New Zealand Guidelines for the Assessment and Treatment of Attention-Deficit/ Hyperactivity Disorder

Disclaimer: These guidelines are not intended to provide comprehensive assessment or diagnostic information on the range of emotional and behavioural problems experienced by children. It is assumed that practitioners either have the specialist training to assess and diagnose these conditions including diagnosis of comorbid conditions and differential diagnosis or, if they do not, they refer on as appropriate to specialist services. A comprehensive manual was considered to be beyond the scope of these guidelines.

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Summary

Symptoms of Attention-Deficit/Hyperactivity Disorder (ADHD) in childhood are persistent overactivity, impulsiveness and inattention, although not all may be present. As defined in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV), there are three types of ADHD:

1. Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type
2. Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type
3. Attention-Deficit/Hyperactivity Disorder, Combined Type.

ADHD is one of the most widely and well-researched mental health disorders in childhood. As a result, a large number of high quality studies meet the criteria of evidence-based medicine covering key areas of diagnosis, assessment, treatment and outcome.

The conclusions of these *New Zealand Guidelines* have scientific/evidential support that is detailed in Part II.

The intended audience for the guidelines is mainly health professionals. These *New Zealand Guidelines* address only the assessment and treatment of ADHD. It is assumed that services and practitioners will also address the holistic needs of the child and family and whānau, including any comorbidity.

Assessment

Māori

Children and young people should be offered an assessment that is appropriate to their cultural needs. It is important that assessments of Māori children and young people incorporate relevant whānau and cultural aspects. Wherever possible, culturally appropriate staff should be available to address these aspects during assessment.

Diagnostic criteria

The relevant DSM-IV criteria must be present for a diagnosis of ADHD (refer Appendix 2). Children receive a diagnosis if they have core symptoms of either attention problems or hyperactivity/impulsiveness, or both.

It is also necessary that:

- symptoms are present in more than one setting, such as home and school, or with more than one caregiver, such as parents and grandparents
- symptoms result in significant impairment
- the core problems have been present for at least six months – though in the vast majority of instances they have been present since the first years of life
- the problems have begun before the age of seven years of age.

Assessment and management in schools and early childhood settings

Other than in very exceptional cases, symptoms must occur in both home and school before ADHD is diagnosed. Therefore ordinarily a diagnosis should be made with supporting information from teachers and other education professionals such as Specialist Education Service (SES) staff and Resource Teachers: Learning and Behaviour (RTLBs). Also important are medication management systems in schools and early childhood education settings and reporting on changes in the child's behaviour in these settings.

Information may be gained through a face-to-face interview, telephone consultation and/or teacher reports and checklists. Time and resources may influence the type of contact that can occur. It is important however for the above reasons that there is sufficient and diverse forms of contact and information provided.

When children are not attending school or early childhood settings, confirming evidence may come from relatives, babysitters and other caregivers.

Rating scales

A behavioural rating scale that has good reliability and validity should be administered as part of a comprehensive assessment (see 3.2.5).

Specific screening tests/procedures

The potential contribution of underlying medical conditions and hearing and vision problems should be considered in the initial assessment. In most instances this information should be available from the family doctor.

As yet, no medical screening tests, for example, electroencephalograms (EEGs), heavy metal concentration, thyroid, blood or organ imaging tests have proven to be useful as screening or diagnostic tools for ADHD. Their use should be dictated by specific medical indications, not by the possibility of ADHD.

In the assessment of ADHD it is possible to use rating scales and behavioural observations designed specifically for diagnosing ADHD. No other psychological, general intelligence, neuropsychological or personality tests are of proven value in the diagnosis of ADHD. However, they may be helpful in other areas, such as educational assessments and differential diagnosis.

Differential diagnosis

It is essential to examine for and rule out other psychiatric disorders before a diagnosis of ADHD is made. DSM-IV lists certain conditions (eg, psychosis and Pervasive Developmental Disorders) that need to be excluded. A comprehensive assessment therefore requires routine screening for these conditions to rule out differential diagnoses.

Ideally these conditions would be assessed to a specialist mental health standard, for example, to the Mental Health Commission mental health assessment tool. The Mental Health Commission has developed a specialist mental health assessment tool for children and young people. This tool is available to child and adolescent mental health services in New Zealand to assist with a comprehensive mental health assessment. However, while this assessment tool and related training are available to child and adolescent mental health services, at present they are not readily available outside these services.

Comorbidity

Most children in clinical settings have more than one problem (comorbidity); most notably, oppositional defiant, conduct or learning disorders which are so common they can mistakenly be assumed to be part of ADHD.

Therefore in assessing and treating ADHD it is important to search for and properly identify any comorbid psychiatric disorders as each has specific management strategies. For the assessment and management of these disorders, other diagnosis-specific guidelines should be consulted, such as those produced by the American Academy of Child and Adolescent Psychiatry.

Where ADHD is severe, there is significant comorbidity and/or the problems are complex, the child should be referred to a child and adolescent mental health service.

Treatment

As noted above, most children seen in clinics have associated problems or comorbid conditions that require management in their own right. Treatment of ADHD symptoms in children and young people should occur holistically, addressing the needs and circumstances of the child and family and whānau, as well as any other comorbidity. These *New Zealand Guidelines* focus only on treatment that is specifically for ADHD and that has been found to be effective. Their premise is that children and young people have a right to be offered the most effective treatment for their condition based on the best available evidence. Therefore treatments without proven effectiveness for ADHD specifically are not recommended here for treating ADHD. However, treatments for other disorders, where indicated, should be part of the final management plan, for example, behaviour management for comorbid oppositional defiant disorder.

Multidisciplinary treatment

ADHD problems occur in multiple settings, with a number of different caregivers and professionals likely to be involved in managing the child's needs. For effective multidisciplinary management, it is essential to have co-operation among health professionals as well as effective consultation and liaison with family, schools, early childhood settings and support services.

Treatment should be individualised to the needs of the child or young person and take into account the resources and capacity of the family.

Pharmacotherapy

There is now considerable evidence that a carefully executed regimen of pharmacotherapy is superior to alternative treatments including behavioural treatment alone. As a general rule, monotherapy with a stimulant drug (methylphenidate or dexamphetamine) is the first line of treatment. The stimulants, methylphenidate (Rubifen™ and Ritalin™) or dexamphetamine (Dexedrine™), are regarded as pharmacologic agents of first choice in ADHD. Medication should always be considered (but not necessarily used) to treat core DSM-IV symptoms that are persistently severe enough to cause significant impairment in social/academic or occupational functioning. Where medication is trialled but symptoms do not improve or there are unacceptable side effects, it may be useful to:

- check compliance with the medication regime
- reconsider the initial diagnosis, differential diagnoses and comorbid conditions
- vary the dosage
- change medication type, for example, substituting dexamphetamine for methylphenidate.

Overall 70–80 percent of children exhibit improvement in their symptoms of ADHD while on stimulant medication. Improvements are in relation to the 'core' symptoms of ADHD – namely improvement of attention span and reduced intensity of disruptive and impulsive behaviour. The evidence for any substantial benefits in academic achievement in the short term is mixed, and good studies of long-term benefits are lacking. In general, medication improves application and performance rather than skill acquisition.

Many of the side effects associated with stimulant use appear to be relatively mild and of short duration, and seem to respond to dosing or timing adjustments. There is insufficient data to draw definitive conclusions on the long-term effects and severity of adverse effects of most interventions. However, the data available suggest medication has no long-term or severe adverse effects.

Behaviour therapy

Behaviour therapy may be an alternative treatment where:

- parents refuse to allow medication
- there are other reasons for not trying medication
- medication proves unsuccessful.

However, behaviour therapy is much more difficult, labour intensive and expensive than pharmacotherapy. Behaviour therapy should however be used for common comorbid conditions such as oppositional defiant disorder where it is known to be effective.

Combined medication and behavioural treatment

Combined treatments of medication and behavioural treatments are superior to behavioural treatment alone. Whether such combination treatments are superior to medication alone is less clear. There is little evidence to support the value of adding behavioural approaches to

medication. Studies in this area have methodological problems and have produced inconsistent results, such that the evidence is insufficient to make definitive conclusions.

The Multimodal Treatment Study of Children with Attention-Deficit/Hyperactivity Disorder (MTA study) found that combined behavioural and pharmacological management with a stimulant drug produced significantly better results than pharmacological interventions alone. But the behavioural interventions used were more labour intensive and costly than interventions in most studies and the added benefit was relatively modest. The resources involved in the MTA study would not normally be available in New Zealand. While important, these results require further analysis and critique (soon to be available), as well as replication, before definitive conclusions can be made.

Second-line medication

Second-line medication can be considered for children and young people whose diagnosis is clearly ADHD but who fail to respond to stimulants or who have unacceptable side effects. These medications include tricyclic antidepressants and, where all else has failed, atypical neuroleptics such as risperidone for a short term. In general, second-line medication should not be used without consulting a specialist child and adolescent psychiatrist or behavioural paediatrician, as the need for it suggests that the problem is probably more complex than ADHD alone.

Combined pharmacotherapy

Combined pharmacotherapy (polypharmacy) for ADHD is controversial. Much more research in this area is needed. Such treatment should only be used in exceptional circumstances and with appropriate consultation. It may be considered if trials of at least two individual agents (initially methylphenidate and dexamphetamine) have failed.

Note that the simultaneous use of other medications for comorbid disorders is not considered to be polypharmacy. This 'combined' approach is appropriate if the other disorder or problem is a proper indication for that pharmacotherapy.

Reviews and monitoring responses to stimulant medication

No good evidence favours any particular monitoring regime, therefore principles of good flexible care to suit individual need should be followed. It is suggested that minimal standards should be to monitor progress, including screening for side effects (eg, weight loss, depression and insomnia):

- at least every three to six months by the prescriber or key worker
- more frequently after initiating or significantly altering any medication (eg, weekly phone contacts and a face-to-face visit at four to six weeks).

Good practice also involves making available a prescribing doctor, colleague or an informed after-hours service at all times to discuss any concerns that parents may have when initiating medication. Most advice in this regard can be given by telephone and should take very little time.

Treatment response may be monitored using behaviour rating scales and standard assessment forms, but good detailed feedback from parents and teachers are equally, if not more important. An annual specialist review by, or under the direction of, a child and adolescent psychiatrist or paediatrician is recommended, using similar parameters to those for the initial diagnosis.

PART I

Rationale, Review and Guidelines

1.0 Introduction

Disclaimer: These guidelines are not intended to provide comprehensive assessment or diagnostic information on the range of emotional and behavioural problems experienced by children. It is assumed that practitioners either have the specialist training to assess and diagnose these conditions including diagnosis of comorbid conditions and differential diagnosis or, if they do not, they refer on as appropriate to specialist services. A comprehensive manual was considered to be beyond the scope of these guidelines.

1.1 Overview of ADHD assessment and treatment

One of the major advances in child and adolescent mental health in the last two decades has been the development of a clear diagnostic classification of the various problems and behaviours, improving on the previous large and rather ill-defined categories. There has also been a major paradigm shift away from perceiving children's problems as merely a reflection of parenting and other ecological variables towards stable 'disorders' within the child often with a contributing genetic or biological cause. In addition these diagnostic categories or disorders have been subject to increasing scientific scrutiny as to their reliability and validity and their implications for aetiology, treatment and prognosis.

One of the disorders of greatest interest and study has been ADHD, formerly known as the hyperkinetic syndrome of childhood or minimal brain dysfunction. This disorder was first described around the start of the 20th century but then largely lost from view as theories of environmental factors became paramount in the 1920s (see review by Silk et al 2000).

Symptoms of ADHD in childhood are persistent overactivity, impulsiveness and inattention, although not all may be present. Three subtypes of ADHD are defined in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) (American Psychiatric Association 1994: 83–4):

1. Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type
2. Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type
3. Attention-Deficit/Hyperactivity Disorder, Combined Type.

Together these subtypes represent one of the most common childhood psychiatric disorders. In New Zealand it is the most common diagnosis given to children in child and adolescent mental health services. The disruptive symptoms, along with the learning and behavioural problems that are often associated with the disorder, lead to significant stresses at school and in the home.

The aetiology of ADHD is likely to involve a variety of genetic and neurological factors. Hereditary factors are thought to contribute most, accounting for 50 percent of the variance (Epstein et al 2000). An organic neurological problem involving the frontal lobes (especially executive function) and/or basal ganglia in the brain also has considerable support (Clark et al 2000). Social factors alone are not considered an etiological cause but may exacerbate pre-existing symptoms and genetic or neurological vulnerability (Barkley 1998: Chapter 5).

When ADHD persists into adolescence and adulthood there are increased risks associated with education failure and antisocial behaviour. The individual and societal costs of ADHD, which has an estimated prevalence of 1.5 to 12 percent (Green et al 1999) in children of primary school age, are leading to demands for increased recognition and management of the disorder.

Comorbid conditions are common. In their review Green et al (1999) found that of children who presented to clinics and were diagnosed with ADHD:

- about one-third also qualified for a diagnosis of oppositional defiant disorder
- one-quarter qualified for a diagnosis of conduct disorder
- almost one-fifth had a depressive disorder
- more than one-quarter had an anxiety disorder
- almost one-third had more than one comorbid condition.

Barkley's (1998) review found similar rates of comorbidity (see table 2). These comorbid disorders increase the range and degree of disability and complicate management and outlook.

1.2 Objective of the *New Zealand Guidelines*

These *New Zealand Guidelines for the Assessment and Treatment of Attention-Deficit/Hyperactivity Disorder* address the issue of ADHD in children and young people aged between 5 and 13 years. The guideline development group was aware that considerable work is being undertaken on the assessment and management of those outside this age range, and expects that the *New Zealand Guidelines* can be extended in the future when the results of these reviews are available.

The *New Zealand Guidelines* are primarily directed at health practitioners. In addition, their principles and recommendations are of relevance to parents, caregivers, teachers and other professionals involved in the care of children and young people with ADHD.

While these *New Zealand Guidelines* are focused on ADHD only and are driven by an evidence base, clinicians must also pay attention to and use assessment and treatment methods appropriate to meeting the humanistic and cultural holistic needs of the child and family and whānau. Equally this requirement for a holistic approach applies to identifying and treating any comorbid psychiatric disorders and/or other disabilities that the child may have.

Assessment and treatment of ADHD will continue to evolve. These *New Zealand Guidelines* are evidence-based decision aids, based on the systematic evaluation of current evidence. They are not a substitute for informed clinical judgement regarding any specific clinical procedure or treatment based on the patient's individual circumstances. The *New Zealand Guidelines* may be subject to change, including the addition of more detail and/or becoming more specific in purpose, as further relevant data or input are adopted. These *New Zealand Guidelines* should be reviewed and updated every two years from the date of publication. The Ministry of Health should ensure these *New Zealand Guidelines* are reviewed.

