full remission was also estimated based on the study by Fairburn and colleagues (2000). A cumulative 15 month reported relapse risk was used to estimate the relapse risk at 12 months that was utilised in the economic analysis.

Table 2 provides all the clinical input parameters utilised in the economic model.

S.2.5 Findings of the NMA undertaken to inform the economic analysis

The summary statistics of a number of parameters of the NMA undertaken to inform the economic analysis, including the odds ratios (ORs) of all treatments considered in the economic analysis versus wait list and the between-trial variation, are reported in Appendix U. The NMA included a range of treatments including CBT-ED individual (N=377), Interpersonal Psychotherapy (IPT) (N=200), self-help with support (N=215), self-help with no support (N=125), CBT-ED group (N=68), fluoxetine (N=47), behavioural therapy (BT)-individual (N=41), relaxation (N=39), CBT-ED individual plus fluoxetine (N=39), BT-group

(N=26), supportive psychotherapy (N=22) and wait list (N=177). However, after reviewing the results the committee were uncomfortable making recommendations based on treatments with a total pooled number of participants (N) of less than 150 across all randomised controlled trials (RCTs). It must be noted that the meta-analysis was based on an ITT approach and therefore considered all trial participants without excluding those who discontinued. Participants who discontinued were considered as non-remitters.

IPT was not considered in the economic analysis since it was less effective than CBT-ED individual and self-help with support. The probability of remission was 0.12, 0.32, 0.32 for IPT, CBT-ED individual and self-help with support, respectively. Also, the committee estimated that IPT is more expensive when compared with the self-help with support. As a result, IPT was dominated by self-help with support (that is, self-help with support was estimated to be more effective and less costly than IPT). Consequently, only CBT-ED individual, self-help with support and wait list were assessed in the economic analysis.

Table 1 provides the results of the NMA of data on full remission of each intervention versus wait list that were included in the economic analysis. The table shows the probability of full remission of each option considered in the economic analysis over 16 weeks of treatment (mean and 95% credible intervals [CrI]). Interventions have been ranked from 'best' to 'worst' in terms of their ability to achieve full remission, according to the results of the NMA.

Table 1: Full remission associated with interventions for BN – findings of the NMA

Intervention	Probability of full remission (95% CrI)	Mean OR versus wait list (95% CrI)
CBT-ED individual	0.32 (0.09 to 0.66)	4.88 (1.17 to 14.24)
Self-help with support	0.32 (0.11 to 0.61)	4.51 (1.49 to 11.25)
Wait list	0.10 (0.05 to 0.19)	-

The results of the NMA indicated that wait list had the lowest probability of full remission at 16 weeks (mean 0.10), followed by self-help with support (0.32) and CBT-ED individual (0.32). Both CBT-ED individual and self-help with support showed a significant effect compared with wait list. There was no significant difference between CBT-ED individual and self-help with support. The odds ratio of CBT-ED individual versus self-help with support was 1.14 (95% CrI: 0.36 to 2.81).

S.2.6 Utility data and estimation of quality-adjusted life years

In order to express outcomes in the form of QALYs, the health states of the economic model needed to be linked to appropriate utility scores. Utility scores represent the health-related quality of life (HRQoL) associated with specific health states on a scale from 0 (death) to 1 (perfect health); they are estimated using preference-based measures that capture people's preferences on the HRQoL experienced in the health states under consideration.

NICE recommends the EuroQol five dimensions questionnaire (EQ-5D) (Brooks, 1996) as the preferred measure of HRQoL in adults for use in cost-utility analysis. When EQ-5D scores are not available, NICE recommends that such data be estimated by mapping other health-related quality of life measures to EQ-5D (NICE, 2013).

De la Rie and colleagues (2005) used the 36-Item Short Form Health Survey (SF-36) for the estimation of HRQoL in people with eating disorders, which is a validated generic measure of HRQoL. The algorithm developed by Ara & Brazier (2008) was used to convert the eight mean SF-36 dimension scores into a mean EQ-5D preference based score for each population in the study; thus the resulting utility values that were used in the economic analysis satisfy the NICE criteria for use of utility data in cost-utility analysis.

The HRQoL data reported in de la Rie and colleagues (2005) corresponded to the health states described in the economic model. In this study HRQoL was reported for BN and

'former ED'. HRQoL associated with BN was used to estimate utility scores for people with active BN and HRQoL associated with 'former eating disorder' was used to estimate utility scores for people who are in the 'full remission' health state.

It was assumed that the improvement in utility for people with BN remitting after treatment occurred linearly over the 16 weeks of treatment, starting from the utility value of active BN and reaching the utility value of former eating disorder. People responding and not relapsing were assumed to have their utility equivalent to 'former eating disorder' during the remainder duration of the model (1 year). People relapsing following remission were assumed to experience a linear reduction in their utility during the follow-up, starting (at the end of treatment) from the utility value of 'former eating disorder' and reaching the utility value of active BN (at 6 months of follow-up). According to the committee expert opinion, people who relapse would get booster sessions of their initial therapy to re-establish remission. Hence, it was assumed that these people would experience a linear improvement in their utility during the remainder of the follow-up (6 months), starting (at 6 months of follow-up) from active BN and reaching the utility of 'former eating disorder' at the end of the model (at 1 year follow-up). In contrast, people who did not achieve full remission at the end of treatment were assumed to experience the utility value of 'active BN' for the remainder duration of the model (1 year).

S.2.7 Cost data

Intervention costs as well as other health and social care costs incurred by people with BN were calculated by combining resource use estimates with respective national unit costs.

Intervention costs for CBT-ED individual consisted of therapists' time. The cost of a therapist's time was estimated by combining the mean total therapist's time per person treated, as reported in the study by Mitchell and colleagues (2008), an RCT included in the guideline systematic review, with the national unit cost of a clinical psychologist (Curtis, 2010). According to Mitchell and colleagues (2008) 10% of people receive 1-5 sessions, 12% 6-10 sessions, 9% 11-15 sessions and 69% 16-20 sessions of CBT. This resulted in an average of 15 sessions per course of treatment. The duration of each session was modelled to be 50 minutes. The unit cost of a clinical psychologist per hour of client contact has been estimated based on the median full-time equivalent basic salary for Agenda for Change Band 7 (for qualified Allied Health Professionals) of the January-March 2010 NHS Staff Earnings estimates, including salary, salary oncosts and overheads. The qualification costs were not available for a clinical psychologist. As a result, these were estimated by deriving the ratio of unit costs with and without qualifications for other mental healthcare professionals including a psychiatric consultant and a mental health nurse (Curtis, 2010) and applying this ratio to the unit cost of a clinical psychologist. The unit costs were uplifted to 2014/15 UK pounds (Curtis and Burns, 2015).

Intervention costs for self-help with support consisted of therapists' time providing support (spent on telephone calls, emails and face-to-face contacts as reported in the RCTs included in the guideline systematic review and modified by the committee to reflect the clinical practice in the NHS). Self-help with support was modelled as involving 6 support sessions each lasting 30 minutes. The cost of a therapist's time for self-help was estimated by combining the mean total therapist's time per person treated with the national unit cost of a mental health nurse (Curtis and Burns, 2015). The unit cost of a mental health nurse per hour of client contact was estimated based on the mean full-time equivalent basic salary for Agenda for Change band 5 of the July 2014 to June 2015 NHS staff earnings estimates for nurses, including salary, salary oncosts, qualifications and overheads. The intervention cost also included the cost of a self-help manual. The average cost of 3 manuals was used, including *Overcoming Binge Eating* (Fairburn et al., 1995), *Getting Better Bite By Bite* (Schmidt et al., 2015) and *Overcoming Bulimia Nervosa and Binge Eating* (Cooper, 1993).

The intervention cost of wait list was zero.

The extra health and social care costs incurred by people with BN were estimated based on the committee expert opinion. According to the committee, people with BN who achieve remission would have 2 follow-up consultations with the therapist who delivered initial therapy (that is, band 7 and band 5 worker for CBT-ED individual and self-help with support, respectively); 3 GP visits and 2 dental procedures. The resource use estimates were then combined with appropriate unit costs taken from national sources (Curtis and Burns, 2015, DoH., 2015) in order to estimate an overall annual health and social care cost incurred by people with BN. According to the committee, people with BN would require on average 2 major restorative dental procedures. People who were on the wait list and achieved remission were assumed to have only GP visits and dental care.

Given the lack of suitable data the extra health and social care costs (standard care costs) incurred by people with BN who did not remit following treatment were estimated based also on the committee expert opinion. According to the committee, these people would incur the cost equivalent to the subsequent treatment. The subsequent treatment costs were modelled as the average cost of CBT-ED individual and self-help with support. No inpatient care costs were included in this estimate, as the Committee expressed the view that people with BN are unlikely to receive inpatient care for their ED per se. Also, according to the committee expert opinion, these people would receive monthly blood tests by the GP practice nurse. The cost of blood test (phlebotomy) was obtained from the NHS reference costs 2014/15 (DoH., 2015). The unit cost of the GP practice nurse was obtained from national sources (Curtis and Burns, 2015). This cost was assumed to be the same for all cohorts (that is, people who were initiated on CBT-ED individual, self-help with support and also those on wait list).

The extra health and social care costs incurred by people with BN who remitted and subsequently relapsed were also estimated based on the committee expert opinion. According to the committee, these people would incur the cost equivalent to 5 booster sessions with the therapist who delivered the initial treatment (that is, band 7 and band 5 worker, for CBT-ED individual and self-help with support, respectively). The average of band 7 and band 5 worker was assigned to those on wait list. Also, according to the committee expert opinion people who relapsed would receive weekly blood tests for the duration of the relapse (that is, approximately 2 months) plus 2 GP visits. The cost of blood tests was estimated as mentioned above.

Discounting of costs was not necessary since the time horizon of the analysis was shorter than 2 years.

The average dosages and the total intervention costs over 16 weeks of treatment are presented in Table 2 which reports the mean (deterministic) values of all input parameters utilised in the economic model and provides information on the distributions assigned to specific parameters in probabilistic sensitivity analysis.

