

Attention deficit hyperactivity
disorder

Costing report

Implementing NICE guidance

September 2008

NICE clinical guideline 72



This costing report accompanies the clinical guideline: 'Attention deficit hyperactivity disorder: diagnosis and management of ADHD in children, young people and adults' (available online at www.nice.org.uk/CG072).

Issue date: September 2008

This guidance is written in the following context

This report represents the view of the Institute, which was arrived at after careful consideration of the available data and through consulting healthcare professionals. It should be read in conjunction with the NICE guideline. The report and templates are implementation tools and focus on those areas that were considered to have significant impact on resource utilisation.

The cost and activity assessments in the reports are estimates based on a number of assumptions. They provide an indication of the likely impact of the principal recommendations and are not absolute figures. Assumptions used in the report are based on assessment of the national average. Local practice may be different from this, and the template can be amended to reflect local practice to estimate local impact.

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Contents

Executive summary.....	5
Supporting implementation.....	5
Significant resource-impact recommendations.....	5
Total cost impact	6
Benefits and savings	7
Local costing template.....	8
1 Introduction.....	9
1.1 Supporting implementation	9
1.2 What is the aim of this report?	9
1.3 Epidemiology of ADHD	10
1.4 Models of care	11
2 Costing methodology.....	12
2.1 Process	12
2.2 Scope of the cost-impact analysis.....	12
2.3 General assumptions made	17
2.4 Basis of unit costs	17
3 Cost of significant resource-impact recommendations	18
3.1 Group-based parent-training/education programmes for the parents of young people aged 13–15 years with moderate or severe ADHD	18
3.2 Treatment of older adolescents aged 16 or 17 years with moderate ADHD	22
3.3 Comprehensive treatment programme for adults.....	24
3.4 Assessment, drug treatment and the monitoring of adults with ADHD	25
3.5 Benefits and savings.....	29
4 Sensitivity analysis	30
4.1 Methodology	30
4.2 Impact of sensitivity analysis on costs.....	31
5 Impact of guidance for commissioners	31
6 Conclusion.....	32
6.1 Total national cost for England.....	32

6.2 Next steps	33
Appendix A. Approach to costing guidelines	35
Appendix B. Results of sensitivity analysis	36
Appendix C. References	37

Executive summary

This costing report looks at the resource impact of implementing the NICE guideline 'Attention deficit hyperactivity disorder: diagnosis and management of ADHD in children, young people and adults' in England.

The costing method adopted is outlined in appendix A; it uses the most accurate data available, was produced in conjunction with key clinicians, and reviewed by clinical and financial professionals.

Supporting implementation

The NICE clinical guideline on ADHD is supported by a range of implementation tools available on our website www.nice.org.uk/CG072 and detailed in the main body of this report.

Significant resource-impact recommendations

Because of the breadth and complexity of the guideline, this report focuses on recommendations that are considered to have the greatest resource impact and therefore require the most additional resources to implement or can potentially generate savings. They are:

- Group-based parent-training/education programmes for the parents of young people aged 13–15 years with moderate or severe ADHD.
- Group-based treatment programmes (cognitive behavioural therapy [CBT] or social skills training) for young people aged 13–15 years with moderate ADHD whose parents are receiving a parent-training/education programme.
- Individual psychological interventions (CBT or social skills training) for older adolescents aged 16 or 17 years with moderate ADHD.
- Comprehensive treatment programme for adults with ADHD (aged 18 years and older).
- Assessment, drug treatment and the monitoring of adults with ADHD (aged 18 years and older).

Total cost impact

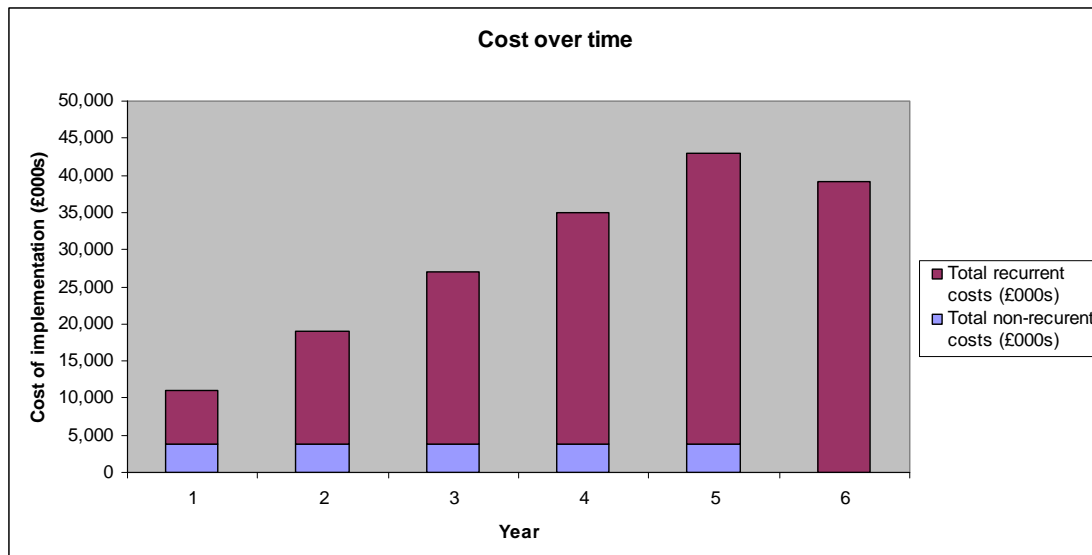
The annual changes in revenue costs arising from fully implementing the guideline are summarised in the table below.