1.3 Membership of the group developing the *New Zealand Guidelines*

The following members were involved in the guideline development process:

Dr Shanthi Ameratunga, Public Health Medicine Registrar, University of Auckland, Paediatrician

Dr Kevin Appleton, Child and Adolescent Psychiatrist, Waitemata Health, Auckland

Dr Russell Austin, Developmental Paediatrician, Christchurch Hospital, Department of Paediatrics

Dr Nick Baker, Community Paediatrician, Nelson/Marlborough region

Dr Leo Buchanan, Paediatrician, Wellington

David Bunting, Starship Children's Hospital

Dr Phillipa Clark, Developmental Paediatrician, Auckland

Sam Cliffe and Linzi Jones, Project Managers, Service Development, Personal and Family Health, Ministry of Health

Dr Denise Guy, Child and Adolescent Psychiatrist, Hutt Valley Health

Dr Tony Hanne, General Practitioner and Senior Lecturer Goodfellow Unit, Auckland School of Medicine

Dr Pat Tuohy, Chief Advisor, Child and Youth Health, Personal and Family Health, Ministry of Health (Chair of the ADHD guideline development group)

Ministry of Education, Christine Druce, Senior Advisor, Special Education

Barbara Mullins, Parent Representative

Dr Gail Tripp, Senior Lecturer and Director of the Clinical Psychology Programme, University of Otago

Diane Wellacott, ADHD Association Incorporated

Professor John Scott Werry, Emeritus Professor of Child and Adolescent Psychiatry, University of Auckland

Dr Russell Wills, Community Paediatrician, Wellington

Sue Willoughby, Community Representative, Dunedin

1.4 Process

The development of these *New Zealand Guidelines* differs slightly from the traditional approach to the production of evidence-based clinical guidelines. Usually there is first a systematic review of the literature and then a consensus is reached among a broad-based, multidisciplinary group which includes both clinical and consumer representatives. The multidisciplinary approach has been retained for these *New Zealand Guidelines*. However, rather than attempting yet another review, the process has involved an analysis of evidence-based systematic reviews and consensus conferences, which have been published in the health-related literature over the last five years.

A more detailed description of the process is provided in Part II.

1.5 Prevalence of Attention-Deficit/Hyperactivity Disorder

A number of problems are associated with determining accurate prevalence rates for ADHD. Problems include but are not limited to:

- the period when the study was conducted
- the diagnostic criteria used, which have varied greatly over the last 20 years
- the sampling method, for example, the age range of the child population
- differing diagnostic methods
- the degree of agreement among informants
- other methodological and sampling problems (Barkley 1998: 78–88; Jensen 2000; Kelleher 2000; Safer 2000).

Prevalence rates and the use of medication may also vary according to the country under examination. For example, rates of ADHD and pharmacotherapy reported in the United States tend to be higher than in the United Kingdom. The setting in which children are seen may also be influential. Children seen in primary care settings by a general practitioner may be more likely to receive medication than those identified by teachers in classrooms (Safer 2000). Such problems led Barkley (1998: 78–88) to conclude that the true prevalence rate cannot be determined.

Not surprisingly then, there has been wide variation in prevalence rates reported. The review by Barkley (1998: 78–88) in this area involved 15 studies, including some in New Zealand. The range in prevalence rates was 1.4 to 13.3 percent, consistent with other reviews reporting that prevalence rates range from 1.2 to 16.1 percent (Safer 2000). The New Zealand prevalence rates reported also vary. Using a psychiatric interview by an experienced child psychiatrist, a rate of 6.7 percent was reported for children involved in the Dunedin Health and Development Study (Anderson et al 1987). The results of the Dunedin Health and Development study have some limitations on their generalisability. Namely, this cohort study includes relatively low numbers of Māori and Pacific children and no children from large urban areas.

The DSM-IV cites a prevalence rate of 3 to 5 percent among school-age children (American Psychiatric Association 1994: 82). JS Werry (personal communication, 2000) suggests a prevalence rate of 5 percent as a rough guide.

It appears that only two studies have used epidemiological survey methods of community samples to determine how well ADHD is actually identified when present and how it is treated. Results were inconsistent between these studies. Arngold et al (2000) reported a pattern of both under- and over-diagnosis and under- and over-prescribing of medication, depending on the primary person involved in diagnosis (medical or educational practitioner). Jensen (1999) reported under-diagnosis and under-prescribing of medication.

Caution is required in interpreting these results as the studies are not without methodological problems. Nevertheless these studies are important and require replication, particularly given the current concern over prescribing stimulant medication. No results from similar studies are as yet available for New Zealand.

2.0 Nature and Diagnosis in the Developmental Course of ADHD

2.1 Children under five years of age who have ADHD

Several studies have found that many children under five years of age are likely to be rated as inattentive and overactive by their parents. The majority of these problems have decreased within six months. Even among those aged 3 to 4 years with significant inattention and overactive behaviour, 50 to 90 percent will not have such symptoms by late childhood or early adolescence, though they may develop other problems such as oppositional defiant disorder and conduct disorder. It is the **degree** and **duration** of preschool ADHD symptoms that predict ADHD during subsequent developmental periods. Persistence of symptoms to age four years is more likely to be associated with such problems at school entry (Barkley 1998; Campbell et al 1977).

There is less information on the prevalence of ADHD in children under five years of age than other age groups. Information is available from the Dunedin Multidisciplinary Health and Development Study by McGee and his colleagues (McGee et al 1996). At age three, 2 percent of the sample were identified as showing hyperactive behaviours according to maternal and observer reports. Associated symptoms included poorer comprehension and language skills but not poorer motor skills. A further 3 percent were described as 'very difficult to manage' but they did not show hyperactive behaviours.

The period when the child is under five years of age is one of the most difficult in the parent's life in terms of managing children with ADHD. Additional problems may include sleep problems, toilet training difficulties, and/or motor and speech delays. Such children are more likely to receive reprimands and negative attention from parents than other children are. If these problems occur in combination with maternal mental health problems, marital conflict and/or antisocial behaviour and alcohol and drug problems in parents, such children may be more at risk of physical abuse and developing aggressive behaviour and oppositional defiant disorder (Barkley 1998: Chapter 6).

Children who have ADHD when they enter school are at higher risk of low cognitive and academic performance, including lower reading ability (Barkley 1998: Chapter 6; McGee et al 1996). Overseas research has found that their persistent disruptive behaviour (which includes but is not limited to ADHD) in children under five years of age is one of the three most powerful predictors of poor adjustment in adolescence and adulthood (Loeber and Farrington 2000). One aspect of this poor adjustment is the experience of a significant mental health problem during one or more subsequent developmental periods (McGee et al 1996).

ADHD in children under five years of age is therefore an important target for intervention if it is severe and persists. Given that these children are likely to experience subsequent problems, monitoring and regular follow-up are very important regardless of whether they are receiving medication. Principles of assessment are set out below for school-aged children, which in general apply equally to children under five years of age with suitable adaptations. For example, reports should be validated but with reference to day care or other caregivers rather than schools.

Further information on identified children with ADHD under five years of age will become available when the child enters school and must concentrate for long periods. It is very important that the diagnosis of such children is reviewed comprehensively at school entry. This period is likely to clarify whether a diagnosis of ADHD can be confirmed. If the symptoms are severe then medication may be indicated but given the child's young age consideration must be given to the appropriate dosages and more frequent, regular reviews of medication.

There is some evidence that methylphenidate has short-term benefits in reducing hyperactive and oppositional behaviour during the preschool period. The risk-to-benefit ratio of prescribing medication may be higher for children with ADHD under five years of age than for older children. The risk of adverse side effects is higher so more caution is needed in prescribing methylphenidate to children under five years of age than to older school age children children. The lowest effective dose should be administered, as side effects are dose-related (Hazell 2000). Some data support behaviour management training for parents to deal with oppositional symptoms in ADHD preschoolers (Hazell 2000).

2.2 The middle childhood period

Among schoolchildren (6–14 years), an estimated prevalence of ADHD is 1.5 to 12 percent (Green et al 1999). An estimated 1.4 percent of boys and 1.3 percent of girls have Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type (Barkley 1998: Chapter 4), though the more disruptive types are more frequent among boys.

Often the greatest impact on a child's ADHD symptoms arises from the demands of formal education. Social interaction is also often problematic; the child may behave loudly and noisily, try to dominate or interrupt games and activities, or have poor social skills. Social rejection by peers and sibling conflict are common. Between 20 and 35 percent of children with ADHD are likely to have a severe reading difficulty. Maths and writing difficulties may also go unrecognised.

Disorganisation may also impair performance and may require intervention periodically. Greater supervision of these children and tighter more explicit rules are usually required, for example, in regard to undertaking chores, homework and self-care activities (Barkley 1998: Chapter 6).

2.3 Adolescence

More recent studies have indicated that a majority of children with ADHD continue to display symptoms into adolescence (Barkley 1998). While hyperactivity and attention span may improve, adolescence brings additional demands. Major depression may develop in up to 25 percent of young people with ADHD at this time and 25 to 45 percent display oppositional or antisocial behaviour. Academic performance of young people with ADHD has also been shown to be significantly behind their peers (Barkley 1998).

Often the evidence for increased alcohol and substance abuse is less clear-cut. It would appear that young people with associated conduct problems are at increased risk (Barkley 1998). The majority of studies in this area used clinical samples. When epidemiologically derived samples are used, however, the rates for antisocial behaviour, academic failure and continuation of ADHD symptoms are higher than matched normal samples but less than half the rates reported in clinical samples. In addition, on adolescent outcome measures, risk increases most for young people with comorbid conduct problems. During adolescence they are more likely to be involved in motor accidents and traffic violations. Therefore the combination of factors, rather than any single factor, predicts adolescent outcome (Barkley 1998).

Predictors of poor adolescent outcome include (Barkley 1998: Chapter 6):

- low socioeconomic status
- low general level of intelligence of the child
- high degree of peer relationship problems in childhood
- high degree of conduct problems and aggression
- parental adjustment such as a history of ADHD, antisocial behaviour and substance abuse
- parental conflict and hostility
- severe degree of ADHD symptoms in the child. However, this predictor is related only to the degree of academic attainment in adolescence, not to other outcomes.

2.4 Adults

Several samples of children have been followed into adulthood. Approximately half of those in the samples continue to experience some problems with ADHD symptoms and behaviour into early adulthood. The problems are not necessarily of clinical significance. However, the results depend on the source of the information: self-report underestimates problems compared to parental reports. Moreover, diagnostic criteria (eg, the DSM criteria) become much less sensitive to diagnosis of the disorder with age than empirical criteria do (Barkley 1998: Chapter 6).

Problems experienced in adulthood are similar to those in adolescence. A small but significant minority of those with a history of symptoms of ADHD develop antisocial personality disorder in adulthood, experience a major depressive disorder, have an anxiety disorder or have another personality disorder or traits associated with the personality disorders. They are also more likely to engage in sexual risk-taking behaviour, first appearing in adolescence.

In employment, adults with ADHD symptoms do not appear to differ from those without ADHD symptoms except they tend to have lower job status (underachievement in terms of their measured intelligence). The majority are in unskilled, semi-skilled and part-time employment. They also tend to have a poorer work record (Barkley 1998: Chapter 6).

2.5 Summary of outcome

While many children diagnosed with ADHD no longer have clinical problems in adolescence or adulthood, a substantial minority continue to be affected by their ADHD or go on to develop other problems such as offending, alcohol and drug abuse, and depression. Many are considered to underachieve in terms of their intelligence level. However, it is emphasised that most make a reasonably satisfactory adjustment as adults, so the outcome should not be prejudged.

Nevertheless, ADHD should be considered a major public health problem of childhood. It requires initiatives to reduce long-term disabilities as much as possible as well as to allow individuals to achieve their full potential.

3.0 Assessment of Attention-Deficit/ Hyperactivity Disorder

3.1 Clinical assessment

The significance of parents and teachers as co-assessors and contributors to the diagnostic process and management plans cannot be overemphasised. Information should be gathered from the child's parents and teacher, ideally during assessment at both the primary and secondary levels. Treatment, medication management and follow-up should also incorporate information from parents and school personnel who are closely involved with the child and able to identify changes in symptoms.

If a child presents to a general practitioner or teacher with learning or behaviour problems, an assessment will involve gathering additional information to determine whether ADHD is likely to be present. The assessment should be undertaken by appropriate professional staff involved with the child, for example, the general practitioner and other associated professionals such as the class or specialist teacher, and/or nurse. The relevant professionals should work in partnership with the parents/caregivers.

Based on the information gathered during this stage, a decision must be made as to whether ADHD is likely to be present. Screening for any associated medical problems at this time is essential.

If ADHD is suspected after the preliminary assessment in the primary care setting, referral to appropriate secondary agencies and specialist resources should always be considered (AACAP Official Action 1997). Since March 1999 a specialist such as a paediatrician or psychiatrist must confirm the diagnosis before a prescribing Special Authority can be obtained and an initial trial of medication can be instituted. This confirmation process must be substantive but can be undertaken as a consultation by phone or letter.

A comprehensive assessment is required for all children who present to secondary specialist services. A multidisciplinary team – for example, the paediatrician or child psychiatrist and associated health professionals such as clinical psychologists, nurses and social workers – should undertake this assessment. Information gathered in the primary care setting should also be included along with any medical/paediatric, developmental, psychological and educational evaluation required.

It is particularly important that, where the differential diagnosis for other psychiatric disorders is complex, symptoms are severe and/or there is comorbidity for other psychiatric disorders, the child is referred to a child and adolescent mental health service.

Accepted practice dictates that a key worker/case manager should be appointed from the multidisciplinary team in both the primary and secondary care settings. This key worker takes responsibility for co-ordinating further assessments and subsequent treatment, including appropriate interventions, and ensures that medication and treatment reviews are conducted in a timely manner.

The general practitioner also provides a key link with regard to follow-up and continuing medication management.

3.1.1 Māori

Children and young people should be offered an assessment that is appropriate to their cultural needs. For Māori children and young people, it is important that assessments:

- take into account the cultural context for the child and family, including consideration of the child within the context of the extended family
- have cultural staff available, wherever possible, to address cultural aspects during assessment.

There is a lack of prevalence data categorised specifically into Māori and non-Māori in terms of ADHD in children and young people. In the absence of such evidence it is reasonable to assume that the rates among Māori may be similar to rates among Pākehā children.