1 **Table 2: Input parameters utilised in the economic model of interventions for adults with BN**

Input parameter	Deterministic value	Probabilistic distribution	Source of data - comments
Probability of remission		**95% credible intervals**	NMA of data included in the guideline systematic review; data refer to a period of 16 weeks; distributions based on 10,000 iterations.
CBT-ED individual	0.32	0.09 to 0.66	Probability of remission for wait list at 16 weeks estimated based on data from Fairburn and colleagues (2000), using exponential function.
Self-help with support	0.32	0.11 to 0.61	
Wait list	0.10	0.05 to 0.19	
Probability of relapse at 12 months	0.27	**Beta distribution** α = 8; β = 17	Data from Fairburn and colleagues (2000).
Utilities		**Beta distribution**	Data from de la Rie and colleagues (2005). SF-36 domain scores converted to EQ-5D utility scores using an algorithm developed by Ara & Brazier (2008); distributions estimated using the method of moments.
Remission	0.78	α = 798.75; β = 220.18	
No remission	0.68	α = 340.41; β = 158.21	
Intervention costs (16 weeks) – 2015 prices		**Modified gamma distribution**	Mean number of sessions of CBT-ED individual based on Mitchell and colleagues (2008)) (10% received 1-5 sessions, 12% 6-10 sessions, 9% 11-15 sessions, and 69% 16-20 sessions). Mean duration per session 50 min, delivered by a band 7 clinical psychologist (£101 per hour).A qualification factor of 1.14 was applied based on the average ratio of unit costs for psychiatric consultant and mental health nurse with and without qualifications (Curtis, 2010). Self-help with support sessions based on resource use reported in RCTs included in the guideline systematic review, supported by the committee expert opinion. Six sessions, each lasting 30 min, delivered by band 5 worker (£75 per hour), plus the average cost of 3 manuals (£12.55) including *Overcoming Binge Eating* (Fairburn, 1995), *Getting Better Bite By Bite* (Schmidt et al., 2015) and *Overcoming Bulimia Nervosa and Binge Eating* (Cooper, 1993). National staff unit costs were used (Curtis, 2010, Curtis and Burns, 2015).
CBT-ED individual	£1,247.25	SE: 20% of mean values (assumption)	
Self-help with support	£237.55		
Remission costs during 1 year follow-up – 2015 prices		**Gamma distribution**	CBT-ED individual comprised 2 follow-up consultations with band 7 worker (£101 per hour), 3 GP visits (£44 per contact lasting 11.7 min), and 2 dental procedures. A qualification factor of 1.14 was applied based on the average ratio of unit costs for psychiatric consultant and mental health nurse with and without qualifications as reported in Curtis (2010).
CBT-ED individual	£776.43	SE: 20% of mean values (assumption)	
Self-help with support	£683.00		

Input parameter	Deterministic value	Probabilistic distribution	Source of data - comments
Wait list	£608.00		Self-help with support comprised 2 follow-up consultations with band 5 worker (£75 per hour), 3 GP visits (£44 per contact lasting 11.7 minutes), and 2 dental procedures. For wait list the average of CBT-ED individual and self-help with support cost estimates was used. National staff unit costs were used (Curtis, 2010, Curtis and Burns, 2015). The cost of a dental procedure was obtained from the NHS reference costs 2014/2015 (DoH., 2015), restorative dentistry, major dental procedure (service code CD01A) at £238 per procedure.
Non-remission costs – 2015 prices All treatment options	£909.44 (subsequent treatment costs of £742.40 plus £167.04 monthly blood tests)	**Gamma distribution** SE: 20% of mean values (assumption)	Treatment costs assumed to be equivalent to the average of all available treatments including CBT-ED individual (£1,247 per participant) and self-help with support (£238 per participant) based on committee expert opinion. Cost of a blood test obtained from the NHS reference costs 2014/15 (DoH., 2015) (direct access pathology services, phlebotomy, code DAPS08, £3 per test); administered by a GP practice nurse (£10.92 per contact lasting 11.7 min). National staff unit costs were used (Curtis, 2010, Curtis and Burns, 2015).
Relapse costs – 2015 prices CBT-ED individual Self-help with support Wait list	 £606.51 £372.94 £489.73	**Gamma distribution** SE: 20% of mean values (assumption)	Equivalent to 5 booster sessions with the therapist who delivered the initial treatment (for CBT-ED individual band 7 worker [£101 per hour], 30 min per session; for self-help with support band 5 worker [£75 per hour], 50 min per). Plus 2 GP visits (£44 per contact lasting 11.7 min) and weekly blood tests for approximately 2 months (that is, the duration of the relapse). Cost of blood testing obtained from the NHS reference costs 2014/2015 (direct access pathology services, phlebotomy, code DAPS08, £3 per test) (DoH., 2015); blood test administered by a GP practice nurse (£10.92 per contact lasting 11.7 min). National staff unit costs were used (Curtis, 2010, Curtis and Burns, 2015). For band 7 worker a qualification factor of 1.14 was applied based on the average ratio of unit cost for psychiatric consultant and mental health nurse with and without qualifications as reported in Curtis (2010).

S.2.81 Data analysis and presentation of the results

2 Deterministic and probabilistic analysis was employed to analyse the input parameter data
3 and present the results of the economic analysis.

4 A deterministic analysis was undertaken, where data are analysed as point estimates; results
5 are presented as mean total costs and QALYs associated with each treatment option are
6 assessed. Relative cost effectiveness between alternative treatments was estimated using
7 incremental analysis: all options were ranked from most to least effective. Options that were
8 dominated by absolute dominance (that is, they were less effective and more costly than one
9 or more other options) or by extended dominance (that is, they were less effective and more
10 costly than a linear combination of two alternative options) were excluded from further
11 analysis. Subsequently, incremental cost-effectiveness ratios (ICERs) were calculated for all
12 pairs of consecutive options remaining in the analysis.

13 ICERs expressed the additional cost per additional unit of benefit associated with one
14 treatment option relative to its comparator. Estimation of such a ratio allowed consideration
15 of whether the additional benefit were worth the additional cost when choosing one treatment
16 option over another.

17 The treatment option with the highest ICER below the cost-effectiveness threshold was
18 deemed to be the most cost-effective option.

19 One-way sensitivity analyses explored impact of varying:

20 • the probabilities of remission (using upper and lower CrI)
21 • the relapse rate (±50% around the base-case value)
22 • the utility values (±10% around the base-case value)
23 • the intervention costs (±50% around the base-case value)
24 • the costs of remission (±50% around the base-case value)
25 • the costs of relapse (±50% around the base-case value)
26 • the costs of non-remission (±50% around the base-case value)

27 In addition to deterministic analysis, a probabilistic analysis was also conducted.

28 In this case, all model input parameters were assigned probability distributions (rather than
29 being expressed as point estimates), to reflect the uncertainty characterising the available
30 clinical and cost data. Subsequently, 10,000 iterations were performed, each drawing
31 random values out of the distributions fitted onto the model input parameters. This exercise
32 provided more accurate estimates of mean costs and benefits for each intervention assessed
33 (averaging results from the 10,000 iterations), by capturing the non-linearity characterising
34 the economic model structure (Briggs et al., 2006).

35 The distributions of the probability remission for each treatment option, which were obtained
36 using mixed treatment comparison techniques, were defined directly from values recorded in
37 each of the 10,000 iterations performed in WinBUGS, as described in Appendix U.

38 The probability of relapse was given a beta distribution. Beta distributions were also assigned
39 to utility values, using the method of moments. Costs (with the exception of intervention
40 costs) were assigned a gamma distribution; in order to define the distribution, the assumption
41 was made that costs had a standard error of 20% of their mean value. Intervention costs
42 were assigned the modified gamma distribution skewed to the left of the mode (as people are
43 more likely to miss one or more sessions during the course of treatment). The modified
44 gamma distribution was defined as: 2 x mode - gamma of the mode.

45 Results of probabilistic analysis were presented in the form of cost effectiveness acceptability
46 curves (CEACs), which demonstrated the probability of each treatment option being the most

cost effective among the strategies assessed at different levels of willingness-to-pay per unit of effectiveness (that is, at different cost-effectiveness thresholds the decision maker may set).

S.2.9 Bias adjustment analyses

As part of the sensitivity analyses two different bias adjustment scenarios were tested pertaining to the estimation of treatment effects in the NMA:

- In trials of active treatments versus wait list, active treatments were favoured;
- All active treatments were favoured against wait list and CBT was favoured against other treatments.

The deterministic results were recalculated using the alternative effectiveness data generated using different bias scenarios.

S.2.10 Secondary analysis

The committee expressed the opinion that CBT-ED individual is associated with long-term benefits, as the effect is sustained over a longer period of time than the time horizon of the analysis. As the longer-term benefits of CBT-ED individual were not fully captured by the base-case analysis, a secondary analysis was undertaken, in which the time horizon of the analysis was extended to 5 years.

In the analysis, it was assumed that people will remain in the same health state throughout the 5 years. It was also assumed that people in remission will not incur any costs during the long term follow-up and people who are in no-remission and relapse health states would continue incurring healthcare costs and QALYs as in the year 1 of the follow-up.

The secondary analysis also tested a scenario where people receiving CBT-ED individual do not relapse (that, is all of them sustain remission during the long term follow-up) whereas people receiving self-help with support and wait list were assumed to relapse during the long term follow-up at a rate equivalent to the baseline annual relapse rate of 0.27 (the relapse rate was applied at each year of the long term follow-up). This scenario tested the GCs view that CBT-ED individual is better at sustaining effect at the long term follow-up when compared with self-help with support and wait list.

For the time horizon secondary analysis a discount rate of 3.5% was used for future costs and outcomes.

The probabilistic sensitivity analysis was also undertaken using the costs and outcomes over 5 years.

S.2.11 Economic modelling results

S.2.11.1 Results of the deterministic analysis

According to deterministic analysis, self-help with support was the most cost-effective option with a cost per QALY of £8,822 versus wait list that is well below NICEs lower cost-effectiveness threshold of £20,000 per QALY.

CBT-ED individual was not cost-effective as its ICER versus self-help with support was more than £1 million per QALY. This was because the two interventions were found to have similar effectiveness in terms of full remission, but CBT-ED individual was associated with substantially higher intervention costs.

Table 3 provides mean costs and QALYs for every treatment option assessed in the economic analysis. The 3 options have been ranked from the most to the least effective in

terms of number of QALYs gained. Figure 2 provides the cost-effectiveness plane showing the incremental costs and QALYs of all interventions versus wait list. It can be seen that both interventions resulted in higher costs and QALYs relative to wait list.