Recurrent costs	First year (£000s)	At full implementation (£000s)
Group-based parent-training/education programmes for the parents of young people aged 13–15 years with moderate or severe ADHD.	65	326
Group-based treatment programmes (CBT or social skills training) for young people aged 13–15 years with moderate ADHD whose parents are receiving group parent-training/education programmes.	1	5
Individual psychological interventions (CBT or social skills training) for older adolescents aged 16 or 17 years with moderate ADHD.	51	229
Drug treatment and monitoring of adults with ADHD (aged 18 years and older).	7,099	39,399
Annual recurrent costs	7,216	39,958
Non-recurrent cost		
Assessment for adults with ADHD prior to commencing drug treatment.	3,855	19,277

There may be additional cost implications arising from the recommendation concerning drug treatment for adults with ADHD forming part of a comprehensive treatment programme that addresses psychological, behavioural and educational or occupational needs. We have not been able to quantify the cost impact of this because of a lack of data on current baseline and how services may respond to implement this recommendation. The cost of implementing this recommendation should be assessed locally.

Mental health services are currently excluded from the scope of 'Payment by results'. The treatment of ADHD falls within programme budgeting category 05X 'Other mental health disorders'.

This guideline may lead to a substantial change in practice across most of England in drug treatment for adults with ADHD. It is anticipated that full implementation of this guideline may take approximately 5 years; see below for anticipated costs over time.



Benefits and savings

Implementing the clinical guideline may bring the following benefits.

- A reduction in broader societal costs, such as parental absence from work and related productivity losses.
- A reduction in the costs of special education services, and costs of other social services, including the youth justice system.
- An increase in the productivity and performance of adults with ADHD, at work, after starting drug treatment.
- Compliance with NICE guidance is one of the criteria indicating good risk reduction strategies and, in combination with meeting other criteria indicating good risk management, could lead to a discount on contributions to the NHS Litigation Authority schemes, including Clinical Negligence Scheme for Trusts (CNST).

Local costing template

The costing template produced to support this guideline enables organisations in England, Wales and Northern Ireland to estimate the impact locally and replace variables with ones that depict the current local position. A sample calculation using this template showed that additional recurrent costs of £78,000 could be incurred for a population of 100,000 at full implementation, with a further £38,000 non-recurrent cost.

1 Introduction

1.1 *Supporting implementation*

1.1.1 The NICE clinical guideline on ADHD is supported by the following implementation tools available on our website

www.nice.org.uk/CG072:

- costing tools
 - a national costing report; this document
 - a local costing template; a simple spreadsheet that can be used to estimate the local cost of implementation.
- a slide set; key messages for local discussion
- implementation advice; practical suggestions on how to address potential barriers to implementation
- audit support.

1.1.2 A practical guide to implementation, 'How to put NICE guidance into practice: a guide to implementation for organisations' is also available to download from the NICE website. It includes advice on establishing organisational level implementation processes as well as detailed steps for people working to implement different types of guidance on the ground.

1.2 *What is the aim of this report?*

1.2.1 This report provides estimates of the national cost impact arising from implementation of guidance on ADHD in England. These estimates are based on assumptions made about current practice and predictions of how current practice might change following implementation.

1.2.2 This report aims to help organisations plan for the financial implications of implementing NICE guidance.

1.2.3 This report does not reproduce the NICE guideline on ADHD and should be read in conjunction with it (www.nice.org.uk/CG072).

1.2.4 The costing template that accompanies this report is designed to help those assessing the resource impact at a local level in England, Wales or Northern Ireland. NICE clinical guidelines are developmental standards in the Department of Health's document '[Standards for better health](#)'. The costing template may help inform local action plans demonstrating how implementation of the guideline will be achieved.

1.3 *Epidemiology of ADHD*

1.3.1 The number of young people (aged 13–15 years), older adolescents (aged 16 or 17 years) and adults (aged 18 years or older) with ADHD is summarised below (table 1).

Table 1 Number of people aged 13 years and older with ADHD

Sex/age band	Population in England (000s)	Prevalence of ADHD (%)	Number of people with ADHD (000s)
Boys aged 13 to 15 years	982	3.62	36
Girls aged 13 to 15 years	931	0.85	8
Boys aged 16 or 17 years	681	2.72	18
Girls aged 16 or 17 years	645	0.64	4
Men aged 18 years and older	18,769	1.81	340
Women aged 18 years and older	20,125	0.43	86

1.3.2 ADHD is a heterogeneous behavioural syndrome characterised by the core symptoms of hyperactivity, impulsivity and inattention. While these symptoms tend to cluster together, some people are predominantly hyperactive and impulsive, while others are principally inattentive.

1.3.3 Two main diagnostic criteria for ADHD are in current use – the International Classification of Mental and Behavioural Disorders 10th revision (ICD-10) and the Diagnostic and Statistical Manual of Mental Disorders 4th edition (DSM-IV). For estimating the numbers

affected in this cost estimate ADHD has been defined using the DSM-IV classification and severe ADHD, also known as hyperkinetic disorder, has been defined using the ICD-10 classifications.

- 1.3.4 The prevalence of ADHD in boys and girls aged 13–15 years is taken from the study by Ford and coworkers and is based on the DSM-IV classification for ADHD (Ford et al. 2003). Clinical opinion suggests that the midpoint estimate between the prevalence of ADHD in adults (men and women) and ADHD in boys and girls should be used for older adolescents aged 16 and 17 years.
- 1.3.5 It is assumed that 35% of young people with ADHD have a moderate form of the disorder and 41% of young people are classified as severe. The remaining 24% are considered to have a mild form of the disorder (Kessler et al. 2005).
- 1.3.6 The prevalence of ADHD in adults is based on the assumption that 65% of childhood cases of ADHD persist to adulthood, using the DSM-IV classification of ADHD (Faraone et al. 2006).

1.4 Models of care

- 1.4.1 The diagnosis of ADHD in children, young people and adults should take place in secondary care by a specialist psychiatrist, paediatrician or other appropriately qualified healthcare professional.
- 1.4.2 The treatment of children, young people and adults with ADHD should begin in secondary care and continue in a primary, secondary, tertiary or community healthcare setting.

2 Costing methodology

2.1 Process

- 2.1.1 We use a structured approach for costing clinical guidelines (see appendix A).
- 2.1.2 There is little information concerning treatment programmes for young people aged 13–15 years and older adolescents aged 16 or 17 years with ADHD.
- 2.1.3 There is information available about drug treatment for children, young people and adults with ADHD; there is less information available about psychological and behavioural interventions for adults with ADHD.
- 2.1.4 To overcome these limitations, we had to make assumptions in the costing model. We developed these assumptions and tested them for reasonableness with members of the Guideline Development Group (GDG) and key clinical practitioners in the NHS.