While not exclusive to Māori children, one factor to consider is the possibility that the child may be more likely to stay at several homes with extended whānau, which has implications for management of medication.

How the services are delivered and by whom are important considerations. Mobile services including home visits, Marae-based clinics, Kaupapa Māori service involvement and having Māori staff available may also improve access to services for Māori children and their whānau.

3.1.2 Diagnostic criteria

The relevant criteria from the DSM-IV should be present for a diagnosis of ADHD (see Appendix 2). A diagnosis is based on whether the symptoms involve attention problems, hyperactivity and impulsiveness, or both. It is necessary that the symptoms:

- are present across different settings
- result in significant impairment
- are present for at least six months
- began before seven years of age
- are not better explained by excluding conditions such as psychosis or autism.

The DSM-IV includes subtypes for ADHD, namely: Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type; Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type; and Attention-Deficit/Hyperactivity Disorder, Combined Type.

Barkley (1998: Chapter 4) points out that the Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type was not in the DSM-III-R due to a lack of research on the usefulness of this distinction. In his view, the Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type is relatively rare and, before diagnosing it, the clinician must first rule out all appropriate differential diagnoses for other medical and psychiatric conditions. Differential diagnoses include hearing problems, learning problems, intellectual limitations or a mismatch between these and parental expectations, internalised disorders such as anxiety disorders (including obsessive compulsive disorder), depression and schizophrenia (Murphy and Gordon in Barkley 1998).

In contrast to the other subtypes, there is a lack of research to identify the treatments that might be effective for children with the Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type. With regard to medication, it would appear that both the Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type and the Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive/Impulsive Type respond but lower doses may be sufficient to manage the symptoms of children with the Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type (Barkley 1998: Chapter 4).

Reports on the differences between the ADHD subtypes have been inconsistent. More recent studies have reported some differences between children with and without hyperactivity, in contrast with earlier studies. Children diagnosed with the Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type exhibit less disinhibition and impulsiveness, and are more anxious, daydreamy, lethargic and socially withdrawn. These children also have different comorbidities. For example, they are less likely to have symptoms of oppositional defiant disorder and conduct disorder, social and interpersonal problems and have different family psychiatric histories (Barkley 1998: Chapter 4).

Based on the evidence available, Barkley (1998: 51) contends that the Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type and Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive Type should be considered as separate disorders rather than variants of the same disorder. In his view:

- the Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type is primarily a cognitive/information processing disorder
- the Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive/Impulsive Type is primarily a behavioural disinhibition disorder.

Because the Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive/Impulsive Type is associated with factors such as the significantly increased risk of oppositional defiant disorder and conduct disorder, Barkley considers this subtype is best conceptualised as a subcategory of the disruptive behaviour disorders, which include oppositional defiant disorder and conduct disorder. However, until the DSM-IV comes up for revision in a few years, the subtypes will continue to be variants of ADHD.

3.1.3 Specific screening tests/procedures

Part of the initial assessment should be to rule out associated medical conditions and to routinely screen for hearing and vision problems. As yet, it appears that no other medical screening tests evaluated – for example, electroencephalograms (EEGs), heavy metal, thyroid or other blood, organ imaging tests – are useful screening or diagnostic tools for ADHD. Their use should be dictated by the presence of specific medical indications, not by ADHD.

Rating scales specifically for ADHD and behavioural observations may be useful in diagnosis. No other psychological, general intelligence, neuropsychological or personality tests are of proven value in the diagnosis of ADHD, though they may be helpful in other areas, for example, educational assessments and differential diagnosis.

In a continuous performance tests (CPT) the child responds to a stimulus, usually presented on a computer screen, within a given timeframe. Of the psychological tests available CPTs have been found to be the most reliable for discriminating children with ADHD from those without such symptoms and for monitoring medication effects. Even so, there has been controversy as to how effective these tests are. While some studies have found CPTs distinguish between children with ADHD and normal controls, other studies have not. Another concern is that children with reading disorders will be 'false positives' on such tests. Correlations with other diagnostic measures such as rating scales have usually been modest at best (McGee et al 2000).

Although a number of CPTs are available, evidence is lacking as to which is the most reliable (Gordon and Barkley in Barkley 1998). Recently, McGee, Clark and Symons (2000) examined one of the most popular CPTs, the Conners Continuous Performance Test (CCPT), with a group of clinic-referred children. They found that children with ADHD did not have higher CCPT scores than clinical control children, but children with reading disorders did. The authors concluded that while the CCPT has some strengths, its usefulness for differential diagnosis is questionable. These results require replication.

As with rating scales, CPTs provide just one source of information. Their results should be incorporated with information from all other sources to reach a final diagnosis.

3.2 Clinical approach

The clinical approach recommended in this section is derived from best practice as described by Barkley (1998) in his comprehensive textbook on ADHD, and in the ADHD 'Practice Parameters' of the American Academy of Child and Adolescent Psychiatry (AACAP Official Action 1997). These sources should be consulted for in-depth content. A detailed guide and schema for the following approach are also available from the Mental Health Commission's (1999) publication, developed for use in New Zealand, on history-taking and examination for infants, children and youth with mental health problems.

Unlike the discussion of treatment (Section 4.0), this section has not been subject to critical evidence-based review. However, expert clinicians consider that it reflects current best practice applicable to New Zealand conditions.

3.2.1 Child and history

Gaining a history of the problems the child is experiencing is a fundamental and critical aspect of any assessment. It is particularly important with ADHD where problems may have begun early in the child's life, for example, as a toddler. Observations from both parents are preferable, particularly if there is conflict in the family. Such children may also behave better for one parent than the other. Extended family such as grandparents, teachers, sports coaches or social group leaders can also provide a valuable perspective on the child's behaviour and background information on history, social life and family.

The following factors should be incorporated into an assessment:

- a list of all the problems of concern, their severity and duration

- specific inquiry into the presence and severity of core symptoms, that is, difficulties with activity, attention and impulsivity
- context/settings of symptoms and impairments, including academic, behavioural, family and peer problems
- developmental history
- medical history, screening tests for vision, hearing, medical or neurological primary diagnoses
- exposure to neurotoxins, for example, alcohol, lead and solvents
- home and classroom observation, if feasible
- previous or current treatment for any behavioural or emotional disorder with particular focus on ADHD and outcomes
- key symptoms that may be important in considering treatment, for example, tics, anxiety, depression or cardiac problems.

3.2.2 Family and social history

A family history and a social history are also important elements of any assessment. These histories may be useful for determining hereditary and environmental factors, and for identifying any factors likely to exacerbate the child's problems.

In taking a family history, the following factors should be assessed:

- ADHD or related symptoms, tics, substance abuse disorders, conduct/antisocial personality disorders and other psychological or psychiatric disorders
- developmental and learning problems
- parenting style and family resources
- sibling and family problems
- family functioning and stressors, for example, traumatic events, family crises, changes in family make-up, changes in home and/or school environment
- environmental factors, for example, dysfunctional home circumstances, abuse or neglect.

3.2.3 School functioning

In regard to the child's functioning at school, the following should be assessed or obtained:

- written informed consent regarding release of any information from other sources (eg, schools) should be gained from parents and all sources should be documented
- verbal and/or written school reports (verbal reports can provide useful information that may not necessarily be contained in school reports)
- information from appropriate education staff, for example, past and current teachers
- observations at school and in the classroom, if possible
- the administration of a reliable and valid behavioural rating scale (see 3.2.5)
- verbal reports and/or feedback on specific questions regarding learning, academic performance and achievement, and strengths and weaknesses of educational potential

- classroom and playground behaviour and relationship with peers
- attention span, level of activity, impulsiveness and organisational skills in regard to education
- recreational, sport and motor skills.

3.2.4 Child evaluation

While it is useful to observe the child when interviewing the parent(s), an interview with the child alone is also recommended. Certain kinds of problems – for example, internalising symptoms such as depression and anxiety, low self-esteem, delinquent acts, alcohol, drug and sexual activities – may be minimised in a joint interview. It is also important not to rely exclusively or too heavily on observation of the child in the clinical interview. Children with ADHD behave differently (are usually better behaved) in novel situations, with strangers or in a one-to-one situation.

The following approach is recommended:

- conduct a diagnostic interview, including mental state examination
- identify the presence of DSM-IV symptoms
- evaluate for other comorbid behavioural or psychological/psychiatric problems
- conduct a physical examination including, as indicated, vision and hearing checks (reliance on up-to-date general practitioner assessments is an acceptable alternative)
- conduct further medical and neurological evaluations as indicated
- measure lead or other heavy metal levels (if history suggests pica or environmental exposure to lead or there is any history or current symptoms suggestive of heavy metal poisoning)
- undertake home and classroom observation, if this is feasible
- if clinically indicated, arrange for further specialist assessments, for example, tests of general cognitive functioning , neuropsychological testing,or speech and language assessments.

Note: Although tests of general cognitive functioning and neuropsychological tests are not routinely carried out in the public education system in New Zealand, in some countries such testing appears to be routine when learning problems are present.

3.2.5 Behavioural rating scales

A behavioural rating scale that has good reliability and validity should be administered as part of a comprehensive assessment.

The following information on rating scales for ADHD is based on a review by Green et al (1999). This review was used as it was the most recent and comprehensive available.

The 1997 Revision of the Conners Rating Scale contains two highly effective indices for discriminating between children with ADHD and normal controls:

1. the new Conners Parent Rating Scale-Revised Version: Long Form, ADHD Index Scale (CPRS-R:L-ADHD)/Conners Teacher Rating Scale-1997 Revised Version: Long Form, ADHD Index Scale (CTRS-R:L-ADHD Index)

2. the Conners Parent Rating Scale-1997 Revised Version: Long Form, DSM-IV Symptoms Scale (CPRS-R:L-DSM-IV Symptoms)/Conners Teacher Rating Scale-1997 Revised Version: Long Form DSM-IV Symptoms Scale (CTRS-R:L-DSM-IV Symptoms).

Each of these indices showed sensitivity and specificity values greater than 94 percent. That is, if these scales are used to compare children experiencing ADHD with normal controls, the miss rate will be 6 percent. Some caution is required in this interpretation, however, as the evidence for each scale is based on only one study.

With the exception of the ADD-H: Comprehensive Teacher Rating Scale (ACTeRS)-Parent Version-Hyperactivity Subscale, the hyperactivity subscales of ADHD-specific checklists strongly discriminated between children with ADHD and normal controls. Similar caution is required in this interpretation as the evidence for several subscales is based on only one study.

The DSM-III and DSM-III-R SNAP Checklist's Inattention and Impulsivity Subscales discriminated well between children with ADHD and normal controls. Each subscale showed sensitivity and specificity values greater than 97 percent. The ADD-H: Comprehensive Teacher Rating Scale (ACTeRS) -Parent Version -Attention Subscale performed poorly. The Barkley School Situations Questionnaire (SSQ) -Original Version -Number of Problems Settings Scale and the Mean Severity Scale are weak, with less than 86 percent effectiveness.

None of the broad-band scales analysed effectively discriminated between referred and non-referred children. These scales were: the Child Behaviour Checklist for Ages 4–18 Parent Form (CBCL/4-18-R Total Problem Scale), the Child Behaviour Checklist, Teacher Form (CBCL/TRF–R), Deveraux Scales of Mental Disorders (DSMD–Total Scale), 1997 Revision of Conners Parent Rating Scale, Long Version (CPRS–R:L) Global Problem Index/Conners Teacher Rating Scale, Long Version (CTRS–R:L) Global Problem Index. Therefore it is considered that these tests or composite scores are not useful in distinguishing children with clinically significant problems from children without such problems.

Behavioural rating scales are also useful in conjunction with written or verbal reports from teachers and parents, to assess the effect of medication.

Behavioural rating scales for ADHD can be ordered from the New Zealand Educational Research Council (NZCER; phone 04-384 7939) or the Psychological Corporation (freephone 0800-942 722). Different levels are assigned to various tests; whether a given test user can administer them is based on qualifications relevant to test administration. Such qualification is determined when a person applies to purchase a test, before a test or rating scale is issued.

3.2.6 Differential diagnosis

It is essential to consider other psychiatric disorders as part of the diagnosis and differential diagnosis of ADHD. ADHD is often mistaken for other disorders, for example, oppositional and conduct disorders.

- Some disorders, such as psychosis, pervasive developmental disorder, drug intoxication, exclude a diagnosis of ADHD if they better explain the core symptoms.

- Other disorders are comorbid (see below) and should be taken into account in an overall management plan.

Some disorders that should be considered in a diagnosis are listed in Table 1. Because ADHD is often confused with the co-occurrence of oppositional and conduct problems in people with ADHD, symptoms of these two disorders are included in Appendices 3 and 4. It is also important that low general levels of intelligence and learning difficulties are identified if present.

Table 1: Differential diagnoses

Some disorders to consider
• Oppositional defiant disorder
• Conduct disorder
• Mental retardation/borderline intellectual functioning/head injury
• Autism and Asperger's syndrome
• Anxiety disorders (including obsessive compulsive disorder)
• Alcohol and substance abuse and dependence or withdrawal
• Tic disorders (including Tourette's disorder)
• Specific development disorder (eg, speech, language and learning difficulties)
• Mood disorder-bipolar disorder or agitated depression
• Schizophrenia
• Medical/neurological primary diagnosis (eg, hyperthyroidism and epilepsy)
• Medication-related problems (eg, anti-asthmatics, anticonvulsants, antihistamines, sympathomimetics and steroids)
• Personality disorders of adulthood emerging during adolescence (eg, antisocial and borderline personality disorders)

Comorbidity

Comorbidity is a significant issue for children with ADHD. It is important to identify any comorbid psychiatric disorders that may be present in addition to ADHD. **A comprehensive assessment includes the assessment of comorbid psychiatric disorders.** Clinicians therefore need to routinely screen for other psychiatric disorders in the DSM-IV categories.

Because oppositional defiant and conduct disorders are so common as comorbid disorders in children and young people with ADHD, diagnostic criteria are included for these disorders in Appendices 3 and 4. Such comorbidity must be identified in addition to a diagnosis of ADHD. For example, children and young people with comorbid oppositional defiant and conduct disorders have an increased risk of adverse outcomes.

In his review of the literature, Barkley cites estimates for comorbid disorders as listed in Table 2.