Table 3: Mean costs and QALYs for each treatment option for people with BN assessed in the economic analysis - results per 100 people

Treatment option	Mean total costs	Mean total QALYs	Cost effectiveness (cost/QALY)
Wait list	£88,328	92.21	
Self-help with support	£107,830	94.32	£8,822 (vs. wait list)
CBT-ED individual	£213,264	94.38	£1,855,125 (vs. self-help with support)

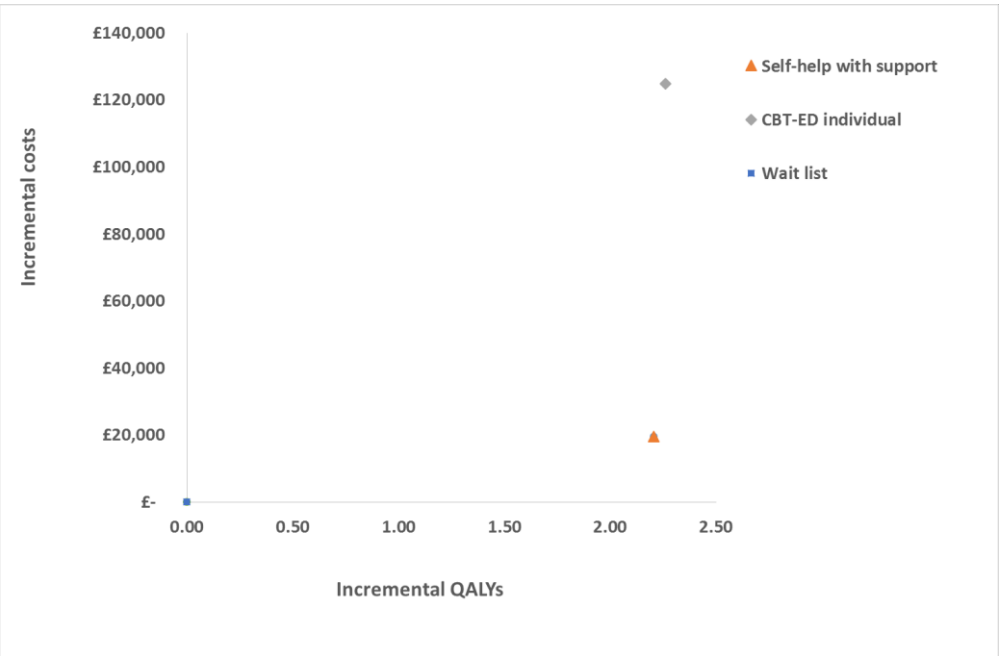
The ICER of self-help with support vs. wait list was sensitive to the probability of remission associated with the self-help with support. Using the lower credible interval value for the probability of remission for self-help with support the ICER of self-help with support vs. wait list increased to £276,775 per QALY. The results were also sensitive to the utility value for remission. When using the lower estimate of utility value for remission (0.706 instead of 0.784) the ICER of self-help with support vs. wait list increased to £39,131 per QALY. Similarly, when using the upper value for the utility associated with active BN (0.751 instead of 0.683), the ICER of self-help with support vs. wait list increased to £27,107 per QALY, which is above the NICE lower cost-effectiveness threshold.

Results were robust under all other scenarios examined in one-way sensitivity analyses.

The ICER of CBT-ED individual vs. self-help with support was sensitive to utility values and CBT-ED individual intervention costs. However, the conclusions did not change (that is, the ICER of CBT-ED individual vs. self-help with support was well above upper NICE cost-effectiveness threshold). Only when the upper credible interval value for the probability of remission for CBT-ED individual was used the ICER was reduced to £28,669 per QALY, which is below upper NICE cost-effectiveness threshold. Results were robust under all other scenarios examined in one-way sensitivity analyses.

Also, the results were robust under all scenarios examined in bias adjustment analyses.

Figure 2: Cost-effectiveness plane of all treatments assessed in the economic analysis plotted against wait list – incremental costs and QALYs per 100 people with BN.



S.2.11.2 Results of the probabilistic analysis

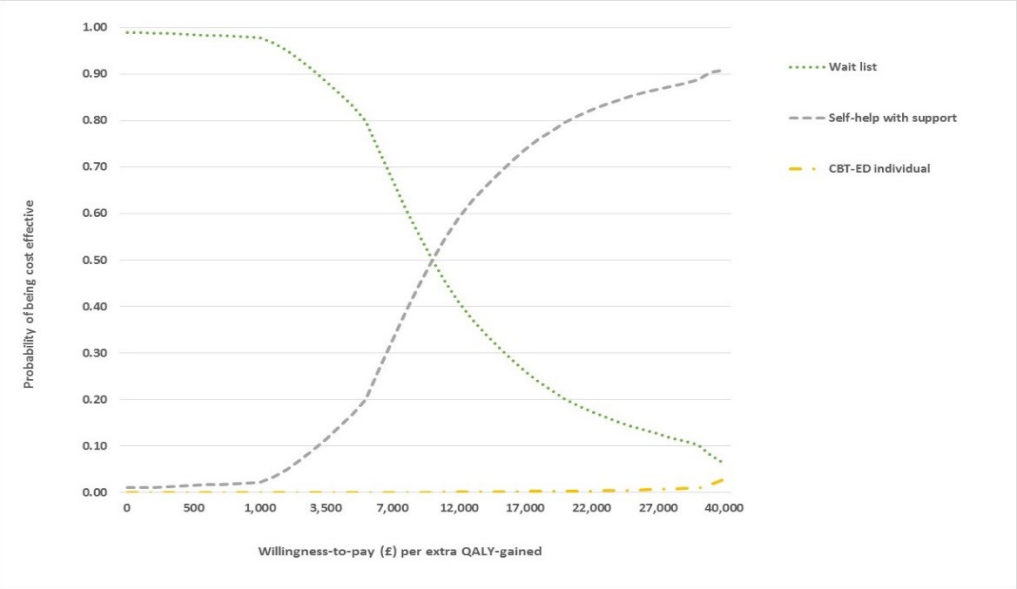
Conclusions of probabilistic analysis were very similar to those of deterministic analysis. Self-help with support remained the most cost-effective option when mean costs and QALYs derived from 10,000 iterations were estimated. The ICER of self-help with support (vs. wait list) was £8,849 and the ICER of CBT-ED individual (vs. self-help with support) was £1,860,504 per QALY. At the lower NICE cost-effectiveness threshold of £20,000 per QALY (NICE., 2008b) the probability of self-help with support being cost-effective was 0.80 and it increased to 0.89 at the upper threshold of £30,000 per QALY. Table 4 provides the results of the probabilistic analysis.

Table 4: Mean costs and QALYs for each treatment option for people with BN assessed in the economic analysis – results of probabilistic analysis per 100 people

Treatment option	Mean total costs	Mean total QALYs	Cost effectiveness (cost/QALY)
Wait list	£88,196	92.15	
Self-help with support	£107,720	94.36	£8,849 (vs. wait list)
CBT-ED individual	£212,958	94.41	£1,860,504 (vs. self-help with support)

Figure 3 shows the CEACs generated for each treatment option assessed in the economic model.

Figure 3: CEACs of all treatment options for people with BN assessed in the economic analysis



S.2.11.3 Secondary analysis – extended time horizon

According to the secondary analysis, where the impact of extending the time horizon of the analysis to 5 years was explored, the ICER of CBT-ED individual versus self-help with support always remained above upper NICE threshold of £30,000 per QALY. However, the ICER of CBT-ED individual versus wait list at 5 years was reduced to £8,171 per QALY (from £55,100 per QALY at 1 year follow-up). The ICER associated with CBT-ED individual was reduced to the lower NICE cost-effectiveness threshold by approximately 2.5 years follow-up. The ICER of CBT-ED individual versus wait list represents the ICER associated with CBT-ED individual where self-help with support is not effective or not acceptable.

The conclusions of the probabilistic analysis were similar to those of deterministic analysis at 5 years (that is, self-help with support was always the preferred treatment option). At the lower NICE cost-effectiveness threshold of £20,000 per QALY the probability of self-help with support and CBT-ED individual being cost effective was 0.60 and 0.37, respectively. When comparing CBT-ED individual with wait list only the probability of wait list and CBT-ED individual being cost effective at the lower NICE cost-effectiveness threshold of £20,000 was 0.40 and 0.60, respectively. The probability of CBT-ED individual being cost effective increased to 0.65 at the upper NICE cost-effectiveness threshold of £30,000 per QALY.

Similarly, in the scenario where the relapse rate associated with CBT-ED individual was assumed to be zero (that is, everyone sustains the treatment effect) and the annual relapse rate associated with self-help with support and wait list was assumed to be equivalent to the baseline rate of 0.27 (which was applied every year during the long term follow-up) the ICER of CBT-ED individual versus self-help with support was reduced to £35,578. However, it was still above upper NICE cost-effectiveness threshold. The ICER of CBT-ED individual versus wait list was reduced to £3,788.

S.2.12 Discussion – limitations of the analysis

The results of the economic analysis suggested that self-help with support was likely to be the most cost-effective first-line treatment for people with BN. Self-help with support resulted in an ICER that was below NICE's lower cost-effectiveness threshold. The probability of self-help with support being the most cost-effective option was 0.80 at a willingness-to-pay of £20,000 per QALY gained and it increased to 0.89 at a willingness-to-pay of £30,000 per QALY gained. The cost effectiveness of self-help with support was attributed to a number of

factors: self-help with support had low intervention cost and the second best probability of remission that was very close to the probability of remission of CBT-ED individual.

The base-case economic analysis considered only data on remission at the end of treatment. There were no suitable follow-up data on remission for interventions for people with BN that could be used to inform the economic model. However, the committee expressed the view that people who have received CBT-ED individual tend to sustain the treatment effect better when compared with people who receive self-help with support. As indicated by the secondary analysis, irrespective of the time horizon, the ICER of CBT-ED individual versus self-help with support always remained above the NICEs upper threshold of £30,000 per QALY (even when a zero rate of relapse was assumed for CBT-ED individual). Nevertheless, the ICER of CBT-ED individual versus wait list at 5 years was reduced to £8,822 per QALY (from £55,100 per QALY at 1 year follow-up). This supports the view that CBT-ED individual potentially has more favourable cost effectiveness in the long run.

Clinical data on remission were synthesised using network meta-analytic techniques. Such methods enabled evidence synthesis from both direct and indirect comparisons between treatments and allowed simultaneous inference on all treatments examined in pair-wise trial comparisons while respecting randomisation (Lu and Ades, 2004, Caldwell et al., 2005).

