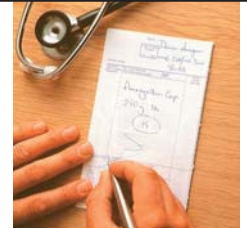




# Obesity in children

## Tackling a growing problem



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### BACKGROUND

Childhood and adolescent obesity has increased dramatically over the past 25 years in Australia. Currently over 20% of Australian children are overweight or obese. The National Health and Medical Research Council has recently developed the 'Clinical practice guidelines for the management of overweight and obesity in children and adolescents'.

### OBJECTIVE

This article discusses the assessment and management of childhood and adolescent overweight and obesity.

### DISCUSSION

Children and adolescents with a body mass index over the 85<sup>th</sup> centile for age are classified overweight and those over the 95<sup>th</sup> centile, obese. Obesity has significant health consequences for children and adolescents, both in the short term and for their adult life. Family involvement is important in management, particularly in primary aged children. A combination of dietary modification, increased physical activity, decreased sedentary activity and behaviour modification is recommended.

The increasing prevalence of overweight and obese children in Australia since the mid 1980s is well documented. The 1985 Australian Health and Fitness survey was conducted by the Australian Council for Health, Physical Education and Recreation (ACHPER) on a sample of over 8000 Australian school children, aged 7–15 years.<sup>1</sup> Booth et al compared this data to three more recent studies in the light of current defini-

tions of overweight/obesity in children.<sup>2–5</sup> This demonstrated a rise in overweight and obese children from 11.8% of boys and 10.7% of girls in the 1985 ACHPER study to over 19% of boys and 21% of girls in the three 1997–2000 studies (*Table 1*).<sup>1–5</sup> Most developed and some developing countries worldwide have shown similar trends.

### Defining childhood obesity

The most widely accepted definition of obesity relates to the body mass index (BMI): weight (kg)/height (m)<sup>2</sup>. Children above the 85<sup>th</sup> percentile are classified overweight and those above the 95<sup>th</sup> percentile, obese.<sup>6</sup> There are currently no BMI growth reference charts for the Australian population. Pending the development of Australian based reference values, the National Health and Medical Research Council (NHMRC) recommends use of the United States Centres for Disease Control and Prevention BMI percentile charts (*Figure 1a, b*). Less precise guidelines refer to being more than 20% above expected weight for height on standard percentile charts and the use of skin fold thickness – these are not commonly used in children.

### Why are obesity rates increasing?

Genetic, endocrine and other medical problems can cause obesity in children. Some genetic, endocrine and other medical problems may have obesity as a significant presenting factor but the contribution they make to the overall level of obesity is small (*Table 2*). Apart from Prader-Willi syndrome, where hyperphagia is a major issue, the management of obesity in these children is likely to be secondary to other problems. The causes of the general increase in overweight

and obesity are multifactorial, with changes in energy intake and expenditure related to both subtle and obvious movements in societal behavioural habits. Technology has contributed to obesity by making food more abundant, attractive, promoted and simply obtained. Energy expenditure has been reduced by an increase in sedentary activities, a decrease in the need to expend energy in daily routines, and an increase in the use of cars and other forms of transport. Exercise has now become a formal activity for many children. Fortunately, some of these contributors have been recognised, acknowledged and are being addressed. *Table 3* outlines the risk factors for the development of obesity, some of which are modifiable and some not.

### Why childhood obesity matters?

#### Effects in childhood

Short term complications of obesity relate to its effects on growing bone, the endocrine, cardiovascular, and gastrointestinal systems. These problems are not rare and may be identified in most general practices (*Table 4*).

The prevalence of type 2 diabetes is increasing in children and adolescents, particularly in certain ethnic groups, including Aboriginal and Torres Strait Islanders and those from middle eastern backgrounds. This increase appears to be associated with high levels of obesity in these populations.<sup>6</sup>

#### Effects in adult life

Childhood obesity tracks into adulthood, ie. obese children are likely to remain obese adults, with the associated health risks. Studies cited in the NHMRC obesity guidelines reveal that up to 50% of obese