Table 2: Estimates of comorbidity with ADHD

Disorder	*Approximate rate in children with ADHD*
Oppositional defiant disorder	Range 54–67%
Conduct disorder	20–56% children, 44–50% adolescents
Specific development disorder (eg, speech, language, and learning difficulties)	8–39% have a reading disability, 12–30% have a maths disability, 10–54% have speech problems, 12–27% have a spelling disorder
Anxiety disorder	25%
Somatic complaints	24% boys, 35% girls
Major depressive disorder	25%
Substance abuse disorder	In adolescence risk is 2–5 times higher than 'normal controls' if both conduct disorder and ADHD are present
Bipolar disorder	6%
Tic disorders/Tourette's disorder	Possible increased risk if ADHD present

4.0 Treatment of Attention-Deficit/ Hyperactivity Disorder

4.1 Multidisciplinary treatment

ADHD problems occur in multiple settings, with a number of different caregivers and professionals likely to be involved in managing the child's behaviour. **Co-operation among health professionals and effective consultation and liaison with family, schools and support services are essential for effective multidisciplinary management.** Treatment should:

- be individualised to the needs of the patient
- take into account the resources and capacity of the family.

4.2 Planning for treatment

Planning for treatment should include (adapted from AACAP Official Action 1997):

- definition of and attention to the holistic needs of child and family or whānau, and good quality clinical care (broadly defined)
- use of approved rating scales as part of the assessment and for monitoring of treatment effects, so that systematic information from different settings is obtained to establish a baseline and to gauge treatment response
- treatment for comorbid conditions (not covered in these *New Zealand Guidelines*)
- prioritisation of interventions to fit target symptoms and available resources
- setting of intervals for monitoring treatment, evaluation of efficacy, review of treatment and the need for additional intervention
- means of communication, liaison and collaboration
- information to caregivers about the treatment, with use of written materials wherever possible.

4.3 Medication

A carefully executed regimen of medication management is superior to alternative treatments, including behavioural treatment alone.

Many randomised, controlled studies show that medication is the single most useful intervention for ADHD and, optimally used, it can minimise the need for other interventions and ongoing specialist resources. Once evident symptoms are under therapeutic control at an optimum titrated dosage (at several months), then attention and resources can be targeted selectively at remaining symptoms (AACAP Official Action 1997; Green et al 1999).

4.4 Combined treatments

Combined treatment – namely, medication and behavioural treatment – is superior to behavioural treatment alone. Whether combination treatments are superior to medication alone is less clear. Overall, results are inconsistent, with little evidence to support the value of adding behavioural approaches to medication. Studies in this area have methodological problems and have produced inconsistent results, such that evidence is insufficient to make definitive conclusions.

The Multimodal Treatment Study of Children with Attention-Deficit/Hyperactivity Disorder (MTA study 1999), however, suggested that combined behavioural and pharmacological management with a stimulant drug may give significantly better results than pharmacological interventions alone. The interventions used were more intensive and longer than most studies or clinical interventions routinely available in New Zealand. These results require replication before definitive conclusions can be made (Jadad et al 1999; MTA study 1999; Shukla and Otten 1999).

From a quantitative review of randomised trials, Klassen et al (1999) concluded that:

- medical treatment is effective in managing children with ADHD
- non-medical treatments used alone are not effective
- combinations of medical and non-medical treatments may be effective in some situations but results were difficult to interpret due to a lack of studies and good quality research, as well as considerable heterogeneity between studies in choice of subjects, interventions, control subjects and outcome measures.

These difficulties limited conclusions with regard to behavioural and combination treatments, and caution was needed in making recommendations. Klassen et al (1999) recommended revisiting the relative benefits of different treatment modalities as the literature addresses these problems and further research becomes available.

The MTA study (1999) found that the prognosis for children with ADHD may alter with a combination of medication, special education, parent counselling and training in child management, classroom consultation and individual counselling of the child, if this approach is maintained over several years into early adolescence. While combined medication and behavioural management demonstrated benefits, a more definitive conclusion awaits a detailed presentation of secondary analyses and follow-up data (see Cunningham 1999 for a discussion of the MTA study's implications).

One such analysis is the replication by Pelham et al (2000), which suggested that intensive prolonged behavioural medications may be as effective as medication if started first rather than added to medication. However, this effect fades as treatment is discontinued. This finding requires replication.

4.5 Stimulants

Methylphenidate and dexamphetamine are central nervous system (CNS) stimulants. Structurally they resemble brain neurotransmitters dopamine and norepinephrine, but they act indirectly by releasing stored neurotransmitters. Although there is a belief that these drugs have a paradoxical effect by 'sedating' disruptive behaviour when they are supposed to be 'stimulating', this view is inaccurate. The mode of action of the CNS stimulants is to raise the activity, arousal or alertness, increasing the efficiency of brain function, especially 'under load' (see Werry and Aman 1977). Stimulants act primarily on dopaminergic and noradrenergic neurotransmitter pathways. They appear to influence mainly prefrontal, frontal and limbic systems with beneficial results on disruptive behavioural inhibition, impulse control, selective attention, active working memory and executive functioning (DuPaul, Barkley and Conner in Barkley 1998).

Despite the existence of evidence relating to dosages of stimulants (0.3–1.0 mg/kg for methylphenidate), the dosages usually cited stem from reports by various committees, which may or may not be evidence-based. Moreover, conflicting evidence suggests that increments in dosage may be negatively decelerating, rather than linear, and that different functions may have different dose response curves. From a clinical point of view, the implications of these findings are that evaluation of the dose and effect of medication must consider learning in school and social behaviours, especially peer relationships, in addition to ADHD core symptoms (Werry and Aman 1999: 225).

Improvement in ADHD symptoms is shown in up to 70 to 80 percent of children using stimulants. It is said that some children may respond better to one stimulant than another. Given that children's response to stimulants may be quite idiosyncratic, it is necessary to undertake a clinical evaluation across symptoms, measures, doses and, in some instances, medications. A clinician should develop an individualised medication plan, rather than making a standard response based solely on factors such as body weight (DuPaul, Barkley and Conner in Barkley 1998).

In New Zealand, stimulants are restricted drugs and can only be prescribed on the special triplicate prescription.

- They can only be prescribed for ADHD (and narcolepsy) by or on the recommendation of a specialist psychiatrist or a paediatrician.
- To be fully funded, it is necessary to apply for a **Special Authority** on the required form; otherwise the cost is prohibitive to most patients.

Since November 2000, in addition to the hydrochloride form of methylphenidate (Rubifen™, Ritalin™) Pharmac has fully funded the **slow-release form of methylphenidate** (methylphenidate hydrochloride long-acting tablets 20 mg, brand name Ritalin Slow Release™). Slow-release methylphenidate is said to be equivalent to two doses of methylphenidate hydrochloride given four to six hours apart. However, there are very few comparative trials of the slow-release form. It is also alleged, though not demonstrated, that the release of methylphenidate is slower and the maximum blood level is lower (Ford et al 2000; Medical Letter 2000) through the slow-release form, but that the effect is more consistent.

The slow-release form offers potential benefits of (J S Werry, 2001, personal communication):

- relieving schools of the responsibility of giving lunchtime doses

- greater confidentiality
- increased compliance
- simplicity of regimen
- reducing teasing from other children and reducing the risk of intimidation of youth for medication or of otherwise misusing medication outside the home
- steady response rather than peaks and troughs.

Other long-acting preparations may be improved versions, for example, Adderall™ and Concerta™. In general, these are available overseas but not yet in New Zealand (Medical Letter 2000). However, one such preparation, a mixture of different isomers of amphetamines (Adderall™), is available. Recently it has been shown to offer no longer duration of action than dexamphetamine alone (JS Werry, personal communication, 2001).

4.6 Psychosocial interventions

As noted above, some studies indicate that the addition of behavioural interventions may be better than medication alone, but usually only marginally (see Pelham et al 2000). Moreover, consideration of its use in New Zealand should take account of availability, resources, level of parental input required and cost effectiveness (including the needs of competing groups with different diagnoses where such interventions are the only or most effective one).

A more difficult issue is the role of behavioural methods alone. While they can be as effective as medication in some cases, the type of intervention and intensity required (see Pelham et al 2000) are largely unrealistic in New Zealand terms. Further, unlike medication, which in most circumstances can be continued easily and safely for an indefinite period, resource constraints mean that behavioural methods cannot be used as freely. It is possible that the MTA study found medication to be superior in part because of its continued use while behavioural interventions had been terminated for some subjects at the point of outcome assessment.

When parents refuse medication, it can be quite difficult to decide whether to implement a behavioural treatment programme (if available) that will be much more resource intensive and possibly less effective than medication.

It is always essential to consider the holistic needs of the child and the child in the larger context of family, school and social group. Because these children experience significant social and interpersonal problems, important aspects of assessment and ongoing treatment are:

- children's interactions with parents, siblings and peers
- parents' psychological/psychiatric status
- parents' marital functioning.

These factors are particularly important when the child has comorbid problems of oppositional defiant disorder and conduct disorder. While evidence for behavioural interventions with ADHD may be less compelling it is well established that behavioural problems such as oppositional defiant disorder and conduct disorder respond to behavioural interventions. Where

children have such comorbidity, therefore, it is essential that parents receive training programmes and other interventions to address the family problems associated with the comorbidity (Barkley 1998: 154).

Associated problems, for example, social and educational problems, are common (Barkley 1998). Interventions in the early childhood sector and schools for these problems may include speech and language therapy, special education interventions and social skills groups. Such interventions are not covered in these *New Zealand Guidelines*. Information on these and other aspects of special education can be accessed through the Ministry of Education Information line 0800 622 222.

4.7 Other treatments/therapies

In the management of ADHD, scientific support is lacking for the use of other therapies such as optometric vision training, sensory integrative training, chiropractic manipulation, tinted lenses, megavitamins, herbal remedies and biofeedback. Therefore these therapies are not recommended (AACAP Official Action 1997).

Dietary treatment is popular among many parents and some clinicians, but clinical trials have not produced unequivocal evidence that it is effective. Where parents initiate this treatment themselves, the practitioner should ensure that it is undertaken as safely as possible. If parents wish to pursue this method, it should be under the direction of a qualified dietician, who preferably has experience in this area (AACAP Official Action 1997), both to ensure proper testing of the anticipated dietary effects and to prevent unhealthy diets.

4.8 Assessment and management in schools

Except in very exceptional cases, symptoms must occur in both home and school before ADHD is diagnosed. Therefore ordinarily a diagnosis should be made with supporting information from class teachers and specialist teachers such as Specialist Education Services staff and Resource Teachers: Learning and Behaviour (RTLBs). All schools have a responsibility in setting up medication management in the school environment and reporting on changes in the child's behaviour.

Information may be gained through a face-to-face interview, telephone consultation and/or class or specialist teacher reports and checklists. While time and resources may influence the type of contact that can occur, it is important for the above reasons that sufficient contact occurs.

Education programmes are critical if the child is to be assisted in managing *any problems associated with ADHD that* interfere with learning, academic performance and achievement. Comprehensive management ensures:

- good liaison and regular communication between the home and school

- consistency across home- and school-based approaches and programmes to improve effectiveness.

Parents should be encouraged to expect an open, collaborative and direct relationship with the education professionals who support their child's learning.

Barkley suggests (1998: 459) teachers should be aware that:

- ADHD is a biologically based educational disability that is treatable but not curable
- ADHD is not the result of a lack of skill or knowledge; it is a disorder of performing what one knows due to an inability to consistently sustain attention, motivation and behaviour to academic tasks. This is particularly so if consequences and rewards are delayed, weak or absent and/or there is a lack of structure for tasks
- it is much harder for students with ADHD to do the same academic work and exhibit the expected social behaviour of their peers
- the most effective interventions for improving academic and behavioural functioning of ADHD children are those that are applied within the school setting at the point of performance.

Comprehensive management includes a programme that changes and adapts the educational environment to cater for the specific needs of a child with ADHD.

The following may be of benefit to the child in educational settings:

- more teacher input, with instruction and oversight of academic work
- a high degree of structure with both academic work and peer interactions
- consideration of how to improve social interaction with teachers and peers
- guidelines for managing difficult situations and/or behaviour.

All schools should have policies and procedures for when medication is to be administered at school (Ministry of Education Circular, 1997/29).

A useful resource booklet for teachers, *Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder: A Resource for Classroom Teachers*, is available from the Ministry of Education (2000). It makes specific suggestions on managing a child with ADHD in the educational setting. By being familiar with these suggestions, health professionals are also likely to benefit in their liaison with schools regarding management.

All schools have funding for students with special education learning and behaviour needs.

1. The **Special Education Grant (SEG):** All schools receive funding for targeting to students with more moderate learning and behaviour needs.
2. **Resource Teachers: Learning and Behaviour (RTLBs):** All schools have access to these specialist teachers who work across a number of schools and support classroom teachers and students with learning and behaviour needs.
3. **Behaviour Support Teams (BST):** These teams work with students with severe and challenging behavioural problems. Access to this service is gained through a referral by the school principal to Specialist Education Services.

4.9 Support services

Where families have difficulty accessing special education assistance for their children in schools, they should be encouraged to work with the Special Education facilitator in the local Ministry of Education Centre. Their role is to work with families and schools to resolve difficulties.

4.9.1 Needs assessment

Disability support services include:

- needs assessment to decide what a person needs in order to achieve independence and participate in society according to his or her abilities, resources and goals. The *Standards for Needs Assessments for People with Disabilities* (1994b), available from the Ministry of Health,[1] describe the standards that can be expected when receiving a needs assessment
- service co-ordination, which identifies the package of services required to meet a persons needs
- service provision, which covers a range of services including Carer Support. With Informal Carer Support, a friend or family member provides relief care to a client, so that the full-time carer can have a break. Alternatively, Formal Carer Support is provided by a professional carer or within a formal care setting based on assessed need.

The following definition is used to determine who is eligible for government-funded disability support services.

> *A person with a disability is a person who has been identified as having a physical, psychiatric, intellectual, sensory or age related disability (or a combination of these) which is likely to continue for a minimum of six months and result in a reduction of independent functioning to the extent that ongoing support is required* (Ministry of Health 1994a).

There has been considerable regional variation with regard to eligibility for people with psychiatric disorders. Carer Support tends to be the only disability support service provided to people with mental health needs.

4.9.2 ADHD support groups

Parents can find it beneficial to attend a support group for parents of children with ADHD. It may provide opportunities for:

- sharing experiences
- gaining informal support
- increasing knowledge about available resources and referral processes
- exchanging information on strategies that parents have found useful in managing their child's ADHD symptoms.

[1] Also available via e-mail from pubs@moh.govt.nz

Citizens Advice Bureaux and local child health and child mental health services may assist with identifying a local ADHD support group for parents.

4.9.3 Internet sources

A number of web sites and other Internet sources provide information on ADHD. These should be used with caution as their accuracy varies and some advocate particular points of view at variance with scientific evidence. Parents and others should consult with a specialist mental health or paediatric professional before acting on such advice.