One of the limitations of the economic analysis was that the costs during the follow-up were based on the committee expert opinion. This was necessary in order to populate the model due to lack of suitable data. Also, there was high uncertainty pertaining to the estimate of the number of sessions associated with CBT-ED individual. However, as indicated by the sensitivity analysis the conclusions of the economic analysis were robust to these model inputs. Also, according to the committee expert opinion all people who relapse will regain remission following booster sessions of the initial treatment. The findings were robust to changes in this assumption since the same assumption was made across all model arms. Also, the model hasn't captured the mortality rate associated with BN. However, the clinical evidence review failed to identify any studies reporting mortality improvements for people receiving psychological therapies. Given the short time horizon of the model exclusion of mortality in the model was unlikely to have underestimated the cost effectiveness of the interventions in question. Also, according to the committee expert opinion, the mortality rate for anorexia patients is likely to be significantly higher than that for the general population, but it is less likely to be so for people with BN or binge eating disorder.

S.3 Economic modelling interventions for people with binge eating disorder

S.3.1 Introduction – objective of economic modelling

The cost effectiveness of psychological interventions for adults with binge eating disorder (BED) was considered by the committee as an area with likely significant resource implications.

Existing economic evidence was limited to one US study that was not directly applicable to the UK setting, and it did not assess the whole range of treatments available in the UK for the treatment of people with BED. Therefore, an economic analysis was undertaken to assess the cost effectiveness of treatments for adults with BED.

S.4 Economic modelling methods

S.4.1 Interventions assessed

The choice of treatments assessed in the economic analysis was determined by the availability of respective clinical data included in the guideline systematic literature review. The economic analysis considered effective treatments as demonstrated by the systematic review of clinical evidence that were deemed appropriate by the committee as treatment options for people with BED in the UK.

Due to the lack of a common comparator between the interventions that would allow the relative effects across interventions to be assessed, two separate economic models were constructed assessing the following interventions:

- individual therapies including IPT-general (that is, IPT not specific to eating disorders), behavioural weight loss, self-help ED with support (that is, self-help specific to eating disorders), self-help ED no support, and no treatment (wait list);
- group therapies including behavioural weight loss, CBT-ED, and IPT-ED.

Pharmacological interventions created a limited network in the NMA, had small numbers randomised, and generally showed no effectiveness. As a result, these were not considered in a separate NMA and economic analysis.

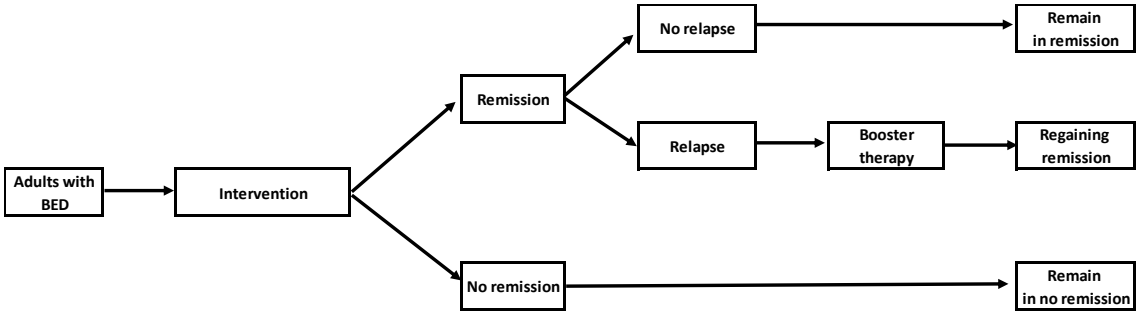
S.4.2 Individual therapies for BED

S.4.2.1 Model structure

A decision-analytic model in the form of a decision-tree was constructed using Microsoft Office Excel 2013. The structure of the model was determined by the availability of clinical data. According to the model structure, hypothetical cohorts of people with BED were initiated on each of the 4 treatments assessed (IPT-general individual, behavioural weight loss individual, self-help ED with support, self-help ED with no support) or no treatment (wait list). People initiated on the treatment were assumed to continue treatment for 16 weeks. ITT analysis was adopted when estimating full remission (that is, anyone discontinuing for whatever reason was assumed to be non-remitter). Consequently, discontinuation was not considered explicitly in the model. People at the end of treatment either achieved full remission or did not remit. Those who achieved full remission had regular visits with the therapist, GP visits, and dental care over 1 year of follow-up. During 1 year follow-up, they either experienced a relapse or did not relapse. People not remitting following the initial treatment were switched to another treatment during the 1 year follow-up, which was a mixture of all available treatments assessed in the economic analysis. They were assumed to remain in the no-remission health state for the duration of the model. People who relapsed were assumed to have booster sessions to re-establish full remission.

The time horizon of the analysis was 1 year and 4 months, based on the average duration of initial treatment (4 months) and follow-up (1 year). A schematic diagram of the decision-tree is presented in Figure 4.

Figure 4: Schematic diagram of the decision-tree constructed for the assessment of the relative cost effectiveness of interventions for people with BED



S.4.2.24 Costs and outcomes considered in the analysis

The economic analysis adopted the perspective of the NHS and personal social services, as recommended by NICE (NICE., 2014). Costs consisted of intervention costs (including contacts with healthcare professional such as psychologists and mental health nurses) and other health care costs incurred by people with BED in remission (such as, contacts with the aforementioned healthcare professionals and dental care); and costs incurred by those not remitting following treatment or experiencing a relapse following full remission (including contacts with the aforementioned healthcare professionals and blood tests). The measure of outcome was the QALY.

S.4.2.31 Clinical input parameters and overview of methods employed for evidence synthesis

Clinical input parameters consisted of the probability of full remission and the probability of relapse following full remission.

The guideline systematic review of the clinical literature on treatments identified one dichotomous outcome that could be utilised in the economic modelling: full remission (defined as cessation of BED-related symptoms over and above 2 weeks)

To take all trial information into consideration, network (mixed treatment comparison) meta-analytic techniques were employed to synthesise evidence on full remission. Details on the methods, clinical data utilised, and full results of the NMA that was undertaken to estimate full remission for each treatment option considered in the economic analysis are presented in Appendix U. The summary findings of the NMA are discussed in the next sub-section.

The baseline probability of remission that was assigned to wait list and utilised in the NMA in order to estimate the probability of remission of the other interventions was derived from a publication by Fairburn and colleagues (2000). In the study, 2 community-based cohorts were studied prospectively over a 5 year period. One of them comprised 48 participants with BED. All participants were female and aged between 16 and 35 years. The assessments were at 15 month intervals and addressed eating disorder features, general psychiatric symptoms, social functioning and also reported relapse rates. A 15 month cumulative probability of remission reported in the study was used to estimate the 16 week probability of remission, using exponential function, which was then attached to wait list and was utilised in the NMA.

The probability of relapse following full remission was also estimated based on the study by Fairburn and colleagues (2000). A cumulative 15 month reported relapse risk was used to estimate the relapse at 12 months that was utilised in the economic analysis.

Table 6 provides all the input parameters utilised in the economic model.

S.4.2.4 Findings of the NMA undertaken to inform the economic analysis

The summary statistics of a number of parameters of the NMA undertaken to inform the economic analysis, including the odds ratios of all treatments considered in the economic analysis versus wait list and the between-trial variation, are reported in Appendix U.

The NMA included a range of treatments including IPT-general individual (N=75), self-help ED individual with support (N=181), behavioural weight loss individual (N=64), self-help ED individual no support (N=125), BT-group (N=50), and wait list (N=142). However, after reviewing the results the committee decided to exclude BT-group from the economic analysis since they did not feel comfortable making recommendations on such small numbers. The committee were for more inclusive for BED interventions because of the smaller evidence base. It must be noted that the meta-analysis was based on an ITT approach and therefore considered all trial participants without excluding those who discontinued. Participants who discontinued were considered as non-remitters.

Table 5 provides the results of the NMA of data on full remission of each intervention versus wait list that were included in the economic analysis. The table shows the probability of full remission of each option considered in the economic analysis over 16 weeks of treatment (mean and 95% CrI). Interventions have been ranked from 'best' to 'worst' in terms of their ability to achieve full remission, according to the results of the NMA.

Table 5: Full remission associated with interventions for BED – findings of the NMA.

Intervention	Probability of full remission (95% CrI)	Mean OR versus wait list (95% CrI)
IPT-general	0.78 (0.48 to 0.96)	22.68 (4.91 to 69.53)
Self-help ED with support	0.73 (0.46 to 0.92)	13.88 (5.12 to 33.59)
Behavioural weight loss	0.72 (0.38 to 0.93)	14.79 (3.32 to 44.67)
Self-help ED with no support	0.56 (0.26 to 0.84)	6.27 (2.01 to 15.98)
Wait list	0.20 (0.09 to 0.36)	-

The results of the NMA indicated that wait list had the lowest probability of full remission (mean 0.20 over 16 weeks), followed by self-help ED with no support (0.56), behavioural weight loss (0.72), self-help ED with support (0.73), and IPT-general (0.78).

All treatments showed a significant effect compared with wait list. Also, self-help ED with no support was significantly worse than self-help ED with support with an OR of 0.46 (95% CrI: 0.25 to 0.76).

S.4.2.5 Utility data and estimation of QALYs

Utility data were derived from a study reporting SF-36 summary domain scores for people with eating disorders (de la Rie et al., 2005) converted into EQ-5D values using an algorithm developed by Ara & Brazier (2008). Details on the utility data used in the model are provided in section 1.2.6.

S.4.2.6 Cost data

Intervention costs as well as other health and social care costs incurred by people with BED were calculated by combining resource use estimates with respective national unit costs.

Intervention costs for IPT-general and behavioural weight loss consisted of therapists' time. The cost of a therapist's time was estimated by combining the mean total therapist's time per person treated, as reported in the RCTs included in the guideline systematic review and modified as appropriate by the committee to reflect clinical practice in the NHS, with the national unit cost of a clinical psychologist (Curtis, 2010). Both IPT-general and behaviour

weight loss interventions were modelled as comprising of 20 sessions, each lasting 50 minutes.

The unit cost of a clinical psychologist per hour of client contact has been estimated based on the median full-time equivalent basic salary for Agenda for Change Band 7 (for qualified Allied Health Professionals) of the January-March 2010 NHS Staff Earnings estimates, including salary, salary oncosts and overheads. The qualification costs were not available for a clinical psychologist. As a result, these were estimated by deriving the ratio of unit costs with and without qualifications for other mental healthcare professionals including psychiatric consultant and a mental health nurse (Curtis, 2010) and applying this ratio to the unit cost of a clinical psychologist. The unit costs were uplifted to 2014/15 UK pounds (Curtis and Burns, 2015).