2.2 Scope of the cost-impact analysis

- 2.2.1 The guideline offers best practice advice on the treatment of children aged 3 years and older, young people and adults with a diagnosis of ADHD.
- 2.2.2 The guideline does not cover the separate management of comorbid conditions and the management of children younger than 3 years.
- 2.2.3 The costing work focuses only on the direct costs and savings arising from implementing this guideline.
- 2.2.4 Due to the breadth and complexity of the guideline, we worked with the GDG and other professionals to identify the recommendations that would have the most significant resource impact (see table 2). Costing work has focused on these recommendations.

Table 2 Recommendations with a significant resource impact

High-cost recommendations	Recommendation number	Key priority?
If the child or young person with ADHD has moderate levels of impairment, the parents or carers should be offered referral to a group parent-training/education programme, either on its own or together with a group treatment programme (CBT and/or social skills training) for the child or young person.	1.5.2.4	✓
For older adolescents with ADHD and moderate impairment, individual psychological interventions (such as CBT or social skills training) may be considered as they may be more effective and acceptable than group parent-training/education programmes or group CBT and/or social skills training.	1.5.2.6	
In school-age children and young people with severe ADHD, drug treatment should be offered as the first-line treatment. Parents should also be offered a group-based parent-training/education programme.	1.5.3.1	✓
<p>Before starting drug treatment for adults with ADHD a full assessment should be completed, which should include:</p> <ul style="list-style-type: none"> • full mental health and social assessment • full history and physical examination including: <ul style="list-style-type: none"> - assessment of history of exercise syncope, undue breathlessness and other cardiovascular symptoms - heart rate and blood pressure (plotted on a centile chart) 	1.7.1.3	

<ul style="list-style-type: none"> - weight - family history of cardiac disease and examination of the cardiovascular system. • an ECG if there is past medical or family history of serious cardiac disease, a history of sudden death in young family members or abnormal findings on cardiac examination • risk assessment for substance misuse and drug diversion. 		
Drug treatment for adults with ADHD should always form part of a comprehensive treatment programme that addresses psychological, behavioural and educational or occupational needs.	1.7.1.4	✓
Following a decision to start drug treatment in adults with ADHD, methylphenidate should normally be tried first.	1.7.1.5	✓
Atomoxetine and dexamfetamine should be considered in adults unresponsive or intolerant to an adequate trial of methylphenidate (this should usually be about 6 weeks). Caution should be exercised when prescribing dexamfetamine to those likely to be at risk of stimulant misuse or diversion.	1.7.1.6	

2.2.5 Ten of the recommendations in the guideline have been identified as key priorities for implementation, and four of these are also among the seven recommendations considered to have a significant resource impact.

2.2.6 Three key recommendations concern:

- parent training/education programmes for the parents or carers of pre-school children with ADHD (recommendation 1.5.1.3).
- drug treatment as part of a comprehensive treatment plan including psychological, educational and behavioural advice and interventions for children and young people with ADHD (recommendation 1.5.4.2).
- drug treatment for children and young people with ADHD (recommendation 1.5.5.3).

2.2.7 Parent-training/education programmes have been addressed in ‘Parent-training/education programmes in the management of children with conduct disorders’ (NICE technology appraisal guidance 102), and drug treatment has previously been covered in ‘Methylphenidate, atomoxetine and dexamfetamine for attention deficit hyperactivity disorder (ADHD) in children and adolescents’ (NICE technology appraisal guidance 98).

2.2.8 NICE technology appraisal guidance 102 concerns children aged 2–12 years with conduct disorders, whose parents receive a group-based parent-training/education programme; the estimated annual cost to the NHS from the implementation of this appraisal is £35.5 million, which is offset by anticipated savings of £45.2 million across both the NHS (£16.7 million) and other sectors such as education and social services. This assessment is based on all children with conduct disorders, which includes some children with ADHD. Therefore implementation of these three recommendations is not likely to result in additional resource impact. However, progress in implementing NICE technology appraisal guidance 102 will need to be assessed locally.

2.2.9 Expert opinion, from teachers within an educational setting suggests that the key recommendation concerning the delivery of behavioural interventions in the classroom by teachers that have received training about ADHD (recommendation 1.5.2.3) is unlikely

to result in a significant change in the use of resources nationally as behavioural interventions are carried out as part of a teacher's normal working day. There may be implementation costs for individual organisations and this should be assessed locally.

- 2.2.10 One key recommendation concerning diagnosis of ADHD, where symptoms of hyperactivity/impulsivity and/or inattention should meet the criteria outlined in DSM-IV or ICD-10 (hyperkinetic disorder), is considered to assist clinicians with decision making (recommendation 1.3.1.3). Implementation of this recommendation is unlikely to result in any additional cost implications nationally, as the diagnosis of ADHD and hyperkinetic disorder using DSM-IV and ICD-10 forms part of current practice.
- 2.2.11 The key recommendation concerning specialist ADHD teams for children, young people and adults jointly developing age-appropriate training programmes for the diagnosis and management of ADHD for mental health, paediatric, social care, education, forensic and primary care providers and other professionals who have contact with people with ADHD (recommendation 1.1.3.1), is not considered to have significant resource implications nationally; as many specialist ADHD teams have developed age-appropriate training schemes. There may be costs for individual organisations and this should be assessed locally.
- 2.2.12 We have limited the consideration of costs and savings to direct costs to the NHS that will arise from implementation. We have not included consequences for the individual, the private sector or the not-for-profit sector. Where applicable, any realisable cost savings arising from a change in practice have been offset against the cost of implementing the change.