Professionals may wish to visit some of the more reputable internet sites in anticipation of such requests by parents. These include:

http://www.starship.org.nz
http://www.aacap.org/publications/factsfam/index.htm
http://www.mentalhealth.org.nz/conditions.asp
http://addwarehouse.com/shopsite_sc/store/html/index.html
http://www.attention.com

5.0 General Principles in Prescribing for ADHD

As a general rule, monotherapy with a stimulant drug (methylphenidate or dexamphetamine) is the first line of treatment. Consider medication to treat core DSM-IV symptoms that are persistently severe enough to cause significant impairment in social/academic or occupational functioning.

The stimulants, methylphenidate and dexamphetamine, are regarded as pharmacological agents of first choice in ADHD. Pemoline, the only other effective stimulant, is not available in New Zealand. Due to liver toxicity, it has been withdrawn in Canada and the United Kingdom, though it is still available under restricted conditions in the United States.

A specialist or, when this is not possible, a medical practitioner acting on the recommendation of a specialist should initiate and titrate stimulant medication. This is required by regulation in New Zealand (refer Appendix 1).

Use of stimulants in special groups – children under six years and over 14 years and adults – should only be initiated in specific consultation with, or under the direct care of, an appropriate specialist (paediatric specialist or child and adolescent psychiatrist).

5.1 Principles for all prescribing processes

1. **Prior to prescription,** measure height and weight (as well as taking pulse and blood pressure, if the general practitioner has not already done so). Obtain a history of and observe for any tics and involuntary movements. Also obtain any history suggestive of cardiac problems, including family history especially of early sudden death or arrhythmia. In the majority of cases, the family doctor should have repeatedly examined the child and can be asked to provide evidence of good health. It is helpful if the general practitioner has screened for any physical problems prior to a visit to a specialist (some child mental health services may find such examinations difficult to execute due to resource issues).
2. **Comorbid conditions** frequently exist with ADHD. These need to be prioritised and specifically addressed.
3. The use of **agents other than stimulants** or the introduction of **combined pharmacotherapy** requires careful consideration and, ideally, proper consultation with a specialist.
4. If medication is indicated, **inform the parents and patient**, as appropriate, of:
   - risk/benefits associated with using medication and with not using it
   - what changes to expect
   - appropriate dosage and administration schedule
   - possible side effects
   - target symptoms for evaluation of response, after initiation, to establish effect and thereafter for regular monitoring to gain ongoing feedback
   - how optimum duration of treatment with medication has not been established and will depend on the effect of other interventions (AACAP Official Action 1997).

Also provide parents/caregivers and, if appropriate, the young person with information sheets (refer Appendix 5).

5. **Manufacturers' prescribing information** should be consulted though such information is not necessarily entirely evidence-based since it has a role in protecting the manufacturer as much as informing practitioners. For example, it is said that caution is required if there is a family history of bipolar disorder or cyclothymia. However, a recent preliminary study found no evidence that methylphenidate precipitated young adult bipolar disorders in susceptible individuals (Carlson et al 2000). These results require replication.

6. Methylphenidate and dexamphetamine may require **separate clinical trials** to determine which medication is most suitable They are not identical in pharmacokinetics, clinical benefits and side effects; one agent may suit an individual better than the other. Generally, both agents have clinical effects within about 30 minutes and benefits wane after about three to six hours. The half-life of dexamphetamine is about six hours compared with three hours for methylphenidate. Its effect is somewhat longer, though onset may not be quite as fast as with methylphenidate (see Werry and Aman 1999: 215–16).

7. **Dosage** should be individually titrated, starting at the lower end of the dose range (about 0.1–0.2 mg/kg methylphenidate, or half that amount for dexamphetamine). Raise the dose as needed and at a pace that will vary with the intensity of the monitoring for effect and side effects. For example, five to seven days allows adjustment to initial side effects such as gastric discomfort or tearfulness. Administer medication in divided doses, with appropriate timing, and maintaining it at the smallest dose for optimal therapeutic response.

8. **Suggested effective dose ranges** are methylphenidate 0.3 to 1.0 mg/kg (max/day 60 mg), and dexamphetamine 0.15 to 0.5 mg/kg (max/day 20 mg; 40 mg older children). The dose required, benefits and side effects vary between individuals. Optimal treatment depends on the balance of best improvement of the most significant problem, relatively lesser effect on other problems and existence of any side effects. Dosages and duration of action vary considerably, so the right dose and regimen can be determined only by careful evaluation of the result. Teachers and parents can be particularly informative in this process.

9. **Significant side effects** that should always be taken seriously include tics, major mood changes with marked sadness, anxiety or aggression, and any bizarre or persecutory thoughts. In the past it was sometimes considered that tic disorders were a contraindication to stimulant use.

10. **Tic disorders** are no longer considered to be a contraindication to stimulant use (see Werry and Aman 1999: 223–5). Although it is clear that stimulants may increase the frequency of existing tics, it is doubtful that stimulants precipitate them. The initial augmenting effect on tics often diminishes after a few weeks but, if it does not, try lowering the dose. If this fails, consider an antidepressant. The decision about whether to continue involves weighing the severity of ADHD against the severity and conspicuousness of the tic.

11. **If symptoms do not improve** following the initial trial of medication, check compliance with the medication regime, vary the dosage or change the medication type, for example, with a trial of dexamphetamine instead of methylphenidate. If symptoms still do not improve, review the diagnosis, if necessary with a second or specialist opinion. Over time the medication dose may be insufficient to control symptoms and symptoms may worsen. It is important therefore to address such issues by regularly reviewing the child's medication (see 7.4 below).

12. **After medication has been well stabilised**, regularly review continued and long-term use of stimulant treatment at diminishing intervals (but never less frequently than 9–12 months in school-aged children and 6 months in preschoolers). The review should cover response to medication, other interventions and their relative roles in overall management of the disorder. Parents should also know that, if any problems occur, they can contact the prescribing doctor or specialist again.

5.2 Other stimulant medications

5.2.1 Long-acting methylphenidate

Long-acting methylphenidate (Ritalin Slow Release™; Ritalin S-R) has recently been approved and funded for use in New Zealand. Generally, a methylphenidate S-R mg tablet is equivalent to 10 mg of the hydrochloride given twice (four hours apart) which usually eliminates the need for a lunchtime dose (Werry and Aman 1999: 226). Consider the use of sustained release medication as it may:

- obviate the need for the child to take medication at school
- improve compliance and possibly even out the response to medication throughout the school day
- reduce the responsibility on schools along with the attendant risks of stigmatisation and inadequate storage and security of medication (AACAP Official Action 1997).

Start-up of effect is slower. If its slowness is a problem, medication can be given about half an hour earlier. This approach may not be an option if:

- medication cannot be administered half an hour earlier than usual
- parents find the first hour or two particularly troublesome
- children have problems on the school bus, where it is their transport to school.

In such circumstances, a small dose of the hydrochloride can be given on waking, with the S-R or before it is given, if it is important to maximise the duration during school.

A common misapprehension among pharmacists is that the S-R tablet may not be halved. In fact the S-R properties reside in the methylphenidate itself, not in the coating. Preliminary work by the manufacturer suggests that portions of the tablet work in a similar way to whole tablets (JS Werry, personal communication, 2001).

5.2.2 Pemoline

Pemoline is not registered for use in New Zealand. However, sometimes children arrive from overseas where they have been taking this medication and parents wish to continue with it. Pemoline can be imported by a doctor for the treatment of a specific patient under his or her care, but it cannot be advertised or distributed beyond that. It is supplied under Section 25 of the Medicines Act 1981.

Note: Pemoline has been withdrawn from use in the United Kingdom and Canada due to some undesirable side effects, particularly hepatic toxicity.

6.0 Stimulant Preparations in New Zealand

Stimulants are controlled drugs in New Zealand. From February 1999 new regulations for prescribing came into effect (refer Appendix 1). The only stimulants approved for use in New Zealand are:

- dexamphetamine
- methylphenidate, in two preparations – the standard 10 mg hydrochloride and the slow-release 20 mg tablets (subsidised since November 2000).

In New Zealand the use of these stimulants is restricted to ADHD and narcolepsy (a neurological disorder). Other stimulants, for example, pemoline and other combinations (Adderall™, Concerta™), are available overseas.

6.1 Prescription requirements

Scripts must be:

- written on the controlled drugs forms (triplicate)
- in the prescriber's handwriting for all details except the doctor's address.

With regard to **dispensing**:

- prescriptions must be filled within seven days of the date on the script
- the maximum supply per dispensing is strictly 30 days
- no repeats are allowed.

Approved **prescription status** for:

- dispensing and subsidy of methylphenidate and dexamphetamine is referred to as 'Retail Pharmacy-Specialist', allowing for scripts by a specialist or by a general practitioner with specialist endorsement.

Closely controlled supply (seven days each dispensing) should be considered where there is concern over compliance or potential misuse or abuse of medication.

6.2 Authorisation and records

Only **specialist psychiatrists or paediatricians** may prescribe or authorise the prescription of stimulants for ADHD. Other medical practitioners may prescribe but only with such specialist approval.

If the drug is to have a **government subsidy,** then:

- the prescribing doctor must apply for a Special Authority using the prescribing form for stimulants
- scripts must cite this Special Authority number or the patient may be charged the full price.

For audit purposes, the patient's clinician should hold on file:

- a record of the prescription
- supporting documents of patient ADHD diagnosis, medication reviews and relevant authorisations/endorsements.

7.0 Use of Other Medication

Second-line medication should only be considered if stimulant medication compliance, dosages and accurate diagnosis have been thoroughly examined. For young people with a clear diagnosis of ADHD who fail to respond to stimulants or who have unacceptable side effects, second-line medication that can be considered includes:

- tricyclic antidepressants (AACAP Official Action 1997)
- in cases where all else has failed, atypical neuroleptics such as risperidone for a short term.

In general, second-line medication should be used only **in consultation with a specialist child and adolescent psychiatrist or behavioural paediatrician** as it suggests that the problem is probably more complex than ADHD alone.

Given the controversy over combined pharmacotherapy (polypharmacy) for ADHD, much more research in this area is needed (Spencer, Biederman, Wilens et al 1996). **Combined pharmacotherapy should only be used exceptionally and with appropriate specialist consultation.** It may be considered if trials of at least two individual agents (initially methylphenidate and dexamphetamine) have failed.

The use of other medications for comorbid disorders is not considered to be polypharmacy. This 'combined' approach is appropriate if the other disorder or problem is a proper indication for that pharmacotherapy.

7.1 Antidepressants

7.1.1 Tricyclics (heterocyclics)

There is strong evidence that tricyclic (TCAs; more properly called heterocyclics) antidepressants are as good or almost as effective as stimulants in treating ADHD. Of 29 studies evaluating tricyclic antidepressants, 27 report either moderate or robust response rates to tricyclics (Spencer, Biederman, Wilens et al 1996). However, some studies suggest that minor side effects (mostly sedation, irritability and anticholinergic symptoms) may be more common. The TCAs for which the evidence regarding efficacy is strongest are imipramine and desipramine, but other TCAs seem to be equivalent (JS Werry, personal communication, 2000). Advantages of the antidepressants include:

- long half-life
- minimal risk of abuse or dependence
- benefits in treating comorbid anxiety and depression (Prince et al 2000).

Tricyclic antidepressants have been implicated in eight sudden deaths in children since 1990, though in most cases other medications were also involved (Varley 2000). Tricyclics can cause changes in cardiac conduction on the electrocardiogram (ECG) typically only in high doses (in

excess of 5 mg/kg imipramine equivalents). Desipramine, however, is thought to be more cardiotoxic and is generally not now used (Prince et al 2000).

Studies have shown that improvement can be maintained using doses of 3 to 5 mg/kg per day in imipramine equivalents (Spencer, Biederman, Wilens et al 1996), which is below the usual cardiotoxic level.

There is debate about the usefulness of ECGs before and during use of antidepressants in ADHD as:

- the risk is very low
- it is difficult to adhere to rigorous monitoring regimes
- the predictive value of routine ECGs is uncertain.

Paediatric cardiologists have recommended cardiac monitoring of children and adolescents who are receiving psychotropic medication. This recommendation was approved as an official scientific statement of the American Heart Association (see Varley 2000). Varley regards this recommendation as prudent to protect the prescriber but comments that the question of whether this practice improves patient safety is controversial. Varley points out that the sudden death rate may not differ from the baseline risk of sudden death in the age group under consideration.

Nevertheless, it has been recommended that TCAs should be used:

- as a second-line treatment
- only after carefully weighing the risks and benefits of treating or not treating the child (Spencer et al 1996).

Prince et al (2000) recently conducted a randomised controlled trial of nortriptyline. Results showed a reduction in symptoms of ADHD and oppositional behaviour, with few clinical or cardiovascular effects.

7.1.2 Selective serotonin reuptake inhibitors

At this point, evidence is insufficient regarding the efficacy of serotonin reuptake inhibitors (SSRIs) in improving core ADHD symptoms. However, there are suggestions that they may be useful in the treatment of comorbid conditions or secondary mood and anxiety symptoms (AACAP Official Action 1997).

7.1.3 Monoamine oxidase inhibitors

Moclobemide, a reversible MAO-A inhibitor, has some popularity in New Zealand. Other mono amine oxidase inhibitors (MAOIs) have been tried overseas (see Barkley 1998: 556). Adequate proof that they are effective is lacking, though information is limited (AACAP Official Action 1997). Traditional MAOIs that affect A and B types of the enzyme can cause dangerous toxicity if the patient eats certain foods, for example, cheese containing pressor amines such as tyramine.

7.1.4 Atypical antidepressants

Buproprion is an atypical antidepressant unlike either tricyclics or SSRIs. Like clonidine it has been widely used in the United States although evidence regarding efficacy is lacking. The AACAP Official Action (1997) recommends it at the second level, though at the time of its recommendation buproprion had only been evaluated in one open trial and 25 percent of the subjects suffered intolerable agitation. It can also cause seizures (Barkley 1998: 555–6).

Venlafaxine is one of the newer atypical antidepressants currently under investigation for ADHD in the United States. It has both noradrenergic and serotonergic properties. It was useful in four open trials (Barkley 1998: 557) but definitive evidence of its usefulness and safety is needed.