Intervention costs for self-help ED with support consisted of therapists' time providing support (spent on telephone calls, emails and face-to-face contacts) as reported in the RCTs included in the guideline systematic review and modified by the committee to reflect the clinical practice in the NHS. Self-help ED with support was modelled as involving 6 support sessions each lasting 30 minutes. The cost of self-help ED with no support was modelled as involving 1 induction session lasting 20 minutes.

The cost of a therapist's time for self-help was estimated by combining the mean total therapist's time per person treated with the national unit cost of a mental health nurse (Curtis and Burns, 2015). The unit cost of a mental health nurse per hour of client contact was estimated based on the mean full-time equivalent basic salary for Agenda for Change band 5 of the July 2014 to June 2015 NHS staff earnings estimates for nurses, including salary, salary oncosts, qualifications, and overheads.

The intervention cost for self-help also included the cost of a self-help manual. The average cost of 3 manuals was used, *Overcoming Binge Eating* (Fairburn, 1995), *Getting Better Bite By Bite* (Schmidt et al., 2015) and *Overcoming Bulimia Nervosa and Binge Eating* (Cooper, 1993).

The intervention cost of wait list was zero.

The extra health and social care costs incurred by people with BED were estimated based on the committee expert opinion. According to the committee, people with BED who achieved remission would have 2 follow-up consultations with the therapist who delivered initial therapy (that is, band 7 worker for IPT-general and behaviour weight loss; and band 5 worker for self-help ED); 3 GP visits, and 2 dental procedures. The resource use estimates were then combined with appropriate staff unit costs taken from national sources (Curtis and Burns, 2015) in order to estimate an overall annual health and social care cost incurred by people with BED. The cost of dental procedure was obtained from the NHS reference costs 2014/2015 (DoH., 2015). According to the committee, people with BED would require on average 2 major restorative dental procedures. People who were on the wait list and achieved remission were assumed to have only GP visits and dental care.

The extra health and social care costs incurred by people with BED who did not remit following treatment were also estimated based on the committee expert opinion. According to the committee, these people would incur the cost equivalent to the subsequent treatment. The sub-sequent treatment costs were modelled as the average cost of all available treatments including IPT-general, behaviour weight loss, self-help ED with support, and self-help ED with no support (manual-based). No inpatient care costs were included in this estimate, as the Committee expressed the view that people with BED are unlikely to receive inpatient care for their ED per se.

Also, according to the committee expert opinion, these people would receive monthly blood tests by the GP practice nurse. The cost of blood test (phlebotomy) was obtained from the NHS reference costs 2014/15 (DoH., 2015). The unit cost of the GP practice nurse was

obtained from national sources (Curtis and Burns, 2015). This cost was assumed to be the same for all cohorts in the model.

The extra health and social care costs incurred by people with BED who remitted and subsequently relapsed were also estimated based on the committee expert opinion. According to the committee, these people would incur the cost equivalent to 5 booster sessions with the therapist who delivered the initial treatment (that is, band 7 worker for IPT-general and behaviour weight loss; and band 5 worker, for self-help ED with support and self-help ED with no support). The average of band 7 and band 5 worker was assigned to those on wait list. Also, according to the committee expert opinion people who relapsed would receive weekly blood tests for the duration of the relapse (that is, approximately 2 months) plus 2 GP visits. The cost of blood tests was estimated as mentioned above.

Discounting of costs was not necessary since the time horizon of the analysis was shorter than 2 years.

The average dosages and the total intervention costs over 16 weeks of treatment are presented in Table 6.

Table 6 reports the mean (deterministic) values of all input parameters utilised in the economic model and provides information on the distributions assigned to specific parameters in probabilistic sensitivity analysis.

1 **Table 6: Input parameters utilised in the economic model of interventions for adults with BED.**

Input parameter	Deterministic value	Probabilistic distribution	Source of data – comments
Probability of remission		**95% credible intervals**	NMA of data included in the guideline systematic review; data refer to a period of 16 weeks; distributions based on 10,000 iterations. Probability of 16-week remission for wait list estimated based on data from Fairburn and colleagues (2000), using exponential function.
IPT-general	0.78	0.48 to 0.97	
Self-help ED with support	0.73	0.46 to 0.91	
Behaviour weight loss	0.72	0.38 to 0.93	
Self-help ED with no support	0.56	0.26 to 0.84	
Wait list	0.20	0.09 to 0.36	
Probability of relapse at 12 months	0.08	**Beta distribution** α = 2; β = 18	Data from Fairburn and colleagues (2000).
Utilities		**Beta distribution**	Data from de la Rie and colleagues (2005) for EDNOS. SF-36 domain scores converted to EQ-5D utility scores using an algorithm developed by Ara & Brazier (2008); distributions estimated using the method of moments.
Remission	0.78	α = 798.75; β = 220.18	
No remission	0.69	α = 540.14; β = 246.68	
Intervention costs (16 weeks) – 2015 prices		**Modified gamma distribution**	Resource use based on RCTs included in the guideline systematic review and the committee expert opinion. IPT-general and behaviour weight loss included 20 sessions each lasting 50 min, delivered by band 7 worker (£101 per hour). A qualification factor of 1.14 was applied based on the average ratio of unit costs for psychiatric consultant and mental health nurse with and without qualifications (Curtis, 2010). Self-help ED with support involved 6 sessions, each lasting 30 min, and delivered by band 5 worker (£75 per hour). Self-help ED with no support included 1 induction session lasting 20 min, delivered by band 5 worker (£75 per hour) plus the cost of the self-help manual (£12.55) estimated based on the average cost of 3 manuals including *Overcoming Binge Eating* (Fairburn, 1995), *Getting Better Bite By Bite* (Schmidt et al., 2015) and *Overcoming Bulimia Nervosa and Binge Eating* (Cooper, 1993).
IPT-general	£1,684.29	SE: 20% of mean values (assumption)	
Self-help ED with support	£237.55		
Behaviour weight loss	£1,684.29		
Self-help ED with no support	£37.55		
Remission costs during 1 year follow-up – 2015 prices		**Gamma distribution**	IPT-general and behaviour weight loss comprised of 2 follow-up consultations with band 7 worker (£101 per hour), 3 GP visits (£44 per contact lasting 11.7 min), and 2 dental procedures. A qualification factor of 1.14 was applied on the band 7 worker unit cost based on the
IPT-general	£776.43	SE: 20% of mean values (assumption)	

Input parameter	Deterministic value	Probabilistic distribution	Source of data – comments
Self-help ED with support Behaviour weight loss Self-help ED with no support Wait list	£683.00 £776.43 £675.67 £608.00		average ratio of unit costs for psychiatric consultant and mental health nurse with and without qualifications as reported in Curtis (2010). Self-help comprised of 2 follow-up consultations with a band 5 worker (£75 per hour), 3 GP visits (at £44 per contact lasting 11.7 minutes), and 2 dental procedures. For wait list the average of IPT-general, behaviour weight loss, self-hep ED with support and without cost estimates was used. The cost of dental procedure was obtained from the NHS reference costs 2014/2015 (DoH., 2015), restorative dentistry, major dental procedure (service code CD01A) at £238 per procedure.
Non-remission costs – 2015 prices All treatment options	£1077.96 (subsequent treatment costs of £910.92 plus £167.04 monthly blood tests)	**Gamma distribution** SE: 20% of mean values (assumption)	Treatment costs assumed to be equivalent to the average intervention costs of all available treatments including IPT-general, behaviour weight loss, self-help ED with support, and self-help ED no support, based on the committee expert opinion. Cost of blood test obtained from the NHS reference costs 2014/15 (DoH., 2015) (direct access pathology services, phlebotomy, code DAPS08, £3 per test); administered by a GP practice nurse (£10.92 per contact lasting 11.7 min).
Relapse costs – 2015 prices IPT-general Self-help ED with support Self-help ED with no support Behaviour weight loss Wait list	 £606.51 £372.94 £354.61 £606.51 £485.14	**Gamma distribution** SE: 20% of mean values (assumption)	Equivalent to 5 booster sessions with the therapist who delivered the initial treatment according to committee expert opinion (that is, for IPT-general and behaviour weight loss band 7 worker [£101 per hour] and for self-help band 5 worker [£75 per hour]). Also, 2 GP visits (at £44 per contact lasting 11.7 min) and weekly blood tests for approximately 2 months (that is, the duration of the relapse). The cost of blood test was obtained from the NHS reference costs 2014/2015 (DoH., 2015) (direct access pathology services, phlebotomy, code DAPS08, £3 per test) and was administered by a GP practice nurse (£10.92 per contact lasting 11.7 min). For a band 7 worker a qualification factor of 1.14 was applied (based on the average ratio of unit cost for psychiatric consultant and mental health nurse with and without qualifications as reported in Curtis & Burns (2015).

S.4.2.71 Data analysis and presentation of the results

Deterministic and probabilistic analysis was employed to analyse the input parameter data and present the results of the economic analysis.

A deterministic analysis was undertaken, where data are analysed as point estimates; results are presented as mean total costs and QALYs associated with each treatment option are assessed. Relative cost effectiveness between alternative treatment options was estimated using incremental analysis: all options were ranked from most to least effective; options that were dominated (they were more expensive and less effective than other options) were excluded from further analysis. Subsequently, ICERs were calculated for all pairs of consecutive options. ICERs express the additional cost per additional unit of benefit associated with one treatment option relative to its comparator. Estimation of such a ratio allows consideration of whether the additional benefit is worth the additional cost when choosing one treatment option over another.

The treatment option with the highest ICER below the cost-effectiveness threshold was deemed to be the most cost-effective option.

One-way sensitivity analyses explored impact of varying:

- the probabilities of remission (using upper and lower CrI)
- the relapse rate (±50% around the base-case value)
- the utility values (±10% around the base-case value)
- the intervention costs (±50% around the base-case value)
- the costs of remission (±50% around the base-case value)
- the costs of relapse (±50% around the base-case value)
- the costs of non-remission (±50% around the base-case value)

In addition to deterministic analysis, a probabilistic analysis was also conducted.

In this case, all model input parameters were assigned probability distributions (rather than being expressed as point estimates), to reflect the uncertainty characterising the available clinical and cost data. Subsequently, 10,000 iterations were performed, each drawing random values out of the distributions fitted onto the model input parameters. This exercise provided more accurate estimates of mean costs and benefits for each intervention assessed (averaging results from the 10,000 iterations), by capturing the non-linearity characterising the economic model structure (Briggs et al., 2006).