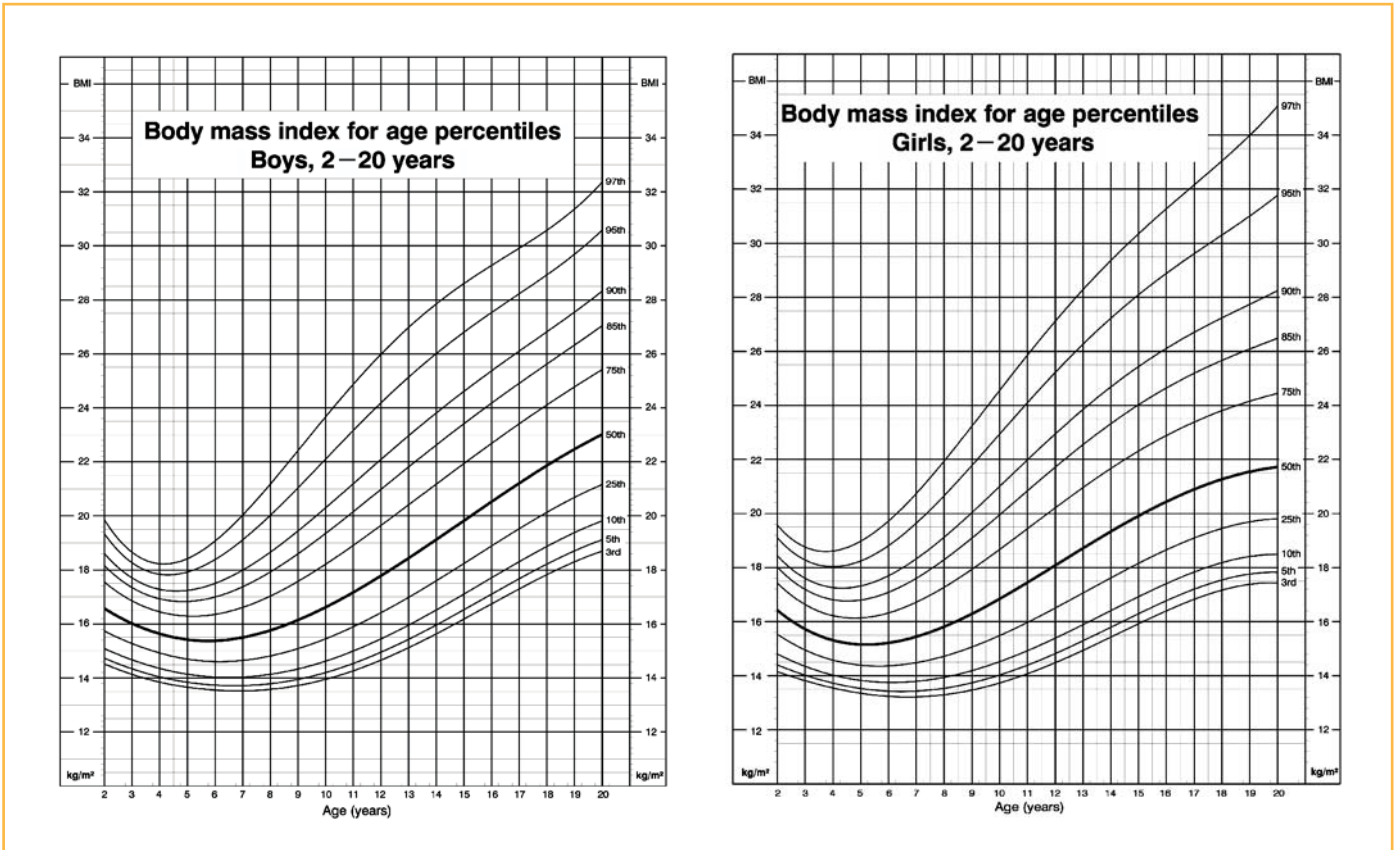


Figure 1a, b. CDC BMI percentile charts. Reproduced with permission: Centers for Disease Control and Prevention, 2000

	ACHPER 1985 <sup>1</sup> n=8492		SFPAS 1997 <sup>3</sup> n=5518		NNS 1998 <sup>4</sup> n=2962		HOYUS 2000 <sup>5</sup> n=3104	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
% overweight or obese	11.8	10.7	20.1	21.3	19.3	22.3	21.1	23.5