Hypericin (St John's Wort) is a herbal remedy with mild antidepressant properties, possibly somewhat similar to SSRIs (Werry and Aman 1999). It has been tried informally to treat ADHD, usually by parents without medical advice. It has not been subject to proper clinical trials to allow comment on its value or safety. It can cause drug reactions through induction of liver P450 enzymes, which has been the subject of a warning from the Ministry of Health (*Prescriber Update* 20, February 2001).[2]

7.2 Neuroleptics (antipsychotics)

From the 1960s to 1980s neuroleptics were in common use for the treatment of ADHD. However, these drugs fell into disuse in the United States because of legal action by patients who developed tardive dyskenesia. Most of these patients had schizophrenia and/or intellectual impairment, not ADHD, and had received very high doses for many years. While tardive dyskinesia can occur in children and adolescents, most of their symptoms associated with neuroleptic use involve short-lived withdrawal rather than permanent effects (see Werry and Aman 1999: 134).

7.2.1 Empirical evidence

In their review Spencer et al (1996) found 12 controlled studies of neuroleptics, of which eight showed clinically significant improvement (see Table 5). However, the effect size is usually modest and, in the majority of studies, is inferior to that of stimulants (JS Werry, personal communication, 2000).

Although none of the 12 studies trialled used it, because all neuroleptics share qualitatively similair psychotropic actions, **risperidone** is now the neuroleptic of first choice in doses of 0.25 to 1 mg because it is associated with reduced risk of:

- extrapyramidal side effects
- tardive dyskinesias.

The most common side effect of risperidone is weight gain (Martin et al 2000), which can be quite rapid so monthly weight checks are essential. Females, especially adolescents, may develop

[2] See http://www.medsafe.govt.nz

galactorrhea, which should be discussed before beginning any treatment. Haloperidol in similar dosage can be used if risperidone is unacceptable.

7.2.2 Benefits and risks

Views differ on the benefits and risks associated with the use of neuroleptics. The AACAP Official Action (1997) suggests that the risks of neuroleptic medication outweigh the potential benefits. This view is not necessarily generally accepted (see, eg, Barkley 1998: 557) especially if doses are kept low and duration of treatment is short (JS Werry, personal communication, 2000).

Werry considers that neuroleptics can be useful in treating ADHD in the following circumstances:

- when stimulants and antidepressants are ineffective, not tolerated or only partially effective
- where tics are an associated severe problem
- where sleep disturbance and/or emotive aggression are also a problem.

Generally, neuroleptics should be used only in consultation with a specialist psychiatrist. The size and quality of their effect on ADHD core symptoms, while significant, are inferior to stimulants. Also, because of the development of tolerance and the risk of tardive dyskinesia from long-term use, they should be used only intermittently (not to exceed three months at a time).

7.3 Other medication

Carbamazepine, an anticonvulsant, was reviewed by Silva et al (1996). Through a meta-analysis of studies with children and adolescents with ADHD, they found that carbamazepine produces a statistically significant therapeutic effect compared to baseline. However, its overall effect size is small (1.01). Due to its small effect size and side effects such as leukopaenia, anemia and hepatoxicity, carbamazepine cannot be recommended for ADHD.

Clonidine (an alpha-adrenergic agonist used primarily in the treatment of hypertension) enjoys popularity in New Zealand usually in combination with stimulants. However, its effectiveness has not been properly evaluated (see Werry and Aman 1999: 446–52). Although one small study suggests that clonidine may help modulate mood and activity, the study was poorly evaluated (AACAP Official Action 1997).

There has been concern about:

- the possible cardiotoxicity of clonidine in combination with methylphenidate in sudden deaths in four children, although the real toxicity of this combination has been disputed (see Salle et al 2000)
- possible adrenergic rebound, including hypertensive crises, with clonidine.

The greatest use of clonidine may be with allied symptoms such as insomnia, common in ADHD, or from rebound as stimulants wear off in the evening or from direct effects of stimulants on the arousal systems.

Guanfacine, a drug from the same class that has some advantages over clonidine, is not available in New Zealand.

Beta (adrenergic) blockers such as propranolol have been used for ADHD, although mostly for the management of associated symptoms like anxiety, anger and emotive aggression. Their value has not been established (Barkley 1998: 572; Werry and Aman 1999: 459–62).

7.3.1 Drugs not helpful for ADHD

Many other drugs have been tried for ADHD. Barkley (1998: 578) lists a number that have been found to be not useful, including:

- fenfluramine (withdrawn because of toxicity)
- antihistamines
- benzodiazepines
- lithium
- caffeine.

7.4 Monitoring

Progress should be monitored:

- every three to six months
- more frequently after initiating any medication (eg, weekly phone contacts and visits at four to six weeks).

Treatment response may be monitored using **behavioural rating scales** and **standard assessment forms**. **Feedback from parents** and **school reports** are equally important. There is no good evidence either for or against this monitoring regimen but it does represent accepted clinical practice.

7.4.1 Annual review

It is recommended that an **annual review** is undertaken by, or under the direction of, a specialist, using the same parameters as for the initial diagnosis. The review should cover:

- persistence of DSM-IV target symptoms
- academic performance and school behaviour
- peer interactions
- family interactions
- leisure activities.

If the child is on medication:

- check blood pressure, pulse, height and weight

- inquire about side effects
- note any effects from missed or delayed doses that may confirm continuing therapeutic efficacy.

The annual review should include determining whether there is a continuing need for medication. Approximately 20 percent of children may be able to discontinue medication after a year. A short trial without medication, lasting a few days or a fortnight, can occur at a convenient time to parents and teachers, preferably not at the start of the school year. The start of the school year can be a stressful settling in time and it may get the child off to a bad start with teachers and peers. There is a risk that this initial impression of the child may persist even with resumption of medication. This trial should be undertaken at least annually. Information from both home and school is needed when monitoring medication response and side effects.

7.4.2 Follow-up interviews and standardised questionnaires

Follow-up interviews and standardised questionnaires should also be undertaken. Older children may be able to provide information. Standardised rating scales of ADHD symptoms should be employed in both home and school. Clinicians should be aware of practice effects with repeated administrations, which tend to lower subsequent scores and may be mistaken for improvement (DuPaul, Barkley and Conner, in Barkley 1998).

It may be useful for parents and teachers and older children to complete a weekly rating scale regarding medication side effects following the initial medication trial and any dose changes. A questionnaire that can be administered to monitor side effects is available (see DuPaul, Barkley and Conner, in Barkley 1998: 539).

7.4.3 Medication-specific monitoring

If the child is on pemoline, liver function should be routinely tested at baseline and again periodically during the use of this drug, because of an apparently greater risk of hepatic complications (Barkley 1998: 532).

A large body of literature shows benign and predictable dose-related cardiac effects with TCAs. However, eight children who were receiving TCAs have suffered sudden deaths, raising concerns over possible risks. Overseas authors (Spencer, Biederman and Wilens 1996, 1998) recommend:

- obtaining vital signs, blood tests and an electrocardiogram (ECGs) before initiating treatment
- repeating this process after an initial trial at a low dose (2–3 mg/kg) or after adding any other medications likely to affect TCA metabolism.

Varley (2000), however, suggests this approach as more likely to protect the prescriber than the patient because such tests lack predictive value except in rare instances, for example, in pre-existing heart disease. The repeated use of ECGs in New Zealand may present resourcing issues. Nevertheless, it should certainly be undertaken where:

- there is a family history of cardiovascular problems
- doses approach 5 mg per kg (JS Werry, personal communication, 2000).

PART II

Background Information Including Evidence Summary

Reviewing the Evidence – Methods

This section summarises the strategy for searching and reviewing the available evidence on the effectiveness of approaches to the assessment, diagnosis and management of ADHD in children. This information can assist decision-making with individual patients and their families.

In assessing the evidence for these *New Zealand Guidelines*, the guideline development group was aware of:

- the extensive published literature on the assessment and treatment of ADHD in children
- the existence of several reviews, practice parameters, consensus statements and guidelines on the topics of interest
- two systematic reviews published in 1999 and 2000 by the United States Agency for Healthcare Research and Quality (AHRQ) on the diagnosis and treatment of ADHD.

It was therefore considered appropriate to assess existing reviews of the evidence, supplemented by information on selected topics where indicated. The New Zealand Health Technology Assessment (NZHTA) at the Christchurch School of Medicine assisted with the search for relevant reviews. The sources searched included:

- bibliographic databases: eg, Medline, Embase, Science Citation Index, Current Contents, Index New Zealand, CINAHL, PsycLit, HealthStar, NZHTA database
- review databases: Cochrane Library, DARE, NHS Centre for Reviews and Dissemination, Best Evidence
- library catalogues: Te Puna – New Zealand Bibliographic Network, US National Library of Medicine, United Kingdom/North Thames Regional Catalogue, COPAC – combined university catalogues
- web sites: New Zealand Ministry of Health, Health Canada, Australian Department of Health and Aged Care, United Kingdom National Coordinating Centre for Health Technology Assessment, and several other general Internet sites found through Google.

The titles and abstracts identified were examined for relevance. Original full reports or articles were reviewed by two members of the guideline development group. The reviews were critically appraised, noting in particular the scope and methodology employed (eg, search criteria and strategy), and the quality and rigour of the analysis.

The identified reviews addressed one or more of the questions of interest to the guideline development group, as defined below.

Questions relating to the assessment or diagnosis of ADHD

- What are the accuracy and reliability of behavioural rating screening tests for ADHD compared with a reference standard (such as DSM-IV or ICD-9 criteria)?

- Are medical screening tests useful in the diagnosis of children with ADHD?
- Do medical screening tests frequently detect conditions that require specific intervention?

Questions relating to the treatment of ADHD

- What is the evidence for the effectiveness and safety, in both the short and long term, of pharmacological and non-pharmacological interventions for ADHD in children?
- Are combined interventions more effective than individual interventions?
- Are stimulants safe?

Findings of the evidence search

The evidence summary included information published up to March 2000. In all, the guideline development group identified, reviewed in detail and summarised:

- nine recent reports from expert groups including overviews, meta-analyses, consensus documents guidelines and clinical protocols
- one recently published randomised controlled study.

Evidence published since early 2000 will be reviewed and published with a revision of these *New Zealand Guidelines* (if required) in two years from the date of publication of these Guidelines. The Ministry of Health is responsible for reviewing these Guidelines.

The most comprehensive review of the assessment of ADHD was published by the AHRQ in late 1999 (Green et al 1999). The initial computer search for this review identified over 4000 articles. The final analysis was based on 87 articles and 10 manuals that met the review criteria. This review is summarised in Table 3.

Several reviews or meta-analyses of the treatment of ADHD were identified. Previous reviews dating back to the 1980s, along with many thousands of individual articles since, were included in these publications (Jadad et al 1999; Jadad et al 2000; Klassen et al 1999). The findings from the identified major reviews on treatment are summarised in Table 4.

Since the publication of the identified reviews, a major treatment trial on the potential advantages of combination therapy, the Multimodal Treatment Study of Children with Attention-Deficit/Hyperactivity Disorder (MTA study), has been published. However, the preliminary information from this trial was included in the AHRQ's comprehensive review on treatment of ADHD (Jadad et al 2000).

Table 5 summarises key points regarding other relevant reports (including previously published guidelines, protocols and consensus statements) that assisted the guideline development group.

Evidence Summary for ADHD Assessment

In clinical settings, ADHD is usually suspected and/or diagnosed through the standard interview for history-taking and an examination. These methods are complemented by behavioural checklists. While there is good evidence that structured and semistructured interviews can produce reliable and valid results (see *Journal of the American Academy of Child and Adolescent Psychiatry* 2000), these methods are not commonly used in clinical practice. However, the DSM-IV field trials for ADHD, in which experienced mental health professionals from 10 different clinics in the United States (Lahey et al 1994) used their usual methods of history-taking and examination, found that ADHD can be diagnosed with acceptable reliability in this way. However, the same outcome may not be achieved with less experienced mental health professionals.

The following information on screening instruments and rating scales is based primarily on the review on the diagnosis of ADHD, published by the Agency for Health Research and Quality (AHRQ), as summarised in Table 3 (Green et al 1999).

Screening tests and behavioural rating scales

Broad-band checklists

Of the broad-band scales examined in the AHRQ review, none discriminated effectively between referred and non-referred children. They were therefore not considered useful in distinguishing children with clinically significant problems from children without such problems.

The scales reviewed were:

- the Child Behaviour Checklist Revised (CBCL/4-18-R)
- Total Problem Scale, DSMD Total Problem Scale
- Conners Parent Rating Scale Revised: Long Version (CPRS-R:L)
- Global Problem Index
- the Conners Teacher Rating Scale Revised: Long Version (CTRS-R:L).

ADHD-specific questionnaires

The 1997 Revision of the Conners Rating Scale (CRS) contains two highly effective indices for discriminating between children with ADHD and normal controls:

- the new ADD/ADHD Index
- the DSM-IV Symptoms Scale.

Each index achieved effect sizes greater than 3, which translated into matched sensitivity and specificity values greater than 94 percent.

The Barkley School Situations Questionnaire performed poorly in discriminating between children with and without ADHD. However, only a few evaluations of this instrument were published.

With the exception of the ADD-H: Comprehensive Teacher Rating scale (ACTeRS) Checklist, the hyperactivity subscales of ADHD-specific checklists strongly discriminated between children with ADHD and normal controls. The DSM-IV SNAP Checklist's inattention and impulsivity subscales discriminated well between children with ADHD and normal controls (effect sizes more than 4.0; matched sensitivity and specificity values more than 97 percent). The ADD-H: Comprehensive Teacher Rating scale (ACTeRS) performed poorly.

Screening for comorbidities

Screening for medical comorbidities

Some have proposed medical tests to screen for covert conditions in children who present with behaviour problems suggestive of ADHD. These include lead levels, thyroid function, neuro-radiological imaging, EEGs and clinical neurological screening tests.

When evaluated, none of these tests appears to be a useful screening or diagnostic tool for ADHD. Although many studies found significant differences in brain wave activity between ADHD children and normal controls, the variability of results across studies did not support the routine use of EEG as a screening tool.

Population screening for ADHD is not recommended. No population screening tools for ADHD have been developed that meet the Wilson and Junger (1968) criteria.

High-risk population group screening

Evidence indicates that, under ideal conditions, the 1997 revision of the Conners Rating Scale – Long Form effectively discriminates between children with ADHD and normal controls. This scale is the preferred screening test for children considered to be at increased risk (such as those referred for assessment). The Barkley School Situations Questionnaire was less effective in these conditions.

None of the broad-band scales evaluated in the AHRQ report (Green 1999) effectively discriminated between referred and non-referred children. Therefore they are not recommended as tools to detect ADHD in children with behavioural problems presenting in primary care.

Hyperactivity subscales that effectively discriminated between ADHD children and normal controls include the DSM-III-R, DSM-IV SNAP Checklist and the Connors Abbreviated Teacher Questionnaire (CATQ, HI). These subscales are the preferred subscale tests.