2.3 *General assumptions made*

- 2.3.1 The model is based on prevalence and population estimates (see table 1).
- 2.3.2 Clinical opinion suggests that 33% of the CBT programme and social skills training will be led by a clinical psychologist, with the remaining 67% of the programme led by a mental health nurse.
- 2.3.3 Clinical opinion suggests that clinical psychologists will deliver 100% of parent-training/education programmes for the parents of children with moderate or severe ADHD.
- 2.3.4 Clinical opinion suggests that the uptake of this guidance may take 5 years. We assume that the uptake of these recommendations will be evenly spread over the 5-year period.

2.4 *Basis of unit costs*

- 2.4.1 All drug prices are taken from the PPA NHS Electronic Drug Tariff, and do not include VAT. Secondary care providers pay VAT for drugs purchased; this may be offset by any discounts offered on drug prices.
- 2.4.2 Staff costs, using Agenda for Change (AfC) banding information and estimates of client contact time have been calculated based on clinical opinion.
- 2.4.3 The average pay banding for a mental health professional delivering group parent-training/education programmes is band 7, although it is recognised that local services may be provided by staff on higher or lower grades.
- 2.4.4 Clinical opinion, in combination with Personal Social Services Research Unit (2007), suggests that the average pay band for a clinical psychologist and mental health nurse involved in the delivery of either CBT or social skills training for young people aged 13–15 years and older adolescents aged 16 or 17 years is AfC

2.4.5 The hourly rate for the delivery of a parent-training/education programme and CBT or social skills training is based on unit costs shown in table 3.

Table 3 Hourly costs of staff input for parent-training programmes and cognitive behavioural therapy or social skills training

Type of intervention	Clinical psychologist	Mental health nurse
Agenda for Change Band	7	5
Salary plus on-costs	£40,842	£27,541
Working hours per whole time equivalent	1,655	1,655
Hours of patient contact	50%	50%
Number of hours of patient contact	828	828
Cost per hour of patient contact	£49.33	£33.26

3 Cost of significant resource-impact recommendations

3.1 *Group-based parent-training/education programmes for the parents of young people aged 13–15 years with moderate or severe ADHD*

Background

3.1.1 If the child or young person with ADHD has moderate levels of impairment, the parents or carers should be offered referral to a group parent-training/education programme, either on its own or together with a group treatment programme (CBT and/or social skills training) for the child or young person (recommendation 1.5.2.4).

3.1.2 In school-age children and young people with severe ADHD, drug treatment should be offered as the first-line treatment. Parents

- 3.1.3 NICE Technology Appraisal 102: Conduct disorders in children, guidance on parent-training programmes for children aged 2 to 12 years with conduct disorders, including ADHD. The costs of implementation for children under 12 years has previously been considered as part of this technology appraisal, available at <http://www.nice.org.uk/Guidance/TA102>.

Assumptions made

- 3.1.4 Based on clinical opinion, it is assumed that currently 5% of parents or carers of young people aged 13-15 years with moderate or severe ADHD receive one parent training/education programme over this three year period. Therefore, it is assumed that 1.67% of parents or carers of young people aged 13-15 years with moderate or severe ADHD receive a parent training/education programme each year.
- 3.1.5 Based on clinical opinion, following the publication of this guideline it is predicted that 20% of parents of young people aged 13 – 15 years with moderate or severe ADHD that are offered a group-based parent-training/education programme will accept. Therefore is assumed that 6.67% of parents or carers of young people with moderate or severe ADHD will receive a parent training/education programme each year.
- 3.1.6 Clinical opinion suggests that an average of 10 families attend a group-based parent-training/education programme and that the programme will be delivered by two facilitators over 20 hours in total.
- 3.1.7 It is assumed that the current 5% of young people aged 13– 15 years with moderate ADHD, whose parents are receiving a group-based parent-training/education programme, will receive a

group-based treatment programme (CBT or social skills training). Following the publication of this guideline it is predicted that 15% of young people aged 13–15 years with moderate ADHD, whose parents are receiving a group-based parent-training/education programme will receive a group-based treatment programme (CBT or social skills training).

- 3.1.8 This is equivalent to 0.25% of young people aged 13–15 years with moderate ADHD currently receiving a group-based treatment programme rising to 3% of young people aged 13–15 years with moderate ADHD in the future.
- 3.1.9 Clinical opinion suggests that an average of 10 individuals will attend each group-based treatment programme for young people aged 13–15 years, which will be delivered by one facilitator, over 10 hours in total.

Cost summary

- 3.1.10 The change in cost resulting from an increase in the number of parents of young people aged 13–15 years with moderate or severe ADHD receiving a group-based parent-training/education programme and an increase in the number of group-based treatment programmes (CBT and/or social skills training) for young people aged 13–15 years with moderate ADHD whose parents are receiving a parent-training/education programme is shown in table 4.

Table 4 Group-based training programmes

	Cost per group (£)	Current		Proposed		Change	
		Number of groups	Cost (£000s)	Number of groups	Cost (£000s)	Number of groups	Cost (£000s)
Group-based parent-training/education for the parents of young people aged 13–15 years with moderate or severe ADHD	1,973	56	110	221	436	165	326
Group-based treatment programme (CBT and/or social skills training) for young people aged 13–15 years with moderate ADHD whose parents are attending a group-based parent-training/education programme	386	2	1	16	6	14	5
Total			111		442		331

Other considerations

- 3.1.11 The structure of the local group-based parent-training/education programme should be assessed. The local costing template can be amended to reflect local assumptions.
- 3.1.12 There may be additional costs from implementing this recommendation relating to accommodation and other associated costs. These should be assessed locally.
- 3.1.13 There may be additional costs arising from group treatment programmes (CBT or social skills training) for young people with severe ADHD, whose parents are receiving a group-based parent-training/education programme, the cost of these programmes should be assessed locally.
- 3.1.14 There may be a reduction in costs incurred by the youth justice service as a result of the parents of a child with moderate or severe

ADHD participating in a group-based parent-training/education programme or resulting from the young person attending a group treatment programme (CBT or social skills training).

- 3.1.15 There may also be a possible productivity benefit for the parents of children with moderate or severe ADHD arising from a reduction in the amount of time off work.