The distributions of the probability remission for each treatment option, which were obtained using mixed treatment comparison techniques, were defined directly from values recorded in each of the 10,000 iterations performed in WinBUGS, as described in Appendix U.

The probability of relapse was given a beta distribution. Beta distributions were also assigned to utility values, using the method of moments. Costs (with the exception of intervention costs) were assigned a gamma distribution; in order to define the distribution, the assumption was made that costs had a standard error of 20% of their mean value. Intervention costs were assigned the modified gamma distribution skewed to the left of the mode (as people are more likely to miss one or more sessions during the course of treatment). The modified gamma distribution was defined as: 2 x mode - gamma of the mode.

Table 6 provides details on the types of distributions assigned to each input parameter and the methods employed to define their range.

Results of probabilistic analysis are presented in the form of CEACs, which demonstrate the probability of each treatment option being the most cost effective among the strategies

assessed at different levels of willingness-to-pay per unit of effectiveness (that is, at different cost-effectiveness thresholds the decision maker may set).

S.4.2.83 Economic modelling results

Results of deterministic analysis

According to the deterministic analysis, wait list was dominated by self-help ED with no support (that is, self-help ED with no support resulted in lower costs and also was more effective). Similarly, behavioural weight loss was dominated by self-help ED with support (that is, self-help ED with support resulted in lower costs and also was more effective). Both wait list and behaviour weight loss options were thus excluded from further analysis. When calculating ICERs for all consecutive pairs of options self-help ED with support versus self-help ED with no support resulted in the ICER of £7,381 per QALY. IPT-general was not cost-effective (that is, it resulted in a cost per QALY versus self-help ED with support that was above NICEs upper cost-effectiveness threshold of £30,000 per QALY.

Table 7 provides mean costs and QALYs for every treatment option assessed in the economic analysis. The options have been ranked from the most to the least effective in terms of number of QALYs gained.

Figure 5 provides the cost-effectiveness plane showing the incremental costs and QALYs of all interventions versus wait list. It can be seen that both interventions resulted in higher costs and QALYs relative to wait list.

Table 7: Mean costs and QALYs for each treatment option for people with BED assessed in the economic analysis - results per 100 people.

Treatment option	Mean total costs	Mean total QALYs	Cost effectiveness (cost/QALY)
Wait list	£99,061	93.76	Dominated by self-help ED with no support
Self-help ED with no support	£89,123	97.67	
Behavioural weight loss	£258,160	99.38	Dominated by self-help ED with support
Self-help ED with support	£102,916	99.54	£7,381 (vs. self-help ED no support)
IPT-general	£253,935	100.15	£248,123 (vs. self-help ED with support)

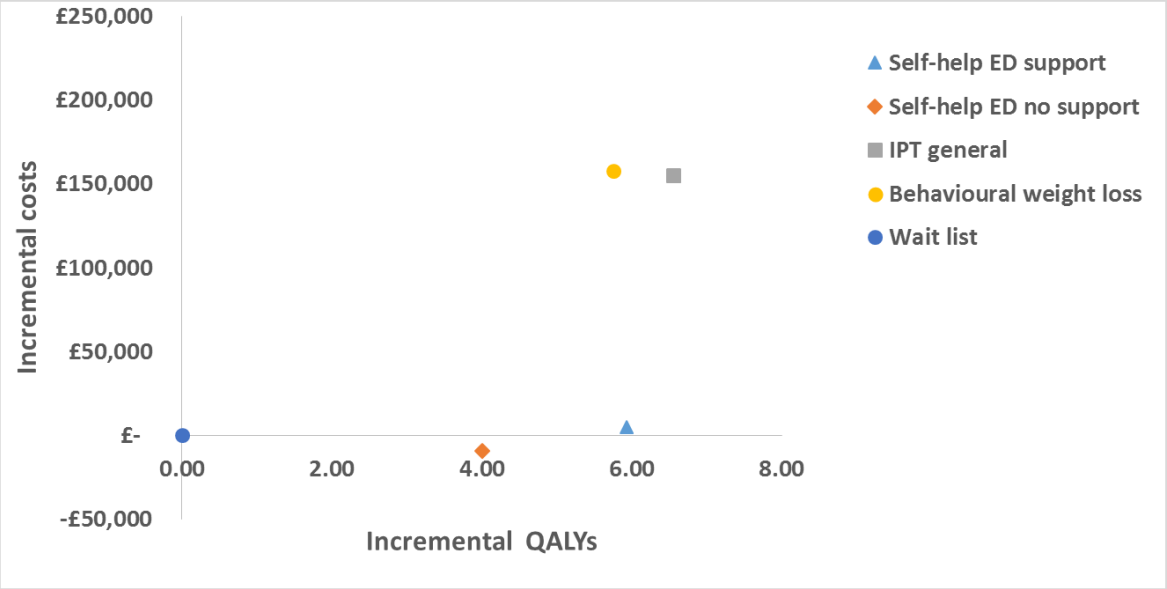
The ICER of self-help ED with support (vs. self-help ED with no support) was sensitive to the utility value of remission. Using the lower value of 0.71 (base-case 0.78) the ICER of self-help ED with support (vs. self-help ED with no support) increased to £37,769 per QALY. Similarly, when using the upper value for utility value for no-remission, the ICER of self-help ED with support (vs. self-help ED with no support) increased to £24,984 per QALY.

The results were also sensitive to the cost of remission associated with self-help ED with support. Using the upper value of £1,031 (base-case £687) the ICER of self-help ED with support (vs. self-help ED with no support) increased to £20,176 per QALY.

Results were robust under all other scenarios examined in one-way sensitivity analyses.

The ICER of IPT individual (vs. self-help ED with support) was above the NICEs upper cost-effectiveness threshold of £30,000 per QALY in all considered scenarios.

Figure 5: Cost-effectiveness plane of all treatments assessed in the economic analysis plotted against wait list – incremental costs and QALYs per 100 people with BED.



Results of probabilistic analysis

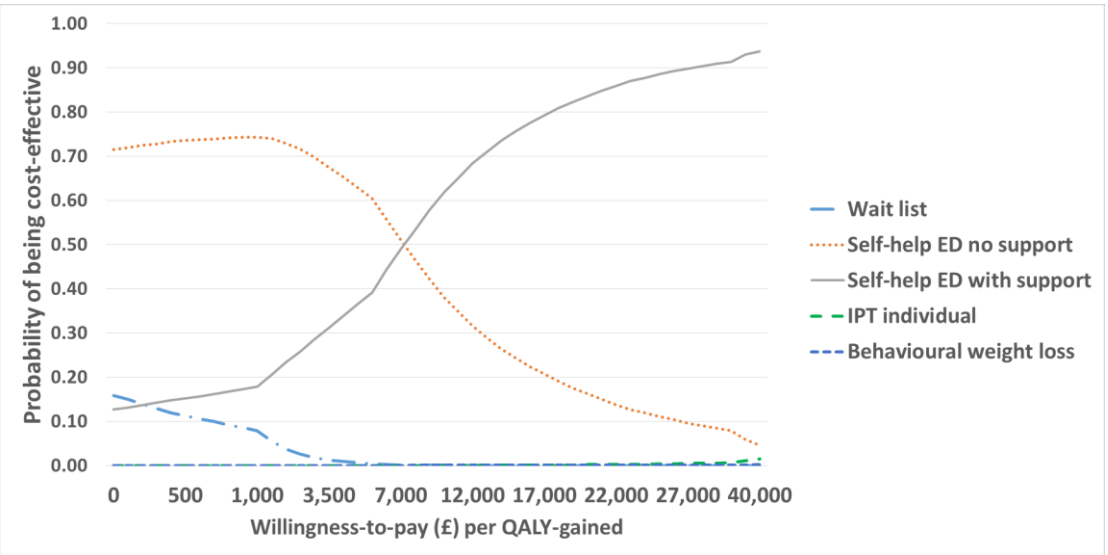
Conclusions of probabilistic analysis were the same to those of deterministic analysis: self-help ED with support was the most cost-effective option when mean costs and QALYs derived from 10,000 iterations were estimated. Self-help ED with support had the highest probability of being the most cost-effective treatment option, at any level of willingness-to-pay per additional QALY gained above £7,000 per QALY. At the lower NICE cost-effectiveness threshold of £20,000 per QALY (NICE., 2008b) the probability of self-help ED with support being cost effective was 0.83. Table 8 reports results of the probabilistic analysis.

Table 8: Mean costs and QALYs for each treatment option for people with BED assessed in the economic analysis – results of probabilistic analysis per 100 people.

Treatment option	Mean total costs	Mean total QALYs	Cost effectiveness (cost/QALY)
Wait list	£99,097	93.76	Dominated by self-help ED with no support
Self-help ED with no support	£89,200	97.66	
Behavioural weight loss	£258,152	99.37	Dominated by self-help ED with support
Self-help ED with support	£103,055	99.53	£7,424 (vs. self-help ED no support)
IPT-general	£253,737	100.14	£247,138 (vs. self-help ED with support)

Figure 6 shows the CEACs generated for each treatment option assessed in the economic model.

Figure 6: CEACs of all treatment options for people with BED assessed in the economic analysis.



S.4.2.9 Discussion – limitations of the analysis

The results of the economic analysis suggested that self-help ED with support was likely to be the most cost-effective individual treatment for people with BED. Self-help ED with support resulted in an ICER that was below the NICE lower cost-effectiveness threshold and had the highest probability of being the most cost-effective option at the NICE lower cost-effectiveness threshold of £20,000 QALY gained. The cost effectiveness of self-help ED with support was attributed to a number of factors: self-help ED with support had relatively low intervention cost and had the second best probability of remission.

Clinical data on remission were synthesised using network meta-analytic techniques. Such methods enabled evidence synthesis from both direct and indirect comparisons between treatments and allowed simultaneous inference on all treatments examined in pair-wise trial comparisons while respecting randomisation (Lu and Ades, 2004, Caldwell et al., 2005).

One of the limitations of the economic analysis was that the costs during the follow-up were based on the committee expert opinion. This was necessary in order to populate the model due to lack of suitable data. Nevertheless, one-way sensitivity analysis, in which the costs were varied by ±50%, demonstrated that the results of the economic analysis were robust to these estimates and the ICER of self-help ED with support remained within £20,000 to £30,000 per QALY gained range. Also, due to the lack of data, utility values for BED were derived from people with eating disorder not otherwise specified. However, as indicated by the sensitivity analysis the conclusions were robust to the changes in this model input.

