

Primary care

Plays a key role in the management of

ADHD

Although the diagnosis and management of Attention Deficit Hyperactivity Disorder (ADHD) is primarily the responsibility of specialist multidisciplinary teams, primary care clinicians play important roles in improving outcomes for people with ADHD.

These roles include:

- Making a provisional diagnosis and referring appropriately
- Assisting patients and their families to reach decisions on management options
- Facilitating and encouraging adherence to treatment regimens
- Monitoring for adverse effects and response to treatment
- Discussing the future

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Making a provisional diagnosis and referring appropriately

It is estimated that at least 5% of children in New Zealand have ADHD; which equates to one or two children in every classroom.

ADHD tends to run in families. It is a complex genetic disorder with a range of environmental and other non-genetic factors involved in its expression. Family history, pregnancy and delivery complications, maternal smoking during pregnancy and adverse family environment variables are considered important risk factors for ADHD.¹

The principle characteristics are inattention, hyperactivity and impulsivity that are excessive, long-term and pervasive

For some people with ADHD inattention is the predominant issue, for others hyperactivity and impulsivity predominate. Some people exhibit both inattention and hyperactivity/impulsivity.

These behaviours are, of course, not exclusive to people with ADHD. Everyone shows them at some times. Many parents for example, rate their under five-year-olds as inattentive and hyperactive but most of these behaviours settle with time.

For a diagnosis of ADHD to be considered the behaviours must be excessive, long-term and pervasive. They must:

- appear before the age of seven years
 - continue for at least six months
- and**
- create a real handicap in at least two areas of a person's life, usually home and school

ADHD-like behaviour may have other causes

When general practitioners are considering a diagnosis of ADHD they will first want to seek other causes for these behaviours such as:

- hearing or visual problems
- stressful or chaotic family situations
- undetected seizures
- adverse effects of medications, such as sympathomimetics for asthma management

Diagnosis and management usually requires specialist multidisciplinary approach

Diagnosis of ADHD, consideration of management options and evaluation of response to treatment, usually requires comprehensive assessments by specialist multidisciplinary teams. As well as gathering information on a child's behaviour these assessments need to address specific cultural issues, which may impact on a child's behaviour, the support that is available and the ability of carers to adhere to management strategies.

Specialist teams also consider other conditions, which may account for the behaviours, such as psychosis and autism. Comorbidities will be found in most children with ADHD. Some of these, such as oppositional defiant disorder, conduct or learning disorders, can mistakenly be assumed to be part of the ADHD but require their own management strategies. Oppositional defiant disorder, the commonest comorbidity, is characterised by persistent negativistic, hostile and defiant behaviour causing significant functional impairment.

Assisting patients and their families to reach decisions on management options

Although specialist services will recommend management options, parents often want to discuss these with their GP especially when management includes long-term medication for a child.

Stimulant medication superior to alternative treatments

There is considerable evidence that monotherapy with carefully managed drug regimens of stimulant medication, methylphenidate or dexamphetamine, is superior to alternative treatments such as behavioural therapy.

Seventy to eighty percent of children with ADHD on stimulant medication have improvement of their symptoms. This improvement is mainly in increased attention span and reduced intensity of disruptive and impulsive behaviour. Unfortunately evidence for short-term improvement in academic ability is mixed and good studies of long-term benefits are lacking.

Many of the side effects associated with stimulant medications are relatively mild and short lived and generally respond to dosing or timing adjustments.

There appears to be no long-term or severe adverse effects associated with stimulant medications but there are few studies on this. However, recently the cardiovascular effects of stimulants have come under close scrutiny.² It is important to enquire for any past or family history of unexplained fainting or cardiovascular problems and to carry out a cardiovascular review of the child before prescribing. If there is any positive history or findings, an ECG and cardiology review is recommended.

Parents are often aware that stimulant medications can be abused as recreational drugs. They may be concerned that using them could lead to their child's involvement in the drug scene later in life. However there is evidence that adolescents with ADHD, who continue with their stimulant medications are less likely to be involved in alcohol or drug abuse than other adolescents with ADHD who don't continue with stimulants.

