

Morbid Obesity Health Network

WA Morbid Obesity Model of Care

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Health Networks Branch
Working Together to Create a Health WA



Government of **Western Australia**
Department of **Health**



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Executive summary

Currently overweight, obesity and morbid obesity are the leading cause of preventable disease in Australia. Obesity and morbid obesity are associated with numerous metabolic consequences and consequences related specifically to excess weight. Such consequences mean those classified as obese or morbidly obese have an increased risk of mortality and morbidity, thus a reduced life expectancy.

The Morbid Obesity model of care initiated from a Western Australian Health branches/services meeting, the '*Obesity Think Tank*', held in February 2007. Gaps were identified in clinical treatment and services for the morbidly obese. A discussion paper was developed to support the need for a morbid obesity model of care and a Morbid Obesity Consultation Workshop was then held in November 2007. Key issues, needs, concerns and solutions in management of morbidly obese patients in Western Australia (WA) were discussed at the workshop. Priorities arose from this workshop, which guided development of the model of care. Four reference groups (Refer to Appendix A) containing a cross section of expert health professionals, consumers, providers of primary care, Aboriginal Health, and Non Government Organisations were also convened from the workshop for more extensive consultation and collaboration on the key priorities identified.

The model of care concentrates on and provides a number of recommendations regarding:

- Comprehensive primary care strategies for the management of morbid obesity
- The role of General Practice in the care of the morbidly obese
- Surgical interventions for treatment of morbid obesity
- Health care services, equipment and facility issues/initiatives

Special consideration is given to services provided for rural/remote areas, the Indigenous, Culturally and Linguistically Diverse (CALD) communities, paediatrics, maternity, and the elderly.



Recommendations

These recommendations arise from this proposed Model of Care for Morbid Obesity. The recommendations consider the limitations of both conservative and surgical methods of treatment.

Recommendation 1.0

Develop and support a multidisciplinary team approach. This includes multidisciplinary clinics in metropolitan hospitals, regional hospitals and/or the utilisation of the multidisciplinary environment of GP Super Clinics.

Recommendation 1.1

These teams should be supported by comprehensive guidelines and associated highly complex individual case management processes, training and education, as well as opportunities to pilot advanced therapies and conduct research.

Recommendation 2

Health promotion and prevention strategies should be integrated across health, education and community development government agencies.

Recommendation 3

Support networks of peak bodies linked to morbid obesity to develop strategies with the Australian Government that give morbid obesity the same priority as other recognised chronic conditions such as diabetes and heart disease.

Recommendation 4

All gastric surgery should be performed by an appropriately credentialed surgeon with access to specialised accredited peri-operative support.

Recommendation 4.1

Promote state wide implementation of surgical guidelines, endorsed by credentialed professional bodies, for the treatment of the morbidly obese.

Recommendation 5

Development a robust state wide database, with agreed fields that are compatible with the national database. This database would be utilised to promote integration of services, monitor key performance indicators for bench marking, model future initiatives and inform research.

**Recommendation 6**

Hospital/Health service policy should include specialised services and facilities to manage morbid obesity in a dignified manner.

Recommendations 7

Develop guidelines for transport management, which will include:

- A bariatric assessment tool
- Identification and specifications for appropriate equipment
- Patient transfer processes



1.0 Overview of Morbid Obesity

1.1 Definition

Body Mass Index (BMI) is a simple measurement used to identify morbidly obese individuals. It is defined as the weight in kilograms divided by the square of the height in metres (kg/m^2). The table below describes classification of adults based on BMI and the associated risk of co-morbidities. Morbid obesity (class III obesity) in adults is defined as a BMI of equal to or greater than 40kg/m^2 , or a BMI over 35kg/m^2 with obesity-related co-morbidities.¹

Figure 1. Classification of adults according to BMI²

Classification	BMI (kg/m^2)	Risk of co-morbidities
Underweight	<18.5	Low (but risk of other clinical problems increased)
Normal range	18.5–24.9	Average
Overweight	≥ 25.0	
<i>Pre-obese</i>	25.0–29.9	<i>Increased</i>
<i>Obese class I</i>	30.0–34.9	<i>Moderate</i>
<i>Obese class II</i>	35.0–39.9	<i>Severe</i>
<i>Obese class III</i>	≥ 40.0	<i>Very severe</i>

The above BMI classifications are not suitable for people below 18 years of age. International age and gender specific cut offs for overweight and obesity have been determined,³ however the definition of morbid obesity in children has only been defined as a BMI greater than the 95th centile adjusted for age and sex.⁴ While this remains a statistical definition, it does not define current or future morbidity. The advantage of these cut offs is they allow prediction of national point prevalence, trends, and enables international comparisons.⁴

The above classification of obesity and morbid obesity is also not suitable for pregnant women. Obesity in pregnant women at 10–12 weeks is defined by a BMI equal to or greater than 30kg/m^2 and at 18–20 weeks equal to or greater than 32kg/m^2 . Morbid obesity in pregnant women at any gestation is defined by a BMI greater than or equal to 35kg/m^2 .⁵

BMI does not take into account those individuals and populations who are inclined towards a high BMI due to muscle mass.⁶ For individuals with a BMI over 35kg/m^2 , alternative measures do little to improve the measure of risk offered by BMI. However, some research suggests that other measures of fat distribution, such as waist circumference (WC) or waist to hip ratio (WHR) should be considered together with or instead of BMI as indicators of health risk.⁷ Morbid obesity in children is defined by BMI.

WHR has become a standard clinical method of identifying patients with accumulated abdominal fat. The hip measurement is the maximum circumference at the level of the greater trochanter and the waist measurement is the minimum



circumference above the level of the iliac crest. Classification of overweight regarding HWR is $\geq 0.95\text{cm}$ for men and $\geq 0.80\text{cm}$ for women.⁸

WC is a simpler measure, which correlates with BMI and WHR. The following table (Figure 2) outlines the relationship between WC and health complications for different ethnic groups defined by the International Diabetes Foundation.⁹ Other factors such as the homogeneity of the population^{10, 11} and measurement methodologies¹² affect the significance and strength of predicted health complications. Men and women may have similar amounts of visceral adipose tissue¹³; however WC measurements corresponding to amounts of visceral adipose tissue differ with age, sex and are less in post-menopausal women compared to premenopausal.¹⁴ Studies have reported a correlation between WC changes and abdominal fat mass for women and visceral fat mass for both genders.¹⁵ Furthermore, a correlate between a decrease in WC and improvements in glucose metabolism has been found.¹⁶ Due to these factors, WC and WHR are simple and cost-effective measurement methods, however they do have limitations in terms of public health applications.¹⁷

Figure 2. Waist circumference (WC) associated with increased risk of metabolic complications in different ethnic groups⁹

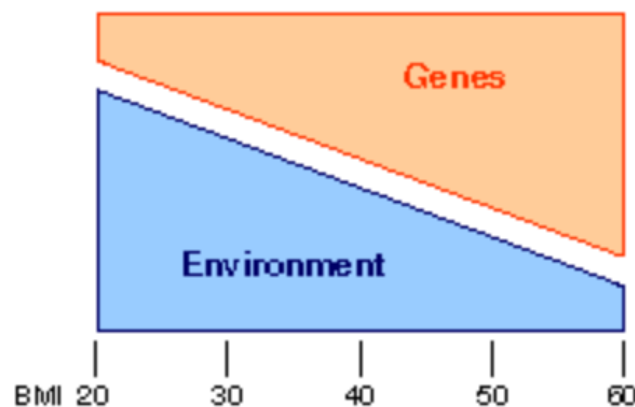
Ethnic origin increased risk	Gender	Increased risk	Substantially
Europids	men	$\geq 94\text{ cm}$	$\geq 102\text{cm}$
	women	$\geq 80\text{cm}$	$\geq 88\text{cm}$
South Asians & Chinese	men	$\geq 90\text{cm}$	
	women	$\geq 80\text{cm}$	
Japanese	men	$\geq 85\text{cm}$	
	women	$\geq 90\text{cm}$	