Another limitation of the economic analysis was that it considered remission at the end of treatment only. However, there were no suitable long-term efficacy data for people with BED that could be used to populate the economic model.

S.4.3 Group therapies for BED

S.4.3.1 Model structure

A decision-analytic model in the form of a decision-tree was constructed using Microsoft Office Excel 2013. The structure of the model was determined by the availability of clinical data. According to the model structure, hypothetical cohorts of people with BED were initiated on each of the three treatments assessed (CBT-ED group, IPT-ED group and behavioural weight loss group). People initiated on the treatment were assumed to continue

treatment for 16 weeks. ITT analysis was adopted when estimating full remission (that is, any one discontinuing for whatever reason was assumed to be non-responder). Consequently, discontinuation was not considered explicitly in the model. People at the end of treatment either responded to treatment and achieved full remission or did not respond. Those who responded and achieved full remission had regular visits with the therapist, GP visits and dental care over 1 year of follow-up. During 1 year follow-up, they either experienced a relapse or did not relapse. People not remitting after the initial treatment were switched to another treatment during the 1 year follow-up and incurred standard care costs, which given the lack of suitable data were modelled as an average of all available psychological treatments assessed in the economic analysis. They were assumed to remain in the no-remission health state for the duration of the model. People who relapsed were assumed to have booster sessions to re-establish remission. According to the GC expert opinion all people following booster sessions would regain remission.

The time horizon of the analysis was 1 year and 4 months, based on the average duration of initial treatment (4 months) and follow-up (1 year). A schematic diagram of the decision-tree is presented in Figure 4.

S.4.3.2 Costs and outcomes considered in the analysis

The economic analysis adopted the perspective of the NHS and personal social services, as recommended by NICE (NICE., 2014). Costs consisted of intervention costs (including contacts with healthcare professional such as psychiatrists, psychologists and mental health nurses) and other health care costs incurred by people with BED in remission (such as, contacts with the aforementioned healthcare professionals and dental care); and those not responding to treatment or experiencing a relapse following full remission (including contacts with the aforementioned healthcare professionals and blood tests). The measure of outcome was the QALY.

S.4.3.3 Clinical input parameters and overview of methods employed for evidence synthesis

Clinical input parameters consisted of the probability of full remission and the probability of relapse following full remission.

The guideline systematic review of the clinical literature on treatments identified 1 dichotomous outcome that could be utilised in economic modelling: full remission (defined as cessation of BED-related symptoms over and above 2 weeks)

To take all trial information into consideration, network (mixed treatment comparison) meta-analytic techniques were employed to synthesise evidence on full remission (the methods used can be found in Appendix U).

To estimate the baseline probability of remission associated with group behavioural weight loss intervention the committee reviewed all the trials that used the baseline treatment (that is, group behavioural weight loss) in the relative effects model and judged that only 1 trial (Grilo 2011) could be considered as representative of the absolute rate of remission associated with group behavioural weight loss treatment that would be applicable to the UK setting. In this study group behavioural weight loss intervention was administered in 16 group 60-minute sessions over a 24 week period following the manualized LEARN Program for Weight Management. LEARN is an acronym for lifestyle, exercise, attitudes, relationships and nutrition, and focuses on making gradual lifestyle changes with goals of moderate caloric restriction and increased physical activity to produce gradual weight losses. A 24 month cumulative probability of remission reported in the study was used to estimate the 16 week probability of remission, using exponential function, which was subsequently attached to behavioural weight loss and was utilised in the NMA. Details on the methods and clinical data utilised in the NMA that was undertaken to estimate full remission for each treatment

option considered in the economic analysis are presented in Appendix U. The findings of the NMA are discussed in the next sub-section.

Table 10 provides all the input parameters utilised in the economic model.

S.4.3.4 Findings of the NMA undertaken to inform the economic analysis

The summary statistics of a number of parameters of the NMA undertaken to inform the economic analysis, including the ORs of all treatments considered in the economic analysis versus wait list and the between-trial variation, are reported in Appendix U. The NMA included a range of treatments including CBT-ED group (N=170), IPT-ED group (N=81), CBT-ED group plus group behavioural diet (N=35), and cognitive therapy (CT) group (N=21). However, after reviewing the results the committee decided to exclude CBT-ED group plus group behavioural diet and CT group from the economic analysis since they did not feel comfortable making recommendations on such small numbers. The committee were for more inclusive for BED interventions because of the smaller evidence base. It must be noted that the meta-analysis was based on an ITT approach and therefore considered all trial participants without excluding those who discontinued.

Table 9 provides the results of the NMA of data on full remission of each intervention versus behavioural weight loss that were included in the economic analysis. The table shows the probability of full remission of each option considered in the economic analysis over 16 weeks of treatment (mean and 95% CrI). Interventions have been ranked from 'best' to 'worst' in terms of their ability to achieve full remission, according to the results of the NMA.

Table 9: Full remission associated with interventions for BED – findings of the NMA.

Intervention	Probability of full remission (95% CrI)	Mean OR versus behavioural weight loss (95% CrI)
CBT-ED group	0.45 (0.24; 0.67)	2.31 (1.16; 4.19)
IPT-ED group	0.37 (0.15; 0.65)	1.76 (0.58; 4.11)
Behavioural weight loss group	0.27 (0.16; 0.41)	-

The results of the NMA indicated that group behavioural weight loss had the lowest probability of full remission (mean 0.27 over 16 weeks), followed by IPT-ED group (0.37) and CBT-ED group (0.45). Only CBT-ED group showed a significant effect compared with behavioural weight loss OR 2.31 (95% CrI: 1.16 to 4.19).

S.4.3.5 Cost data

Intervention costs as well as other health and social care costs incurred by people with BED were calculated by combining resource use estimates with respective national unit costs.

Intervention costs consisted of therapists' time. The cost of a therapist's time was estimated by combining the mean total therapist's time per person treated, as reported in the RCTs included in the guideline systematic review and modified as appropriate by the committee to reflect clinical practice in the NHS, with the national unit cost (Curtis, 2010, Curtis and Burns, 2015).

CBT-ED group and IPT-ED group were modelled as comprising 12 group sessions, each lasting 90 minutes. Behavioural weight loss intervention was modelled as comprising 16 group sessions, each lasting 60 minutes. The sessions were facilitated by 1 band 7 and 1 band 5 worker. The group size was 10 people.

The unit cost of a clinical psychologist (band 7 worker) per hour of client contact has been estimated based on the median full-time equivalent basic salary for Agenda for Change Band 7 (for qualified Allied Health Professionals) of the January-March 2010 NHS Staff Earnings

estimates, including salary, salary oncosts and overheads. The qualifications costs were not available for a clinical psychologist. As a result, these were estimated by deriving the ratio of unit costs with and without qualifications for other healthcare professionals including psychiatric consultant and mental health nurse (Curtis, 2010) and applying this to the unit cost of a clinical psychologist.

The unit cost of a mental health nurse (band 5 worker) per hour of client contact has been estimated based on the mean full-time equivalent basic salary for Agenda for Change band 5 of the July 2014-June 2015 NHS staff earnings estimates for nurses, including salary, salary oncosts, qualifications and overheads.

The unit costs were uplifted to 2014/15 UK pounds (Curtis and Burns, 2015).

The extra health and social care costs incurred by people with BED were estimated based on the committee expert opinion, as described earlier.

Discounting of costs was not necessary since the time horizon of the analysis was shorter than 2 years.

The average dosages and the total intervention costs over 16 weeks of treatment are presented in Table 10.

1 **Table 10: Input parameters utilised in the economic model of interventions for adults with BED.**

Input parameter	Deterministic value	Probabilistic distribution	Source of data - comments
Probability of remission CBT-ED group IPT-ED group Behavioural weight loss group	 0.45 0.37 0.27	**95% credible intervals** 0.24 to 0.67 0.15 to 0.65 0.16 to 0.41	NMA of data included in the guideline systematic review; data refer to a period of 16 weeks; distributions based on 10,000 iterations. Probability of remission for behavioural weight loss (baseline) based on data in Grilo and colleagues (2011), using exponential function.
Probability of relapse at 12 months	0.08	**Beta distribution** α = 2; β = 18	Data from Fairburn and colleagues (2000).
Utilities Remission No remission	 0.78 0.69	**Beta distribution** α = 798.75; β = 220.18 α = 540.14; β = 246.68	Data from de la Rie and colleagues (2005) for EDNOS. SF-36 scores converted to EQ-5D utility scores using an algorithm developed by Ara & Brazier (2008); distributions estimated using method of moments.
Intervention costs (16 weeks) – 2015 prices CBT-ED group IPT-ED group Behavioural weight loss group	 £316.90 £316.90 £281.69	**Modified gamma distribution** SE: 20% of mean values (assumption)	The resource use associated with interventions were based on RCTs included in the guideline systematic review and the committee expert opinion. CBT-ED group and IPT-ED group included 12 sessions each lasting 90 min. Behavioural weight loss included 16 sessions, each lasting 60 minutes. Group treatments were facilitated by 1 band 7 and 1 band 5 worker (£101 and £75 per hour, respectively). The resource use were combined with the national unit cost data (Curtis, 2010, Curtis and Burns, 2015). Where necessary costs were uplifted to 2014/15 UK pounds (Curtis and Burns, 2015). For band 7 worker a qualification factor of 1.14 was added (based on the average ratio of unit costs for psychiatric consultant and mental health nurse with and without qualifications as reported in (Curtis, 2010).
Remission costs during 1 year follow-up – 2015 prices CBT-ED group IPT-ED group Behavioural weight loss group	 £660.82 £660.82 £643.21	**Gamma distribution** SE: 20% of mean values (assumption)	CBT-ED group, IPT-ED group, and behavioural weight loss comprised of 2 follow-up group sessions with band 7 and band 5 worker (£101 and 75 per hour, respectively), 3 GP visits (£44 per contact lasting 11.7 min), and 2 dental procedures. The resource use were combined with national unit costs (Curtis, 2010, Curtis and Burns, 2015) to estimate the costs. Where necessary costs were uplifted to 2014/15 UK pounds (Curtis and