Behaviour therapy less effective and more difficult

Behaviour therapy for ADHD is less effective and more difficult, labour intensive and expensive than pharmacotherapy. However it is effective for some of the common comorbid conditions associated with ADHD, such as oppositional defiant disorder, and many families will wish to try it as a first option.

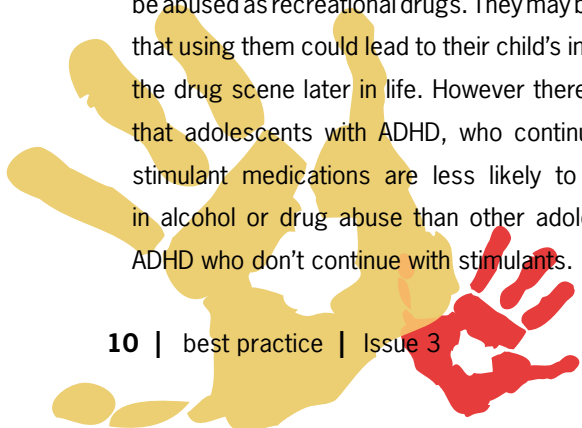
Combining behaviour therapy with pharmacotherapy does not appear to improve outcomes compared to pharmacotherapy alone. There are however some simple behavioural interventions, which are likely to help patients and their families with day-to-day living. These include, for example, regular daily schedules, good organisation of personal belongings, consistent rules, clear communication and praise and rewards for appropriate behaviour.

Families and patients with ADHD often need psychosocial support and a number of options are available, such as special education services, disability support, carer support and ADHD support groups.

Alternative medications are used in some situations

Specialists may prescribe a number of alternative medications, such as tricyclic antidepressants, clonidine and risperidone for people with ADHD. This usually occurs when patients have failed to respond to stimulant medication, have unacceptable side effects from them or have comorbidities, for which an alternative may be a better option.

Atomoxetine has recently become available for the treatment of ADHD in New Zealand but is not currently funded. It is a selective noradrenaline reuptake inhibitor. A recent review of the evidence was not able to differentiate between atomoxetine and stimulant medication in terms of effectiveness.³ Atomoxetine has a potential for severe liver injury although this appears to be very rare and has been linked to possible increased risk of suicide ideation in children and adolescents. It is not currently sought by drug users to any extent.



Alternative therapies⁴

Many parents concerned about long-term stimulant medication for their child will seek alternative therapies. In general the results of studies are mixed and none have been found to be as effective as stimulant medications. However some may be suitable for particular individuals and a trial may be considered as long as this does not unduly delay the use of treatments of proven effectiveness.

Diet therapies usually involve restricting the diet to a limited range of foods or excluding food dyes and preservatives. Studies involving dietary modification show that this may help alleviate some symptoms but there appears to be no relationship between food dyes and ADHD.

Iron supplementation may improve academic performance in children with ADHD and iron deficiency and certainly iron deficiency. There is no evidence that iron supplementation for people with ADHD without iron deficiency is helpful.

Some **herbal medications** have been shown to reduce ADHD-like symptoms in patients with other disorders such as dementia or problems with concentration problems. This has led to experimentation with Ginkgo biloba, for people for whom inattention is the predominant feature of ADHD.

The use of essential fatty acids and **L-glutamine** in ADHD has not been subject to controlled clinical trials although claims for effectiveness have been made.

A study of **electroencephalogram (EEG) biofeedback**, the main goal being to provide neurofeedback to allow a person to produce an appropriate mental state for the task at hand. However the trial was of short duration, was not randomised, had no controls and included very few subjects.

Sugar has been suggested to increase hyperactivity in children. Although most studies find no link between sugar and ADHD, they are by no means conclusive. It is sensible to reduce refined sugar intake in all children whether or not they have ADHD.

Facilitating and encouraging adherence to treatment regimens

Preferred pharmacotherapy for ADHD management is monotherapy with methylphenidate or dexamphetamine. Separate trials may be required of these agents to find out which is the most suitable. Dosage is titrated against effect on behaviour and side effects and the optimum dose required varies considerably between individuals.