3.2 *Treatment of older adolescents aged 16 or 17 years with moderate ADHD*

Background

- 3.2.1 For older adolescents with ADHD and moderate impairment, individual psychological interventions (such as CBT or social skills training) may be considered as they may be more effective and acceptable than group parent-training/education programmes or group CBT and/or social skills training (recommendation 1.5.2.6).
- 3.2.2 Clinical opinion from the GDG has suggested that older adolescents can be assumed to be 16 or 17 years old.

Assumptions made

- 3.2.3 Based on clinical opinion, it is assumed that currently 5% of older adolescents aged 16 or 17 years with moderate ADHD receive individual CBT sessions or social skills training. Therefore, it is assumed that currently 2.5% of older adolescents with moderate ADHD receive CBT or/and social skills training each year.
- 3.2.4 Based on clinical opinion, following the publication of this guideline, it is assumed that 20%, or 10% each year, of older adolescents aged 16 or 17 years with moderate ADHD will receive individual CBT and/or social skills training.
- 3.2.5 It is assumed that CBT programmes will be delivered by one facilitator, over 10 hours in total. Based on clinical opinion it is

assumed that one third of the group will be led by a psychologist and two thirds by a mental health nurse.

3.2.6 It is assumed that the resource implications resulting from the delivery of CBT for older adolescents are similar to those for social skills training, so both interventions are considered together within the costing model.

Cost summary

3.2.7 The change in cost resulting from an increase in the number of older adolescents receiving CBT or social skills training is shown in table 5.

Table 5 Cognitive behavioural therapy and/or social skills training for older adolescents aged 16 or 17 years

	Intervention cost (£)	Current		Proposed		Change	
		Number	Cost (£000s)	Number	Cost (£000s)	Number	Cost (£000s)
Individual psychological interventions for older adolescents aged 16 or 17 years with moderate ADHD	386	198	76	791	305	593	229

Other considerations

3.2.8 The structure of the psychological intervention should be assessed locally. The local costing template can be amended to reflect local assumptions.

3.2.9 The suitability of individual CBT and social skills training for older adolescents should be assessed locally because other interventions, such as group-based CBT or social skills training, may be more effective and acceptable to the young person.

- 3.2.10 There may be additional costs from implementing this recommendation relating to accommodation and other associated costs. These should be assessed locally.

3.3 *Comprehensive treatment programme for adults*

Background

- 3.3.1 Drug treatment for adults with ADHD should always form part of a comprehensive treatment programme that addresses psychological, behavioural and educational or occupational needs (recommendation 1.7.1.4).

Discussion

- 3.3.2 Existing provision of services for adults with ADHD is not uniform across the country. Currently, drug treatment for adults may be prescribed by primary care and treatment programmes that address psychological or behavioural needs may not exist within some health economies, although we are aware of areas where they are functioning. These include the provision of CBT for adults with significant functional impairment or those not choosing drug treatment.
- 3.3.3 No data exists concerning the national availability of comprehensive treatment programmes for adults with ADHD to form a baseline. Therefore, local organisations should assess the local provision of services for adults with ADHD and the resources required to provide services for adults with ADHD.
- 3.3.4 There may be costs associated with the training of additional clinicians in the delivery of cognitive behavioural therapy or social skills-training programmes as part of prescribing for adults with ADHD.

3.4 *Assessment, drug treatment and the monitoring of adults with ADHD*

Background

3.4.1 Before starting drug treatment for adults with ADHD a full assessment should be completed, which should include:

- full mental health and social assessment
- full history and physical examination, including:
 - assessment of history of exercise syncope, undue breathlessness and other cardiovascular symptoms
 - heart rate and blood pressure (plotted on a centile chart)
 - weight
 - family history of cardiac disease and examination of the cardiovascular system
- an ECG if there is past medical or family history of serious cardiac disease, a history of sudden death in young family members or abnormal findings on cardiac examination
- risk assessment for substance misuse and drug diversion (recommendation 1.7.1.3).

3.4.2 Following a decision to start drug treatment in adults with ADHD, methylphenidate should normally be tried first (recommendation 1.7.1.5).

3.4.3 Atomoxetine and dexamfetamine should be considered in adults unresponsive or intolerant to an adequate trial of methylphenidate (this should usually be about 6 weeks). Caution should be exercised when prescribing dexamfetamine to those likely to be at risk of stimulant misuse or diversion (recommendation 1.7.1.6).

Assumptions made

3.4.4 There are two elements to implementing these recommendations. We have estimated the recurrent cost of increasing numbers of

adults receiving drug treatment and the non-recurrent cost of assessing adults with ADHD.

- 3.4.5 Clinical opinion suggests that adults with ADHD will receive one first appointment in a secondary care setting with a psychiatric consultant and one follow-up appointment with a psychiatric consultant before starting drug treatment. The cost for these appointments has been taken from NHS reference costs (2007) and is based on one first appointment for 'Adult: other services' costing £293 and one follow-up appointment for 'Adult: other services' costing £160, including national average market forces factor of 12.49%.
- 3.4.6 As controlled and off-license drugs (methylphenidate, dexamfetamine and atomoxetine) are used in the treatment of adults with ADHD, it is likely these adults will receive a monthly check-up in primary care.
- 3.4.7 We have assumed that these appointments are delivered by a general practitioner in primary care. The cost of these appointments is based on PSSRU (2007), uplifted by the 2007/08 and 2008/09 pay awards (£36).
- 3.4.8 The estimated number of adults currently receiving medications (methylphenidate, atomoxetine and dexamfetamine) for the management of ADHD was obtained from IMS disease analyser, based on a large sample of GP practice systems. It is estimated that 1.24% of adults with ADHD currently receive these medications for the management of ADHD.
- 3.4.9 It is estimated that 63% of adults using medication receive methylphenidate, 9% receive atomoxetine and the remaining 28% receive dexamfetamine (IMS disease analyser). It is assumed that the proportionate split between drugs used for the treatment of ADHD in adults will remain the same in the future.

3.4.10 Based on clinical opinion, it is assumed the 50% of adults with ADHD that currently receive methylphenidate will receive an immediate-release preparation and 50% of adults with ADHD receive a modified-release preparation of methylphenidate.