Input parameter	Deterministic value	Probabilistic distribution	Source of data - comments
			Burns, 2015). For band 7 worker a qualification factor of 1.14 was added (based on the average ratio of unit costs for psychiatric consultant and mental health nurse with and without qualifications as reported in (Curtis, 2010). The cost of dental procedure was obtained from the NHS reference costs 2014/2015 (DoH., 2015), restorative dentistry, major dental procedure (service code CD01A) at £238 per procedure.
Non-remission costs – 2015 prices CBT-ED group IPT-ED group Behavioural weight loss group	£305.17 (subsequent treatment costs plus £167.04 monthly blood tests)	**Gamma distribution** SE: 20% of mean values (assumption)	Based on the committee expert opinion these were equivalent to the average intervention costs of all available treatments including CBT-ED group, IPT-ED group, and behavioural weight loss. The cost of blood test was obtained from the NHS reference costs 2014/15 (DoH., 2015) (direct access pathology services, phlebotomy, code DAPS08, £3 per test); administered by the GP practice nurse (£10.92 per contact lasting 11.7 min).
Relapse costs – 2015 prices CBT-ED group IPT-ED group Behavioural weight loss group	 £317.48 £317.48 £273.47	**Gamma distribution** SE: 20% of mean values (assumption)	Based on the committee expert opinion these were equivalent to 5 booster group sessions with the therapists who delivered the initial treatment (that is, band 7 and band 5 worker workers [£101 and £75 per hour, respectively]. Also, 2 GP visits (at £44 per contact lasting 11.7 min) and weekly blood tests for approximately 2 months (that is, the duration of the relapse). The cost of blood test was obtained from the NHS reference costs 2014/2015 (DoH., 2015) (direct access pathology services, phlebotomy, code DAPS08, £3 per test) and was administered by the GP practice nurse (£10.92 per contact lasting 11.7 min). The resource use were combined with national unit costs (Curtis, 2010), (Curtis and Burns, 2015)) to estimate the costs. Where necessary costs were uplifted to 2014/15 UK pounds (Curtis and Burns, 2015). For band 7 worker a qualification factor of 1.14 was added (based on the average ratio of unit cost for psychiatric consultant and mental health nurse with and without qualifications as reported in (Curtis, 2010).

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Table 10 reports the mean (deterministic) values of all input parameters utilised in the economic model and provides information on the distributions assigned to specific parameters in probabilistic sensitivity analysis.

The methods that were employed to analyse the input parameter data and present the results of the economic analysis.

Table 10 provides details on the types of distributions assigned to each input parameter and the methods employed to define their range in the probabilistic sensitivity analysis.

S.4.3.6 Economic modelling results

Results of the deterministic analysis

According to the deterministic analysis, IPT-ED group was extendedly dominated by behavioural weight loss group and CBT-ED group (that is, IPT-ED group was less effective and more costly than a linear combination of group behavioural weight loss and CBT-ED group). CBT-ED group (vs. behavioural weight loss group) resulted in an ICER of £3,834 per QALY and was the preferred treatment option.

Table 11 provides mean costs and QALYs for every treatment option assessed in the economic analysis. The options have been ranked from the most to the least effective in terms of number of QALYs gained.

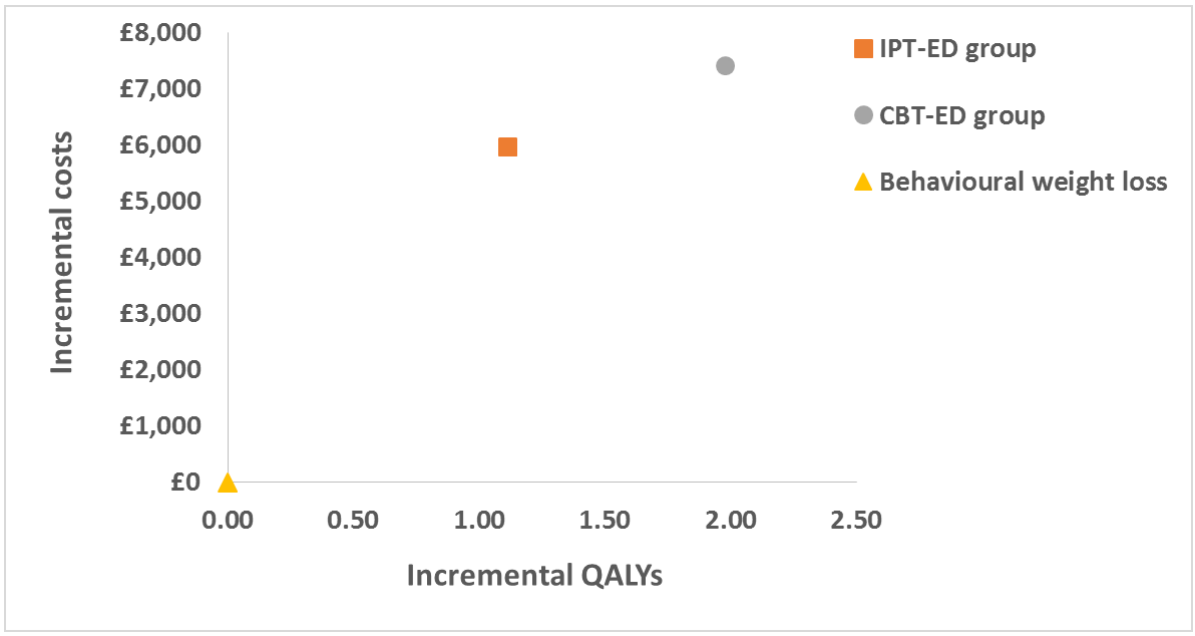
Figure 7 provides the cost-effectiveness plane showing the incremental costs and QALYs of all interventions versus wait list. It can be seen that both interventions result in higher costs and QALYs relative to wait list.

Table 11: Mean costs and QALYs for each treatment option for people with BED assessed in the economic analysis - results per 100 people.

Treatment option	Mean total costs	Mean total QALYs	Cost effectiveness (cost/QALY)
Behavioural weight loss group	£79,927	94.51	
IPT-ED group	£85,857	95.59	£5,469 (vs. behavioural weight loss) - extendedly dominated
CBT-ED group	£87,283	96.43	£3,834 (vs. behavioural weight loss group)

According the deterministic sensitivity analyses the ICER of CBT-ED group (vs. behavioural weight loss group) was robust to changes in the model inputs. Under none of the scenarios examined the IPT-ED group or group behavioural weight loss were the preferred treatment options.

Figure 7: Cost-effectiveness plane of all treatments assessed in the economic analysis plotted against wait list – incremental costs and QALYs per 100 people with BED.



Results of the probabilistic analysis

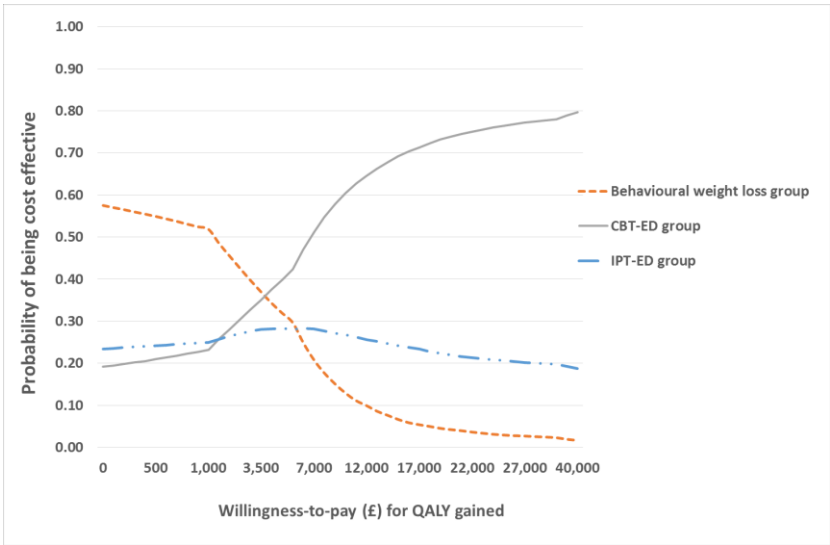
Conclusions of the probabilistic analysis were the same to those of deterministic analysis: CBT-ED group was the most cost-effective option when mean costs and QALYs derived from 10,000 iterations were estimated. CBT-ED group had the highest probability of being the most cost-effective treatment option, at any level of willingness-to-pay per additional QALY gained above £3,500 per QALY. At the lower NICE cost-effectiveness threshold of £20,000 per QALY (NICE., 2008b) the probability of CBT-ED group being cost effective was 0.74. Using probabilistic mean costs and QALYs the ICER of CBT-ED group (vs. behavioural weight loss group) was £3,820. Table 12 reports results of the probabilistic analysis.

Table 12: Mean costs and QALYs for each treatment option for people with BED assessed in the economic analysis – results of probabilistic analysis per 100 people.

Treatment option	Mean total costs	Mean total QALYs	Cost effectiveness (cost/QALY)
Behavioural weight loss group	£79,977	94.51	
IPT-ED group	£85,798	95.60	£5,351 (vs. behavioural weight loss) - extendedly dominated
CBT-ED group	£87,336	96.44	£3,820 (vs. behavioural weight loss group)

Figure 8 shows the CEACs generated for each treatment option assessed in the economic model.

Figure 8: CEACs of all treatment options for people with BED assessed in the economic analysis.



4.3.74 Discussion – limitations of the analysis

The results of the economic analysis suggested that CBT-ED group was likely to be the most cost-effective group treatment for people with BED. CBT-ED group resulted in an ICER that was below the NICE lower cost-effectiveness threshold and had the highest probability of being the most cost-effective option at any level of willingness-to-pay above £3,500 per QALY gained. The cost effectiveness of CBT-ED group was attributed to a number of factors: it had the same intervention cost to IPT-ED group and had the best probability of remission.

Clinical data on remission were synthesised using network meta-analytic techniques. Such methods enabled evidence synthesis from both direct and indirect comparisons between treatments, and allowed simultaneous inference on all treatments examined in pair-wise trial comparisons while respecting randomisation (Lu and Ades, 2004, Caldwell et al., 2005).

One of the limitations of the economic analysis was that the costs during the follow-up were based on the committee expert opinion. This was necessary in order to populate the model due to lack of suitable data. Nevertheless, one-way sensitivity analysis, in which the costs were varied by ±50%, demonstrated that the results of the economic analysis were robust to these estimates.

Another limitation of the economic analysis was that it considered remission at the end of treatment only. However, there were no suitable long-term efficacy data on people with BED that could be used to populate the economic model.

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