1.2 Causes

Morbid obesity is a chronic condition that does not have a single cause. There is strong evidence to suggest that some individuals are genetically predisposed to the accumulation of fat more than others. However, genetics is unlikely to account for the increase over time in the proportion of the population who are obese.¹⁸ Contributing factors include level energy consumption and energy imbalance⁴, and psychological, medical and environmental factors. An interpretation of the evidence has suggested as BMI increases genetics becomes a higher causal factor of weight (see Figure 3).¹⁹



Figure 3. The relative contributions of genetics and the environment to the aetiology of morbid obesity²⁰



As with any health condition, identifying the causes of morbid obesity is invaluable in the development and refinement of appropriate prevention and treatment strategies. The complex interaction of casual factors suggests a multidisciplinary approach is required.

1.3 Prevalence and trends

Australia

The prevalence of morbid obesity is increasing in Australia. Some reports based on ABS census data suggest that between 1995 and 2001 the number of adults classified as morbidly obese rose from 84,000 to 144,000 (equivalent to 1% of the population).²¹ The increase in prevalence of morbid obesity is a recent development, as between 1989 and 1995, the proportion of morbidly obese Australians was a steady 0.6%.²¹ AusDiab data for 1999-2000 suggests a higher prevalence than this, with 1.7% of their sample having a BMI of 40kg/m² or over, and 4.1% with a BMI between 35-40kg/m².

Western Australia

Estimates based on the 1999-2000 AusDiab study 4% (73, 280) of Western Australians had a BMI of 35-39.9kg/m² (class II obese), and 1% (18, 320) had a BMI of equal to or greater than 40kg/m² (class III obese).²² Data required to describe trends in morbid obesity in WA is not currently available. However, an increase in prevalence would be expected, given the increase in obesity in WA, as well as increases in morbid obesity nationally. Patient self reported data (Refer to Appendix B) is available via the Health and Wellbeing Surveillance System (HWSS) survey, which captures the prevalence of morbid obesity within the state, based on information collected in 2007.

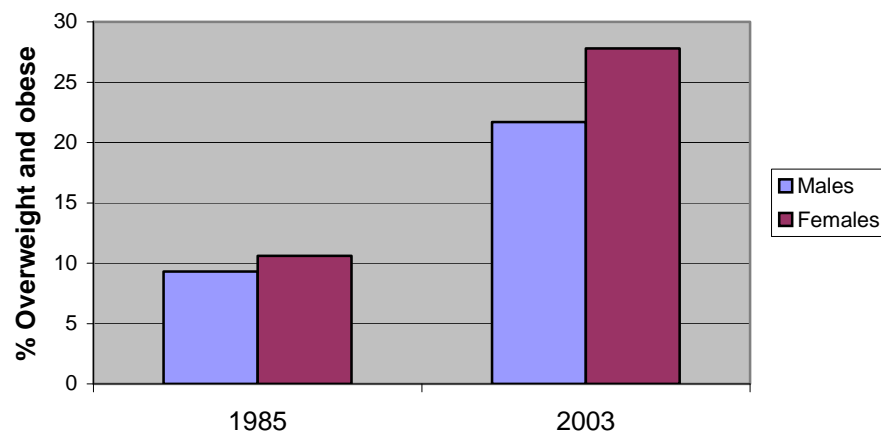
Children and adolescents

The most recent national measured data for children aged 2-14 years comes from the 1995 National Nutrition Survey. The 1985 Australian Health and Fitness Survey also collected measured data on children aged 2-14 years. These surveys indicate national childhood overweight and obesity levels have been increasing between 1985 -1995. More specifically, in the 7-15 years age group, obesity has tripled in this



time period.²³ Results from the WA Child and Adolescent Physical Activity Survey (2003) found that the prevalence of overweight and obesity in 7-15-year-old students increased from 9.3% of males and 10.6% of females in 1985 to 21.7% of males and 27.8% of females in 2003.²⁴ These results are shown in Figure 4.

Figure 4. Trends in overweight and obesity in children and youth in WA 1985-2003²⁵



While data on the prevalence of morbid obesity in Western Australian children and adolescent is not currently available, the increases in overweight and obesity would suggest that the prevalence of morbid obesity in children and adolescents has also increased. Even though Australia has slightly lower rates of obesity compared to the United States of America (USA), recent estimates suggest 2-3% of the paediatric population in the USA are morbidly obese.²⁶

1.4 Populations at risk

Research indicates certain groups within the WA population are more vulnerable to obesity.^{24, 27, 28} While prevalence data for morbid obesity within these groups is not currently available, it is assumed from overweight and obesity prevalence data that morbid obesity will also be more common within these populations. Higher rates of obesity, also correspond with higher rates of obesity related morbidity and mortality.¹⁹ A summary of the available evidence and discussion points for identified 'at risk' populations is provided below.

Certain ethnic minorities

Recent migrants and their children from southern Mediterranean countries and the Middle East are more likely to be obese. New South Wales data suggests that school children from Middle Eastern backgrounds are more likely to be overweight.²⁹ WA data indicates children who speak a language other than English have higher BMIs.²⁴ There is currently no evidence available for the prevalence of morbid obesity in these population groups in WA.

Socioeconomic disadvantage

An inverse relationship exists between socioeconomic disadvantage and obesity. Prevalence of obesity is substantially higher among the most socioeconomically disadvantaged subpopulations in Australia. Growing national and international

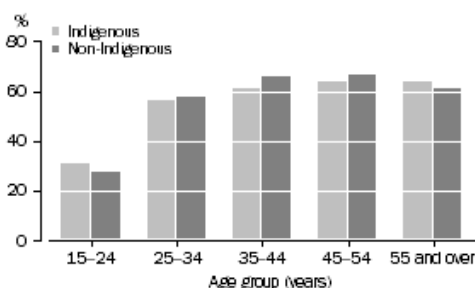


evidence reveals children from low socioeconomic status (SES) families are more likely to be overweight or obese compared to families with a higher SES.^{30, 31} This evidence also supports the prediction that overweight or obese children have an increased risk of adult overweight and obesity. Rate of morbid obesity data among disadvantaged populations in WA are not currently available, however with higher rates of overweight and obesity it can be presumed morbid obesity rates would be higher.