Source: Booth<sup>2</sup> as cited in NHMRC guidelines<sup>6</sup>

<b>Chromosomal</b> Prader-Willi, Down syndrome, Lawrence-Moon-Bardet-Biedl
<b>Endocrine</b> Cushing syndrome, hypothyroidism, GH deficiencies, hypogonadism
<b>Pharmacological</b> Antimigraine, antihistamine, antiepileptic, haloperidol, resperidone, tricyclic antidepressants
<b>Psychiatric</b> Depression, psychogenic polyphagia

adolescents remain obese in adulthood.<sup>7-13</sup> The greater the degree of overweight, and the later in adolescence it persists, the greater the likelihood of adult obesity. In addition, obesity in childhood is associated with increased adult cardiovascular mortality, regardless of adult weight.<sup>14-18</sup>

### Community role

Recognition of the rising incidence of obesity has led to responses such as the issuing of new dietary guidelines for children and adolescents and management guidelines for childhood and adolescent obesity by the

NHMRC,<sup>6</sup> the recruitment of Australian cricket star Brett Lee to encourage increased activity and fitness in children, and the increasing availability of 'low fat' options on the fast food market.

### What can GPs do?

With so much community activity, what is the role of the medical profession and, in particular, general practice? The effects of obesity on self esteem, mood and social interaction are understandable, but seem insufficient for many to motivate change in their habits and lose weight. Many do not

seem to recognise they are overweight or have accepted their stature. However, they may be unaware of both the short term and adult health consequences of obesity in their children. The role of the medical profession, therefore, should be to:

- identify obesity
- discuss health related factors, and
- recommend effective interventions.

**Table 3. Risk factors for obesity<sup>6</sup>**

Nonmodifiable	Modifiable
Genetic predisposition: parental obesity is a strong risk factor for future obesity	Television viewing: US studies show positive correlation between television viewing and overweight (evidence is not yet available for other small screen entertainments)
Ethnicity: overweight and obesity is higher in those of middle eastern and Mediterranean origin	Reduced physical activity energy expenditure
A number of single gene abnormalities ( <i>Table 2</i> )	Disordered eating in a parent
Medical conditions ( <i>Table 2</i> )	Certain medical conditions ( <i>Table 2</i> )
High weight for gestational age babies	
Low weight for gestational age babies with rapid catch up	

NB: The role of diet composition in the role of overweight/obesity in children is unclear and more studies are required to elucidate this. Breastfeeding is protective against childhood obesity

**Table 4. Pathology associated with obesity**

<b>Orthopaedic</b> Slipped femoral epiphysis, genu valgum
<b>Endocrine</b> Diabetes type 2, advanced growth, early puberty, polycystic ovary syndrome
<b>Cardiovascular</b> Hypertension, hyperlipidemia, cor pulmonale
<b>Respiratory</b> Obstructive sleep apnoea, Pickwickian syndrome
<b>Hepatic</b> Fatty liver, cholelithiasis
<b>Psychological and social problems</b> Impaired psychosocial function is greater in females and with increasing age
<b>Adult obesity and complications</b>

## Assessment of obesity

To identify, assess and monitor children with obesity it is important to:

- calculate BMI and plot this on percentile charts, and
- measure waist circumference. Although there are as yet no Australian reference values for waist circumference in children, direct measurements of central fat correlates with cardiovascular risk.<sup>6</sup> Establishing a baseline and serial measurements are important in monitoring response to interventions.

## Investigations

Generally, investigations are not necessary for overweight or mildly obese children. For those with moderate obesity, and associated physical signs, blood glucose (postprandial), serum lipids, liver function tests, ultrasound of the liver and thyroid function tests should be considered. In some cases investigation for an underlying medical cause may be appropriate, eg. chromosomes, adrenal function, growth hormone. The NHMRC recommends:

- a fasting lipid profile should be considered in obese children and adolescents, particularly those with a family history of cardiovascular risk factors
- fasting insulin and glucose should be considered in obese children, particularly with a family history of type 2 diabetes,

Acanthosis nigrans and those from certain ethnic backgrounds (eg. Aboriginal and Torres Strait Islander, middle eastern).

## Management of obesity

Before considering an intervention, it needs to be established whether the parents, and preferably the child, agree there is a problem. Familial factors, whether physiological, psychological or cultural, are relevant. Change will not occur without agreement and motivation in a family setting.

The NHMRC guidelines state: 'For children and adolescents, there is (level III–2) evidence that weight management programs that involve parents achieve better outcomes than programs that do not. For children of primary school age ... a program that involves parents alone does better than one that requires regular attendance by their children as well'.