3.4.11 The average daily dose, unit cost and annual cost of the drugs used for the treatment of ADHD in adults are shown in table 6. The average daily dose for treatment is based on clinical opinion.

Table 6 Drugs costs used in the treatment of adults ADHD

Drug name	Average daily dose (mg)	Unit cost (£)	Annual cost (£)
Methylphenidate			
Immediate-release	40	0.77	282
Modified-release	36	1.98	723
Atomoxetine	80	4.29	1566
Dexamfetamine	15	0.32	117

3.4.12 Based on clinical opinion it is assumed that an additional 10% of adults with ADHD will receive medication..

Cost summary

3.4.13 The change in cost resulting from an increase in the number of adults with ADHD receiving medication is shown in table 7.

Table 7 Drug treatment and monitoring of adults with ADHD receiving drug treatment

Recurrent cost	Annual cost per adult (£)	Current		Proposed		Change	
		Number of adults	Cost (£000s)	Number of adults	Cost (£000s)	Number of adults	Recurrent cost (£000s)
Methylphenidate	502	3,356	1,686	30,418	15,284	27,062	13,598
Atomoxetine	1,566	449	704	4,074	6,379	3,625	5,675
Dexamfetamine	156	1,468	230	13,308	2,082	11,840	1,852
Subtotal - Drug treatment for adults		5,273	2,620	47,800	23,745	42,527	21,125
Monitoring of adults	430	5,273	2,266	47,800	20,539	42,526	18,274
Total			4,885		44,284		39,399

3.4.14 The non-recurrent cost associated with an increase in the number of adults receiving an assessment prior to starting drug treatment is shown in table 8.

Table 8 Assessment for adults with ADHD before starting drug treatment

Cost of assessment (£)	Number of assessments	Non-recurrent cost (£000s)
453	55,311	25,060

Other considerations

3.4.15 It is assumed that the initial assessment of adults with ADHD will be a non-recurrent cost. There will be a recurrent cost each year from new adults receiving an assessment before starting drug treatment for ADHD; it is assumed that the number of assessments for adults before starting drug treatment will reduce to a lower level over time.

3.4.16 It is assumed that all adults that receive an assessment prior to starting drug treatment, go on to receive drug treatment. However, a small number of adults may not satisfy the criteria in the assessment and therefore not receive drug treatment.

- 3.4.17 It is assumed that the prescribing and monitoring of adults with ADHD receiving drug treatment occurs with a primary care setting, however, if this monitoring occurs within secondary care costs may be higher.
- 3.4.18 The increase in the level of prescribing of drugs for adults with ADHD may result in an increase in the occurrence of adverse events caused by stimulant drugs. However, the number of patients affected by adverse events and the costs associated with these is not anticipated to be significant.

3.5 *Benefits and savings*

- 3.5.1 A reduction in broader societal costs, such as parental absence from work and related productivity losses is anticipated. Benefits following implementation will be realised within the NHS and the public sector including voluntary, educational and social services. There may be a reduction in costs of special education services, and costs of other social services, including the youth justice system, following implementation of this guideline.
- 3.5.2 There may be an increase in the productivity and performance of adults with ADHD who are receiving medication and a reduction in the number of days lost to absenteeism.
- 3.5.3 It has not been possible to quantify the benefits and savings arising from the anticipated increases in activity, however, as can be seen from the cost assessment for the NICE guidance on parent-training/education programmes for parents of children with conduct disorders (NICE technology appraisal guidance 102), where research existed that enabled quantification of the savings, it is possible that the savings may exceed the cost of implementation.
- 3.5.4 Compliance with NICE guidance is one of the criteria indicating good risk reduction strategies and, in combination with meeting other criteria indicating good risk management, could lead to a

discount on contributions to the NHS Litigation Authority schemes, including CNST.

4 Sensitivity analysis

4.1 Methodology

- 4.1.1 There are a number of assumptions in the model for which no empirical evidence exists. Because of the limited data, the model developed is based mainly on discussions of typical values and predictions of how things might change as a result of implementing the guideline and is therefore subject to a degree of uncertainty.
- 4.1.2 As part of discussions with practitioners, we discussed possible minimum and maximum values of variables, and calculated their impact on costs across this range.
- 4.1.3 Wherever possible we have used the national tariff plus market forces factor to determine cost. We used the variation of costs for the 25th and 75th percentiles from reference costs compared with the reference cost national average as a guide to inform the maximum and minimum range of costs.
- 4.1.4 It is not possible to arrive at an overall range for total cost because the minimum or maximum of individual lines would not occur simultaneously. We undertook one-way simple sensitivity analysis, altering each variable independently to identify those that have greatest impact on the calculated total cost.
- 4.1.5 Appendix B contains a table detailing all variables modified and the key conclusions drawn are discussed below.

4.2 *Impact of sensitivity analysis on costs*

Proportion of adults with ADHD receiving drug treatment and monitoring.

4.2.1 Varying the absolute proportion of adults with ADHD that are predicted to receive drug treatment and monitoring, over the next 5 years, between the minimum (5%) and maximum (15%) estimates provided by clinicians, results in a cost of implementation varying between £20.3m to £59.7m.

Proportion of adults with ADHD receiving an assessment prior to starting drug treatment

4.2.2 Clinical opinion has suggested that an additional 5% to 15% of adults with ADHD may receive an assessment prior to starting drug treatment.

4.2.3 Varying these estimated between these maximum and minimum results in a non-recurrent cost of implementation varying from £10.4m to £39.7m.

Proportion of adults receiving modified-release methylphenidate

4.2.4 Clinical opinion has suggested that currently 50% of adults receiving methylphenidate receive a modified release preparation, varying this estimate between 0% and 75% results in a recurrent cost of implementation varying from £34.2 to £42.8m. .

5 *Impact of guidance for commissioners*

5.1 The costs associated with implementing this guideline will be within primary care and mental health services and hence are currently excluded from the scope of 'Payment by results'.

5.2 The costs arising from drug treatment within this guideline falls within programme budgeting category 05X 'Other mental health disorders'.