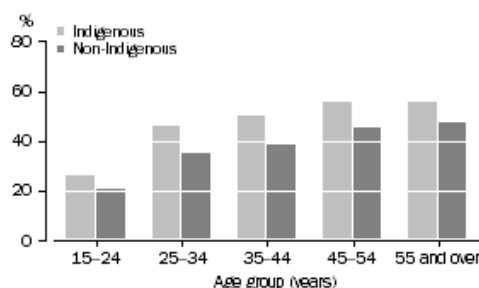
Indigenous

Data from the 2004-05 National Aboriginal and Torres Strait Islander Health Survey indicated in each age group and gender in comparison to other Australians, Indigenous people were more likely to be obese.²⁸ Indigenous Western Australians are 1.3 times more likely than non-Indigenous to be overweight or obese.²⁷ Census data from 2004-05 showed that 24% of Indigenous Australians were classified as obese. The proportion of Indigenous Australians in non-remote areas classified as overweight or obese increased from 48% in 1995 to 56% in 2004-05. It is important to note this difference was not actual defined as statistically significant.²⁸ Figures 5a and 5b show the difference in prevalence of overweight and obesity between Indigenous and non-Indigenous Western Australians. Figure 5a indicates a higher prevalence of overweight/obese among non-Indigenous men in some age groups; however 5b indicates a higher prevalence of overweight/obese among Indigenous women. Once again no data was available on rates of morbid obesity in the Indigenous population; however trends and differences in rates of overweight and obesity signify an increased risk for morbid obesity.

Figure 5. Prevalence of overweight/obese in Indigenous Western Australians²⁸



a) Males



b) Females

Evidence suggests that the 'at risk' populations mentioned above are more likely to be morbidly obese. They are also more likely to experience financial, cultural and/or geographical barriers to accessing preventative measures, treatment and ongoing support.

1.5 Co-morbidities

Morbid obesity is a risk factor for a number of preventable diseases and health conditions. Figure 6 summarises diseases and conditions associated with obesity similar to that of morbid obesity, which are categorised as metabolic consequences, and consequences directly related to excess weight.¹⁹

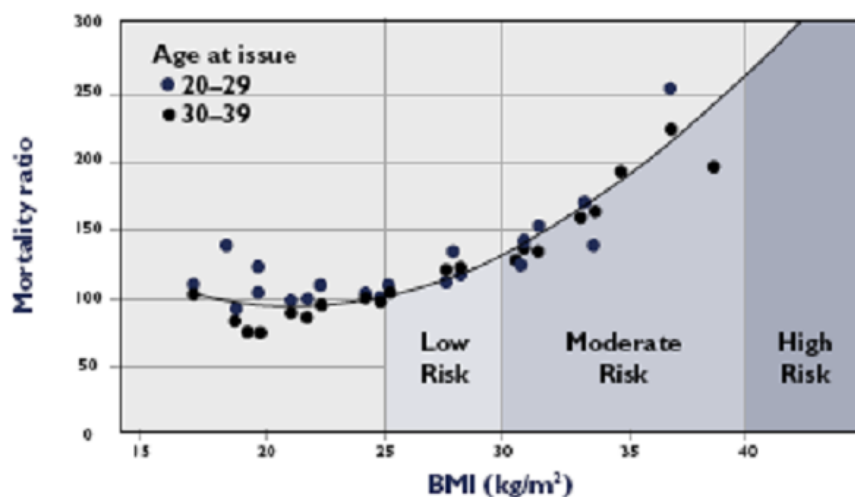


Figure 6. Diseases and conditions associated with obesity¹⁹

Relative risk (RR)	Associated with metabolic consequences	Associated with excess weight
Greatly increased RR > 3	Type 2 diabetes	Sleep apnoea
	Gall bladder disease	Breathlessness
	Hypertension	Asthma
	Dyslipidaemia	Social isolation and depression
	Insulin resistance	Daytime sleepiness and fatigue
	Non-alcoholic fatty liver	
Moderately increased RR 2 –3	Coronary heart disease	Osteoarthritis
	Stroke	Respiratory disease
	Gout/hyperuricaemia	Hernia
		Psychological problems
Slightly increased RR 1– 2	Cancer	Varicose veins
	Reproductive abnormalities/impaired fertility	Musculoskeletal problems
	Polycystic ovaries	Bad back
	Skin complications	Stress incontinence
	Cataract	Oedema/cellulitis

The level of risk and severity of some co-morbidities appears to increase with the degree of obesity. For example, with each unit increase in BMI, risk of heart failure increases 5% for men and 7% for women.³² As Figure 7 illustrates, mortality risk increases as BMI increases.

Figure 7. BMI and associated mortality risk¹⁹





2.0 Proposed Model of Care

Overview

The proposed Morbid Obesity model of care will assist the WA health system to provide the right care, at the right time, by the right team and in the right place. Health Networks (HN) have given particular consideration to the management of morbid obesity. Specific Health Networks with an active interest in morbid obesity management are the Endocrine (HN), Renal (HN), Musculoskeletal (HN), Cardiovascular (HN), Maternal and Newborn (HN), and Child and Youth (HN).

This proposed model of care adds to the discussion occurring within the Health Networks by identifying the specific needs of the morbidly obese, identifying gaps in current services, and making recommendations to address those gaps. A key trend throughout the discussion is that morbidly obese patient pathways need to be defined by a multidisciplinary team approach. Specific discussion and recommendations have been made regarding:

- Comprehensive primary care strategies for the management of morbid obesity
- The role of General Practice in the care of the morbidly obese
- Surgical interventions for treatment
- Health care services equipment and facility issues/initiatives

2.1 Comprehensive primary care strategies for the management of morbid obesity

Introduction

Most people classified as morbidly obese have usually had multiple attempts at structured supervised weight loss programs, predominantly through different diets. They often describe initial success with rapid weight regain when the diet is ceased. Currently there are several evidence-based guidelines and consensus statements on the management of overweight and obesity,^{19, 33, 34} however it is likely that a combined approach tailored to the individual is necessary for the morbidly obese.^{35, 36} Modest weight loss is linked with a reduced risk of specific co-morbidities, particularly diabetes and cardiovascular disease. Recently modest weight loss has been shown to significantly reduce the risk of death from obesity-related conditions such as certain cancers, diabetes and cardiovascular disease.³⁷ In addition weight loss has shown to improve fertility and obstetric outcomes.³⁸ Certain therapeutic approaches, such as surgery, may be more effective in terms of absolute weight loss. However, adopting a healthy lifestyle (in relation to diet, exercise and smoking cessation) is associated with a significant reduction in future risk of co-morbidities as well as being the cornerstone of success of any specific therapeutic intervention (including pharmacotherapy and surgery) for morbid obesity.

Assessment:

Weight/anthropometry

Weight specific measures including BMI, WHR and WC indicate the risk of adverse health outcomes. Each of these methods is commonly used during the initial assessment of morbid obese patients. It is important to use a consistent methodology and be aware of its limitations.



Motivation and readiness for change

Achieving and maintaining sustainable weight loss requires a detailed assessment of the morbidly obese individual's acknowledgment and understanding of their current weight, weight associated risks, motivation to change current behaviour and previous attempts at behaviour modification. Harm reduction strategies may even need to be considered when clinicians become aware of their patients' unwillingness or inability to change their lifestyle.³⁹

Existing support and barriers

Understanding the psychosocial context in which morbid obesity treatment is occurring is equally important in determining the likelihood of achieving and maintaining sustainable weight loss. Crucial determinants include:

- Personal barriers such as time, motivation and priorities
- Psychological factors
- Family environment
- Personal and community support networks
- Lack of appropriate services and equipment
- Geographical and transport limitations
- Financial constraints
- Community discrimination

Managing morbid obesity and associated co-morbidities

A medical assessment of the morbidly obese individuals is required to identify associated co-morbidities.¹⁹ In addition to considering the specific management a single co-morbidity, the presence of several co-morbidities impacts on the morbidly obese individuals' suitability for some treatments. For example the presence of coronary artery disease or significant musculoskeletal problems, impact on the amount and type of physical activity the morbidly obese individual can undertake. Similarly certain co-morbidities will impact on anaesthetic risk or suitability for specific pharmacotherapy.