The effective dose ranges are:

- Methylphenidate, 0.3 to 1.0 mg/kg/day (maximum 60 mg per day)
- Dexamphetamine, 0.15 to 0.5 mg/kg/day (maximum 20 mg, 40 mg for older children)

Doses toward the lower end of the ranges are often appropriate for people with ADHD with inattention as the predominant feature.

Correct timing of doses is important

Timing of doses is important. Both these agents have onset of action within about 30 minutes. Methylphenidate has a half-life of about three hours and dexamphetamine about six hours. However there is considerable variation in duration of action between individuals. Administration is usually timed to give optimum effect during school hours. Poor response may be due to poor adherence to the treatment regimen or may indicate need to adjust timing of the doses.

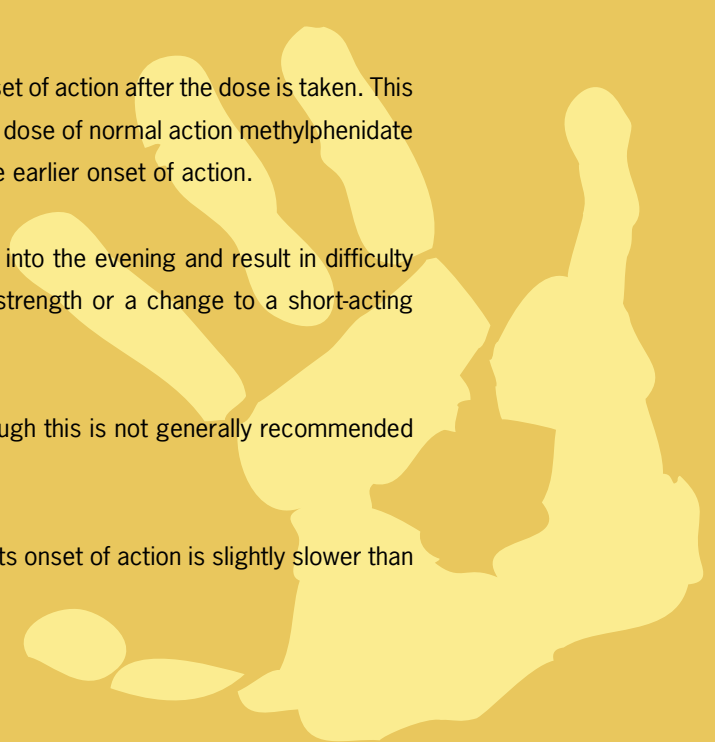
Methylphenidate is usually given first thing in the morning and at lunchtime. Long-acting preparations remove the need for a lunchtime dose.

Long-acting preparations have a longer period until the onset of action after the dose is taken. This may make the first hour or two of the day difficult. A small dose of normal action methylphenidate may be given with the long-acting methylphenidate to give earlier onset of action.

The effects of long-acting methylphenidate may continue into the evening and result in difficulty getting to sleep, requiring a change in dose, timing or strength or a change to a short-acting preparation.

Long-acting methylphenidate tablets can be halved, although this is not generally recommended by manufacturers.

Dexamphetamine only needs to be taken once a day and its onset of action is slightly slower than methylphenidate.



Monitoring for adverse effects and response to treatment

Specialist review of progress is usually performed at least six monthly and more frequently during initiation and adjustment of medication. However general practitioners are likely to be involved with ongoing prescriptions, when they see the patient with other conditions, or to discuss side effects.

Methylphenidate and dexamphetamine are started at low dose and increased slowly to allow monitoring of effect and side effects. Common side effects include insomnia, nervousness, headache, decreased appetite, gastrointestinal symptoms and minor cardiovascular effects such as minor increases in blood pressure or pulse rate.

Significant side effects of stimulant medications that should always be reported by families include tics, major mood changes with marked sadness, anxiety or aggression, fainting, symptomatic cardiovascular issues such as tachycardia or palpitations and any bizarre or persecutory thoughts.

A period of five to seven days between dose increases allows adjustment to minor side effects and assessment of response to treatment. Maintenance doses are the lowest doses which produce optimal therapeutic responses without significant side effects.