6 Conclusion

6.1 Total national cost for England

6.1.1 Using the significant resource-impact recommendations shown in table 2 and assumptions specified in section 3 we have estimated the annual cost impact of fully implementing the guideline in England to be £40.0 million, with an additional £19.3 million non-recurrent cost. Table 9 shows the breakdown of cost of each significant resource-impact recommendation.

Table 9 Summary of resource impact

Recurrent costs	First year (£000s)	At full implementation (£000s)
Group-based parent-training/education programmes for the parents of young people aged 13–15 years with moderate or severe ADHD.	65	326
Group-based treatment programmes (CBT or social skills training) for young people aged 13–15 years with moderate ADHD whose parents are receiving group parent-training/education programmes.	1	5
Individual psychological interventions (CBT or social skills training) for older adolescents aged 16 or 17 years with moderate ADHD.	51	229
Drug treatment and monitoring of adults with ADHD (aged 18 years and older).	7,099	39,399
Annual recurrent costs	7,216	39,958
Non-recurrent cost		
Assessment for adults with ADHD prior to commencing drug treatment.	3,855	19,277

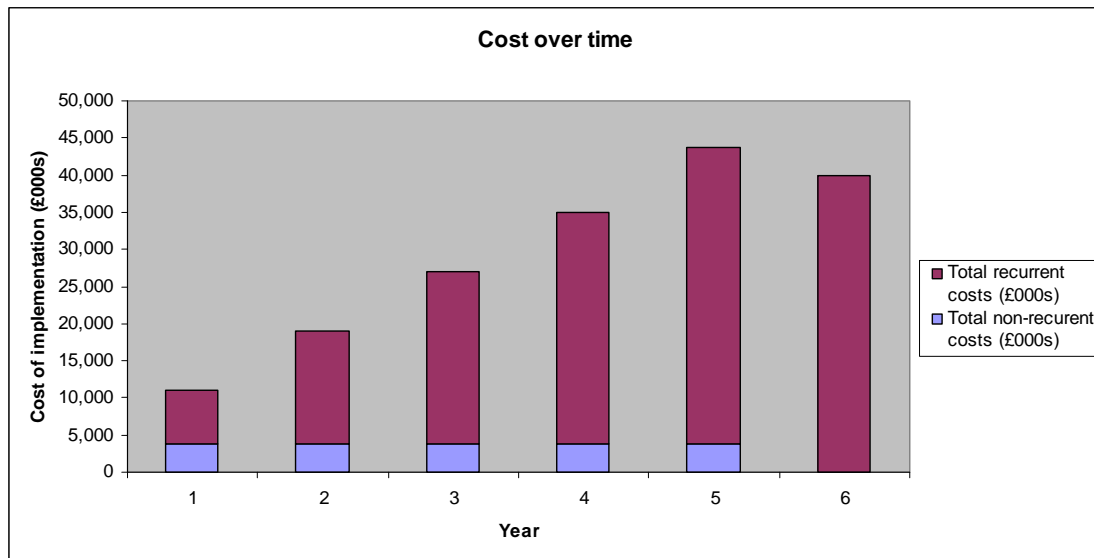
6.1.2 There may be additional cost implications arising from the recommendation concerning drug treatment for adults with ADHD forming part of a comprehensive treatment programme that addresses psychological, behavioural and educational or occupational needs. We have not been able to quantify the cost impact of this because of a lack of data on current baseline and how services may respond to implement this recommendation. The National costing report: Attention deficit hyperactivity disorder (September 2008)

cost of implementing this recommendation should be assessed locally.

6.1.3 We applied reality tests against existing data wherever possible, but this was limited by the availability of detailed data. We consider this assessment to be reasonable, given the limited detailed data regarding diagnosis and treatment paths and the time available. However, the costs presented are estimates and should not be taken as the full cost of implementing the guideline.

6.1.4 It may take time to fully implement this guideline and identify adults requiring assessment and drug treatment. Clinical opinion suggested that for some areas this could be up to five years. See figure 1 for the anticipated cost of uptake of full implementation of the guideline, phased over a 6-year time horizon.