Cardiovascular disease remains the principal cause of death in morbidly obese individuals. From an assessment of cardiovascular risk factors future cardiovascular risk can be determined. This will assist in determining the type and intensity of the required treatment plan for example, cholesterol lowering therapy, blood pressure lowering therapy, diabetes management and smoking cessation.

Contributing factors/causes

A detailed medical assessment is necessary to determine potential secondary causes of morbid obesity that may require specialist referral and specific care. Such conditions may include hypothyroidism, Cushing's syndrome, monogenetic forms of obesity and certain drugs (glucocorticoids, antipsychotics etc). More commonly, the various psychological factors that are associated with morbid obesity such as eating disorders, depression, anxiety and other stress-related disorders are crucial to understand the causes, motivation, barriers and likelihood of success from any therapy.



Goals of therapy

The amount and rate of weight loss from a therapeutic intervention needs to be carefully determined and understood. The desires and expectations of patients (and, in some cases, of health professionals) are often unrealistic. Equally, the amount of weight loss required to achieve substantial health benefits is often overestimated. A loss of about 5-10% of initial weight is usually sufficient to produce metabolic benefits. Specific age related goals should be considered for children, gestational weight gain and weight loss/weight maintenance. For morbidly obese women the change in fertility status should be considered and communicated to the patient.

With any weight loss intervention, the rate of weight loss slows or plateaus with time. Prevention of weight regain and weight maintenance are essential priorities for ongoing care. Several studies have demonstrated that weight regain is common after most initial weight loss interventions and continuing gradual weight loss and prevention of weight regain requires substantial behavioural change and lifestyle modification with on-going re-enforcement and motivation.⁴⁰⁻⁴² All interventions need to consider additional health improvements, particularly in respect to cardiovascular risk factors (such as cholesterol, blood pressure, diabetes, sleep apnoea and smoking) and other co-morbidities.

Therapeutic approaches

There is no single effective treatment for long-term weight loss that is applicable to all morbidly obese individuals. Adopting a healthy lifestyle underlies all currently effective treatments and has health benefits beyond just weight loss. For example making healthy lifestyle choices plays a role in maintaining active participation in life and work as this impact on the ability of the individual to continue to move around at home, work, school and within the community. Such an approach should be encouraged and re-enforced at all points in a morbidly obese individual's treatment plan.¹⁹ Specific therapeutic interventions require careful individual assessment and consideration. Prevention of further weight gain, as opposed to weight loss, may be an appropriate course of action in some circumstances, for example the elderly. Equally, the dynamic nature of individual weight and weight determinants need to be considered when planning an individualised intervention

Dietary therapy and physical exercise

Accredited Practising Dietitians (APDs) and Registered or Accredited Exercise Practitioners (AEPs) are considered the highest qualified health professionals able to design and deliver exercise and nutrition interventions respectively. Exercise physiology and dietetic services should be a component in the management of morbid obesity in collaboration with other medical and allied health professionals. In particular, collaboration should occur between APDs and AEPs to enhance patient outcomes. This is particularly well illustrated by the model provided within the *Joint Position Statement of the Australian Association for Exercise and Sport Science and Dietitians Association of Australia*.⁴³

APDs have the knowledge, skills and ability to provide expert nutrition and dietary advice. APDs design and deliver Medical Nutrition Therapy, which is an important aspect in the prevention and treatment of morbid obesity. Medical Nutrition Therapy facilitates self-management through nutrition, diet and other lifestyle changes to



produce long-term behaviour change. APDs provide nutrition assessment, dietary advice, knowledge and skill development as well as behavioural counselling. The advice and counselling provided by APDs is within the context of the patients' readiness to change, goals, skills, knowledge and access to resources. Management plans should be clearly agreed upon and delivered in the context of a multidisciplinary team approach. Patient outcomes should be monitored utilising a database.⁴³

A reduction in total energy intake remains the basic mechanism whereby all dietary weight loss occurs. Low-fat ad libitum diets are associated with long-term weight loss. Other dietary approaches including very low calorie diets and meal replacement programmes have been associated with short-term weight loss and should be considered within the context of the individuals' circumstances and other combined therapeutic approaches.

AEPs provide physical exercise advice as a strategy for disease prevention and treatment of morbid obesity. They develop appropriate exercise interventions tailored to patient's state of readiness to change, physical abilities, goals, individual level of knowledge, skills and access to resources. AEP services involve individualised assessment, exercise advice, prescription, behavioural change counselling and support. The initial planning of programs by AEPs considers patients overall health status, especially for exercise regimes. Strategies should be developed in partnership with the patient to promote and assist a regular and sustained physical activity program. Interventions developed by AEP rarely involve physical activity alone, thus they work within a multidisciplinary team. All exercise programs must be safe, individualised and sustainable to maximise calorie burning to produce optimal long term weight loss and associated health benefits. Exercise programs should be able to be carried out in facilities that cater for the specific needs of the morbidly obese in terms of the environment and equipment. This provides the room to move in a safe environment, which in term promotes the desire to exercise.⁴³

Cognitive behavioural therapy

Cognitive behavioural therapy is focussed on the understanding and modification of behaviours associated with eating, physical activity and thinking habits. Cognitive behavioural therapy aims to promote healthy lifestyle changes, sustained motivation, stress management, and prevention of weight regain. Additional counselling and behaviour modification techniques may be required for some morbidly obese individuals. In children, this approach requires the parent/s or the whole family need to be involved. Behavioural therapies with other therapeutic interventions, are associated with better long-term compliance, sustainable weight loss, improved psychological functioning and reduced relapse¹⁹.

Pharmacotherapy

Several weight loss pharmacological agents are currently available. These agents should only be used when conventional approaches to diet and lifestyle modification have already been considered. They should only be used in the presence of a multidisciplinary approach to weight loss, which includes lifestyle modification. The safety of prolonged use of weight loss drugs is unclear and these agents are



generally only for short-term use only. Most of these agents are not licensed for use in children.

Design, location and integration of services

Traditionally, morbidly obese patients are seen in specialist obesity clinics, which have been located within tertiary hospitals and provide a limited range of services from very specific disciplines. To improve access to a range of services specifically for morbid obesity, multidisciplinary clinics should be in a location more accessible to more of the community.

For successful management of morbid obesity, including the prevention and management of associated co-morbidities, the condition needs to be viewed as a chronic disease that requires long-term, co-ordinated, integrated multi-faceted, multi-disciplinary and multi-level care. This care needs to focus not only on the individual, but also on their support structure, including family, social and community networks. At present, there are numerous individual, group, community and population based programmes involved with the prevention and management of overweight and obesity. This model of care for the management of morbid obesity needs to integrate with these various programmes as well as providing its own specific approaches to address the unique challenges of morbid obesity.

The multidisciplinary team approach should include multidisciplinary clinics in secondary metropolitan hospitals, regional hospitals and/or the utilisation of the multidisciplinary environment of GP Super Clinics. For example this approach would include expert input from specialist physicians and general practitioners (GPs), allied health professionals, psychologists, nurses and surgeons. Information and/or services would include assessment, goal setting, motivation, combined lifestyle therapies, referral, and patient review and follow up. These teams should be supported by comprehensive guidelines and associated highly complex individual case management processes, training and education, as well as opportunities to pilot advanced therapies and conduct research.

Rural and remote outreach

Poor or no access to medical services is an issue in rural and remote regions. It has been suggested by expert opinion that visiting multidisciplinary teams could address this issue. Similarly, visiting multidisciplinary teams may alleviate issues that arise when transporting morbidly obese people to the metropolitan area for treatment.