Note that in clinical practice, all these scales are likely to perform more poorly than they do in studies conducted under ideal conditions.

There is no evidence that any of these tests is effective in screening for ADHD or is useful as a diagnostic tool for children without the core clinical symptoms or signs, that would indicate their use. Thus these tests should be used where clinically indicated, and not as screening tests or as part of the routine investigation of children with ADHD.

Evidence Summary for ADHD Treatment

Note: The evidence-based reviews were conducted some time before the final draft of the *New Zealand Guidelines*, so they do not include some of the latest studies (mostly from 2000 onwards). More recent studies have been included in the summary where relevant.

General findings

- Evidence shows clearly and consistently that stimulant medication is the single most useful intervention for children and young people with ADHD in the short to medium term (Gilmore et al 1998; Jadad et al 2000). The evidence relating to methylphenidate and dexamphetamine is particularly robust.
- Far fewer studies of the treatment of 'non-hyperactive' children with ADHD – that is, with Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type – have been conducted. There is some evidence that lower doses of stimulant treatment may be optimal and that the proportion of non-responders may be higher among this group than among children with hyperactivity (AACAP Official Action 1997).
- Most reviews suggest methylphenidate (MPH) and dexamphetamine should be the first-line drugs. MPH is the most studied drug. Meta-analyses of clinical studies have found no difference among methylphenidate, dexamphetamine and pemoline in terms of their efficacy (Shukla and Otten 1999).
- There is little evidence that medications other than stimulants are effective in treating the core symptoms of ADHD. While some have interpreted the existing outcome data as not allowing firm conclusions regarding their efficacy (National Institutes of Health Consensus Development Conference Statement 1998: 7), two other classes of medications (tricyclic antidepressants and neuroleptics/antipsychotics) may have a role when stimulants are unsuccessful or not tolerated well (Spencer et al 1996; Werry and Aman 1999).
- The systematic reviews that addressed behavioural management concluded that behavioural therapies alone appeared to lack efficacy in terms of improving the symptoms of ADHD (Jadad et al 2000; Shukla and Otten 1999).
- Results from studies comparing combined treatments (involving medication and behavioural approaches) with a stimulant or a non-drug intervention alone have been inconsistent. Overall the reviews found little evidence for any additive effects from combination therapy (Jadad et al 2000; Shukla and Otten 1999).
- Studies evaluating adverse side effects of drug therapy suggest most associated side effects are relatively mild, of short duration and respond to dosing or timing adjustments. There are inadequate data on the long-term effects and severity of adverse effects of most interventions (Jadad et al 2000).

Multimodal Treatment Study of Children with Attention-Deficit/Hyperactivity Disorder

Recently the Multimodal Treatment Study of Children with Attention-Deficit/Hyperactivity Disorder (MTA study) concluded a large trial comparing combination therapy with a stimulant or non-drug interventions alone. The findings have been published in scientific journals (MTA Cooperative Group 1999a, 1999b) since the most recent review. However, preliminary findings of the study were included in the AHRQ review (Jadad et al 2000). Based on outcomes examined at 14-months follow-up, the review authors concluded that:

- 'combined therapy did not yield significantly greater benefits than medication management for core ADHD symptoms'
- combination therapy has modest advantages over behavioural treatment and/or community care for non-ADHD areas of functioning such as oppositional/aggressive symptoms, internalising symptoms, teacher-rated social skills, parent-child relations and reading achievement.

The MTA study has been subjected to intense scrutiny with several issues raised in support and against the conclusions (Boyle and Jadad 1999; Cunningham 1999; Jensen 1999; Pelham 1999; Schachar 1999). The behavioural methods used in this study were intensive (covering the home, school and peer group environments). As the outcomes were measured after the non-drug interventions were stopped but while medication was continuing, some have argued that it is invalid to conclude that behavioural methods are not as good as medication. Others note that at a practical level, medication can be continued easily, unlike behaviour therapy of this intensity and cost, and so the argument is to some degree academic.

Other interventions

A number of other interventions have been used to treat ADHD. These include family therapy, family psychotherapy, individual psychotherapy, group therapies, social skills training and cognitive therapies. Currently evidence is insufficient to determine the effectiveness of these interventions. Recommendations regarding their effectiveness are therefore not made in these *New Zealand Guidelines*.

Table 3: Diagnosis of ADHD-systematic reviews and meta-analyses

Reference, topic and search	*Selection criteria for articles and data extraction/appraisal*	*Data sources included*	*Data synthesis*	*Comments*
Green et al (1999) Diagnosis of ADHD (studies and manuals) MEDLINE PsycINFO Reference lists in reviews and research articles AACAP and AAP members involved in ADHD guideline development Catalogues from publishers Bibliographies of CBCL studies Expert sources	Review period 1980–1997 *Inclusion criteria* Studies in peer-reviewed publications and manuals in the English language meeting defined criteria relating to: the diagnosis of ADHD and comorbid conditions; target population (boys and girls aged 6–12 years); behavioural rating scales and medical screening tests *Data extraction/appraisal* Scope, questions and methods defined; systematic independent appraisal by two reviewers, and relevant statistical analyses conducted *Questions relevant to* NZ Guidelines • What is the accuracy of behavioural rating screening tests for ADHD compared with a reference standard? • What is the prevalence of abnormal findings on selected medical screening tests commonly recommended as standard components of an evaluation of a child with suspected ADHD?	4000 citations identified *Final source:* 87 articles and 10 manuals	*Findings relevant to* NZ Guidelines Two indices in the Connors Rating Scales of 1997 strongly discriminated between children with ADHD and normal controls (while the Barkley School Situations Questionnaire was less effective): • the new ADHD Index and DSM-IV Symptoms Scale • the hyperactivity subscales of ADHD-specific checklists except the ACTeRS Checklist. DSM-IIIR SNAP checklist (inattention and impulsivity subscales) was also a strong discriminating tool. The broad-band scales analysed were *not* effective discriminating tools. Medical screening tests evaluated did *not* appear useful screening or diagnostic tools for ADHD.	Most ADHD-specific behavioural rating scales were useful in ADHD diagnosis. Broad-band behavioural rating scales were not useful. Medical and neurological screening tests were not helpful for the diagnosis of ADHD. Tests evaluated included: EEG, lead concentration, thyroid hormone levels, imaging, continuous performance, hearing and vision screening and neurological screening. Such medical and neurological screening tests may have a role in specific situations where co-existent disorders are suspected.

Table 4: Management of ADHD-systematic reviews and meta-analyses

Reference, topic and search	*Selection criteria for articles and data extraction/appraisal*	*Articles or reviews included*	*Data synthesis*	*Comments*
Jadad et al (1999) *Treatment of ADHD (reviews)* MEDLINE CINAHL HealthStar Cochrane library PsycINFO EMBASE Personal files of researchers Reference lists of eligible studies	*Review period* Up to August 1998 *Inclusion criteria* Systematic review, meta-analysis or review article with a methods section describing search strategy Focus on treatment of ADHD Publication in a peer-reviewed journal in any language *Data extraction / appraisal* Methods clearly defined; systematic review with independent appraisal by two reviewers; eligible studies rated for scientific quality	*13 reviews:* Kavale 1982 Kavale 1983 Ottenbacher 1983 Thurber 1983 Schachar 1993 Wilen 1993 Losier 1996 Silva et al 1996 Spencer et al 1996 Stein 1996 Shevell 1997 Goldman 1998 DuPaul 1997	Eight reviews included meta-analysis; five included a qualitative review Six included non-pharmacological therapy. Three included combination therapy Target population included children (11 reviews), adults (two) and adolescents (one). Most reviews had major methodological flaws	Four reviews supported use of stimulants and one found pharmacological intervention had a variable effect. One review supported use of non-pharmacological school-based interventions. Each of the following was discredited by one review: • Feingold hypothesis • importance of MPH side effects • risk of hepatic failure with pemoline. Most reviews were of limited value for clinical, policy and research decisions.
Klassen et al (1999) *Treatment of ADHD (trials)* Current Index to Journals in Education MEDLINE HealthStar PsycINFO EMBASE First Search Current Contents Cochrane library Text bibliographies Journal handsearch Trial info from drug industry	*Review period* 1981–August 1997 *Inclusion criteria* Ages 0–18 years; DSM-III criteria for ADD, ADD-H or ADHD with no coexisting diagnoses. Random assignment to therapy. Interventions: more than one week of stimulant therapy or a course of psychosocial intervention; outcome measured with a behavioural rating scale completed by a teacher or parent Data extraction/appraisal Methods well defined; systematic review with scientific quality of articles assessed by two reviewers; meta-analyses conducted	More than 1000 citations identified Twenty-six studies met selection criteria *Trial designs* randomised (22) double-blind (22) cross-over (19) Between-subjects parallel design (seven) *Interventions* Drugs only (24), behavioural therapy only (two); combined therapy (three)	Methodological quality of studies was variable. Stimulant therapy is effective in reducing elevated levels of behaviours (symptoms) measured within weeks of treatment onset and while continuing to take treatment Behavioural therapies did not produce significant differences in ADHD symptoms Minimal support for combination therapy over drug therapy alone	Stimulant therapy is effective in reducing observable behaviour problems among children and youth with ADHD. Few behavioural and/or combination therapy studies met review selection criteria. Therefore it was not possible to reach definitive conclusions regarding the merits of these approaches relative to drug-only treatment.

Table 4: Management of ADHD-systematic reviews and meta-analyses *(continued)*

Reference, topic and search	*Selection criteria for articles and data extraction/appraisal*	*Articles or reviews included*	*Data synthesis*	*Comments*
Jadad et al (2000) Treatment of ADHD (trials) MEDLINE CINAHL HealthStar Cochrane library PsycINFO EMBASE Reference lists of eligible studies ADHD web-sites Personal files of research team	*Review period* Up to November 1997 *Inclusion criteria* RCTs of ADHD in humans, published in peer-reviewed journals in any language as a full report. Non-RCTs included if data were provided on adverse effects collected over more than 16 weeks *Data extraction/appraisal* Scope, questions and methods clearly defined; systematic review with independent appraisal by two reviewers; detailed evidence tables provided with qualitative review. Meta-analyses considered inappropriate (reasons provided)	2405 citations identified 78 studies published from 1971-1999 met all selection criteria *Interventions* Drugs only (22) Drug vs non-drug (12) Combination (27) TCAs vs placebo (12) Long-term therapy ((12 weeks) (19) Adverse effects (32) Treatment of adults (13) Treatment of children (64)	Major deficiencies existed in methodological quality and available outcome data There are few, if any, short-term differences in effectiveness among MPH, DAS, pemoline Stimulants are more effective than non-pharmacological therapy Combined therapy offers modest additional benefit over single-component therapy for non-ADHD areas of functioning (including MTA study) TCAs (desipramine) is more effective than placebo. Lithium is not an effective alternative for patients who do not respond to stimulants	*Long-term therapy:* Better quality studies showed a trend to general improvement regardless of therapy and support; MPH reduces behavioural disturbance as long as it is taken but there is little evidence for improvement in academic performance. Many reported side effects of stimulant therapy are relatively mild, of short duration and respond to dose and timing adjustments. There are inadequate data on long-term effects of most interventions. Reviews of behavioural interventions could benefit from inclusion of non-random studies-but latter considered were too vulnerable to bias and of limited utility in head-to-head comparisons with other interventions.

Table 5: Selected guidelines, practice parameters and consensus statements

Reference (year) and organisation	*Scope and Purpose*	*Identification and use of evidence*	*Formulation of recommendations*	*Comments*
AACAP Official Action (1997) Journal of American Academy of Child and Adolescent Psychiatry Release date: 14 February 1997 Developed by the Work Group on Quality Issues (principal author: Mina Dulcan) *Funding source:* not indicated	*Aim* To review the literature and present **practice parameters** for assessment and treatment of children, adolescents and adults with ADHD *Intended users* Physicians, nurse practitioners, other *Interventions considered:* Education, behaviour therapy, pharmacotherapy	*Review* Based on searches of electronic databases and hand searches of published literature; evidence tables not provided. Quality and strength of evidence reviewed by expert consensus Parameters made available to Academy membership for review in 1997	Detailed outline of recommended 'Practice parameters' following a textbook-like overview of topic. Specific recommendations by age-group (3–5 years, 6–12 years, adolescents and adults)	Published on the World Wide Web and in the Journal of the AACAP. Information provided includes protocol for evaluation (history-taking, examination, treatment planning and monitoring) Implementation strategy not stated. Not updated since 1997
National Institutes of Health Development Conference Consensus Statement (1998) Consensus Development Panel: Thirteen members representing health and research professionals and the public. Statement developed during a three-day conference *Lead organisations:* Office of Medical Applications of Research, NIDA, NIMH	*Aim* Provide biomedical and clinical practice communities with state-of-the-art information regarding effective treatments for ADHD *Intended users* Psychiatrists, family practitioners, paediatricians, physicians and psychologists *Interventions considered* Stimulants, psychosocial, other	An extensive bibliography of references from a MEDLINE search provided to the panel and conference audience; experts prepared abstracts of relevant literature Panel developed statement based on scientific evidence presented in open forum, and revised this based on feedback from audience and other experts	*Main conclusions* Stimulant therapy is more effective than psychosocial interventions in reducing symptoms of ADHD More data are needed on long-term effects of all interventions Wide variation in use of stimulant therapy suggests there is no consensus on which patients should be treated	Published in a report form and made available on the World Wide Web Statement focused on current evidence regarding effective treatments, risks of therapy, barriers to diagnosis and therapy, and directions for future research Implementation strategy not stated

Table 5: Selected guidelines, practice parameters and consensus statements *(continued)*

Reference (year) and organisation	*Scope and purpose*	*Identification and use of evidence*	*Formulation of recommendations*	*Comments*
National Health and Medical Research Council, Australia (1997) Endorsed by NHMRC: 1 December 1996 Working Party chair: Prof Allan Carmichael	*Aims* Review evidence and formulate recommendations for appropriate methods of diagnosis, assessment and management of ADHD *Intended users* Health professionals, health service managers, educators, parents, consumers	Strategy for searching and synthesis of evidence unclear, but extensive bibliography included with citations in the body of the text No grading of the evidence or recommendations provided	Twenty-six listed recommendations, most relating to the diagnosis, assessment and management of school-aged children. Specific issues relating to preschoolers and adolescents noted Support organisations and related resources listed	Multimodal therapy involving consideration of simultaneous medication use, behaviour management, family counselling and educational management recommended. Dietary manipulation and other therapies not routinely recommended
American Academy of Pediatrics (2000) Release date: 5 May 2000 Developed by the Committee on Quality Improvement, Subcommittee on ADHD Funding source: not indicated	*Aim* Clinical practice guideline incorporating recommendations for the diagnosis and evaluation of the child aged 6–12 years with ADHD but without comorbid conditions *Intended users* Primary care physicians	Evidence based on AHRQ systematic review (Green et al 1999) Draft guideline reviewed by peers and revised. Strength of recommendations based on quality of scientific evidence or, in its absence, on strength of expert consensus	Guideline highlights: • use of explicit criteria for diagnosis • requirement for collecting information on child from several settings including school • need to consider comorbidities that could complicate management	Six recommendations formulated and a clinical algorithm provided Published in *Pediatrics* but strategy for implementation not stated