Figure 1 Costs of implementing the ADHD guideline

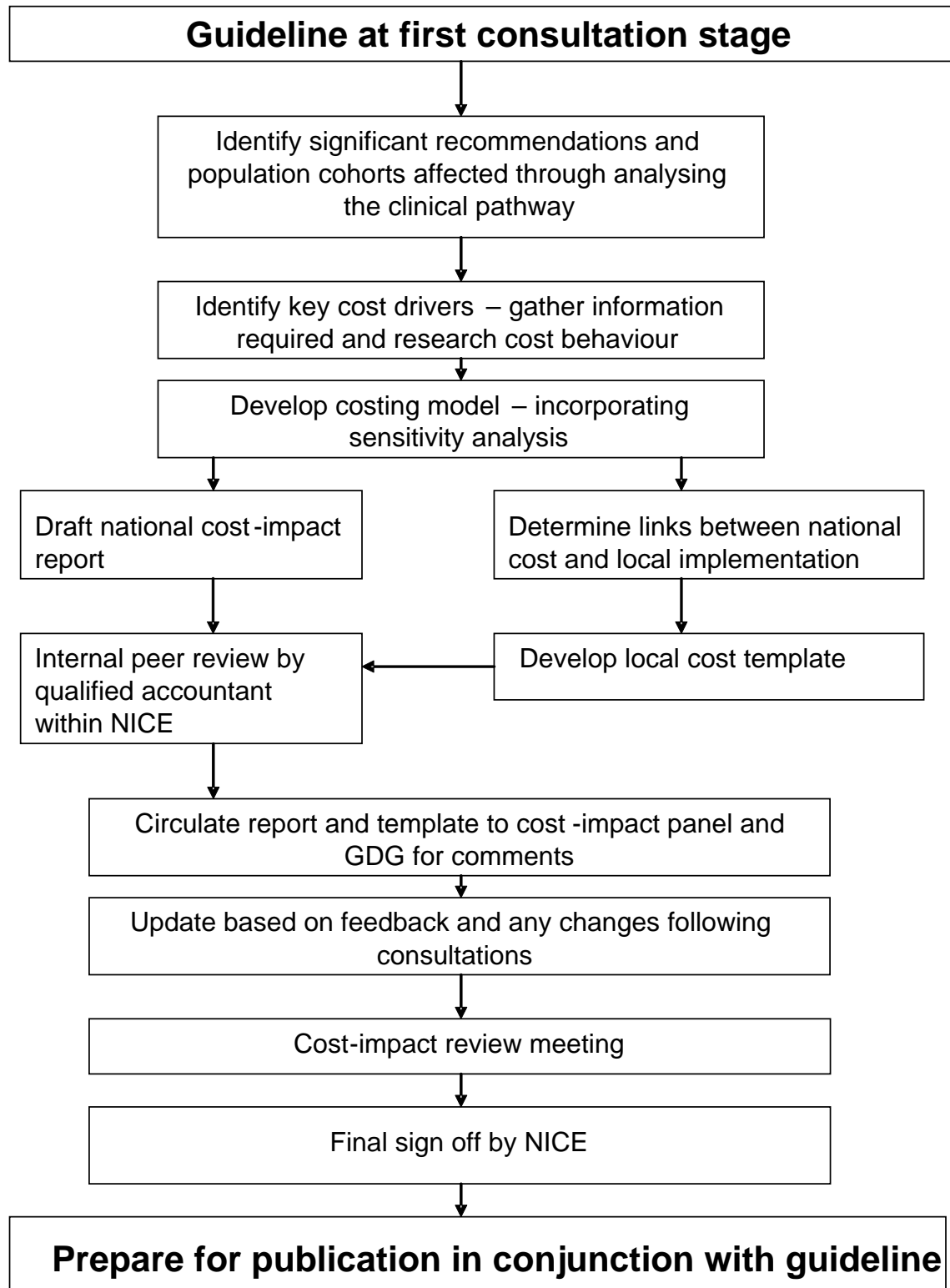


6.2 *Next steps*

6.2.1 The local costing template produced to support this guideline enables organisations, such as primary care trusts or health boards in Wales and Northern Ireland, to estimate the impact locally and replace variables with ones that depict the current local position. A sample calculation using this template showed that a population of

100,000 could expect to incur additional recurrent costs of £78,000 at full implementation, with a further £38,000 non-recurrent cost. Use the costing template to calculate the cost of implementing this guidance in your area.

Appendix A. Approach to costing guidelines



Appendix B. Results of sensitivity analysis

Assessment of sensitivity costs to a range of variables							
Parameter varied	Baseline value	Minimum value	Maximum value	Baseline costs (£000s)	Minimum costs (£000s)	Maximum costs (£000s)	Change (£000s)
Prevalence of ADHD in boys aged 13 to 15 years	3.62%	1.61%	4.00%	39,958	39,812	39,992	180
Prevalence of ADHD in girls aged 13 to 15 years	0.85%	0.38%	1.00%	39,958	39,930	39,974	44
Proportion of boys retaining their DSM-IV diagnosis of ADHD into adulthood	50%	40%	65%	39,958	33,248	50,034	16,786
Proportion of girls retaining their DSM-IV diagnosis of ADHD into adulthood	50%	40%	65%	39,958	38,272	42,498	4,226
Average number of parents per group-based parent-training/education programme	10	8	12	39,958	39,908	40,047	139
Predicted proportion of young people aged 13 to 15 years, with moderate or severe ADHD, whose parents receive a group-based parent-training/education programme	6.67%	6.67%	8.33%	39,958	39,958	40,071	113
Predicted proportion of young people aged 13 to 15 years with moderate ADHD whose parents receive a group-based parent-training/education programme, that receive a group treatment programme (CBT or social skills training)	15%	15%	25%	39,958	39,958	39,966	8
Number of sessions of CBT or social skills training for adolescents aged 16 or 17 years with ADHD	10	8	12	39,958	39,915	40,009	94
Predicted proportion of adults with ADHD that receive drug treatment and monitoring	11.24%	6.24%	16.24%	39,958	20,261	59,669	39,408
Adult dosage of short acting methylphenidate	40 mg	10 mg	50 mg	39,958	37,200	40,878	3,678
Proportion of adults with ADHD receiving a modified-release methylphenidate (Concerta 36 mg daily dose - costing £1.35)	50%	0%	75%	39,958	34,219	42,834	8,615
Adult dosage of dexamfetamine	20 mg	15 mg	25 mg	39,958	39,512	40,404	892
Predicted proportion of adults with ADHD that receive an assessment prior to starting drug treatment	11.24%	6.24%	16.24%	19,277	10,419	39,696	29,277

Appendix C. References

Faraone S, Biederman J (2006) What is the prevalence of adult ADHD: Results of a population survey of 966 adults. *Journal of attention disorders*, 9:389–391.

Ford T, Goodman R, Meltzer H (2003) The British Mental Health Survey 1999: The prevalence of DSM-IV Disorders. *Journal of the American Academy of Child & Adolescent Psychiatry*. 42:1203–1211.

Kessler R, Chiu W, Demler O et al. (2005) Prevalence, Severity and Comorbidity of 12 month DSM-IV Disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62:617–627.

National Institute for Health and Clinical Excellence (2006) Attention Deficit Hyperactivity Disorder – methylphenidate, atomoxetine and dexamfetamine (review). NICE technology appraisal 98. Available from www.nice.org.uk/Guidance/TA98.

National Institute for Health and Clinical Excellence (2006) Conduct disorder in children – parent training /education programmes. NICE technology appraisal 102. Available from www.nice.org.uk/Guidance/TA102.

PPA NHS Electronic Drug Tariff. Available from www.ppa.org.uk/edt/September_2008/mindex.htm [accessed 1 September 2008].

NHS Reference Costs (2007). Available from www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_074072.

Personal Social Services Research Unit (2007) Unit costs of health and social care. Available from www.pssru.ac.uk/uc/uc2007contents.htm.