The multidisciplinary teams would provide education, training, monitoring and management. However, implementing visiting multidisciplinary teams only addresses the issue of access to specialised medical services, one of many issues impacting on rural and remote communities. Other significant issues include cost, supply and access to fresh fruit and vegetables, vital in prevention and management of morbid obesity. Similarly, access to bariatric equipment should be improved for use where preventative measures have failed.

Aboriginal and Torre Strait Islanders

Engagement with Indigenous Australians will require multidisciplinary teams with Aboriginal Health Workers, the Aboriginal Medical Service and/or liaison groups to ensure services involve communities and are culturally appropriate (Refer to Appendix C for Aboriginal Health Impact Statement).



Dietetic information needs to be updated so it is consistent with ethnic/CALD requirements.

Paediatric/adolescent management of morbid obesity

Childhood is potentially the most treatable point in the management of obesity. Therefore services and health promotion approaches in general practice should focus on appropriate educational and behavioural management strategies for children and adolescents.

Regarding child and adolescent morbid obesity, a weight loss camp has been trialled in the United Kingdom. This camp combined dietary restriction, physical activity and behaviour modification, which was successful.⁴⁴ Furthermore, eight-week summer camps in the USA, which are apart of traditional summer holidays, have produced significant decreases in BMI and overall body fat in participants. Outcome evaluation after one year showed BMI remained significantly lower compares to initial assessment before camps. Continued weight management was reported without organised support for participates. Two and four week weight loss courses are being traileed in the eastern states of Australia during the 2008-09 summer holidays. Promotional material suggests participants should expect to lose an average of 2 kg a week, and continue to lose weight after returning home.⁴⁵ Therefore, there is a need to maintain a flexible approach to weight loss strategies, especially in paediatrics and adolescents. All initiatives are required to be rigorously trialled and evaluated to ensure evidence based programs are being implemented.

Increased physical activity is a key component of any lifestyle management model, however has specific issues for children. For instance, many gyms are not prepared to take children, don't have appropriate equipment, and lack expertise in supervision and appropriate management. Incidental activity is a big component of children's energy output; therefore health promotion approaches should emphasise the need to reduce sedentary behaviour. Local councils need to take ownership for providing an environment that encourages healthy and active lifestyles. Safety is a major environmental factor reported by parents, which prevents many parents from allowing their children to play within local neighbourhoods.⁴⁶

Poor psychosocial functioning of obese and particularly morbidly obese children and adolescents requires specific intervention, as part of cognitive behavioural training. A specific focus should be on building self-esteem and coping with bullying in social settings.

Interventions for morbidly obese children and adolescents need to be developmentally appropriate. Parents of preadolescents need to be an integral part of all interventions. Furthermore, considerable behavioural changes for the whole family may need to be considered. Adolescents in many cases need programs targeted at the adolescent alone and a parallel support program for parents and/or extended family. Parents of morbidly obese children frequently carry significant guilt, and have struggled to find the momentum to initiate change. This issue needs to be handled sensitively to ensure ongoing consultation occurs. Those working with children and adolescents need to be committed to and persistent with patient follow-up, as non-attendance does occur frequently.



Special considerations

Adolescent females classified as obese become obese obstetric patients with associated risks. Thus a critical prevention opportunity exists at this time in a female's life span.

Assessments for co-morbidities such as sleep apnoea are only available in tertiary institutions in WA for children and waiting lists are considerable. Therefore, this is an issue that requires attention.

Training is required to successfully manage paediatric patients. Educational resources, teaching tools, and methods need to be tailored to an age appropriate and developmentally appropriate level.

Many health professionals lack confidence to raise the issue of weight with their patients. For example many GPs in WA indicated they don't feel comfortable raising the issue of weight with adolescents. Furthermore, many GPs don't feel confident with the medical assessment required to determine co-morbidities in children.⁴⁷ State wide strategies need to be developed and implemented to manage this issue.

Maternity

Specific maternity care is required for morbidly obese women with particular emphasis on the value of preconception health.

Preconception and periconception issues

Morbidly obese women within the range of reproductive years require assessment and advice regarding fertility and the risks associated with pregnancy and birthing.³⁸ Information regarding pregnancy risks should be clearly explained and delivered with sensitivity. Weight loss before pregnancy is recommended. Weight loss of up to 10% of body weight may result in successful conception.³⁸ However it may also result in unplanned premature pregnancy. Therefore, anticipatory guidance should be given to women regarding contraception and appropriate supplementation of Folate.

Physician review is recommended to determine undiagnosed co-morbidities, such as type 2 diabetes, and medications incompatible with pregnancy.

In general the relative risk of stillbirth or birth defects is high for morbidly obese women.^{48, 49}

Cases where previous poor obstetric outcomes have occurred may require appropriate counselling. The index pregnancy may require medical and obstetric management from early pregnancy.

Chronic dieting, fad diets of poor nutritional value and the effects of bariatric surgery on nutrient intake may result in poor nutritional status in morbidly obese women. Referral to a dietician for assessment and appropriate supplementation is recommended for pregnant women who have had bariatric surgery.

Gestational weight gain

Lower gestational weight gain is associated with reduced risk of gestational diabetes, reduced episodes of risks associated with caesarean section and induction of labour⁵⁰. Early referral to dietetic services or a maternal obesity program is recommended for morbidly obese women. Programs and interventions



need to be evaluated for their effect on maternal and infant outcomes. A positive association between gestational weight gain and the risk of offspring being overweight has been shown in a couple of studies.^{51, 52} More research is needed in this area.

Post natal

There is a lower prevalence of initiation and successful maintenance of breastfeeding among morbidly obese women⁵³. Interventions to improve the rate of successful breastfeeding among morbidly obese women have not been researched.

Establishment of links with child health services such as Meerlinga Early Childhood Centre, Family Focus Australia⁵⁴ and community dieticians is required to prevent obesity in the children of morbidly obese parents.

Issues in pregnancy related to previous bariatric surgery

Women who have had bariatric surgery, which induces malabsorption, should have their nutritional status assessed and nutrient deficiencies corrected with appropriate supplementation for pregnancy. Women with gastric banding may require adjustment of the band for morning sickness or heartburn and to allow dietary changes to meet increased nutrient requirements of pregnancy and lactation. There is an increased risk of nutrient deficiencies for mothers and infants if the quality and quantity of diet does not change during pregnancy.

Maternity multidisciplinary care plan and management

Morbidly obese women with a BMI $>40\text{kg/m}^2$ are almost universally referred to the tertiary obstetric centre (Women's & Newborn Health Service/King Edward Memorial Hospital) and may be placed in a Complex Care case category for multidisciplinary care plan and management. Therefore, the tertiary obstetric centre should have a:

- Policy for bariatric equipment and Occupation Health and Safety risk management such as manual handling
- Facility for foetal scanning and anaesthesia, including epidural
- Governance framework for shared care with secondary obstetric services and physicians allowing for delivery at tertiary centres

Therapeutic approaches in maternity care

Women require sensitive but factual information about risks associated with obesity and the benefits of weight management during preconception and during pregnancy. Consideration should be given to barriers of living a healthy lifestyle and interventions that have a long-term family focus.

Aged care

The elderly are often overlooked but are at great risk of weight gain due to decreased activity later in life. This decreased activity can be attributed to social isolation and co-morbidities such as arthritis, cardiac disease and respiratory disease. These factors need to be taken into consideration when developing a care plan to prevent or manage morbid obesity.