Table 5: Selected guidelines, practice parameters and consensus statements *(continued)*

Reference (year) and organisation	*Scope and purpose*	*Identification and use of evidence*	*Formulation of recommendations*	*Comments*
Institute for Clinical Systems Improvement (2000) Release date: January 2000 Developed by a Work Group led by WB Donald Funding source: not indicated © 2000 ICSI	*Aim* Provide guidance on diagnosis and management of ADHD in the primary care setting for school-aged children and adolescents *Intended users* Health professionals and provider organisations, researchers, policy makers and managers	An extensive bibliography provided as an appendix to guideline with the strength of the supporting evidence graded to a limited extent	Guideline summarised by an evaluation algorithm and a management algorithm Supporting documentation for recommendations provided but the scientific evidence is inconsistently cited	Published on the World Wide Web and as a report. Scheduled for revision by June 2001 Implementation and review strategy noted. Possible measures indicating successful implementation of guideline outlined
Hazell (2000) Australian Early Intervention Network for Mental Health in Young People Developers: Philip Hazell and Expert Advisory Panel Funded by: Commonwealth Department of Health and Aged Care, Australia	*Aim* To review the evidence and make recommendations regarding early interventions for ADHD in infants, toddlers and preschool or kindergarten children	*Search strategy* Included Medline, PsycLit and ERIC (to 1998), bibliographic searches of published papers and hand-searching of key journals. Searches not limited to RCTs. Data pooled where relevant and levels of evidence considered Recommendations on assessment derived through consensus of Expert Advisory Panel (due to sparse data)	Prevalence of ADHD among preschoolers is approx one in every 50 children. Preschool diagnosis of ADHD warrants rigorous review at school entry MPH is effective in reducing target symptoms of ADHD When oppositional behaviour is a presenting feature behaviour management by parents and special classroom placement are of benefit	Current evidence does not conclusively support dietary management for preschool-aged children with ADHD. No evidence is available regarding efficacy of megavitamin therapy, art therapy, social skills training or exercise in this age group. These therapies are therefore not recommended for preschoolers until further data are available

Appendices

APPENDIX 1:

New General Ministerial Approvals for Prescribing, Supply and Administration of Dexamphetamine and Methylphenidate

On 18 December 1998 new general Ministerial approvals (issued under Regulation 22 of the Misuse of Drugs Regulations 1977) came into effect for the prescribing, supply and administration of dexamphetamine and methylphenidate.

From 18 December 1998 any medical practitioner vocationally registered under the Medical Practitioners Act 1995 in:

- internal medicine or
- paediatrics or
- psychological medicine or psychiatry

or any medical practitioner acting on the recommendation of one of the above may prescribe dexamphetamine for a patient under his or her care. Approval on an individual patient/prescriber basis will no longer be required.

From 1 February 1999, the approval will only permit prescribing by medical practitioners with vocational registration in internal medicine, paediatrics or psychological medicine or psychiatry, or any medical practitioner acting on the recommendation of one of the above. General practitioners currently prescribing methylphenidate without specialist recommendation will need to arrange specialist referrals for their patients.

Under the new approvals, any pharmacist may supply dexamphetamine or methylphenidate (on the prescription of a medical practitioner permitted to prescribe it) in the course of their employment as a pharmacist. Dispensing will no longer be restricted to hospital or particular community pharmacies.

The approvals will also permit a person who is caring for a patient who has been prescribed dexamphetamine or methylphenidate to administer the drug to that patient in accordance with the directions of the prescriber. This part of the approval is intended to clarify the situation for caregivers, including teachers.

Any previous approvals relating to the prescribing, supply or administration of dexamphetamine and methylphenidate are revoked when the new approvals come into effect on 18 December 1998.

The changes in prescribing approvals for prescribing, supply and administration of methylphenidate and dexamphetamine provide an opportune time for the release of these *New Zealand Guidelines* for the management of children and young people with ADHD.

Note:

'Acting on the recommendation of a specialist' is to be interpreted as action that follows a substantive consultation with an appropriate specialist. This consultation:

- relates to the patient for whom the prescription is written
- means communication by referral, phone, letter or fax
- except in emergencies, precedes annotation of the prescription
- is recorded in a written form by both the specialist and the general practitioner.

For the purposes of the definition it makes no difference whether the specialist is employed by a Hospital and Health Service (HHS).

APPENDIX 2:

DSM-IV Diagnostic Criteria for Attention-Deficit/ Hyperactivity Disorder

Criteria

One of the following two criteria must be met.

A1 Six (or more) symptoms of inattention (see below) have persisted for at least six months to a degree that is maladaptive and inconsistent with developmental level.

A2 Six (or more) symptoms of hyperactivity/impulsivity (see below) have persisted for at least six months to a degree that is maladaptive and inconsistent with developmental level.

In addition to A1 or A2 above, the following criteria (B–E) must also be met.

B Some inattention or hyperactivity/impulsivity symptoms were present before age seven years.

C Some impairment from the symptoms is present in two or more settings (eg, at school (or work) or at home).

D There must be clear evidence of clinically significant impairment in social, academic or occupational functioning.

E The symptoms do not occur exclusively during the course of a pervasive development disorder, schizophrenia, or other psychotic disorder and are not better explained by another mental disorder, for example, mood disorder, anxiety disorder and dissociative disorder, or a personality disorder.

Inattention items

- often fails to give close attention to details or makes careless mistakes in schoolwork, work or other activities
- often has difficulty in sustaining attention in tasks or play activities
- often does not seem to listen when spoken to directly
- often does not follow through on instructions and fails to finish schoolwork, chores or duties in the workplace (not due to oppositional behaviour or failure to understand instructions)
- often has difficulty organising tasks or activities
- often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (eg, schoolwork or homework)
- often loses things necessary for tasks or activities (eg, toys, school assignments, pencils, books or tools)
- often is easily distracted by extraneous stimuli
- often is forgetful in daily activities

Hyperactivity items

- often fidgets with hands or feet or squirms in seat
- often leaves seat in classroom or in other situations where remaining seated is expected
- often runs about or climbs excessively in situations where it is inappropriate (in adolescents or adults, may be limited to feelings of subjective restlessness)
- often has difficulty in playing or engaging in leisure activities quietly
- often is 'on the go' or acts as 'if driven by a motor'
- often talks excessively

Impulsivity items

- often blurts out answers before questions have been completed
- often has difficulty awaiting turn
- often interrupts or intrudes on others (eg, butts into conversations or games)

Code based on type

314.01 Attention-Deficit/Hyperactivity Disorder, Combined Type: if both criteria A1 and A2 are met for the past six months

314.00 Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type: if criterion A1 but criterion A2 is not met for the past six months

314.01 Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type: if criterion A2 is met but criterion A1 is not met for the past six months.

Coding note: For individuals (especially adolescents and adults) who currently have symptoms that no longer meet full criteria, 'In Partial Remission' should be specified.

APPENDIX 3:

Diagnostic Criteria for 313.81 Oppositional Defiant Disorder

All criteria A–D must be met.

A. A pattern of negativistic, hostile, and defiant behaviour lasting at least six months, during which four (or more) of the following are present:

   1. often loses temper
   2. often argues with adults
   3. often actively defies or refuses to comply with adult's requests or rules
   4. often deliberately annoys people
   5. often blames others for his or her mistakes or misbehaviour
   6. is often touchy or easily annoyed by others
   7. is often angry and resentful
   8. is often spiteful or vindictive

   Note: Consider a criterion to be met only if the behaviour occurs more frequently than is typically observed in individuals of comparable age and developmental level.

B. The disturbance in behaviour causes clinically significant impairment in social, academic, or occupational functioning.

C. The behaviours do not occur exclusively during the course of a psychotic or mood disorder.

D. Criteria are not met for conduct disorder and, if the individual is 18 years or older, criteria are not met for antisocial personality disorder.

APPENDIX 4:

Diagnostic Criteria for 312.8 Conduct Disorder

A. A repetitive and persistent pattern of behaviour in which the basic rights of others or major age-appropriate societal norms or rules are violated, as manifested by the presence of three (or more) of the following criteria in the past 12 months, with at least one criterion present in the past six months:

Aggression to people and animals

1. often bullies, threatens, or intimidates others
2. often initiates physical fights
3. has used a weapon that can cause serious physical harm to others (eg, a bat, brick, broken bottle, knife, gun)
4. has been physically cruel to people
5. has been physically cruel to animals
6. has stolen while confronting a victim (eg, mugging, purse snatching, extortion, armed robbery)
7. has forced someone into sexual activity

Destruction of property

8. has deliberately engaged in fire setting with the intention of causing serious damage
9. has deliberately destroyed others' property (other than by fire setting)

Deceitfulness or theft

10. has broken into someone's house, building or car
11. often lies to obtain goods or favours or to avoid obligations (ie, 'cons' others)
12. has stolen items of nontrivial value without confronting a victim (eg, shoplifting but without breaking and entering; forgery)

Serious violations of rules

13. often stays out at night despite parental prohibitions, beginning before 13 years of age
14. has run away from home overnight at least twice while living in parental or parental surrogate home (or once without returning for a lengthy period)
15. is often truant from school, beginning before age 13 years

B. The disturbance in behaviour causes clinically significant impairment in social, academic, or occupational functioning.

C. If the individual is 18 years or older, criteria are not met for antisocial personality disorder

Specify type based on age at onset:

- **Childhood-Onset Type:** onset of at least one criterion characteristic of conduct disorder prior to 10 years of age
- **Adolescent-Onset Type:** absence of any criteria characteristic of conduct disorder prior to 10 years of age.

Specify severity:

- **mild:** few if any conduct problems are in excess of those required to make the diagnosis **and** conduct problems cause only minor harm to others
- **moderate:** number of conduct problems and effect on others are intermediate between 'mild' and 'severe'
- **severe:** many conduct problems are in excess of those required to make the diagnosis **or** conduct problems cause considerable harm to others.

APPENDIX 5:

Recommended Reading and Other Resources

Readings for professionals

American Academy of Child and Adolescent Psychiatry Official Action. 1997. Practice parameters for the assessment and treatment of children, adolescents and adults with Attention Deficit/Hyperactivity Disorder. *Journal of the American Academy Child Adolescent Psychiatry* 36(10), Supplement: 85S-121S. Web site: <http://www.guideline/gov> (National Guideline Clearinghouse, USA)

American Academy of Pediatrics (AAP). 2000. Clinical practice guideline: diagnosis and evaluation of the child with Attention-Deficit/Hyperactivity Disorder. *Pediatrics* 105: 1158–70.

Barkley RA. 1998. *Attention Deficit Hyperactivity Disorder: A handbook for diagnosis and treatment* (2nd edition). New York: Guilford Press.

Relevant reports

1. Miller A, Lee SK, Raina P, Klassen A, Zupancic J, Olsen L. 1999. A review of therapies for ADHD. Report to the Canadian Co-ordinating Office for Health Technology Assessment (CCOHTA).
2. Shukla VK, Otten N. 1999. Assessment of ADHD therapy: a Canadian perspective. CCOHTA, January.

National Health and Medical Research Council (NHMRC). 1997. *Attention Deficit Hyperactivity Disorder.* Commonwealth of Australia: NHMRC. Relevant web site: <http://www.health.gov.au/hfs/nhmrc/publicat/adhd/>

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Werry JS, Aman MG (eds). 1999. *A Practitioner's Guide to Psychoactive Drugs for Children and Adolescents*. New York: Plenum Press.

Readings for parents

Barkley RA. 2000 *Taking Charge of ADHD: The authoritative guide for parents.* New York: Guilford Press.

Dulcan MK (ed). 1999. *Helping Parents, Youth, and Teachers Understand Medications for Behavioral and Emotional Problems: A resource book of medication information handouts.* Washington DC: American Psychiatric Press.

Green C, Chee K.2001. *Understanding ADHD* (3rd edition). Sydney: Doubleday.

Ministry of Education. 2000. *Attention Deficit Disorder Press. Attention Deficit Disorder: A resource for classroom teachers.* Wellington: Ministry of Education.

Phelan T. 1995. *1-2-3 Magic: Effective discipline for children 2–12*/2nd edition. Glen Ellyn: Illinois: Child Management Inc.

Readings for children and adolescents

Gordon M. 1991. *Jumpin Johnny Get Back to Work: A child's guide to ADHD/Hyperactivity.* New York: GSI Publications (also available on video c1994).

Gordon M. 1992. *My Brother's a World-class Pain: A sibling's guide to ADHD/Hyperactivity.* New York: GSI Publications.

Quinn, PO. 1992. *Putting on the Brakes: Young people's guide to understanding Attention Deficit Hyperactivity Disorder.* Magination Press Book.

Videos for parents (PAL video format required for New Zealand)

Barkley R. 1992. *ADHD: What Can We Do?* New York: Guilford Publications.

Green C. 1996. *Understanding ADD.* Australian Video Publishers, PO Box 478, Double Bay NSW 2028, Australia. Tel (+61-2) 9369 1051.

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American Psychiatric Association. 1994. *Diagnostic and Statistical Manual of Mental Disorders* (4th edition). Washington DC: American Psychiatric Association.

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Arngold A, Erakanli A, Egger HL et al. 2000. Stimulant treatment for children: a community perspective. *Journal of the American Academy of Child and Adolescent Psychiatry* 39(8): 975–84.

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Cunningham CE. 1999. In the wake of the MTA: charting a new course for the study and treatment of children with attention deficit disorder. *Canadian Journal of Psychiatry* 44: 999–1006.

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Gilmore A, Best L, Milne R. 1998. *Methylphenidate in Children with Hyperactivity.* DEC Report no. 78. Wessex Institute for Health Research and Development. NHS Executive, South and West Research and Development Directorate.

Green M, Wong M, Atkins D et al. 1999. *Diagnosis of Attention-Deficit/ Hyperactivity Disorder.* Technical Review no. 3. (Prepared by Technical Resources International, Inc under contract no. 290–94–2024.) AHCPR Publication no. 99–0050. Rockville, MD: Agency for Health Care Policy and Research.

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