When response to treatment appears unsatisfactory, checks for side effects, adherence and timing issues are reviewed before dose adjustment is considered.

Stimulants routinely result in appetite and weight loss. Although growth in height is less than expected, most studies show that children with ADHD continue to grow while medicated. These deficits in expected height could be transient maturational delays that are associated with ADHD. Overall height seems to be unaffected if treatment is discontinued in adolescence and several long-term studies suggest that deficits in expected height are reversible even with continued treatment for two to three years, although no attenuation was recorded over two years in one study. Clinicians should continue to monitor growth in children treated with stimulant drugs.⁵

ADHD

- Attention-deficit / hyperactivity disorder is an early onset, highly prevalent neurobehavioural disorder with genetic, environmental and biologic aetiologies that persist into adolescence and adulthood in a sizeable majority of afflicted children of both genders.
- It is characterised by behavioural symptoms of inattention, hyperactivity and impulsivity across the life cycle. Comorbidity is a distinct clinical feature of both childhood and adult ADHD.
- Although its aetiology remains unclear emerging evidence documents its strong neurobiologic and genetic underpinnings. A pathophysiologic profile of ADHD has not been fully characterised, although structural and functional imaging studies consistently implicate dysfunction in the fronto-subcortical pathways and imbalances in the dopaminergic and noradrenergic systems, in the origin of core symptoms.
- Although not entirely sufficient, changes in dopaminergic and noradrenergic function seem to be necessary for the clinical efficacy of pharmacological treatments for ADHD, supporting the hypothesis that alteration of monoaminergic transmission in critical brain regions might be the underlying factor for therapeutic action in ADHD.

Biederman J. Attention-Deficit/Hyperactivity Disorder: A Selective Overview. Biol Psychiatry 2005;57:1215-1220.

Discussing the future

Approximately 20% of children may be able to discontinue medication after about a year of treatment

Because of this, a period off medication should be trialled annually to determine if there is a continuing need for it. These trials need to occur during school term so that response at school as well as at home can be assessed. However the start of the school year is not a good time as it is often stressful and examination times should also be avoided. Trial periods only need to be from a few days to a fortnight and medication can be resumed if problems return.

The majority of children with ADHD continue to display symptoms into adolescence

The teen years are challenging for most people and often more so for adolescents with ADHD. Hyperactivity frequently becomes less visible but other symptoms of ADHD, particularly impulsivity, can place extra demands on young people coping with increasing physical, social and psychological challenges.

Academic problems become more noticeable as cognitive demands increase and students are expected to become more independent of supervision. The routine ups and downs of daily life can result in excessive highs and lows coupled with low thresholds for frustration and anger. These problems are often compounded by poor adherence to treatments as teenagers learn to make their own decisions.

Comorbid conditions may complicate the situation. Mood disorders in adolescents with ADHD demand careful assessment of self-injury or life threatening behaviours. Adolescents with ADHD are at increased risk of substance abuse and unlawful activity although some of this risk can be offset by continuation of treatment with stimulant medication.

Wolraich et al review the diagnosis, treatment and implications for people in this age group with ADHD.⁶

At least half of children with ADHD will carry some symptoms into adult life

These symptoms are not necessarily negative and can often help achieve success. Energy, risk taking and the ability to see things from a different point of view can lead to great accomplishments. Richard Branson, Bono and Steve Jobs, the inventor of the iPod are all apparently on record as acknowledging they have ADHD.

Adolescents with ADHD need skilled and supportive guidance. They cannot be forced into unsuitable career paths or lifestyles but, if they are helped to gain insight into the disorder and its effect on their life, most will find satisfying careers and lifestyles to which they can bring energy, warmth and boundless enthusiasm.

References

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6. Wolraich M, et al. Attention-Deficit/Hyperactivity Disorder Among Adolescents: A Review of the Diagnosis, Treatment, and Clinical Implications. *Pediatrics* 2005;115:1734-46.

Recommended reading: This article is based on New Zealand Guidelines for the Assessment and Treatment of Attention-Deficit/Hyperactivity Disorder. MoH. 2001. Available from <http://snipurl.com/14qhy>