Recommendation 1.0

Develop and support a multidisciplinary team approach. This includes multidisciplinary clinics in metropolitan hospitals, regional hospitals and/or the utilisation of the multidisciplinary environment of the GP Super Clinics.

Recommendation 1.1

These teams should be supported by comprehensive guidelines and associated highly complex individual case management processes, training and education, as well as opportunities to pilot advanced therapies and conduct research.

Recommendation 2

Health promotion and prevention strategies should be integrated across health, education and community development government agencies.

2.2 The role of General Practice in the care of the morbidly obese

Primary prevention

Morbid obesity is the direct outcome of obesity, which has not been managed or where management approaches has not been successful. Therefore, for the purpose of this discussion primary prevention of morbid obesity is described as the prevention of the progression from obesity to morbid obesity. Currently the majority of overweight and obesity management is carried out in primary care by GPs. A ten-step guides for GPs has been developed by the National Health and Medical Research Council (NHMRC) to aid GPs in the management of overweight and obesity in adult as well as children and adolescents.¹⁹ This opportunistic approach in primary care includes identifying overweight or obesity patients, assessing and treating co-morbidities, determining causes, developing treatment plans (prescribe or referral advise/medication), patient reviews and regular assessments.¹⁹ This guide considers the *stages of change theory*⁵⁵. Therefore, the patient's level of willingness to change determines the approach GPs adopt.

Secondary prevention

The Royal Australian College of General Practitioners (RACGP) has also produced a document regarding overweight and obesity management. Management is outlined in relation to BMI classifications, ethnicity and related co-morbidities. A multi-disciplinary approach is outlined for each BMI classifications with dietary and exercise advice in addition to medication or surgery options for obese patients.⁵⁶ Moderate weight loss (approximately 5-10% of total weight) is often achievable in General Practice with the above conservative treatment in the setting of regular counselling and medical review. According to the NHMRC this proportion of weight loss is sufficient to achieve clinically relevant health benefits.¹⁹

The Enhanced Primary Care Program allows GPs to access Medicare rebates to manage the health care of patients with chronic medical conditions.⁵⁷ However, morbid obesity is not listed as a chronic disease Medicare item within the program, meaning patients are unable to access Medicare support for multidisciplinary care.



By adding morbid obesity as a chronic disease Medicare item GPs will be supported in the provision of more appropriate community based care.

Multidisciplinary support should be readily accessible to primary care physicians/GPs, the principal source of initial assessment of morbid obesity and subsequent referral. Primary care physicians/GPs with specific interest/expertise in morbid obesity should also have access to training, support for on-going medical assessment, management of co-morbidities/risks, pharmaco-therapy, to co-ordinate referral, patient review and to give advice where appropriate. The use of e-health should be considered to ensure provision of these services to rural and remote regions.

Tertiary prevention

Currently, according to the NHMRC General Practice guide, the ninth step for the management of overweight and obesity in adults, outlines referral for surgery.¹⁹ This referral decision and process should include support and on going input from a multidisciplinary team approach.⁵⁸

Recommendation 3

Support networks of peak bodies linked to morbid obesity to develop strategies with the Australian Government that give morbid obesity the same priority as other recognised chronic conditions such as diabetes and heart disease.

2.3 Surgical interventions for treatment

The availability and delivery of bariatric surgery in the public health system in Australia is inconsistent. This is mirrored in the Western Australian public health service. One to two years after surgery, morbidly obese patients can lose 16-43% (22-63 kg) of body weight, which can be maintained with a supervised weight management plan.¹⁹ Surgery on morbidly obese patients should only be conducted where appropriate back up support and transport is available if complications occur. Therefore, surgery in rural areas should be restricted to regional centres where appropriate support systems have been developed.

A range of surgical guidelines are currently available for the treatment of the morbidly obese. The Obesity Surgery Society of Australia and New Zealand provide a selection criteria for bariatric surgery.⁵⁹ Area Health Services currently have policy guidelines on all surgical procedures for the morbidly obese.⁶⁰ The issue with these guidelines is that they vary across WA, along with facilities. There needs to be coordinated or integrated approach towards adopting available guidelines. Therefore, surgical guidelines for the morbidly obese should be consistent across WA and widely distributed.

In summary there are two basic types of bariatric procedures, the *restrictive* and the *malabsorptive* procedures.

The restrictive operations include:

- Adjustable gastric band
- Sleeve gastrectomy
- Roux en Y gastric bypass (hybrid procedure)
- Vertical Banded Gastroplasty (historical interest only)



- Magenstrasse and Mill (historical interest only)
- Intra gastric Balloon (BIB, Heliosphere systems)
- Per Cutaneous Intra gastric balloon
- Endoscopic Transoral Gastroplasty

The malabsorptive operations include:

- Biliopancreatic Diversion
- Biliopancreatic Diversion with Duodenal Switch

Restrictive procedures

The *adjustable gastric band* is now routinely placed laparoscopically (LAGB) and is the most common anti obesity (morbid obesity) operation employed in Australia.⁶¹ Accordingly in the Australian context, this procedure is currently considered the *gold standard* against which other surgical interventions are compared. LAGB results in dietary restriction due to the creation of a small stomach pouch, meaning patients feel satisfied after eating a small meal. Importantly, there is no associated malabsorption. The degree to which dietary intake is reduced, *restriction*, can be adjusted. Weight loss reported after *adjustable gastric band* surgery has been reported to be greater than dietary, medical, behavioural or combined approaches.⁵⁸ The *adjustable gastric band* should remain the 'preferred' procedure for anti obesity (morbid obesity) surgery in WA. This procedure should be conducted by surgeons with specialist training and access to quality perioperative support services.

The *sleeve gastrectomy* is routinely performed laparoscopically (LSG) and is the second most popular anti obesity (morbid obesity) operation in WA. The *sleeve gastrectomy* should not be offered as a 'preferred' procedure in WA on the basis of current outcomes data.⁶² However this procedure will have specific clinical indications that deem it suitable for some patients. Surgeons should be trained in advanced laparoscopic procedures and have access to quality peri-operative support.

The *intra gastric balloon* has been employed for over a decade and is used for short-term (up to 6 months) weight loss usually prior to more definitive surgery. Being an endoscopic procedure the majority of morbidly obese patients can be treated as day cases or 23-hour stay patients. Therefore to obtain long term results (two years) one year balloon treatment and one year balloon-free follow-up is recommended.⁶³ According to studies approximately 50% of patients maintain a at least 10% of weight loss after the procedure.^{63, 64} *Intra gastric balloons* should only to be used in specific cases where other means of weight reduction prior to surgery have failed. Furthermore this should only be used for those cases where BMI is very high and significant preoperative weight loss is deemed essential. The *Percutaneous intra gastric balloon* procedure is a recent development and is currently being trialled. The weight loss rate is currently not known.⁶⁵ Nonetheless opportunities to conduct ethically approved trials should be maximised in order to explore best therapeutic outcomes for patients.

The *Endoscopic Transoral Gastroplasty* was only mentioned for the first time in late 2006. It is very much a trial procedure but has been shown to be technically feasible. The role is yet to be fully established but the USA recommends use for redo procedures in individuals who have dilated proximal pouches from such operations as Roux en Y gastric bypass.



The *Roux en Y gastric bypass* is generally carried out laparoscopically and is probably the third most common procedure in Australia for the treatment of obesity. It involves a longer in patient stay of five to seven days and should only be carried out in highly specialised units.