The evidence for effective intervention for obesity is not strong. There is a single review in the Cochrane Library.<sup>19</sup> A meta-analysis was not possible because of the variation in populations, measurements of obesity and aims of outcomes. To be expected, specialist clinics with physicians, dietician and psychologists and, presumably, motivated clients did best.

In the absence of clear evidence as to which strategies are the most effective in childhood and adolescent obesity, the NHMRC recommendations are to make use

of all the conventional components of weight management.<sup>6</sup> These are:

- dietary modification
- increased physical activity
- decreased sedentary activity
- family involvement, and
- behaviour modification.

The following strategies are suggested to stimulate ideas that may make a difference:

- Encourage appropriate eating patterns from a young age – see *Table 5* and NHMRC website for current guidelines
- Parents should have an appropriate body image of their children, ie. it is normal to see a child's ribs
- School canteens should actively promote appropriate eating patterns
- Avoid using food as a reward
- Encourage an increase in casual activity, eg. walking to school
- Reduce sedentary pursuits, especially those associated with eating, eg. after school television. Lose the remote control!
- Information about dietary recommendations in the waiting room might include the idea of BMI. Offer to measure BMI and help with weight loss if parents agree. Aim for a small initial weight loss, celebrate it and consolidate it
- Encourage a long term change of life habits. Look for positives in these

**Table 5. NHMRC recommendations for healthy eating in children<sup>20</sup>**

Encourage and support breastfeeding  
Physical activity is important for all children and adolescents  
Enjoy a wide variety of nutritious foods  
Children and adolescents should be encouraged to:

- eat plenty of vegetables, legumes and fruits
- eat plenty of cereals (including bread, pasta, rice and noodles), preferably wholegrain
- include lean meat, fish, poultry and/or alternatives
- include milks, yoghurts, cheese and/or alternatives (reduced fat milks are not suitable for children under 2 years but reduced fat varieties should be encouraged for older children and adolescents)
- choose water as a drink (alcohol is not recommended for children)

Care should be taken to:

- limit saturated fat and moderate total fat intake (low fat diets are not suitable for infants)
- choose foods low in salt
- consume only moderate amounts of sugars and foods containing added sugars

changes apart from weight loss, eg. a sport or physical activity that is seen by the child as ‘cool’ and rewarding.

## Conclusion

Obesity is an increasing problem in children and will lead to significant morbidity in adults in the next decade. There are already changes at the macro level with Brett Lee being appointed as a fitness ambassador specifically aimed at preventing and reducing obesity, articles in the popular press, and some fast food manufacturers promoting nutritional aspects of their products. Unfortunately, the effects of the convenience of packaged food and decreased activity will require a more individual and conscious effort by parents to reverse. General practitioners and others in the health industry – through promotional

material in their surgeries, contact with patients, and community activities (eg. visits to schools) – have a duty to include obesity in their list of preventable diseases.

### Summary of important points

- Children with a BMI over the 85<sup>th</sup> centile for age are classified as overweight.
- Children with a BMI over the 95<sup>th</sup> centile for age are classified as obese.
- Follow NHMRC recommendations for healthy eating in children and adolescents.
- Involve parents in weight management in children, particularly those of primary school age.
- A combination of dietary modification, increased physical activity, decreased sedentary activity and behaviour modification is recommended for treatment of overweight and obese children.

### Resources

BMI percentile charts are available on the Royal Children’s hospital website at:  
[http://www.rch.org.au/emplibrary/genmed/cdc\\_bmbiboys.pdf](http://www.rch.org.au/emplibrary/genmed/cdc_bmbiboys.pdf)  
[http://www.rch.org.au/emplibrary/genmed/cdc\\_bmi\\_girls.pdf](http://www.rch.org.au/emplibrary/genmed/cdc_bmi_girls.pdf)  
NHMRC obesity management guidelines: [www.obesityguidelines.gov.au](http://www.obesityguidelines.gov.au). Hard copies are available free to GPs. Order forms are on the website NHMRC. Food for Health: Dietary guidelines for children and adolescents in Australia. Canberra: Commonwealth Department of Health and Ageing, 2003. Available at: <http://www.nhmrc.gov.au/publications/order.htm>  
To obtain copies of pamphlets, poster or A4 information booklet phone 1800 020 103 extension 8654 (toll free number) or email: [phd.publications@health.gov.au](mailto:phd.publications@health.gov.au).

Conflict of interest: none declared.

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