The malabsorptive procedures

The *malabsorptive procedures* require a high degree of training and skill to perform laparoscopically and consequently have higher complication rates. These procedures do have a greater overall weight loss profile. However this is at the expense of vitamin deficiencies, protein malnutrition, anaemia, gall stone formation, ulceration and osteoporosis and in some cases liver cirrhosis and death. The postoperative death rate is up to 2% and the medium to long-term death rate is greater than 5%. If the rationale for performing anti obesity (morbid obesity) procedures is to improve the quality of life, reduce complications and increase life expectancy then on the basis of side effects and mortality *malabsorptive procedures* should almost be considered obsolete.

Recommendation 4

All gastric surgery should be performed by an appropriately credentialed surgeon with access to specialised accredited peri-operative support.

Recommendation 4.1

Promote state wide implementation of surgical guidelines, endorsed by credentialed professional bodies, for the treatment of the morbidly obese.

Operative and comprehensive management integration

A multidisciplinary team should contribute to the decision-making process involving surgery. This team should develop individualised management plans for pre and post surgery consultation. A state wide patient register of morbidly obese patients that seek treatment within the public health system of WA should be established. It would enable multidisciplinary teams to coordinate high quality individual care and monitor the success of long-term care across state wide services. This in turn would inform the development of evidence based guidelines and promote best practice.

Recommendation 5

Development of a state wide database, with agreed fields that are compatible with a national database. This database would be utilised to promote integration of services, monitor key performance indicators for bench marking, model future initiatives and inform research.

2.4 Health care services equipment and facility issues/initiatives

Morbid obesity presents a challenge to health care services, as providing a safe environment for patients and staff is paramount.

The WA Equal Opportunity Act (1984) protects individuals from discrimination including those with physical impairment limiting their capacity to complete activities.⁶⁶ Under this legislation it is therefore essential that health services ensure



the availability of appropriate facilities and equipment to accommodate the morbidly obese.

The following points outline improvements in facilities and equipment provision required to improve services for the morbidly obese and ensure the safety of morbidly obese patients as well as health care staff.

- Australasian Health Facilities Guidelines recommend “One bed room –special” accessible for the management of bariatric patients, which has implications for site redevelopments and new construction.⁶⁷ Hospitals that regularly provide services to morbidly obese patients should have a minimum of one allocated room that can accommodate a bariatric patient with basic equipment of appropriate calibre. This includes a variety of patient care and handling facilities such as equipment to weigh patients up to at least 250kg, larger BP cuffs, wider/stronger wheelchairs, hoists, beds, toilets, chairs and gowns.
- Assessment of equipment in relation to the patient's physical environment requirements by Occupational Therapists is important for morbidly obese patients. This assessment will then guide the design and modification of equipment for individual morbidly obese patients.
- Hospital/Health service policy formation addressing patient needs, and minimising manual handling risks to staff.
- Develop protocols and guidelines for the use of various methods to predict/assess the patient's weight for example WHR. This measurement tool would determine whether a patient can be transported and identify the most suitable means of transport based on available equipment to service providers.
- Implementation of a standardised assessment or auditing tool to determine current demand for bariatric equipment.
- Establishment of a human resources and equipment database within health regions would promote information sharing between health services and increase accessibility to appropriate equipment with adequate (>120kg) safe working limits. This strategy will facilitate the capacity of secondary and regional hospitals to accept patients for rehabilitation or on going post acute care. Information sharing capacity further supports the implementation of care management guidelines to assist in the continuum of care.
- Service linkage, for example teleconferencing to allow improved education and resource sharing of human resources.
- Promote the collection of data on morbid obesity at a national level by the Australian Bureau Statistics (ABS) and/or similar data collators.

Recommendation 6

Hospital/Health service policy should include specialised services and facilities to manage morbid obesity in a dignified manner.

Transport

There are established aviation standards for restraint to which Royal Flying Doctors Service equipment is designed and certified. The difficulty in transporting morbidly obese patients is width for manoeuvrability inside the aircraft and weight for transfer



into the aircraft. Similar issues affect other state wide patient transport services such as St John Ambulance Services.

A consistent state wide approach to the way morbidly obese patients are transferred from one site to another should be developed. Issues impacting on patient transport are based around lack of appropriate equipment to safely transfer patients. For example a stretcher loading system is required to transfer morbidly obese patients into aircrafts. To minimise manual handling stretchers and loading systems should be compatible with those used in hospitals and by other transport services such as St John Ambulance Services.

Recommendations 7

Develop guidelines for transport management, which will include:

- A bariatric assessment tool
- Identification and specifications for appropriate equipment
- Patient transfer processes



3.0 Costs of Morbid Obesity

Tangible costs

Tangible costs of morbid obesity for WA are not available; therefore national costs associated with obesity are outlined. The total financial cost of obesity was estimated to be \$3.77 billion for Australia in 2005. These costs can be spilt up into loss of productivity (43%), health system costs (23%), carer costs (21%), taxation and welfare costs (10%), and other costs (1%).⁶⁸ If the personal net costs of loss of wellbeing were also taken into account, another \$17.2 billion can be added, bringing the total estimated cost of obesity to \$21 billion.^{68, 69} The cost to WA based on population share is estimated to have totalled \$2 billion in 2005, including \$88 million to the health system and \$170 million to industry.⁶⁸

The prevalence of co-morbidities associated with morbid obesity can also lead to substantial medical expenses for the individual. Although figures of medical costs for morbid obesity in WA are not currently available, a study in the USA found that morbidly obese individuals spend twice as much as non-obese on medical services.⁷⁰

Intangible costs

Intangible costs of morbid obesity include disability, loss of wellbeing and premature death due to morbid obesity and related diseases/conditions, known as Burden of Disease. No data currently identifies the Burden of Disease caused by morbid obesity. However, 8.6% of the Burden of Disease in Australia can be directly attributed to overweight and obesity, recently surpassing tobacco smoking as the leading preventable cause of disease in the nation.⁷¹ A further 21.5% of disease burden can be attributed to determinants closely related to morbid obesity, including high blood pressure (7.3%), physical inactivity (6.7%), high blood cholesterol (6.1%), and lack of fruit and vegetable consumption (1.4%).⁷¹

Cost effectiveness of bariatric surgery

Services should be provided on the basis of cost benefits for the intervention, not savings to health alone. Co-morbidities associated with morbid obesity have a significant and increasing economic burden.⁷² Sustainable weight loss is linked to the prevention and disappearance of morbid obesity related comorbidities.⁷³⁻⁷⁵ However, studies have found conservative methods of long term weight loss including diet, exercise, medications and behavioral therapy have nearly a 100% failure rate.⁷⁶ In contrast, surgery can produce long-term weight loss and maintenance in most patients. Therefore surgery reduces the burden of morbid obesity related co-morbidities.⁷³⁻⁷⁵ Some insurance and government agents have questioned the cost effectiveness of bariatric surgery. However, a number of studies have found in relation to hospital, pharmaceutical and physician costs, bariatric surgery is a cost-saving procedure to healthcare and governmental agencies after the first few years of surgery.⁷⁷⁻⁷⁹

Furthermore, sustainable weight loss leads onto pharmaceutical saving from the decreased severity and prevention of co-morbidities, improved psychological health, financial status, life expectancy, employability, productively at work and a decrease in medical claims as well as absenteeism.^{74, 79-81}



Glossary

ABS	Australian Bureau of Statistics
APD	Accredited Practising Dieticians
AEP	Accredited Exercise Practitioners
BMI	Body Mass Index
CALD	Culturally and Linguistically Diverse
Cm	Centimetres
DoHWA	Department of Health of Western Australia
GP	General Practitioner
NH	Health Network
LAGB	Laparoscopic Adjustable Gastric Band
LSG	Laparoscopic Sleeve Gastrectomy
NHMRC	National Health and Medical Research Council
kg/m ²	Square of the height in metres
USA	United States of America
WC	Waist circumference
WHR	Waist to Height Ratio
WA	Western Australia



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Appendices

Appendix A: Reference group members

Development of dietetic care for patients	
Name	Title
Jeff Hamdorf	Clinical Lead, Chairperson, Surgeon
Krystyna Creighton	Deputy HoD, Nutrition and Diet Therapy
Bianca Mazur	Clinical Dietician
Laura Marie Kiely	Senior Dietician

Comprehensive primary care strategies for the management of morbid obesity	
Name	Title
Joey Kaye	Chairperson, Endocrinologist
Jo Beer	Nutritionist, Director, Diabetes Educator
Cassie Booth	Senior Occupational Therapist
Linley Boulden	Senior Dietician
Krystyna Creighton	Deputy HoD, Nutrition and Diet Therapy
Liz Davis	Paediatric Endocrinologist
Catherine Hunt	Physiotherapist
Iren Hunyadi	Consumer Representation
Kylie Johnston	Physiotherapy Research Coordinator
Colleen O'Brien-Malone	Senior Occupational Therapist
Jane Pearce ¹	Senior Dietician
Steve Pratt	Nutrition and Physical Activity Coordinator, Cancer Council WA
Richard Prince	Endocrinologist
Anne Rae	A/Director of Allied Health
Jayne Senior	Project Manager Ambulatory Care



Surgical interventions for treatment	
Name	Title
Alan Thomas	Chairperson, Upper GI/HPB Surgeon
Krishna Epari	Upper GI/HPB Surgeon
Harsha Chandraratna	Surgeon

The role of General Practice in the care of the morbidly obese	
Name	Title
Alistair Vickery	Chairperson, Bariatric Assessor
Jayne Senior	Project Manager Ambulatory Care
Susan Powe	Manager, Policy and Planning OAH

Health care services equipment facility issues/initiatives	
Name	Title
Fiona Enriken	Chairperson, Clinical Nurse Specialist
Anne Armanasco	Ergonomics Coordinator
Melanie Baker	Ergonomics Coordinator
Catherine Hunt	Physiotherapist
Stephen Langford	Medical Director
Desmond Martin	Senior Policy Officer
Alison Daly	Health Service Planner



Appendix B: WA Health and Wellbeing Surveillance System (HWSS)

1.0 Background

The WA Health & Wellbeing Surveillance System (HWSS) is a continuous data collection system, which began in March 2002 and was developed to monitor the health and wellbeing of Western Australians. People are asked questions on a range of indicators related to health and wellbeing, including chronic health conditions, lifestyle risk factors, protective factors and socio-demographics.

The HWSS is conducted as a Computer Assisted Telephone Interview (CATI). Households are selected from the 2004 Electronic White Pages¹ by a stratified random process. So while the information collected by the HWSS is representative of the Western Australian population as a whole, it may not be representative of small minority groups within the population, such as Aboriginal people. People requiring information about Aboriginal health are recommended to consult the results of the 2004 National Aboriginal Health survey², which would be more representative of that population.

Each year since the HWSS began response rates of over 75% have been obtained. A full explanation of the HWSS methodology is available in *Design and Methodology, Technical Paper No 1. May 2005*, from health.wa.gov.au/publications/pop_surveys.cfm.

The information in this report is presented as a prevalence of the population who are morbidly obese and was collected from adults aged 18 years and over during 2007. This information is based on self-reported data.

1.1 Weighting

The HWSS data have been weighted to compensate for over-sampling in rural and remote areas and then weighted to the age and sex distribution of the WA Estimated Resident Population.

1.2 Confidence intervals

The table presents the estimate of the prevalence along with the 95% confidence interval around that estimate. The 95% confidence interval is the range between which there is a 95% probability that the true estimate lies. Overlapping confidence intervals indicate that there is probably no difference in the estimates being compared.

¹ The 2004 EWP is the last publicly available version available. A new sampling frame is being developed for 2008 as the 2004 EWP is now very out-of-date.

² National Aboriginal and Torres Strait Islander Health Survey, Australia 2004-05, ABS Catalogue No 4715.0. [http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/B1BCF4E6DD320A0BCA25714C001822BC/\\$File/47150_2004-05.pdf](http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/B1BCF4E6DD320A0BCA25714C001822BC/$File/47150_2004-05.pdf)



2.0 Results

2.1 Morbid obesity

Respondents to the HWSS were asked to provide their height without shoes and their weight. A BMI was derived from these figures by dividing weight in kilograms by height in metres squared. A BMI of 40 or higher is classified as morbidly obese. Table 1 shows the prevalence of morbid obesity by health region.

- In 2007 1.4% of respondents aged 18 years and over in the state reported, measurements that classified them as morbidly obese.
- There were no regions with a significantly different prevalence of morbid obesity compared with the state.
- In 2007 over 20,000 adults aged 18 years and over were estimated to be morbidly obese.

Table 1. Prevalence of morbid obesity, adults aged 18 years and over, HWSS 2007

	Prevalence Estimate (%)		Estimated Pop'n (no.)
	%	95% CI	Persons
NMAHS	1.2	(0.5 · 2.9)	7943
SMAHS	1.6	(0.8 · 2.9)	8953
Kimberley	2.4	(1.2 · 4.8)	553
Pilbara	1.9	(1.2 · 3.1)	597
Midwest-Murchison-Gascoyne	1.3	(0.5 · 3.6)	581
Goldfields-South East	1.5	(0.6 · 3.7)	599
Wheatbelt	1.2	(0.6 · 2.5)	670
Great Southern	1.9	(0.9 · 4.0)	771
South West	1.0	(0.5 · 1.9)	1063
<i>Western Australia</i>	<i>1.4</i>	<i>(0.9 · 2.1)</i>	<i>21683</i>

This information is based on responses from 5880 adults aged 18 years and over within the state.

[^] Estimated population refers to the estimated number of morbidly obese people. It is derived by multiplying the Estimated Resident Population of the region by the prevalence estimate.



Appendix C: Aboriginal health impact statement

Model of Care for Morbid Obesity

1. Will this policy, program or strategy significantly affect the health of Aboriginal people? Yes

If so, how: The proposed recommendations will reduce the risk of overweight and obesity in Aboriginal people, and improve the management of morbid obesity in Aboriginal people.

2. Is this policy, program or strategy likely to lead to a change in the nature or level of resources of health services available for Aboriginal Health? Yes

If so, specify: The Model of Care for Morbid Obesity recommends a multidisciplinary team approach to the management of morbid obesity. This includes multidisciplinary clinics in secondary metropolitan hospitals, regional hospitals and/or the utilisation of the multidisciplinary environment of GP Super Clinics. Strategies have been identified to ensure care is culturally appropriate for Aboriginal people.

The development of transport management guidelines have also been recommended to increase access to medical services for the morbidly obese.

3. Have all items of the checklist been reviewed and answered? Yes

Statement

The health needs and interests of Aboriginal people have been considered, and where relevant, incorporated and appropriately addressed in the development of this health policy, program or strategy.

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Unit name: Health Policy and Clinical Reform Division



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